

TEXAS WATER COMMISSION

Joe D. Carter, Chairman
O. F. Dent, Commissioner
H. A. Beckwith, Commissioner

BULLETIN 6205

CHEMICAL COMPOSITION OF
TEXAS SURFACE WATERS, 1959

By

L. S. Hughes
and
Wanda Shelby
U. S. Geological Survey

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

April 1962

TABLE OF CONTENTS

	Page
INTRODUCTION.....	1
COOPERATION.....	1
COLLECTION AND ANALYSIS OF SAMPLES.....	2
Texas Water Commission-U. S. Geological Survey Sampling Program.....	2
International Boundary and Water Commission-U. S. Department of Agriculture Sampling Program.....	2
EXPRESSION OF RESULTS.....	3
SURFACE-WATER RUNOFF AND CHEMICAL-QUALITY CONDITIONS.....	4
Arkansas River Basin.....	4
Red River Basin.....	7
Sabine River Basin.....	7
Neches River Basin.....	7
Trinity River Basin.....	9
Brazos River Basin.....	9
Colorado River Basin.....	10
Guadalupe River Basin.....	11
Nueces River Basin.....	11
Rio Grande Basin.....	11
TABLES OF ANALYSES.....	17
Arkansas River Basin.....	19
Canadian River near Amarillo.....	19
Miscellaneous Analyses.....	20

TABLE OF CONTENTS (Cont'd.)

	Page
Red River Basin.....	21
Salt Fork Red River near Hedley.....	21
Little Wichita River near Henrietta.....	22
Little Wichita River near Ringgold.....	23
Red River near Gainesville.....	24
Red River at Denison Dam near Denison.....	26
South Sulphur River near Cooper.....	27
Miscellaneous Analyses.....	28
Sabine River Basin.....	33
Sabine River near Tatum.....	33
Sabine River near Ruliff.....	34
Miscellaneous Analyses.....	35
Neches River Basin.....	36
Angelina River near Lufkin.....	36
Neches River at Evadale.....	37
Miscellaneous Analyses.....	38
Trinity River Basin.....	39
Trinity River near Rosser.....	39
Richland Creek near Fairfield.....	40
Trinity River at Romayor.....	42
Trinity River near Moss Bluff.....	43
Old River near Cove.....	44
Trinity River at Anahuac.....	45
Trinity Bay at Mouth of Trinity River near Anahuac.....	46
Miscellaneous Analyses.....	48
San Jacinto River Basin.....	49
Miscellaneous Analyses.....	49

TABLE OF CONTENTS (Cont'd.)

	Page
Brazos River Basin.....	50
Double Mountain Fork Brazos River near Aspermont.....	50
Croton Creek near Jayton.....	51
Salt Flat Creek at Weir B near Aspermont.....	52
Salt Croton Creek at Weir C near Aspermont.....	53
Salt Croton Creek at Weir D near Aspermont.....	54
Haystack Creek near Aspermont.....	55
Salt Croton Creek near Aspermont.....	56
Salt Croton Creek at Mouth near Aspermont.....	57
Salt Fork Brazos River near Aspermont.....	58
Brazos River at Seymour.....	59
Hubbard Creek near Breckenridge.....	60
Salt Creek at Olney.....	61
Salt Creek near Newcastle.....	62
Brazos River at Possum Kingdom Dam near Graford.....	63
Brazos River at Whitney Dam near Whitney.....	64
Navasota River near Bryan.....	65
Brazos River at Richmond.....	66
Miscellaneous Analyses.....	67
San Bernard River Basin.....	72
Miscellaneous Analyses.....	72
Colorado River Basin.....	73
Colorado River near Ira.....	73
Colorado River at Colorado City.....	74
Beals Creek near Westbrook.....	75
Colorado River near Silver.....	77
Colorado River near San Saba.....	79

TABLE OF CONTENTS (Cont'd.)

	Page
Colorado River at Austin.....	80
Colorado River at Wharton.....	81
Miscellaneous Analyses.....	82
Lavaca River Basin.....	84
Miscellaneous Analyses.....	84
Guadalupe River Basin.....	85
Guadalupe River at Victoria.....	85
San Antonio River at Goliad.....	86
Miscellaneous Analyses.....	87
Mission River Basin.....	88
Miscellaneous Analyses.....	88
Aransas River Basin.....	88
Miscellaneous Analyses.....	88
Nueces River Basin.....	89
Nueces River near Mathis.....	89
Miscellaneous Analyses.....	90
Rio Grande Basin.....	91
Rio Grande near El Paso.....	91
Rio Grande below Old Fort Quitman.....	92
Rio Grande at Upper Presidio.....	93
Rio Grande near Johnson Ranch.....	94
Rio Grande at Langtry.....	95
Pecos River below Red Bluff Dam near Orla.....	96
Pecos River near Girvin.....	97
Pecos River near Shumla.....	98
Rio Grande at Laredo.....	99
Rio Grande below Falcon Dam.....	100

TABLE OF CONTENTS (Cont'd.)

	Page
Rio Grande at Fort Ringgold, Rio Grande City.....	101
Rio Grande at Anzalduas Dam.....	102
Miscellaneous Analyses.....	103

TABLE

1. Mean discharge and maximum, minimum and weighted average concentrations of dissolved solids for the 1959 water year for stations operated under the Texas Water Commission--U. S. Geological Survey sampling program.....	6
--	---

ILLUSTRATIONS

Figures

1. Mean discharge at selected stations for the 1958 and 1959 water years and for the period of record.....	5
2. Duration curves for dissolved solids for four selected stations, 1959 water year.....	8
3. Periods of operation of quality-of-water sampling stations in Texas.....	13

Plate

	Follows
1. Quality-of-water stations, water year 1959.....	Page 12

C H E M I C A L C O M P O S I T I O N O F
T E X A S S U R F A C E W A T E R S , 1 9 5 9

INTRODUCTION

This report contains data on the chemical quality of the surface waters of Texas in the water year 1959. 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 October 1, 1958, to September 30, 1959.

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, climatic conditions, and activities of man. 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 fourteenth in a series of annual reports covering surface waters of Texas prepared by the U. S. Geological Survey in cooperation with the Texas Water Commission (formerly 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. These reports may be obtained by writing the Texas Water Commission, Austin, Texas.

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

Analyses for the Red River near Gainesville were made by the Oklahoma City office of the U. S. Geological Survey, in cooperation with the Oklahoma Water Resources Board.

Records for ten 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, 1958, to September 30, 1959. Descriptive statements are given for each sampling station for which a regular series of chemical analyses have been made. These statements give 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 Water Commission-U. S. Geological Survey Sampling Program

During the period covered by this report samples were collected daily at 39 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 seven 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 31 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 52 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 seven sampling points on Salt Croton and Haystack Creeks are indicated as a single location (42) 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 10 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 3 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 29 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 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 sodium-adsorption ratio.

Sodium-adsorption ratio (SAR) 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 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 (CaCO₃).

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 deficient over much of Texas during the 1959 water year. Drought conditions beginning in West Texas in October 1958 had generally spread across the state by March 1959. Only in the area drained by the upper Brazos and Guadalupe Rivers was the runoff excessive. Mean discharges for selected stations for the 1958 and 1959 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 oil-field 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 1959 water year for those stations operated under the Texas Water Commission-U. S. Geological Survey sampling program.

Arkansas River Basin

Rainfall in the Arkansas River basin in Texas was below normal during the 1959 water year and runoff of the Canadian River near Amarillo was only about 40 percent of the 22-year average. Excessive runoff occurred only in the month of August, when the average discharge was 153 percent of the long-term monthly mean. During the remainder of the year, discharge ranged from 4 to 71 percent of the long-term monthly average.

The decrease in runoff was accompanied by an increase in the weighted average of dissolved-solids concentrations from 527 ppm in the 1958 water year to 649 ppm in 1959.

^{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.

MEAN DISCHARGE, IN CUBIC FEET PER SECOND

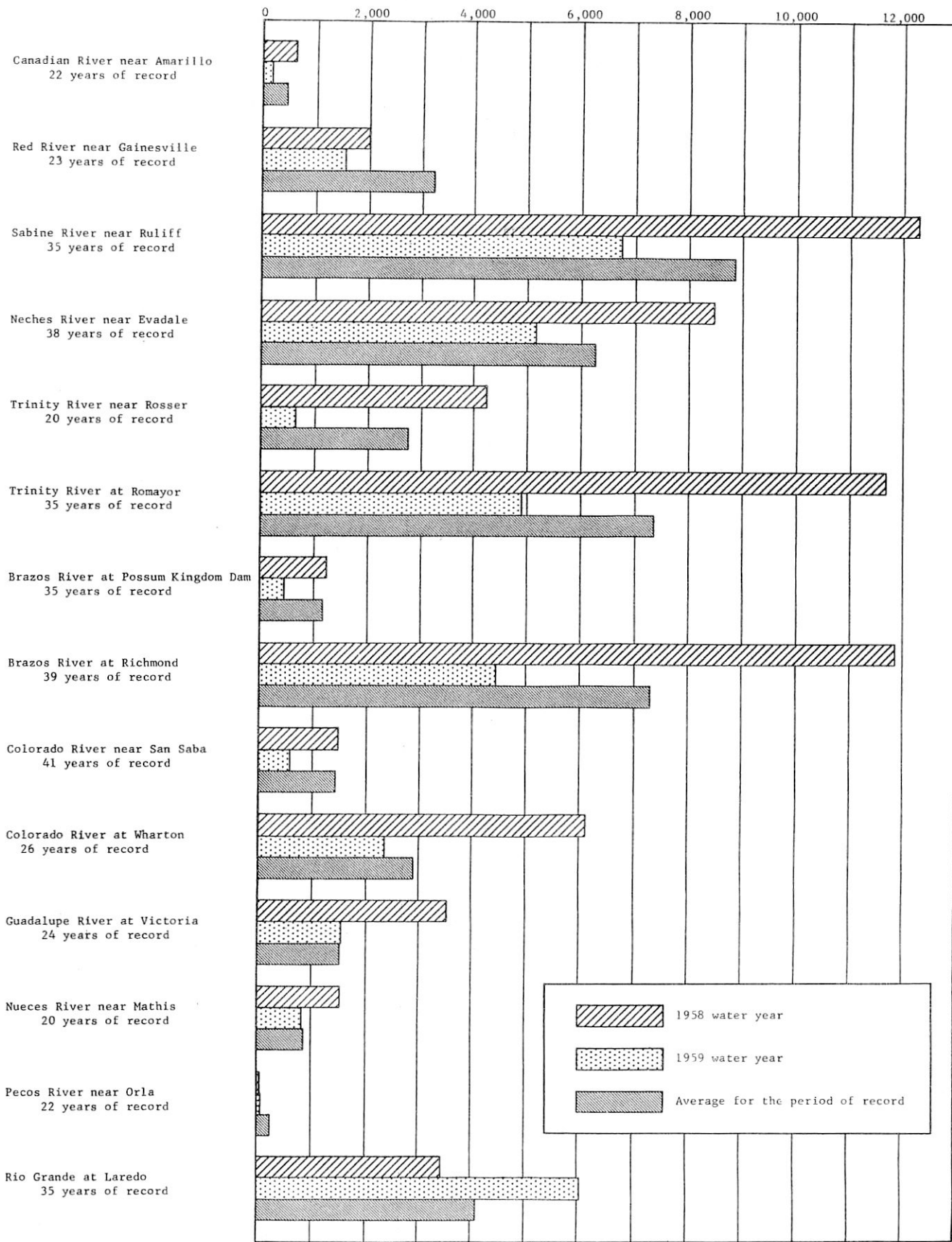


Figure 1.--Mean discharge at selected stations for the 1958 and 1959 water years and for the period of record.

Table 1.--Mean discharge and maximum, minimum, and weighted average concentrations of dissolved solids for the 1959 water year for stations operated under the Texas Water Commission--U. S. Geological Survey sampling program.

Sampling station	Mean discharge (cfs)	Dissolved solids (ppm)		
		Maximum	Minimum	Weighted average
<u>ARKANSAS RIVER BASIN</u>				
Canadian River near Amarillo	188	2,130	394	649
<u>RED RIVER BASIN</u>				
Salt Fork Red River near Hedley	--	1,810	563	--
Little Wichita River near Henrietta	44.8	1,430	63	218
Little Wichita River near Ringgold	--	2,810	38	151
Red River near Gainesville	1,534	4,690	472	1,640
Red River at Denison Dam near Denison	2,298	1,140	1,020	1,100
South Sulphur River near Cooper	91.2	452	125	167
<u>SABINE RIVER BASIN</u>				
Sabine River near Tatum	1,683	883	92	188
Sabine River near Ruliff	6,723	212	43	109
<u>NECHES RIVER BASIN</u>				
Angelina River near Lufkin	994	186	63	111
Neches River at Evadale	5,162	156	52	89
<u>TRINITY RIVER BASIN</u>				
Trinity River near Rosser	664	745	174	425
Richland Creek near Fairfield	--	4,260	140	--
Trinity River at Romayor	4,909	666	132	249
Trinity River near Moss Bluff	--	693	143	--
Old River near Cove	--	585	105	--
Trinity River at Anahuac	--	--	--	--
Trinity Bay near Anahuac	--	--	--	--
<u>BRAZOS RIVER BASIN</u>				
Double Mountain Fork Brazos River near Aspermont	219	4,840	715	999
Croton Creek near Jayton	--	--	--	--
Salt Fork Brazos River near Aspermont	126	99,200	2,130	5,020
Hubbard Creek near Breckenridge	47.9	2,420	143	325
Salt Creek at Olney	.36	3,670	101	463
Salt Creek near Newcastle	3.12	2,170	51	205
Brazos River at Possum Kingdom Dam near Grafard	458	1,370	996	1,130
Brazos River at Whitney Dam near Whitney	681	947	845	893
Navasota River near Bryan	529	928	72	226
Brazos River at Richmond	4,450	718	171	323
<u>COLORADO RIVER BASIN</u>				
Colorado River near Ira	2.59	39,100	255	4,990
Colorado River at Colorado City	20.2	19,000	385	2,010
Beals Creek near Westbrook	15.9	8,440	180	680
Colorado River near Silver	35.7	12,800	314	1,270
Colorado River near San Saba	593	818	220	315
Colorado River at Austin	1,631	287	221	249
Colorado River at Wharton	2,372	302	118	231
<u>GUADALUPE RIVER BASIN</u>				
Guadalupe River at Victoria	1,580	376	216	303
San Antonio River at Goliad	597	808	159	457
<u>NUECES RIVER BASIN</u>				
Nueces River near Mathis	829	362	237	274
<u>RIO GRANDE BASIN</u>				
Pecos River below Red Bluff Dam near Orla	a84.4	6,220	4,240	5,140
Pecos River near Girvin	26.1	--	--	--

a Discharge values adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Extremely low flow is maintained by drainage of sewage effluent down East Amarillo Creek from the Amarillo sewage disposal plant, and analyses often show nitrate concentrations in excess of 50 ppm.

Red River Basin

The water of the Red River upstream from Lake Texoma, except during flood periods, is of poor quality because of the presence of oil-field brines and drainage from natural deposits of salt and gypsum. At the Gainesville station just upstream from Lake Texoma, the weighted average of dissolved-solids concentrations for the 1959 water year, in spite of decreased runoff, was 1,640 ppm as compared with 1,950 ppm in the 1958 water year. In 1958 runoff was more evenly distributed throughout the entire year, with more time for the flow to come in contact with the rocks and soils, whereas in 1959 more than 75 percent of the runoff occurred in the three months, May to July. The effect was to bring about a lower weighted average of dissolved-solids concentrations in 1959.

Below Lake Texoma, the water is of better quality. At Denison Dam, the dissolved-solids concentrations increased slowly from a minimum of 1,020 ppm in October to a maximum of 1,140 ppm in September.

Two new sampling stations were established in the Red River basin in the 1959 water year. They were Little Wichita River near Ringgold and South Sulphur River near Cooper. A station on the Little Wichita near Henrietta, previously operated from December 1952 to January 1956, was re-established.

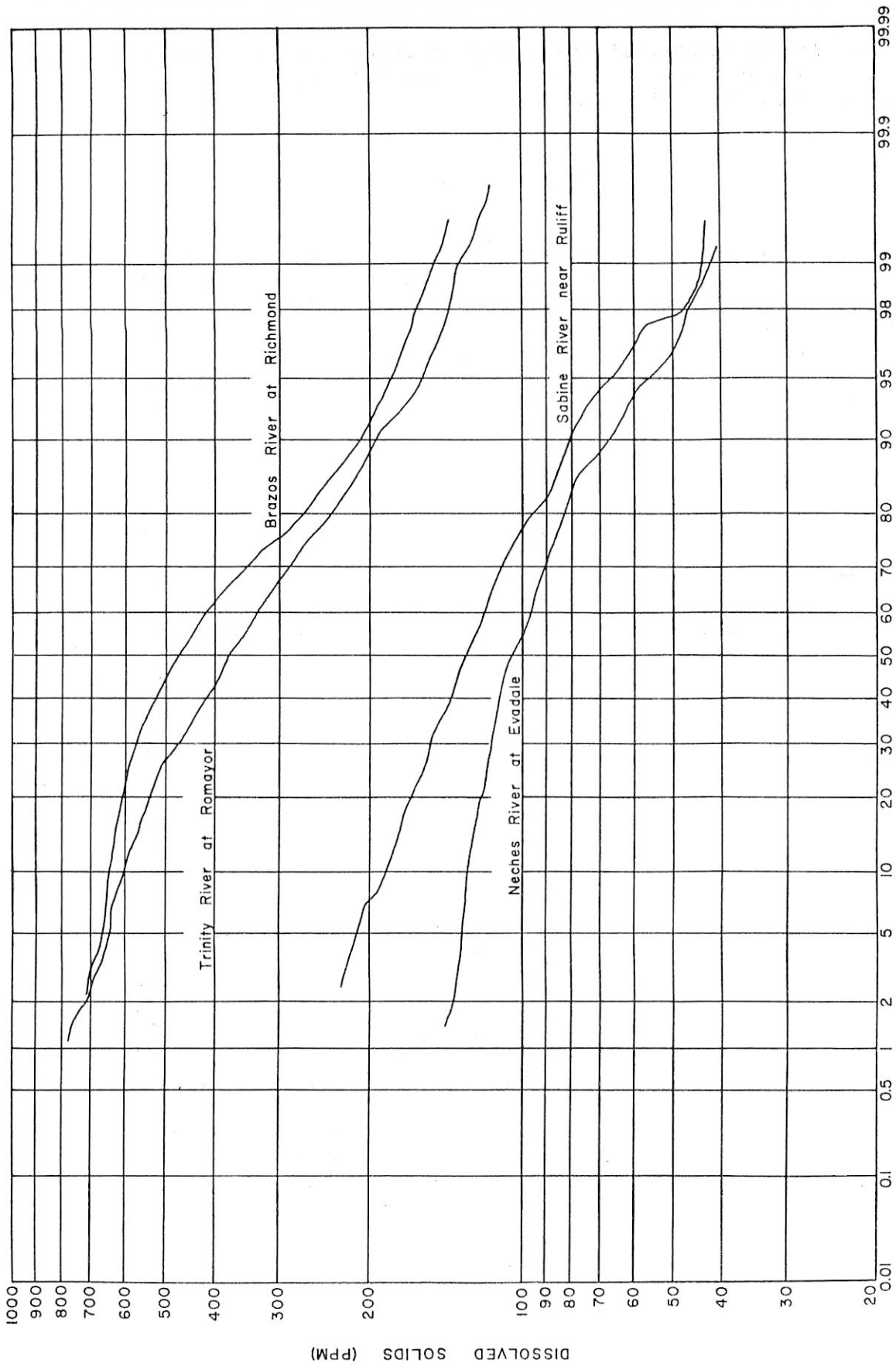
The Cooper station shows water of good quality, with a range of dissolved-solids concentrations from 125 ppm to 452 ppm and a weighted average of 167 ppm.

Sabine River Basin

The Sabine River drains an area of high rainfall in East Texas and Western Louisiana. The water, except where polluted by oil-field or other industrial wastes, is almost always low in dissolved solids although often high in organic color and turbidity. Runoff at the Tatum station during 1959 was about 60 percent of the 20-year average. Excessive flooding occurred in May in the upper part of the basin as a result of spring rains. At the downstream station near Ruliff, runoff was about 75 percent of the 35-year average. The weighted average of dissolved-solids concentrations was 188 ppm at the Tatum station and 109 ppm at the Ruliff station. 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 1959 water year. (See Figure 2.) The curve shows that 200 ppm of dissolved solids was exceeded only 8 percent of the time.

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. At the Evadale station, the streamflow was a record high for October as a result of September rains,



PERCENTAGE OF TIME THAT DISSOLVED SOLIDS CONCENTRATION EQUALED OR EXCEEDED THAT SHOWN

Figure 2.--Duration curves for dissolved solids for four selected stations, 1959 water year.

even though streamflow for the 1959 water year was deficient. Locally heavy runoff occurred after July 24 as a result of Hurricane Debra.

The dissolved-solids concentrations ranged from a minimum of 52 ppm to a maximum of 156 ppm. The weighted average was 89 ppm. A duration curve for the Neches River at Evadale is given in Figure 2 and shows that for 46 percent of the 1959 water year the concentration of dissolved solids was 100 ppm or less. At the station upstream on the Angelina River near Lufkin, the weighted average of dissolved-solids concentrations was 111 ppm.

Trinity River Basin

Streamflow was generally deficient in the headwater areas of the Trinity River basin during the 1959 water year. However, on October 8, rainfall of up to six inches fell at Fort Worth and local flash floods occurred. At the Rosser station, streamflow for the 1959 water year was only 16 percent of that for the 1958 water year, and 24 percent of the 20-year average. The cities of Fort Worth and Dallas divert considerable water for municipal supply, of which about 60 percent is returned as sewage effluent. The effects of this sewage effluent on chemical quality were more pronounced because of the deficient streamflow. Nitrate concentrations ranged from 9.0 ppm to 57 ppm, with a weighted average of 22 ppm.

Average discharge at Romayor during the 1959 water year was 4,909 cfs, as compared to the 35-year average of 7,389 cfs. Dissolved-solids concentrations ranged from a minimum of 132 ppm to a maximum of 666 ppm, with a weighted average of 249 ppm. A duration curve for the Trinity River at Romayor shows the percentage of time during which specified concentrations of dissolved solids were equaled or exceeded during the 1959 water year. (See Figure 2.)

Brazos River Basin

Quality of surface waters varies considerable in the Brazos River basin due to the wide range of geologic, climatic, and cultural factors present. In the upper part of the basin, minor tributaries contribute highly saline water to the Brazos River. Also, where rainfall is light, soluble minerals accumulate on rock and soil surfaces until they are flushed away by heavy rains. Thus, the runoff contains large concentrations of dissolved solids. In the lower part of the basin, where rainfall is heavier and the rocks are more completely leached, the water is less mineralized.

Streamflow of the Double Mountain Fork Brazos River near Aspermont was 122 percent of the 30-year average. Dissolved-solids concentrations exceeded 3,000 ppm 76 percent of the year, yet the weighted average of dissolved-solids concentrations was only 999 ppm because of the improved quality of the water during periods of high runoff. At the Salt Fork Brazos River station near Aspermont, the weighted average decreased from 8,500 ppm in 1958 to 5,020 in 1959.

The weighted average of dissolved-solids concentrations of the water discharged from Possum Kingdom Reservoir was 1,130 ppm as compared with 1,180 ppm in 1958. The monthly composites ranged from 996 ppm to 1,370 ppm. Water stored in Whitney Reservoir is generally of better quality than that stored in Possum Kingdom Reservoir because the intervening drainage area does not have sources of highly saline water as does the Brazos River above Possum Kingdom Reservoir.

However, whereas the quality of the water released from Possum Kingdom Reservoir was somewhat better than in 1958, the weighted average of dissolved-solids concentrations of the water released from Whitney Reservoir increased from 604 ppm in 1958 to 893 ppm in 1959 due to deficient runoff between the two reservoirs.

Water discharge of the Brazos River at Richmond was only about 60 percent of the average for the 39-year period of record. However, the dissolved-solids concentrations ranged from a minimum of 171 ppm to a maximum of only 718 ppm, with a weighted average of 323 ppm. A duration curve for the station, showing the percentage of time during which specified concentrations of dissolved-solids were equaled or exceeded during the 1959 water year, is given in Figure 2.

Three new sampling stations were placed in operation in the Brazos River basin during the year. They were Croton Creek near Jayton, Brazos River at Seymour, and Navasota River near Bryan.

Colorado River Basin

Two new stream-gaging and sampling stations were placed in operation during November 1958 on Colorado River near Ira and Beals Creek near Westbrook. These two stations, together with those at Colorado City and Silver, provide information on the quality of water that would be available for storage in a proposed reservoir near Silver. Runoff from the area was deficient for the 1959 water year, and the water was saline much of the time. The flow at the Colorado City station was about 30 percent of the 13-year average, and the weighted average of dissolved-solids concentrations was 2,010 ppm. Beals Creek is less mineralized than the Colorado River upstream, and the dissolved-solids concentrations ranged from 180 ppm to 8,440 ppm, with a weighted average of 680 ppm.

Downstream from Beals Creek, at the Silver station, the quality of the Colorado River water is better than at Ira or Colorado City. The range in dissolved-solids concentrations was from 314 to 12,800 ppm, a new maximum for the period of record. The weighted average was 1,270 ppm.

During the 1959 water year, water discharge of the Colorado River near San Saba was only about 40 percent of the 41-year average. However, the weighted average of dissolved-solids concentrations was 315 ppm, only slightly greater than the 304 ppm recorded for the 1958 water year, when streamflow was about normal.

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. Although runoff was less than normal, flow passing Austin was of good quality. The weighted average of dissolved-solids concentrations was only 249 ppm.

Inflow from tributary streams below Austin produces little significant change in the chemical composition of the Colorado River. At Wharton, a weighted average of 231 ppm shows water of the same good quality as that released from the lakes above Austin.

Guadalupe River Basin

The Guadalupe River heads in the Edwards Plateau and flows across the Balcones fault zone. A relatively high base flow is maintained by natural springs in the drainage area. Water from the Guadalupe River is of the calcium bicarbonate type and rarely exceeds 400 ppm in dissolved solids. In the 1959 water year, runoff at the Victoria station was slightly greater than the 24-year average, and the weighted average of dissolved-solids concentrations was 303 ppm.

The station, San Antonio River at Goliad, was re-established in the 1959 water year. Chemical-quality records are also available for this station for the 1946 water year. In 1959, dissolved-solids concentrations ranged from 159 ppm to 808 ppm, with a weighted average of 457 ppm.

Nueces River Basin

The only sampling point in the Nueces River basin for the 1959 water year was near Mathis at the outflow 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 concentrations was 274 ppm.

Rio Grande Basin

Streamflow at the station, Pecos River below Red Bluff Dam near Orla, was only 33 percent of the 22-year average but was 15 percent greater than in 1958. The weighted average of dissolved-solids concentrations decreased from 5,900 ppm in 1958 to 5,140 ppm in 1959. Storage in Red Bluff Reservoir decreased during the year to 60,000 acre-feet, only about 20 percent of capacity.

Floods occurred throughout October in the Rio Grande from Rio Conchos downstream but they were most severe in the lower Rio Grande Valley below Falcom Reservoir as a result of heavy inflow from lower Texas tributaries and a record high monthly rainfall of 17.12 inches at Brownsville. Streamflow for the water year was near average and dissolved-solids concentrations were generally lower than in 1958.

No. on Map	Stream and Location	Calendar Year																					
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
<u>Arkansas River Basin</u>																							
1	Canadian River near Tascosa																						
2	Canadian River near Amarillo																						
3	Canadian River near Borger																						
<u>Red River Basin</u>																							
4	Prairie Dog Town Fork Red River near Brice																						
5	Mulberry Creek near Brice																						
6	Salt Fork Red River near Hedley																						
7	Salt Fork Red River near Wellington																						
8	Elm Creek near Shamrock																						
9	Quitaque Creek near Quitaque																						
10	Pease River near Crowell																						
11	Little Wichita River near Archer City																						
12	Little Wichita River near Henrietta																						
13	Little Wichita River near Ringgold																						
14	Red River near Gainesville																						
15	Red River at Denison Dam near Denison																						
16	South Sulphur River near Cooper																						
17	Sulphur River near Darden																						
<u>Sabine River Basin</u>																							
18	Sabine River near Emory																						
19	Sabine River near Tatum																						
20	Sabine River at Logansport, La.																						
21	Sabine River near Ruliff																						
22	Cow Bayou near Mauriceville																						
<u>Neches River Basin</u>																							
23	Angelina River near Lufkin																						
24	Neches River near Rockland																						
25	Neches River at Evadale																						

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

No. on Map	Stream and Location	Calendar Year																						
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
<u>Trinity River Basin</u>																								
26	Clear Fork Trinity River at Fort Worth																							
27	Trinity River near Rosser																							
28	Cedar Creek near Mabank																							
29	Richland Creek near Fairfield																							
30	Trinity River near Oakwood																							
31	Trinity River at Romayor																							
32	Trinity River near Moss Bluff																							
33	Old River near Cove																							
34	Trinity River at Anahuac																							
35	Trinity Bay at Mouth of Trinity River near Anahuac																							
<u>San Jacinto River Basin</u>																								
36	San Jacinto River (West Fork) near Humble																							
37	San Jacinto River near Huffman																							
<u>Brazos River Basin</u>																								
38	Double Mountain Fork Brazos River near Rotan																							
39	Double Mountain Fork Brazos River near Aspermont																							
40	Salt Fork Brazos River near Peacock																							
41	Croton Creek near Jayton																							
42	Salt Croton Creek near Aspermont																							
43	Salt Fork Brazos River near Aspermont																							
44	Brazos River at Seymour																							
45	Clear Fork Brazos River at Nugent																							
46	Paint Creek near Haskell																							
47	Clear Fork Brazos River at Fort Griffin																							
48	Hubbard Creek near Breckenridge																							
49	Brazos River near South Bend																							
50	Salt Creek at Olney																							
51	Salt Creek near Newcastle																							
52	Brazos River at Possum Kingdom Dam near Graford																							

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

No. on Map	Stream and Location	Calendar Year																						
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
<u>Brazos River Basin--Continued</u>																								
53	Brazos River near Whitney																							
54	Leon River near Eastland																							
55	Lampasas River near Belton																							
56	Navasota River near Easterly																							
57	Navasota River near Bryan																							
58	Brazos River at Richmond																							
<u>Colorado River Basin</u>																								
59	Colorado River above Bull Creek near Knapp																							
60	Bull Creek near Ira																							
61	Bluff Creek near Ira																							
62	Colorado River near Ira																							
63	Deep Creek near Dunn																							
64	Colorado River at Colorado City																							
65	Morgan Creek near Colorado City																							
66	Beals Creek near Westbrook																							
67	Colorado River near Silver																							
68	Colorado River at Robert Lee																							
69	Oak Creek near Blackwell																							
70	Colorado River near San Saba																							
71	Colorado River at Austin																							
72	Colorado River at Wharton																							
<u>Guadalupe River Basin</u>																								
73	Guadalupe River near Spring Branch																							
74	Guadalupe River at Victoria																							
75	San Antonio River at Goliad																							
<u>Nueces River Basin</u>																								
76	Nueces River at Cotulla																							
77	Nueces River at Tilden																							
78	Nueces River near Three Rivers																							
79	Nueces River near Mathis																							

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

No. on Map	Stream and Location	Calendar Year																											
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959					
	<u>Rio Grande Basin</u>																												
80	*Rio Grande near El Paso																												
81	*Rio Grande below Old Fort Quitman																												
82	*Rio Grande at Upper Presidio																												
83	*Rio Grande near Johnson Ranch																												
84	*Rio Grande at Langtry																												
85	Salt (Screwbean) Draw near Orla																												
86	Pecos River near Orla																												
87	Pecos River at Pecos																												
88	Toyah Creek near Pecos																												
89	Salt Draw near Pecos																												
90	Toyah Creek below Toyah Lake near Pecos																												
91	Pecos River near Barstow																												
92	Pecos River below Grandfalls																												
93	Pecos River near Girvin																												
94	Pecos River near Sheffield																												
95	*Pecos River near Shulls																												
96	*Rio Grande at Laredo																												
97	*Rio Grande below Falcon Dam																												
98	Rio Grande at Roma																												
99	*Rio Grande at Fort Ringgold, Rio Grande City																												
100	Rio Grande at Mission Pumping Plant near Mission																												
101	*Rio Grande at Anzalduas Dam																												
102	Rio Grande near San Benito																												
103	Rio Grande at Los Fresnos Pumping Plant near Brownsville																												
104	Rio Grande near Brownsville																												

*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 1958 to September 1959" 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
Sodium-adsorption ratio
Specific Conductance (micromhos at 25°C)
pH
Density at 20°C

ARKANSAS RIVER BASIN

2275. 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 miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: July 1948 to October 1949, February 1950 to September 1959.

Water temperatures: August 1949 to September 1959.

Sediment records: August 1949 to September 1952.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 2,130 ppm Apr. 8-9; minimum, 394 ppm Aug. 23-31.

Hardness: Maximum, 704 ppm Apr. 8-9; minimum, 116 ppm Aug. 23-31.

Specific conductance: Maximum daily, 4,130 micromhos Apr. 9; minimum daily, 475 micromhos Aug. 24.

Water temperatures: Maximum, 76°F Aug. 16; minimum, freezing point on many days during winter months.

EXTREMES, 1948-59.--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 daily, 4,490 micromhos Mar. 21, 1957; minimum daily, 359 micromhos July 6, 1958.

Water temperatures (1949-59): 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 1958 to September 1959 given in Water-Supply Paper 1631.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate					
Oct. 1-10, 1958-----	69.1	23		84	28	270		238	280	290	1.0	1.7		1,110	1.51	207	324	130	64	6.5	1,810	7.5	
Oct. 11-20-----	29.2	31		102	38	304		241	317	362	1.6	36		1,310	1.78	103	411	214	62	6.5	2,140	7.2	
Oct. 21-31-----	14.4	49		100	42	257		255	281	292	2.5	77		1,230	1.67	47.8	422	213	57	5.5	1,950	7.0	
Nov. 1-10-----	17.0	54		89	40	284		410	233	250	2.5	83		1,240	1.69	56.9	386	50	62	6.3	1,840	7.3	
Nov. 11-20-----	30.8	34		96	41	259		303	245	290	2.0	66		1,180	1.60	98.1	408	160	58	5.6	1,960	7.0	
Nov. 21-30-----	29.6	34		112	43	319		241	340	390	1.6	56		1,410	1.92	113	456	259	60	6.5	2,330	6.7	
Dec. 1-10-----	21.7	39		108	42	332		350	311	345	1.9	77		1,430	1.94	83.8	442	155	62	6.9	2,250	6.8	
Dec. 11-19-----	27.4	42		122	39	321		271	341	378	1.7	60		1,440	1.96	107	465	243	60	6.5	2,280	7.7	
Dec. 20-31-----	48.2	26		114	39	380		256	397	442	1.1	26		1,550	2.11	202	445	235	65	7.8	2,500	7.9	
Jan. 1-10, 1959-----	17.6	30		142	41	348	8.9	257	411	455	1.2	38		1,600	2.18	76.0	523	312	59	6.6	2,570	7.6	
Jan. 11-20-----	49.8	24		95	36	340		254	306	412	.9	16		1,350	1.84	182	385	176	66	7.5	2,260	8.2	
Jan. 21-31-----	31.0	26		112	41	384		282	371	458	1.0	21		1,550	2.11	130	448	217	65	7.9	2,520	8.2	
Feb. 1-14-----	61.6	33		118	44	397		262	399	478	1.4	39		1,640	2.23	273	476	261	64	7.9	2,660	7.4	
Feb. 15-28-----	14.2	51		85	39	272		426	235	258	2.5	.2		1,150	1.56	44.1	372	24	61	6.2	1,870	7.6	
Mar. 1-10-----	10.6	50		70	34	162		288	143	149	2.5	82		858	1.17	24.6	314	78	53	4.0	1,380	6.5	
Mar. 11-20-----	8.52	51		64	32	159		390	117	118	2.7	26		4762	1.04	17.5	291	0	54	4.1	1,300	6.9	
Mar. 21-31-----	10.0	60		60	32	165		400	117	114	2.4	28		4775	1.05	20.9	281	0	56	4.3	1,240	7.1	
Apr. 1-7-----	13.0	59		64	33	139	16	305	113	118	2.7	88		4783	1.06	27.5	295	45	49	3.5	1,240	6.9	
Apr. 8-9-----	33.5	37		188	57	466		202	634	610	1.3	33		2,130	2.90	193	704	538	59	7.6	3,270	8.2	
Apr. 10-20-----	14.5	50		64	33	176		403	130	143	2.5	4.2		4801	1.09	31.4	295	0	56	4.5	1,340	7.4	
Apr. 21-30-----	10.9	58		60	35	138		384	104	116	2.9	.2		728	.99	21.4	294	0	51	3.5	1,250	7.1	
May 1-3, 6-----	9.65	54		63	36	147		298	117	144	2.5	62		861	1.14	21.9	305	61	51	3.7	1,350	6.8	
May 4-5, 7-10-----	130	18		38	16	137		187	134	115	.9	3.2		584	.79	205	161	8	65	4.7	954	7.7	
May 11-20-----	119	22		69	28	339		238	315	348	1.1	9.9		1,250	1.70	402	287	92	72	8.7	2,090	7.2	
May 21-31-----	60.4	36		76	36	237		246	231	260	1.8	50		1,050	1.43	171	338	136	60	5.6	1,780	6.5	
June 1-10-----	495	38		53	27	187		259	158	169	1.4	37		843	1.15	1,130	243	30	63	5.2	1,310	6.8	
June 11-22-----	26.3	50		63	34	188		326	168	171	2.0	22		896	1.22	63.6	297	10	58	4.8	1,380	7.0	
June 23-30-----	454	21		39	17	160		200	141	140	1.0	6.2		677	.91	818	168	4	68	5.4	1,060	7.2	
July 1-6-----	1,087	19		40	14	147		182	138	128	.7	3.5		4579	.79	1,700	158	8	67	5.1	925	7.2	
July 7-13-----	63.7	34		80	31	233		249	258	245	1.6	14		1,020	1.39	175	327	123	61	5.6	1,630	6.8	
July 14-18-----	620	17		34	11	105		177	91	82	.6	3.0		432	.59	723	130	0	64	4.0	706	7.4	
July 19-31-----	169	20		49	19	178		214	187	150	.9	5.4		734	1.00	335	200	25	66	5.5	1,180	7.7	
Aug. 1-2, 9-----	298	35		64	32	224		292	202	220	1.7	16		4939	1.28	756	291	52	63	5.7	1,510	8.2	
Aug. 3-8, 10, 16-----	947	48		54	32	150		307	139	125	2.2	18		753	1.02	1,930	266	14	55	4.0	1,150	7.4	
Aug. 11-15, 17-22-----	722	17		36	13	137		196	123	105	.9	2.5		532	.72	1,040	144	0	67	5.0	863	7.4	
Aug. 23-31-----	2,332	15		30	10	97		168	91	65	.7	2.5		394	.54	2,480	116	0	65	3.9	637	7.8	
Sept. 1-8-----	128	20		48	16	140		195	136	127	.9	7.9		4592	.81	205	186	26	62	4.5	1,000	7.5	
Sept. 9-18-----	14.9	48		74	33	206		278	203	212	2.0	29		4944	1.28	38.0	320	92	58	5.0	1,570	6.8	
Sept. 19-25, 27-30-----	48.7	42		56	26	159		310	126	135	1.5	14		726	.99	95.5	246	0	58	4.4	1,210	6.9	
Sept. 26-----	74.0	--		--	--	--		215	--	77	--	--		--	--	--	186	10	--	--	--	768	7.8
Weighted average-----	188	24		46	19	153		215	143	134	1.1	11		649	0.88	329	193	17	63	4.8	1,040	--	

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
EAST AMARILLO CREEK NEAR AMARILLO ¹																						
Oct. 1, 1958-----	14.7	54		58	31	121		277	82	104	3.3	85		674	0.92		273	43	49	3.2	1,130	8.0
Dec. 3-----	12.1	48		54	37	187		384	118	122	2.6	94		852	1.16		285	0	59	4.3	1,340	7.5
Jan. 7, 1959-----	19.5	57		56	25	148		438	82	80	2.6	.0		666	.91		242	0	57	4.2	1,070	7.7
Feb. 3-----	8.73	54		50	31	165		396	85	136	2.4	.5		719	.98		232	0	59	4.5	1,230	7.8
Mar. 4-----	11.1	74		56	33	155		440	91	104	3.0	3.2		735	1.00		275	0	55	4.1	1,200	7.7
Apr. 2-----	9.05	74		50	37	192		530	93	110	2.9	.2		820	1.12		277	0	60	5.0	1,290	7.9
Apr. 28-----	12.6	62		58	34	156		461	99	96	3.1	.0		a744	1.01		284	0	54	4.0	1,190	7.9
May 27-----	12.7	59		52	33	129		275	96	104	2.5	82		694	.94		265	39	51	3.4	1,230	7.8
June 12-----	13.0	64		54	36	150		420	83	112	3.0	16		a751	1.02		282	0	54	3.9	1,210	7.5
2276. BONITA CREEK NEAR AMARILLO																						
Dec. 3, 1958-----	2.24							252		16							194	0			155	7.8
2277. CHICKEN CREEK NEAR AMARILLO																						
Dec. 3, 1958-----	1.70							213		225							185	10			350	8.2
2278. COETAS CREEK NEAR AMARILLO																						
Dec. 3, 1958-----	0.86							213		16							177	2			124	7.5

¹ Part of the flow of East Amarillo Creek is effluent from a sewage treatment plant.
a Residue on evaporation at 180°C.

RED RIVER BASIN

2999.3. SALT FORK RED RIVER NEAR HEDLEY, TEX.

LOCATION.--One mile downstream from Whitefish Creek and 9.5 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 1959.

Water temperatures: March 1956 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 1,810 ppm Mar. 11-14, 16, 20, 22, 25, 28; minimum, 563 ppm Mar. 5.

Hardness: Maximum, 841 ppm Mar. 11-14, 16, 20, 22, 25, 28; minimum, 275 ppm Jan. 8.

Specific conductance: Maximum daily, 2,700 micromhos Mar. 11; minimum daily, 768 micromhos May 27.

Water temperatures: Maximum, 90°F Sept. 4; minimum, 34°F Dec. 14.

EXTREMES, 1956-59.--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 daily, 3,530 micromhos Jan. 25, 1957; minimum daily, 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 1958 to September 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
														Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, mag-ne-sium	Non-carbon-ate				
Nov. 14-30, 1958-----	--	28		116	36		158	202	332	188	0.8	2.8		992	1.35		438	272	44	3.3	1,490	7.8
Dec. 1-15-----	--	24		124	38		145	196	358	173	.6	2.5		992	1.35		466	306	40	2.9	1,460	7.7
Dec. 16-31-----	--	22		144	40		145	201	418	168	.6	2.5		1,040	1.41		524	360	38	2.8	1,530	7.8
Jan. 4-7, 9-14, 1959---	--	32		91	34	126	4.9	176	283	153	.8	4.5		862	1.17		367	223	42	2.9	1,260	8.2
Jan. 8-----	73.8	39		69	25		113	129	227	124	.6	2.2		696	.95		275	169	47	3.0	1,040	8.2
Jan. 15-31-----	--	32		121	44		178	192	402	205	.8	3.5		1,080	1.47		483	326	44	3.5	1,620	8.2
Feb. 1, 3-9, 11, 14, 17, 20-----	--	30		119	42		155	184	386	175	.7	4.8		1,000	1.36		470	318	42	3.1	1,510	8.2
Feb. 2-----	2.0	45		144	53		179	175	518	198	.7	3.5		1,230	1.67		578	434	40	3.2	1,800	8.1
Feb. 10, 12-13, 15-16, 18, 19-----	--	16		74	24		91	110	234	103	.4	1.5		634	.86		283	193	41	2.3	956	8.1
Feb. 22-28-----	--	24		152	56		193	183	556	210	.7	2.5		1,280	1.74		610	460	41	3.4	1,870	8.1
Mar. 1-4, 6-10-----	--	24		151	50		152	155	504	182	.7	3.0		1,140	1.55		582	455	36	2.7	1,710	7.6
Mar. 5-----	--	17		72	24		81	100	218	101	.3	1.0		4563	.77		278	196	39	2.1	917	8.2
Mar. 11-14, 16, 20, 22, 25, 28-----	--	24		215	74		278	184	800	325	.9	1.8		1,810	2.46		841	690	42	4.2	2,570	7.6
Mar. 15, 17-19, 21, 23-24, 26-27, 29-----	--	24		149	54		172	156	534	198	.7	2.5		1,210	1.65		594	466	39	3.1	1,800	8.2
Apr. 1-10-----	--	36		110	50	154	7.0	106	475	176	.9	2.5		1,060	1.44		480	393	41	3.1	1,570	7.6
Apr. 11-23-----	--	38		96	46		162	95	428	180	.8	2.0		1,000	1.36		428	350	45	3.4	1,490	7.5
May 5-6, 9-17, 19-21---	--	36		103	41		155	132	386	177	.8	1.8		4966	1.31		426	318	44	3.3	1,460	7.5
May 7-8-----	--	25		86	23		101	160	222	115	.7	3.0		711	.97		309	178	42	2.5	1,060	7.8
May 22-30-----	--	28		92	24		109	173	238	122	.7	2.5		717	.98		328	186	42	2.6	1,080	7.8
June 1-9-----	--	34		95	35		125	130	334	139	.7	2.0		872	1.19		381	274	42	2.8	1,250	7.7
Sept. 3-15-----	--	40		104	36		120	141	340	138	.9	1.8		904	1.23		408	292	39	2.6	1,280	8.0
Sept. 16-30-----	--	46		100	36		134	137	358	141	.9	1.8		911	1.24		398	285	42	2.9	1,280	7.9

a Calculated from determined constituents.

RED RIVER BASIN--Continued

3150. LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.

LOCATION.--At gaging station at bridge on State Highway 148, 1.5 miles northwest of Henrietta, Clay County, and 4 miles upstream from Turkey Creek.

DRAINAGE AREA.--1,037 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1952 to January 1956, March to September 1959.

Water temperatures: December 1952 to January 1956, March to September 1959.

EXTREMES, 1959.--Dissolved solids: Maximum, 1,430 ppm Sept. 5; minimum, 63 ppm June 23.

Hardness: Maximum, 350 ppm Sept. 5; minimum, 31 ppm June 23.

Specific conductance: Maximum daily, 2,740 micromhos Sept. 5; minimum daily, 100 micromhos June 23.

EXTREMES, 1952-56, 1959.--Dissolved solids: Maximum, 1,700 ppm Mar. 15-16, 1953; minimum, 57 ppm May 19, 1955.

Hardness: Maximum, 700 ppm May 1, 1953; minimum, 25 ppm Feb. 20, 1955.

Specific conductance: Maximum daily, 5,910 micromhos May 1, 1953; minimum daily, 81 micromhos Oct. 24, 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1631.

Chemical analyses, in parts per million, March to September 1959

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	Non-carbonate					
Mar. 11, 1959-----	a0	2.2		88	23	258		178	15	505	0.3	0.8		980	1.33	--	314	168	64	6.3	1,860	7.7	
Mar. 12-16-----	a2.60	5.2		92	27	261		169	17	532	.3	.8		1,020	1.39	7.16	340	202	62	6.1	2,000	7.4	
Mar. 17-26-----	a12.2	9.2		32	11	51		170	10	60	.2	.8		b270	.37	8.89	125	0	47	2.0	491	8.2	
Mar. 27-31, Apr. 1-3---	a0	8.2		34	11	55		179	11	64	.2	.8		b284	.39	--	130	0	48	2.1	518	7.4	
Apr. 4-15-----	a0	6.8		36	12	61	4.4	194	13	71	.3	.8		b312	.42	--	140	0	48	2.2	559	7.9	
Apr. 16-17-----	a7.50	7.8		33	9.4	52		170	11	72	.4	2.0		b300	.41	6.08	121	0	53	2.4	529	7.8	
Apr. 18-30-----	a18.0	8.6		20	4.9	24		88	7.0	26	.2	5.9		140	.19	6.80	70	0	42	1.2	258	7.4	
May 1-11-----	a14.0	8.8		23	6.1	28		102	7.2	35	.2	3.5		162	.22	6.12	82	0	43	1.3	308	7.4	
May 12 (12 pm to 8 am)-	471	9.6		78	23	345		128	25	642	.6	2.2		1,190	1.62	1,510	289	184	72	8.8	2,300	7.8	
May 12 (8 am to 12 pm)																							
13-24-----	a53.5	8.8		34	8.5	97		108	9.4	161	.3	4.4		376	.51	54.3	120	32	64	3.8	739	7.6	
May 25-31, June 1-----	a .01	9.8		34	9.3	89		124	11	142	.4	3.0		b382	.52	.01	123	22	61	3.5	688	7.2	
June 2, 4-----	127	7.8		58	17	227		83	16	440	.4	3.5		811	1.10	278	214	146	70	6.7	1,580	7.2	
June 3, 5-15-----	a20.0	8.4		30	8.5	97		107	9.2	156	.4	3.5		b390	.53	21.1	110	22	66	4.0	704	7.3	
June 16-21-----	a0	--		--	--	--		120	--	193	--	--		--	--	--	126	28	--	--	832	7.4	
June 22, 25-26-----	1,225	9.4		17	5.0	39		71	6.4	56	.3	3.0		b186	.25	615	63	5	57	2.1	310	7.1	
June 23-----	2,280	6.4		6.8	3.4	10		39	4.4	10	.2	2.5		63	.09	388	31	0	42	.8	116	7.2	
June 24-----	1,650	4.2		32	8.3	89		80	7.6	164	.2	1.0		345	.47	1,540	114	48	63	3.6	673	8.2	
June 27-30, July 1-2---	599	11		14	4.4	13		60	4.0	18	.3	2.0		97	.13	157	53	4	35	.8	174	6.7	
July 3-10-----	46.3	11		39	12	131		80	11	250	.3	2.0		495	.67	61.9	147	82	66	4.7	961	7.1	
July 11-----	59.0	--		--	--	--		89	--	139	--	--		--	--	--	108	35	--	--	605	7.0	
July 12-13-----	36.0	11		14	4.9	24		81	5.2	23	.3	3.5		126	.17	12.2	56	0	48	1.4	223	7.5	
July 14-----	8.90	--		--	--	--		78	--	136	--	--		--	--	--	110	46	--	--	591	6.9	
July 15-----	7.60	11		43	13	126		99	10	241	.3	2.0		495	.67	10.2	161	80	63	4.3	950	7.4	
July 16-21-----	258	10		14	4.1	13		63	3.2	17	.2	1.5		94	.13	65.5	52	0	36	.8	167	7.0	
July 22-31-----	7.36	12		20	5.5	25		94	4.4	31	.3	1.5		146	.20	2.90	72	0	43	1.3	266	7.2	
Aug. 1-15-----	a0	16		27	6.9	34		113	5.4	50	.3	1.2		b210	.29	--	96	3	44	1.5	353	6.8	
Aug. 16-30-----	a0	14		31	8.3	45		122	5.6	72	.3	1.5		b250	.34	--	112	12	47	1.8	435	6.8	
Aug. 31, Sept. 1-2----	.90	9.0		82	22	244		61	14	538	.3	2.0		941	1.28	2.29	295	245	64	6.2	1,820	6.9	
Sept. 3-4-----	138	8.6		14	4.8	35		55	6.6	54	.1	2.0		152	.21	56.6	55	10	58	2.1	281	6.9	
Sept. 5-----	221	14		96	27	409		48	29	825	.5	6.3		1,430	1.94	853	350	311	72	9.5	2,740	7.7	
Sept. 6-10-----	59.3	9.6		29	7.9	94		97	11	152	.4	2.2		b367	.50	58.8	105	26	66	4.0	680	7.3	
Sept. 11-20-----	a1.45	9.6		32	9.2	111		106	11	184	.4	1.0		b430	.58	1.68	118	31	67	4.4	793	6.9	
Sept. 21-30-----	a17.3	8.0		36	9.4	134		93	14	232	.4	.8		b497	.68	23.2	128	49	69	5.1	935	6.9	
Weighted average----	c79.4	8.9		21	6.1	50		69	6.6	85	0.3	2.4		218	0.30	46.7	78	21	58	2.5	404	--	

a Includes days of less than 0.05 cubic feet per second discharge.

b Residue on evaporation at 180°C.

c Represents 99 percent of flow for water year October 1958 to September 1959.

RED RIVER BASIN--Continued

3154. LITTLE WICHITA RIVER NEAR RINGGOLD, TEX.

LOCATION.--At gaging station at bridge on County Road (abandoned) 2 miles downstream from East Fork Little Wichita River, about 8 miles northwest of Ringgold, Montague County, and about 11.5 miles upstream from mouth.

DRAINAGE AREA.--1,350 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: March to September 1959.

EXTREMES, 1959.--Dissolved solids: Maximum, 2,810 ppm Mar. 16-18; minimum, 38 ppm Sept. 4.

Hardness: Maximum, 770 ppm Mar. 16-18; minimum, 19 ppm Sept. 4.

Specific conductance: Maximum daily, 5,200 micromhos Mar. 18; minimum daily, 60 micromhos Sept. 4.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for the period March to September 1959 given in Water-Supply Paper 1631.

Chemical analyses, in parts per million, March to September 1959

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	Non-carbonate				
Mar. 16-18, 1959-----	32.1	7.8		205	63	783		150	34	1,640	0.3	2.0		2,810	3.82	244	770	648	69	12	1,200	8.1
Mar. 19-24, 26-----	a5.99	7.4		34	13	73		176	14	98	.3	.4		b348	.47	5.63	138	0	54	2.7	529	7.8
Mar. 25-----	.10	13		38	12	100		190	17	132	.3	1.0		b415	.56	.11	144	0	60	3.6	747	8.1
Mar. 27-30-----	0	9.2		42	11	82		203	15	103	.3	.5		363	.49	--	150	0	54	2.9	657	8.2
Mar. 31, Apr. 1-9-----	0	6.6		44	14	84	5.0	220	16	109	.3	1.0		b406	.55	--	168	0	51	2.8	721	8.0
Apr. 10-16-----	0	6.2		42	14	76		216	7.2	101	.3	.5		b384	.52	--	162	0	51	2.6	684	7.8
Apr. 17-18-----	a18.5	6.6		35	10	80		192	9.6	94	.4	.8		b348	.47	17.4	128	0	57	3.1	624	7.8
Apr. 19-30-----	a14.9	10		24	6.5	40		116	8.0	47	.2	4.8		b214	.29	8.61	87	0	50	1.9	371	7.5
May 1-10-----	a	12	8.6	33	10	40		159	5.0	51	.2	3.0		229	.31	.07	123	0	41	1.6	446	7.1
May 11, 12 (12 p.m.-12m)-----	191	8.0		15	4.3	34		71	7.4	44	.3	1.0		149	.20	76.8	55	0	57	2.0	292	7.0
May 12 (12m - 12 p.m.)-----	270	13		145	42	640		107	26	1,280	.3	7.5		2,210	3.01	1,610	534	447	72	12	4,120	7.8
May 13-21-----	72.2	8.2		37	9.1	113		99	11	199	.2	4.0		430	.58	83.8	130	49	65	4.3	854	7.4
May 22-----	3.00	--		--	--	--		77	--	508	--	--		--	--	--	220	157	--	--	1,840	7.6
May 23-31, June 1-----	a3.19	10		48	11	169		107	16	302	.4	2.5		612	.83	5.27	165	78	69	5.7	1,190	7.1
June 2-3, 7-15-----	a11.0	7.8		31	9.1	105		114	9.6	167	.4	3.0		b416	.57	12.4	115	22	66	4.2	752	7.2
June 4-----	199	8.0		16	4.4	29		73	4.8	37	.3	3.5		139	.19	74.7	58	0	52	1.6	257	7.4
June 5-6-----	64.5	9.2		49	14	205		102	13	372	.5	3.0		716	.97	125	180	96	71	5.6	1,390	7.5
June 16-20-----	a5.20	5.6		36	10	113		153	7.2	172	.5	.5		b448	.61	6.29	131	6	65	4.3	813	6.8
June 21-25, 27-29, July 1-3-----	1,529	9.4		10	3.0	16		44	3.8	20	.2	3.0		87	.12	359	37	1	48	1.1	161	6.8
June 26, 30-----	1,240	11		20	5.3	33		72	4.6	55	.3	2.2		166	.23	356	72	13	50	1.7	307	6.5
July 4-9, 11-13-----	38.7	10		39	10	116		82	12	220	.4	1.0		448	.61	46.8	138	72	65	4.3	868	6.5
July 10, 14-15-----	23.3	10		28	7.1	67		81	7.6	119	.3	1.0		280	.38	17.6	99	33	59	2.9	332	6.7
July 16-26-----	151	11		16	3.6	19		70	7.0	20	.2	2.2		113	.15	46.1	55	0	43	1.1	199	6.7
July 27-----	10.0	12		36	9.0	104		108	15	176	.3	1.0		406	.55	11.0	127	38	64	4.0	760	7.7
July 28-31-----	3.38	13		24	6.4	32		104	5.6	44	.3	1.2		178	.24	1.62	86	1	44	1.5	325	7.3
Aug. 1-10-----	a	.08	14	32	8.5	34		140	5.4	48	.3	.8		212	.29	.05	115	0	39	1.4	390	6.9
Aug. 11-19-----	a3.93	16		32	8.7	36		142	5.4	50	.3	1.2		b235	.32	2.49	116	0	40	1.5	392	7.4
Aug. 20-22-----	1.57	10		29	9.6	93		78	10	168	.3	1.2		b392	.53	1.66	112	48	64	3.8	693	7.0
Aug. 23-31-----	a	.66	9.0	37	11	90		102	9.0	170	.3	.8		377	.51	.67	138	54	59	3.3	722	6.8
Sept. 1-----	54.0	--		--	--	--		117	--	570	--	--		--	--	--	270	174	--	--	1,980	7.7
Sept. 2-3-----	68.0	7.6		18	5.6	44		62	5.8	74	.2	1.2		186	.25	34.1	68	17	58	2.3	352	7.0
Sept. 4-----	383	7.6		5.2	1.5	4.3		22	2.6	4.0	.1	2.0		38	.05	39.3	19	1	33	.4	60	6.9
Sept. 5-----	311	8.4		11	3.2	20		50	5.0	26	.3	1.8		101	.14	84.8	41	0	52	1.4	179	7.2
Sept. 6-15-----	44.2	8.8		26	7.0	68		98	7.6	107	.4	2.0		b288	.39	34.4	94	13	61	3.0	321	7.3
Sept. 16-23, 26-----	33.1	8.8		30	8.5	83		115	9.0	132	.4	.8		b350	.48	31.3	110	16	62	3.4	619	6.8
Sept. 24-25-----	415	11		9.5	2.6	9.4		44	4.6	9.0	.2	.8		69	.09	77.3	34	0	37	.7	111	6.6
Sept. 27-28-----	47.0	7.8		46	13	192		77	15	358	.4	2.2		b722	.98	91.6	168	106	71	6.4	1,280	6.8
Sept. 29-30-----	9.20	8.2		30	8.1	105		73	14	185	.4	1.2		388	.53	9.64	108	48	68	4.4	750	7.2
Weighted average-----	130	9.6		15	4.3	33		55	5.1	52	0.2	2.7		151	0.21	53.0	55	10	57	1.9	279	--

a Includes days of less than 0.05 cubic feet per second discharge.

b Residue on evaporation at 180°C.

RED RIVER BASIN--Continued

3160. 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, 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 1959.

Water temperatures: October 1952 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 4,690 ppm Apr. 20; minimum, 472 ppm Sept. 5.

Hardness: Maximum, 1,220 ppm Aug. 16-22; minimum, 185 ppm Sept. 5.

Specific conductance: Maximum daily, 7,920 micromhos Aug. 18; minimum daily, 802 micromhos Sept. 5.

Water temperatures: Maximum, 91°F Aug. 3; minimum, freezing point Jan. 21.

EXTREMES, 1944-46, 1952-59.--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 daily, 9,890 micromhos Apr. 11, 1953; minimum daily, 176 micromhos Nov. 4, 1957.

Water temperatures (1952-59): Maximum, 95°F July 13, 1954; minimum, freezing point Dec. 23, 1953, Jan. 21, 1954, Jan. 16-17, 1957, Jan. 21, 1959.

REMARKS.--Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Records of specific conductance of daily samples for period October 1952 to September 1959 available in district office at Oklahoma City, Okla. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1631.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-2, 1958-----	759	--	--	340	88	976		158	800	1,680	--	--		4,110	5.59	8,420	1,210	1,080	64	12	6,360	7.9
Oct. 3-31-----	240	--	--	258	72	785		148	597	1,350	--	--		3,280	4.46	2,130	940	818	64	11	5,240	7.9
Nov. 1-10-----	149	11	0.00	284	66	606	5.5	244	517	1,160	0.4	--		2,920	3.97	1,170	980	780	57	8.4	4,640	8.2
Nov. 11-13-----	139	--	--	240	85	686		a240	530	1,200	--	--		3,040	4.13	1,140	950	753	61	9.7	4,770	8.3
Nov. 14-20-----	198	--	--	216	78	551		192	470	1,000	--	--		2,630	3.58	1,410	860	702	58	8.2	4,100	8.2
Nov. 21-30-----	208	--	--	248	88	676		196	574	1,200	--	--		3,120	4.24	1,750	980	820	60	9.4	4,840	8.1
Dec. 1-31-----	200	14	0.00	258	77	728	8.0	b264	573	1,200	.3	--		3,130	4.26	1,690	960	744	62	10	4,810	8.3
Jan. 1-20, 1959-----	225	13	0.00	288	85	820	7.0	236	671	1,400	.3	--		3,590	4.88	2,180	1,070	876	62	11	5,500	7.8
Jan. 21-31-----	218	7.5	--	292	93	925		190	750	1,550	--	0.0		3,860	5.25	2,270	1,110	995	64	12	6,110	8.0
Feb. 1-20-----	244	9.0	0.00	302	92	975	7.5	204	746	1,600	.3	--		3,980	5.41	2,620	1,130	963	65	13	6,170	8.1
Feb. 21-28-----	197	8.0	0.00	286	92	964	--	202	761	1,600	.3	--		3,940	5.36	2,100	1,090	924	66	13	6,150	7.7
Mar. 1-10-----	196	7.5	0.00	270	92	850	--	200	686	1,500	.5	--		3,690	5.02	1,950	1,050	886	64	11	5,800	6.8
Mar. 11-12-----	180	5.5	--	194	63	592		178	492	975	--	--		2,590	3.52	1,260	745	599	63	9.4	4,160	8.2
Mar. 13-20-----	146	6.5	--	274	101	949		194	716	1,580	--	--		3,790	5.15	1,490	1,100	941	65	12	5,920	8.1
Mar. 21-31-----	160	--	--	216	112	837		232	643	1,390	--	--		3,500	4.76	1,510	1,000	810	65	12	5,190	8.2
Apr. 1-10-----	194	--	--	224	84	665		158	576	1,150	--	--		3,000	4.08	1,570	905	776	61	9.6	4,580	8.1
Apr. 11-19-----	309	--	--	222	82	714		144	608	1,200	--	--		3,080	4.19	2,570	890	772	64	10	4,730	8.0
Apr. 20-----	652	--	--	300	100	1,170		116	815	1,950	--	--		4,690	6.38	8,260	1,160	1,060	69	15	7,150	8.0
Apr. 21-----	1,530	--	--	147	40	356		c184	257	625	--	5.9		1,800	2.45	7,440	530	379	59	6.7	2,770	8.3
Apr. 22-25-----	3,525	--	--	79	24	177		142	135	298	--	4.2		894	1.22	8,510	295	178	57	4.5	1,440	8.0
Apr. 26-----	1,190	--	--	214	59	462		140	614	725	--	4.6		2,280	3.10	7,330	775	660	56	7.2	3,340	8.1
Apr. 27-----	885	--	--	78	22	178		124	125	310	--	5.0		900	1.22	2,150	285	184	58	4.6	1,440	8.2
Apr. 28-30-----	788	--	--	238	70	672		138	650	1,100	--	--		2,960	4.03	6,300	880	767	62	9.8	4,470	8.1
May 1-9-----	292	--	--	220	57	645		136	571	1,050	--	--		2,760	3.75	2,180	785	674	64	10	4,280	8.2
May 10-----	575	--	--	139	45	350		156	302	600	--	3.1		1,600	2.18	2,480	530	402	59	6.6	2,610	8.0
May 11-----	1,980	--	--	260	50	696		a144	699	1,080	--	--		3,140	4.27	16,790	695	737	64	10	4,570	8.3
May 12-23-----	4,400	--	--	153	24	359		120	380	540	--	5.0		1,630	2.22	19,360	480	382	62	7.1	2,520	7.9
May 24-31-----	10,140	--	--	136	20	244		120	332	360	--	.1		1,270	1.73	34,770	420	322	56	5.2	1,920	7.5
June 1-5-----	5,106	--	--	147	23	261		112	353	400	--	4.9		1,390	1.89	19,160	460	368	55	5.3	2,020	8.2
June 6-8-----	4,390	--	--	172	32	402		128	409	640	--	.5		1,740	2.37	20,620	560	455	61	7.4	2,850	7.7
June 9-10-----	2,520	--	--	246	43	571		128	644	890	--	.5		2,540	3.45	17,280	790	685	61	8.8	3,940	8.2
June 11-20-----	1,286	--	--	304	55	834		152	807	1,300	--	--		3,470	4.72	12,050	985	860	65	12	5,360	8.1
June 21-22-----	826	--	--	276	60	795		148	748	1,250	--	--		3,240	4.41	7,230	935	814	65	11	5,120	7.8
June 23-----	1,020	--	--	131	25	335		108	306	530	--	3.9		1,420	1.93	3,910	430	342	63	7.0	2,360	8.2
June 24-----	13,100	--	--	79	13	149		b132	138	225	--	5.1		694	.94	24,550	250	142	56	4.1	1,170	8.3
June 25-30-----	15,580	--	--	126	17	273		110	288	415	--	3.6		1,210	1.65	50,900	385	295	61	6.0	1,980	8.2

a Includes equivalent of 6 parts per million of carbonate (CO₃).

b Includes equivalent of 2 parts per million of carbonate (CO₃).

c Includes equivalent of 8 parts per million of carbonate (CO₃).

RED RIVER BASIN--Continued

3160. RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 1-3, 1959-----	4,090	--	--	128	24	263		102	331	400	--	0.2		1,240	1.69	13,690	420	336	58	3.6	1,970	7.9
July 4-5-----	12,000	--	--	180	33	362		116	454	570	--	.0		1,730	2.35	56,050	585	490	57	6.5	2,620	7.9
July 6-10-----	4,560	--	--	139	25	252		108	369	372	--	1.9		1,230	1.67	15,140	450	362	55	5.2	1,960	7.7
July 11-16-----	3,870	--	--	157	31	312		112	390	495	--	2.4		1,560	2.12	16,300	520	428	57	5.9	2,430	8.1
July 17-20-----	5,998	--	--	101	17	242		102	228	370	--	3.8		1,100	1.50	17,810	320	236	62	3.9	1,750	8.0
July 21-24-----	3,080	--	--	125	25	290		108	292	462	--	2.2		1,280	1.74	10,640	415	326	60	6.2	2,080	8.1
July 25-31-----	1,633	--	--	232	37	601		122	584	920	--	3.8		2,530	3.44	11,160	730	630	64	9.7	3,850	8.1
Aug. 1-4-----	1,995	--	--	180	51	447		128	447	750	--	3.9		2,040	2.77	10,990	660	555	60	7.6	3,260	8.0
Aug. 5-10-----	818	--	--	110	25	293		136	249	455	--	2.9		1,250	1.70	2,760	378	266	63	6.5	2,100	8.1
Aug. 11-15-----	499	--	--	176	57	508		156	432	850	--	2.8		2,200	2.99	2,960	675	547	62	8.5	3,350	8.1
Aug. 16-22-----	655	--	--	348	85	1,120		134	984	1,780	--	--		4,480	6.09	7,920	1,220	1,110	67	14	6,880	7.9
Aug. 23-26-----	674	--	--	144	45	390		128	355	650	--	2.6		1,720	2.34	3,130	545	440	61	7.3	2,880	8.0
Aug. 27-31-----	317	--	--	168	117	774		136	681	1,250	--	--		3,200	4.35	2,740	900	788	65	11	5,070	7.9
Sept. 1-2-----	290	--	--	224	65	711		134	615	1,150	--	--		2,900	3.94	2,270	825	715	65	11	4,620	8.0
Sept. 3-----	650	--	--	147	41	438		128	378	700	--	1.0		1,840	2.50	3,230	535	430	64	8.2	2,980	7.5
Sept. 4-----	1,250	--	--	66	21	167		114	137	265	--	3.3		759	1.03	2,560	250	156	59	4.6	1,260	7.9
Sept. 5-----	1,960	--	--	48	16	93		104	73	160	--	.8		472	.64	2,500	185	100	52	3.0	802	7.7
Sept. 6-----	2,430	--	--	70	24	186		98	147	315	--	3.2		859	1.17	5,640	275	194	60	4.9	1,420	7.8
Sept. 7-8-----	3,900	--	--	50	18	108		104	88	182	--	3.0		558	.76	5,880	200	115	54	3.3	962	7.9
Sept. 9-----	2,340	--	--	66	23	172		98	117	305	--	2.0		796	1.08	5,030	260	180	59	4.6	1,330	7.8
Sept. 10-----	1,100	--	--	118	38	293		118	137	600	--	1.2		1,480	2.01	4,400	450	354	59	6.0	2,400	7.7
Sept. 11-----	726	--	--	98	34	255		108	200	455	--	1.3		1,190	1.62	2,330	385	296	59	5.6	1,970	7.7
Sept. 12-20-----	416	--	--	162	55	477		132	412	800	--	3.8		2,060	2.80	2,310	630	522	62	8.3	3,250	7.8
Sept. 21-28-----	238	--	--	192	71	561		142	476	975	--	3.1		2,530	3.44	1,630	770	654	61	8.8	4,010	7.6
Sept. 29-30-----	6,110	--	--	109	27	233		132	249	370	--	5.2		1,120	1.52	18,480	385	277	57	5.2	1,830	7.9
Weighted average-----	1,534	--	--	154	31	359		125	375	566	--	--		1,640	2.23	6,790	512	409	60	6.9	2,560	--

RED RIVER BASIN--Continued

3316. RED RIVER AT DENISON DAM NEAR DENISON, TEX.

LOCATION.--Immediately below Denison Dam, 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 1959.

Water temperatures: October 1945 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 1,140 ppm July 1-31, Aug. 1-31, Sept. 1-30; minimum, 1,020 ppm Oct. 1-31.

Hardness: Maximum, 390 ppm Aug. 1-31; minimum, 300 ppm Dec. 1-31.

Specific conductance: Maximum daily, 1,980 micromhos May 7; minimum daily 1,720 micromhos Oct. 2.

EXTREMES, 1944-59.--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 daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.

REMARKS.--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 1958 to September 1959 given in Water-Supply Paper 1631. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
														Oct. 1-31, 1958-----	1,823	8.8		99				
Nov. 1-30-----	1,912	9.8		101	31	228		136	225	375	--	.8		1,040	1.41	5,370	380	268	57	5.1	1,930	7.9
Dec. 1-31-----	1,483	9.0		41	48	270		136	230	380	--	.5		1,050	1.43	4,200	300	188	66	6.8	1,840	8.0
Jan. 1-31, 1959-----	2,268	10		104	28	238	5.3	139	238	382	0.4	.5		1,070	1.46	6,550	374	260	58	5.3	1,870	8.0
Feb. 1-28-----	772	9.0		104	29	245		140	243	385	--	.2		1,080	1.47	2,250	378	264	58	5.5	1,870	8.2
Mar. 1-31-----	2,432	9.2		108	26	242		135	243	382	.2	.5		1,080	1.47	7,090	376	266	58	5.4	1,880	8.0
Apr. 1-30-----	2,263	8.8		108	26	238	5.6	139	238	378	.5	.5		1,070	1.46	6,540	376	262	57	5.3	1,850	7.8
May 1-31-----	712	8.2		108	27	242		140	245	380	--	.5		1,080	1.47	2,080	380	266	58	5.4	1,870	7.5
June 1-30-----	2,117	8.4		105	25	251		142	245	382	.3	.0		1,090	1.48	6,230	365	248	60	5.7	1,860	7.8
July 1-31-----	3,952	10		110	26	264		138	259	405	.2	.5		1,140	1.55	12,160	382	268	60	5.9	1,930	7.0
Aug. 1-31-----	4,623	10		112	27	260		131	259	408	.4	1.8		1,140	1.55	14,230	390	283	59	5.7	1,900	7.4
Sept. 1-30-----	3,074	9.2		108	26	263		124	266	402	.4	1.8		1,140	1.55	9,460	376	275	60	5.9	1,940	7.6
Weighted average----	2,298	9.4		104	28	252		135	246	390	--	0.8		1,100	1.50	6,830	374	264	59	5.7	1,880	--

RED RIVER BASIN--Continued

3425. SOUTH SULPHUR RIVER NEAR COOPER, TEX.

LOCATION.--At gaging station at bridge on State Highway 154, 0.6 mile downstream from Big Creek, 1.0 mile upstream from Brushy Creek, and 5.7 miles southeast of Cooper, Delta County.
 DRAINAGE AREA.--527 square miles.
 RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
 Water temperatures: October 1958 to September 1959.
 EXTREMES, 1958-59.--Dissolved solids: Maximum, 452 ppm Nov. 18-20; minimum, 125 ppm Apr. 17-21.
 Hardness: Maximum, 164 ppm Nov. 18-20; May 1-11; minimum, 69 ppm Apr. 17-21.
 Specific conductance: Maximum daily, 904 micromhos Nov. 18; minimum daily, 142 micromhos Nov. 16.
 Water temperatures: Maximum, 91°F Aug. 5; minimum, 42°F Dec. 18, Jan. 5.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1631.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25 C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1958-----	a0.05	12		43	4.6			151	22	14	0.5	3.2		b218	0.30	0.03	126	2	30	1.0	348	7.9	
Oct. 11-20-----	29.3	9.8		27	3.1			101	30	10	.4	1.8		155	.21	12.3	80	0	39	1.1	262	7.5	
Oct. 21-31-----	a .04	11		34	3.7			125	29	14	.4	.5		179	.24	.02	100	0	35	1.1	302	7.5	
Nov. 1-14-----	a .02	11		47	5.6			165	44	25	.4	.8		b262	.36	.01	140	5	36	1.3	429	8.2	
Nov. 15-17-----	24.7	8.4		25	4.1			104	15	7.5	.4	.5		127	.17	8.47	79	0	30	.8	222	7.5	
Nov. 18-20-----	11.7	10		55	6.7			139	60	148	.6	1.2		452	.61	14.3	164	50	58	3.5	815	7.6	
Nov. 21-30-----	32.0	8.2		39	4.2			147	32	28	.6	1.2		222	.30	19.2	115	0	41	1.5	398	7.7	
Dec. 1-17-----	17.1	11		38	3.7			128	40	26	.5	2.5		b236	.32	10.9	110	5	41	1.5	374	7.6	
Dec. 18-31-----	5.89	12		46	4.6			164	52	24	.4	1.8		b276	.38	4.39	134	0	41	1.6	439	7.5	
Jan. 1-14, 17-19, 1959--	28.6	11		33	3.2	47	4.1	108	40	46	.4	5.0		243	.33	18.8	96	7	50	2.1	427	7.4	
Jan. 15-16-----	23.0	9.8		33	4.1			93	32	180	--	5.0		434	.59	27.0	99	23	73	5.4	803	7.4	
Jan. 20-31-----	2.02	11		51	5.4			65	45	93	--	2.0		b360	.49	1.96	149	39	49	2.3	606	7.5	
Feb. 1-14-----	97.8	8.8		52	6.0			154	45	84	.4	.8		b354	.48	93.5	154	28	47	2.2	606	7.9	
Feb. 15-20-----	832	13		31	2.9			98	29	10	.5	6.3		160	.22	359	89	9	32	.9	264	7.8	
Feb. 21-28-----	6.94	14		44	4.6			145	39	18	.4	5.9		b242	.33	4.53	129	10	32	1.1	374	8.0	
Mar. 1-4-----	3.02	15		52	6.3			176	47	20	.4	4.2		264	.36	2.15	156	11	31	1.1	435	8.1	
Mar. 5, 7-10, 13-16-----	132	10		32	3.5			129	29	9.2	.5	3.5		160	.22	57.0	94	7	30	.8	268	7.6	
Mar. 6-----	594	11		36	2.7			122	40	20	--	5.0		208	.28	334	102	2	41	1.4	355	8.2	
Mar. 11-12-----	548	13		26	3.6			92	22	3.8	.6	4.2		131	.18	194	80	4	27	.7	215	8.1	
Mar. 17-31-----	77.4	9.6		39	4.4			128	36	13	.7	2.8		b204	.28	42.6	115	10	30	.9	324	7.6	
Apr. 1-10-----	12.4	11		44	5.2	25	3.2	150	41	14	.4	2.0		b242	.33	8.10	131	8	29	1.0	374	7.7	
Apr. 11-16-----	3.92	11		51	6.1			179	36	12	.4	1.0		228	.31	2.41	152	6	25	.8	393	7.5	
Apr. 17-21-----	583	12		23	2.9			78	23	7.5	.4	3.2		125	.17	197	69	5	32	.8	208	7.6	
Apr. 22-30-----	36.9	13		38	5.0			133	34	14	.4	2.0		195	.27	19.4	115	6	31	1.0	330	7.7	
May 1-11-----	16.5	13		54	7.1			197	42	17	.4	1.5		b279	.38	12.4	164	2	29	1.1	446	8.0	
May 12-20-----	103	10		40	4.7			129	37	13	.5	6.8		198	.27	55.1	119	13	30	.9	344	7.7	
May 21-31-----	2.73	9.6		49	5.5			172	37	15	.5	3.0		b254	.35	1.87	145	4	29	1.0	406	7.4	
June 1-8-----	18.6	13		46	5.0			174	42	25	.5	3.0		b285	.39	14.3	135	0	40	1.5	440	7.6	
June 9-21-----	99.6	12		33	3.5			117	22	10	.5	4.0		162	.22	43.6	97	1	30	.8	275	7.6	
June 22-30-----	348	14		34	3.0			120	22	7.2	.5	5.1		163	.22	153	97	0	29	.8	267	7.5	
July 1-10-----	6.76	18		43	4.4			144	32	13	.6	1.8		206	.28	3.76	125	7	27	.8	355	6.6	
July 11-18-----	31.0	13		40	3.8			129	26	23	.6	2.5		197	.27	16.5	115	10	32	1.0	360	6.5	
July 19-31-----	789	14		29	2.6			91	19	8.2	.5	2.8		133	.18	283	83	8	24	.6	241	6.4	
Aug. 1-10-----	79.2	23		36	3.4			134	22	11	.5	2.2		b197	.27	42.1	104	0	31	.9	297	7.6	
Aug. 11-20-----	0	21		46	4.3			168	23	14	.4	1.5		b225	.31	--	132	0	28	.9	351	7.8	
Aug. 21-31-----	0	18		50	5.0			180	27	18	.4	1.0		b244	.33	--	145	0	28	.9	394	7.6	
Sept. 1, 3-10-----	60.5	11		26	2.4			93	23	12	.5	3.5		145	.20	23.7	75	0	38	1.1	250	7.4	
Sept. 2-----	138	--		--	--			104	--	163	--	--		--	--	--	102	17	--	--	--	766	7.7
Sept. 11-20-----	0	14		36	3.5			131	26	12	.4	1.0		b191	.26	--	104	0	32	1.0	300	7.7	
Sept. 21-30-----	a2.98	9.0		42	4.2			146	28	27	.5	.8		b230	.31	1.85	122	2	35	1.2	377	7.7	
Weighted average-----	91.2	13		32	3.2			106	26	14	0.5	3.7		167	0.23	41.1	93	6	33	0.9	285	--	

a Includes days of less than 0.05 cubic feet per second discharge.
 b Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water, October 1938 to September 1959

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 (micro-mhos at 25 C)	pH
														Tons per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
2985. PRAIRIE DOG TOWN FORK RED RIVER NEAR BRICE																					
Mar. 24, 1959	a0.01			255	132	1,220	248	849	1,950						1,180	977	69	1.5	7,210	7.9	
MULBERRY CREEK AT STATE HIGHWAY 70 NEAR BRICE																					
Mar. 24, 1959				340	219	227	173	2,190	228						2,250	2,110	18	3.1	3,860	7.9	
LITTLE RED RIVER AT STATE HIGHWAY 70 NEAR TURKEY																					
Mar. 24, 1959	a0.02			1,770	1,050	64,700	105	5,290	102,000						8,750	8,660	94	301	132,000	7.5	
ESTELLEINE SALT SPRING AT ESTELLEINE																					
Feb. 12, 1959	4.0			1,460	273	17,100	--	139	4,230	26,300					4,760	4,650	89	107	61,600	7.9	
Mar. 24, 1959				1,450	261	16,800		135	4,150	26,100					4,690	4,580	89		61,500	7.7	
SALT CREEK AT COUNTY ROAD CONNECTING FM ROAD 1619 AND US HIGHWAY 83 ABOUT 10 MILES NORTHWEST OF CHILDRESS																					
Mar. 24, 1959				1,020	210	5,910	109	2,820	9,380						3,410	3,320	79	44	27,200	7.5	
PRAIRIE DOG TOWN FORK RED RIVER AT US HIGHWAY 83 NEAR CHILDRESS																					
Mar. 24, 1959				1,780	389	22,400	82	5,200	34,900						6,040	5,970	89	125	77,200	8.0	
BUCK CREEK AT FM ROAD 338 NEAR WELINGTON																					
Mar. 22, 1959	a 0.08			390	187	125	247	1,610	94						1,740	1,540	13	1.3	2,800	7.8	
2995.7. RED RIVER NEAR QUANAH																					
Mar. 25, 1959				721	197	2,670	154	2,310	4,170						2,610	2,480	69	23	14,300	7.7	
SALT FORK RED RIVER AT COUNTY ROAD ABOVE BARTON CREEK NEAR LELIA LAKE																					
Mar. 22, 1959	a2			64	26	126	216	150	147						266	89	51	3.4	1,080	8.0	
BARTON CREEK 7 MILES NORTH OF LELIA LAKE																					
Mar. 22, 1959	a3	36		112	47	276	228	402	332						473	286	56	5.5	2,070	8.2	

a Field estimate.

RED RIVER BASIN--Continued
 MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued
 Chemical analyses, in parts per million, water year October 1958 to September 1959--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) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Mar. 22, 1959-----	a0.25			355	98	268	169	1,240	315					1,290	1,150	31	3.2	3,050	7.7	
3000. SALT FORK RED RIVER NEAR WELLINGTON																				
Mar. 22, 1959-----	a5			545	92	188	139	1,650	225					1,740	1,630	19	2.0	3,190	7.6	
SALT FORK RED RIVER AT STATE HIGHWAY 203 NEAR WELLINGTON																				
Mar. 23, 1959-----	a4			630	119	271	106	1,980	355					2,060	1,970	22	2.6	3,940	7.9	
RED RIVER AT US HIGHWAY 283 NEAR ODELL																				
Mar. 25, 1959-----				595	169	1,650	114	1,960	2,580					2,180	2,090	62	15	9,970	8.0	
NORTH FORK RED RIVER ABOVE McLELLAN CREEK 3½ MILES WEST OF KELLERVILLE																				
Mar. 22, 1959-----	a6			208	112	335	149	156	1,010					980	858	43	4.7	3,560	7.9	
McLELLAN CREEK AT MOUTH AT COUNTY ROAD 3½ MILES WEST OF KELLERVILLE																				
Mar. 22, 1959-----	a15	28		70	17	107	235	103	126			0.5		264	52	49	3.0	951	8.2	
NORTH FORK RED RIVER AT COUNTY ROAD 6 MILES SOUTHWEST OF WHEELER																				
Mar. 22, 1959-----	a10			134	44	288	159	253	530					515	384	55	5.5	2,320	8.0	
3013. NORTH FORK RED RIVER NEAR SHAMROCK																				
Mar. 22, 1959-----	a6			235	49	310	159	565	528					790	660	46	4.8	2,740	8.0	
UNNAMED CREEK 3 MILES EAST OF TWITTY																				
Mar. 21, 1959-----	a0.6			490	143	70	225	1,660	35					1,810	1,630	8	0.7	2,760	7.8	
3033. ELM CREEK NEAR SHAMROCK																				
Mar. 22, 1959-----	a2.0	25		225	33	104	161	607	112			0.2		697	565	24	1.7	1,580	7.9	

a Field estimate.

RED RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Mar. 22, 1959-----	a4	13		528	85	94	115	1,610	70	4.0				2,460	3,335	1,670	1,570	11	1.0	2,670	7.8	
ELM CREEK BELOW WOLF CREEK NEAR LUTIE																						
Mar. 25, 1959-----				562	192	1,920	113	1,850	3,080						2,190	2,100	66	18		11,300	7.4	
RED RIVER AT US HIGHWAY 183 NEAR OKLAHOMA																						
Mar. 20, 1959-----	a1.5			82	27	66	318	75	85												956	7.7
June 18-----	1.26					79	8.2	76	84								316	56	31	1.6	853	
3077. ROARING SPRINGS NEAR ROARING SPRINGS																						
MIDDLE PEASE RIVER 14 MILES NORTHEAST OF PADUCAH																						
Feb. 11, 1959-----	a1.0			1,290	212	10,900	122	3,650	16,900								4,090	3,990	85		44,300	8.0
SALT SPRINGS TRIBUTARY TO MIDDLE PEASE RIVER 14 MILES NORTHEAST OF PADUCAH																						
Feb. 11, 1959-----	a0.02			1,390	236	13,500	108	3,980	21,100								4,440	4,350	87		52,000	7.9
PEASE RIVER AT STATE HIGHWAY 104 NEAR KINKLAND																						
Mar. 21, 1959-----				1,180	242	7,500	149	3,220	11,900								3,940	3,820	81	52	32,600	7.8
PEASE RIVER AT I. W. LABOR RANCH 9 MILES SOUTHWEST OF QUANAH																						
Mar. 21, 1959-----				956	133	3,560	134	2,680	5,510								2,930	2,820	73	29	18,000	7.9
RED RIVER AT US HIGHWAY 281 NEAR BURKURNETT																						
Mar. 25, 1959-----				537	187	2,190	120	1,790	3,480								2,110	2,010	69	21	12,100	7.3
NORTH WICHITA RIVER AT COUNTY ROAD CROSSING 2 MILES NORTHEAST OF CHALK																						
Mar. 18, 1959-----	a0.4			465	105	321	241	1,350	485								1,590	1,390	30	3.5	3,760	7.9
NORTH WICHITA RIVER AT FM ROAD 1038 NEAR HACKBERRY																						
Mar. 18, 1959-----				545	129	589	148	1,670	930								1,890	1,770	40	5.9	5,220	7.8

a Field estimate.

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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	Specific conductance (microhmoh at 25° C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
SALT CREEK AT MOUTH 8 MILES SOUTHEAST OF PADUCAH																					
Mar. 18, 1959				1,270	263	12,100	116	3,950	18,700							4,250	4,160	86	81	47,300	7.6
NORTH WICHITA RIVER AT COUNTY ROAD CROSSING 1 MILE WEST OF COTTLE-FOARD COUNTY LINE NEAR PADUCAH																					
Mar. 18, 1959				851	121	5,300	154	2,610	8,020							2,620	2,490	81	45	23,800	7.8
NORTH WICHITA RIVER AT STATE HIGHWAY 283 NEAR TRUSSCOTT																					
Mar. 19, 1959				911	218	4,460	114	2,890	6,930							3,170	3,080	75	34	21,500	7.8
SOUTH WICHITA RIVER AT GUTHRIE																					
Mar. 19, 1959	a0.04			759	296	1,860	125	2,720	2,990							3,110	3,010	57	14	11,700	7.5
SOUTH WICHITA RIVER 3 1/2 MILES EAST OF GUTHRIE																					
Mar. 19, 1959	a0.4			890	199	1,360	120	1,990	2,720							3,040	2,960	69	11	10,200	7.9
BATEMAN RANCH SPRING TRIBUTARY TO SOUTH WICHITA RIVER NEAR GUTHRIE																					
Mar. 17, 1959				858	211	2,450	149	2,500	3,980							3,010	2,890	64	19	14,000	7.3
SOUTH WICHITA RIVER AT BATEMAN OIL FIELD 6 MILES EAST OF GUTHRIE																					
Mar. 19, 1959				1,220	264	9,360	129	3,230	14,900							4,130	4,020	83	63	39,200	8.0
3118. SOUTH WICHITA RIVER NEAR BENJAMIN																					
Mar. 19, 1959				1,390	387	8,180	134	3,680	13,400							5,060	4,950	78	50	36,300	8.1
LAKE WICHITA AT WICHITA FALLS																					
Mar. 11, 1959		5.0		101	24	259	118	175	450	0.3	0.4			1,070	1.46	350	254	62	6.0	1,890	7.6
LONG CREEK NEAR HENRIETTA																					
Apr. 16, 1959	a5	9.0		69	19	363	88	34	660	0.7	0.2			1,200	1.63	250	178	76	10	2,220	7.2
Apr. 21	a.5	14		77	20	503	110	46	670	.8	.8			1,590	2.16	274	184	80	13	2,920	8.1

a Field estimate.

RED RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
Oct. 7, 1958-----	a275	11		238	69	937	86	659	1,540			0.0		3,550	4.83	878	807	70	14	5,800	7.5

RED RIVER ABOVE LITTLE MICHITA RIVER NEAR RINGGOLD

CADDO LAKE NEAR KARMACK

July 22, 1959-----		15	0.08	8.0	2.7	23	26	14	31	0.2	0.2	0.2		107	0.15	31	10	61	1.8	1.77	5.2
--------------------	--	----	------	-----	-----	----	----	----	----	-----	-----	-----	--	-----	------	----	----	----	-----	------	-----

a Field estimate.

SABINE RIVER BASIN

220. 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 1959.
 Water temperatures: February 1952 to September 1959.
 EXTREMES, 1958-59.--Dissolved solids: Maximum, 883 ppm Oct. 20; minimum, 92 ppm May 1-6.
 Hardness: Maximum, 121 ppm Oct. 20; minimum, 31 ppm May 26-30.
 Specific conductance: Maximum daily, 1,680 micromhos Oct. 20; minimum daily, 145 micromhos May 5.
 Water temperatures: Maximum, 89°F July 17; minimum, 40°F Jan. 6.
 EXTREMES, 1952-59.--Dissolved solids: Maximum, 936 ppm Aug. 21-31, 1956; minimum, 74 ppm Apr. 24-30, 1957.
 Hardness: Maximum, 121 ppm Oct. 20, 1958; minimum, 22 ppm Apr. 24-30, 1957.
 Specific conductance: Maximum daily, 1,850 micromhos Oct. 25, 1954, Aug. 31, 1956; minimum daily, 98 micromhos Apr. 29, 1957.
 Water temperatures: Maximum, 98°F Aug. 13, 1956; minimum, 40°F Jan. 6, 1959.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-5, 8-10, 1958----	971	17		12	3.4		52	29	17	82	--	1.2		199	0.27	522	44	20	72	3.4	359	7.4
Oct. 6-7, 11-19-----	528	20		14	4.6		87	30	19	140	--	1.5		301	.41	429	54	29	78	5.1	539	7.2
Oct. 20-----	472	--		--	--		--	39	--	485	--	--		883	1.20	1,130	121	89	--	--	1,680	7.4
Oct. 21-25-----	564	14		14	4.6		119	29	20	189	--	.8		375	.51	571	54	30	83	7.0	715	7.2
Oct. 26-31-----	598	16		10	3.2		60	26	15	93	--	.8		211	.29	341	38	17	77	4.2	385	7.0
Nov. 1-10-----	257	20		15	4.7		112	30	20	180	--	1.0		a382	.52	265	57	32	81	6.5	687	7.2
Nov. 11-20-----	327	18		14	5.0		108	30	16	177	--	.5		a370	.50	327	56	31	81	6.3	673	6.9
Nov. 21-30-----	1,083	14		12	5.0		77	22	23	125	--	.4		a292	.40	854	30	32	77	4.7	502	6.6
Dec. 1-11-----	1,082	16		14	5.2		64	20	32	103	--	.5		a265	.36	774	56	40	71	3.7	445	6.8
Dec. 12-20-----	606	19		15	6.5		78	20	34	128	--	.5		a318	.43	520	64	48	72	4.2	542	6.7
Dec. 21-31-----	562	20		14	5.9		76	20	29	126	--	.8		a302	.41	458	59	43	74	4.3	522	6.7
Jan. 1-9, 1959-----	611	19		14	6.0	79	76	20	29	134	0.1	.5		294	.40	485	60	43	73	4.5	533	7.0
Jan. 10-20-----	645	19		17	7.2		96	22	39	157	--	1.0		347	.47	604	72	54	74	4.9	652	6.7
Jan. 21-31-----	525	17		15	6.6		75	23	33	123	--	.8		281	.38	398	64	46	72	4.1	534	6.8
Feb. 1-9-----	774	16		15	6.0		78	20	32	129	--	.8		287	.39	600	62	46	73	4.3	540	6.8
Feb. 10-15-----	1,227	16		16	7.3		97	16	42	159	--	.8		346	.47	1,150	62	46	75	5.0	655	6.9
Feb. 16-28-----	4,321	11		11	3.8		34	20	26	52	--	.8		149	.20	1,740	43	27	63	2.3	276	6.8
Mar. 1-10-----	3,316	14		14	4.1		46	22	31	72	--	1.0		193	.26	1,730	52	34	66	2.8	343	6.7
Mar. 11-19-----	3,839	12		14	4.3		47	20	33	74	--	.8		195	.27	2,020	53	36	66	2.8	350	6.9
Mar. 20-24-----	3,200	11		14	3.4		33	30	25	49	--	1.2		152	.21	1,310	49	24	59	2.0	266	6.9
Mar. 25-31-----	1,156	16		17	5.8		65	28	35	104	--	.8		258	.35	805	66	43	68	3.5	464	6.9
Apr. 1-9, 11-----	1,241	15		18	6.5	61	76	30	38	104	.2	1.0		262	.36	878	72	47	64	3.1	486	6.5
Apr. 10-----	2,460	14		25	8.0		115	30	50	190	--	1.5		418	.57	2,780	96	72	72	5.1	790	7.3
Apr. 12-23-----	4,633	11		12	3.9		36	18	26	58	--	1.0		157	.21	1,960	46	31	63	2.3	290	6.9
Apr. 24-30-----	5,736	9.0		10	3.0		25	20	20	38	--	1.0		116	.16	1,800	37	21	59	1.8	213	7.2
May 1-6-----	14,200	8.0		10	2.5		19	23	14	28	--	1.0		112	.13	3,530	33	14	56	1.4	172	7.0
May 7-10-----	7,988	9.8		10	3.5		37	26	17	56	--	1.5		148	.20	3,190	39	18	67	2.5	277	6.8
May 11-20-----	2,321	13		14	5.0		53	27	27	85	--	1.5		212	.29	1,330	56	33	68	3.1	402	6.3
May 21-25, 31-----	2,093	12		15	4.2		46	35	25	69	--	2.0		190	.26	1,070	55	26	64	2.7	358	6.6
May 26-30-----	3,936	10		8.0	2.7		24	19	15	36	--	1.0		106	.14	1,130	31	16	62	1.9	198	6.4
June 1-10-----	1,658	15		12	4.5		45	25	18	75	--	1.2		183	.25	819	48	28	67	2.8	351	6.5
June 11-14, 18-19, 21-25	867	14		14	4.9		47	36	21	75	--	1.5		195	.27	456	55	26	65	2.8	362	6.8
June 15-17, 20, 26-30---	797	15		17	6.0		84	38	24	137	--	1.5		a332	.45	714	67	36	73	4.5	579	6.5
July 1-9-----	455	19		14	5.4		68	40	21	106	--	1.2		255	.35	313	57	24	72	3.9	475	6.8
July 10-11, 24-25-----	476	15		21	7.2		171	34	28	281	--	1.2		541	.74	695	82	54	82	8.2	1,030	6.3
July 12-23-----	301	17		18	5.9		95	52	20	150	--	1.2		333	.45	271	70	27	75	5.0	629	6.8
July 26-29-----	2,005	12		14	3.9		82	31	17	131	--	1.0		276	.38	1,490	51	26	78	5.0	517	6.7
July 30-31, Aug. 5-11---	1,839	18		16	3.0		31	54	15	41	--	1.2		152	.21	755	52	8	56	1.8	265	6.7
Aug. 1-4, 12-15-----	1,245	19		18	4.2		51	58	20	74	--	1.2		a236	.32	793	62	15	64	2.8	379	6.7
Aug. 16-18, 23-25-----	200	21		22	5.9		85	73	17	132	--	1.0		a341	.46	184	80	20	70	4.2	586	7.0
Aug. 19-22, 26-29-----	202	21		22	6.7		116	70	20	182	--	.8		a422	.57	230	82	25	75	5.6	751	6.7
Aug. 30-31, Sept. 1-2---	284	21		21	6.3		119	56	15	195	--	1.2		406	.55	311	78	32	77	5.9	770	7.5
Sept. 3-12-----	470	21		12	4.4		69	36	17	107	--	1.2		a263	.36	334	48	19	76	4.3	451	6.7
Sept. 13-20-----	220	20		18	6.4		98	40	25	159	--	1.2		a360	.49	214	72	38	75	5.0	642	6.7
Sept. 21-30-----	185	21		18	6.0		122	50	20	193	--	1.2		a424	.58	212	70	28	79	6.3	762	6.4
Weighted average-----	1,683	13		13	4.1		46	25	24	73	--	1.0		188	0.26	854	49	29	67	2.9	343	--

a Residue on evaporation at 180°C.

SABINE RIVER BASIN--Continued

305. SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 12, 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 1959.

Water temperatures: October 1947 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 212 ppm Sept. 9, 16-24; minimum, 43 ppm Jan. 31.

Hardness: Maximum, 55 ppm Sept. 9, 16-24; minimum, 12 ppm Feb. 1-6.

Specific conductance: Maximum daily, 430 micromhos Sept. 18; minimum daily, 75 micromhos Feb. 3.

Water temperatures: Maximum, 87°F Aug. 6-7; minimum, 48°F Dec. 19-20, Feb. 3.

EXTREMES, 1945-46, 1947-59.--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 daily, 774 micromhos Dec. 26, 1948; minimum daily, 33 micromhos May 22, 1953.

Water temperatures (1947-59): Maximum, 95°F Aug. 12, 1953; minimum, 34°F Jan. 28, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate					
Oct. 1-11, 1958-----	24,480	9.8		5.2	1.5	14		18	7.8	18	--	0.5		86	0.09	4,360	19	4	61	1.4	114	6.8	
Oct. 12-16-----	5,196	15		8.0	1.9	18		25	12	24	--	1.0		92	.13	1,290	28	8	59	1.5	156	6.9	
Oct. 17-31-----	3,219	17		9.5	3.0	30		34	13	42	--	.2		132	.18	1,150	36	8	64	2.2	229	7.0	
Nov. 1-10-----	2,633	16		12	3.3	44		34	14	68	--	.0		a182	.25	1,290	44	16	69	2.9	324	6.6	
Nov. 11-20-----	2,462	17		10	2.8	37		35	11	34	--	.0		a154	.21	1,020	36	8	69	2.6	267	6.7	
Nov. 21-30-----	4,096	16		10	3.0	37		25	13	60	--	.2		151	.21	1,670	38	17	68	2.6	278	6.7	
Dec. 1-10-----	3,372	16		9.5	3.6	40		28	15	61	--	.5		a176	.24	1,600	38	16	69	2.8	288	6.9	
Dec. 11-20-----	2,854	18		11	4.0	41		28	19	64	--	.5		172	.23	1,330	44	21	67	2.7	345	7.0	
Dec. 21-31-----	2,830	18		9.2	3.2	38		26	18	56	--	.4		a170	.23	1,300	36	15	70	2.8	275	6.9	
Jan. 1-10, 1959-----	2,440	20		10	3.6	40	2.2	30	17	60	0.1	.5		a183	.25	1,210	40	16	67	2.8	303	7.6	
Jan. 11-20-----	2,482	18		10	3.6	41		27	17	64	--	.5		a182	.25	1,220	40	18	69	2.8	307	7.0	
Jan. 21-30-----	2,931	17		10	3.6	45		24	19	70	--	.2		177	.24	1,400	40	20	71	3.1	328	6.4	
Jan. 31-----	9,730	5.8		7.4	1.1	4.4		6	5.8	15	--	.5		43	.06	1,130	23	18	29	.4	76	6.7	
Feb. 1-6-----	19,280	7.0		3.0	1.1	12		6	9.0	16	--	.8		52	.07	2,710	12	7	68	1.5	91	6.2	
Feb. 7-13-----	17,440	10		5.1	2.0	18		12	15	24	--	1.0		81	.11	3,810	20	10	66	1.8	138	6.3	
Feb. 14-22-----	13,070	12		6.5	2.7	25		13	19	35	--	1.0		107	.15	3,780	27	16	67	2.1	185	6.4	
Feb. 23-28-----	19,100	9.4		4.8	2.1	17		10	14	24	--	1.0		77	.10	3,970	20	12	64	1.6	135	6.4	
Mar. 1-13-----	11,540	13		8.5	3.5	26		21	22	36	--	.5		120	.16	3,740	36	18	61	1.9	311	6.6	
Mar. 14-20-----	7,966	14		10	4.3	36		20	27	54	--	.2		156	.21	3,360	42	26	65	2.4	284	6.9	
Mar. 21-31-----	7,733	13		9.8	3.6	29		22	24	41	--	.8		132	.18	2,760	40	22	61	2.0	235	6.9	
Apr. 1-7-----	5,231	15		10	3.4	28	2.5	28	22	40	.2	1.0		136	.18	1,920	39	16	59	2.0	243	6.5	
Apr. 8-11, 13-----	7,264	10		6.5	2.0	15		14	12	23	--	.4		76	.10	1,490	24	12	58	1.3	134	6.1	
Apr. 12, 14-20-----	11,120	11		7.5	3.0	26		18	19	36	--	1.5		113	.15	3,390	31	16	64	2.0	202	6.3	
Apr. 21-30-----	17,990	9.8		6.5	2.2	15		14	15	22	--	.5		78	.11	3,790	25	14	57	1.3	141	6.1	
May 1-10-----	11,800	11		11	3.6	23		30	19	34	--	.8		117	.16	3,730	42	18	34	1.5	204	6.8	
May 11-20-----	12,600	9.4		8.5	3.0	19		20	14	31	--	.8		96	.13	3,270	34	17	55	1.4	182	6.0	
May 21-31-----	7,962	12		9.5	3.5	29		26	17	43	--	1.2		128	.17	2,750	38	16	62	2.0	236	7.0	
June 1-9-----	5,620	13		7.5	2.8	22		22	12	33	--	1.2		102	.14	1,550	30	12	62	1.8	185	6.6	
June 10-----	4,260	--		--	--	--		28	--	60	--	--		--	--	--	35	12	--	--	--	278	6.8
June 11-22-----	5,133	14		8.0	3.0	26		28	14	36	--	.8		116	.16	1,610	32	10	63	2.0	202	6.8	
June 23-30-----	2,509	14		9.0	3.7	31		38	14	42	--	.5		133	.18	901	38	6	64	2.2	239	6.4	
July 1-10-----	2,306	13		9.5	2.9	34		36	13	46	--	.8		137	.19	853	36	6	67	2.4	238	6.1	
July 11-23-----	1,863	12		7.5	2.6	31		32	9.2	43	--	.8		122	.17	614	29	3	70	2.5	217	6.1	
July 24-28-----	7,444	6.4		3.5	1.1	13		12	6.2	17	--	.5		54	.07	1,090	13	3	68	1.6	91	5.8	
July 29-31, Aug. 1-3-----	8,807	12		7.0	2.4	36		26	13	49	--	1.2		134	.18	3,190	28	6	74	3.0	237	6.6	
Aug. 4-10-----	4,307	13		9.8	3.3	52		25	17	80	--	1.2		188	.26	2,190	38	18	75	3.7	353	6.4	
Aug. 11-21-----	2,955	14		9.2	2.8	31		31	14	42	--	1.2		126	.17	1,010	34	9	66	2.2	226	6.5	
Aug. 22-31-----	2,508	15		7.5	2.4	20		34	7.6	25	--	1.0		96	.13	650	28	0	60	1.6	156	6.5	
Sept. 1-8, 10-15-----	1,549	18		12	4.0	35		58	9.6	46	--	.8		a166	.23	694	46	0	62	2.2	262	7.3	
Sept. 9, 16-24-----	1,271	15		14	4.9	55		56	12	82	--	.8		212	.29	728	55	9	68	3.2	377	7.0	
Sept. 25-30-----	1,103	18		10	3.5	41		46	8.8	58	--	.8		163	.22	485	40	2	69	2.8	281	7.0	
Weighted average-----	6,723	12		7.6	2.7	24		21	15	35	--	0.7		109	0.15	1,980	30	13	63	1.9	192	--	

a Residue on evaporation at 180°C.

SABINE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Mar. 19, 1959-----	a14.0	12		3.0	0.9	3.9	0.7	12	1.4	6.8	0.0	0.0	35	0.05	11	1	41	0.5	4.7	6.8
BIG COW CREEK AT FM ROAD 1416 NEAR BLEAKWOOD																				
Mar. 19, 1959-----	a20	24		2.8	1.1	8.0	1.0	18	1.8	9.8	0.1	0.2	58	0.08	12	0	58	1.0	6.7	6.1
TROUT CREEK AT STATE HIGHWAY 87 NEAR CALL																				
Mar. 19, 1959-----	4.0	8.4		1.5	1.2	7.2	0.5	10	1.8	9.8	0.2	0.2	36	0.05	9	0	63	1.1	5.6	6.0
300. CYPRESS CREEK NEAR BUNA																				

a Field estimate.

NECHES RIVER BASIN

370. ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59, 200 feet upstream from Procetta Creek, 1½ miles downstream from Bayou Loco, 1.5 miles upstream from Southern Pacific Railroad bridge, and 8 miles north of Lufkin, Angelina County.

DRAINAGE AREA.--1,630 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.

Water temperatures: October 1954 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 186 ppm Aug. 27-31; minimum, 63 ppm Apr. 13-14, 18-23.

Hardness: Maximum, 53 ppm Feb. 11-14; minimum, 22 ppm Apr. 13-14, 18-23.

Specific conductance: Maximum daily, 398 micromhos Dec. 13; minimum daily, 73 micromhos Apr. 19.

Water temperatures: Maximum, 87°F Sept. 21; minimum, 38°F Jan. 5, 10.

EXTREMES, 1954-59.--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 daily, 895 micromhos Nov. 10, 1954; minimum daily, 38 micromhos Sept. 21, 1958.

Water temperatures: Maximum, 89°F July 9, 1957; minimum, 38°F Jan. 5, 10, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-11, 1958-----	3,430	15	--	6.5	2.9	14		18	12	21		1.0		81	0.11	750	28	13	51	1.1	138	7.0
Oct. 12-20-----	723	18	--	8.8	4.4	22		24	19	34		1.0		119	.16	232	40	20	55	1.5	200	7.0
Oct. 21-27-----	404	20	--	7.2	3.3	19		26	17	24		1.0		104	.14	113	32	10	57	1.5	160	7.1
Oct. 28-31-----	478	18	0.11	9.5	4.5	39		26	18	62		.0		164	.22	212	42	21	67	2.6	282	7.5
Nov. 1-10-----	300	20	--	8.0	3.9	20		28	17	27		.8		111	.15	89.9	36	13	55	1.4	185	7.4
Nov. 11-18-----	301	19	--	7.0	3.4	17		27	15	22		.2		97	.13	78.8	31	9	54	1.3	161	7.3
Nov. 19-30-----	452	16	--	8.5	4.0	29		24	17	45		.0		132	.18	161	38	18	63	2.1	237	7.0
Dec. 1-10-----	488	17	--	8.0	4.1	24		23	23	33		.0		120	.16	158	37	18	59	1.7	206	6.8
Dec. 11-24-----	412	17	.12	9.0	4.5	37		22	25	54		.2		a167	.23	186	41	23	66	2.5	278	7.1
Dec. 25-31-----	336	18	.14	7.2	3.6	22		24	21	28		.1		a120	.16	109	33	13	60	1.7	186	7.1
Jan. 1-10, 1959-----	418	17	.12	8.2	4.0	30		22	22	44		.2		a148	.20	167	37	19	64	2.2	247	7.0
Jan. 11-20-----	396	16	--	8.8	4.7	29		24	26	40		1.2		a142	.19	152	41	22	60	1.9	236	6.7
Jan. 21-31-----	411	14	--	8.5	4.3	34		21	26	48		.0		145	.20	161	39	22	65	2.3	258	6.9
Feb. 1-10-----	779	15	--	8.0	4.7	25		16	30	35		.4		a137	.19	288	39	26	58	1.7	220	6.8
Feb. 11-14-----	944	15	--	10	6.8	37		15	41	56		.2		173	.24	441	53	41	61	2.2	318	7.1
Feb. 15-20-----	1,962	14	--	4.8	3.4	11		15	16	15		.8		72	.10	381	26	14	49	1.0	115	6.9
Feb. 21-28-----	2,441	14	--	6.0	3.8	14		16	18	21		.8		86	.12	567	31	18	51	1.1	141	6.9
Mar. 1-6-----	1,482	16	--	8.0	4.5	27		18	27	38		.5		a143	.19	572	38	24	60	1.9	222	5.9
Mar. 7-20-----	827	14	--	9.0	5.0	31		20	32	43		.8		a155	.21	346	43	27	61	2.1	254	6.9
Mar. 21-31-----	563	14	--	8.5	5.3	24		24	27	34		.2		a137	.19	208	43	23	55	1.6	217	6.9
Apr. 1-4, 10-12-----	691	14	--	9.0	4.9	20	2.3	28	26	27		.5		118	.16	220	43	20	49	1.3	204	6.9
Apr. 5-9-----	574	13	--	11	6.0	42		24	27	68		.4		179	.24	277	52	32	64	2.5	339	6.8
Apr. 13-14, 18-23-----	2,214	14	--	4.5	2.7	8.0	1.9	18	12	10		1.0		63	.09	377	22	8	41	.7	98	6.7
Apr. 15-17, 24-30-----	2,269	15	--	7.8	3.5	14		20	18	20		.8		89	.12	545	34	17	47	1.0	150	7.1
May 1-7, 11-----	2,897	14	--	9.0	4.5	23		26	20	34		1.0		118	.16	923	41	20	55	1.6	212	6.7
May 8-10-----	10,580	10	--	9.0	5.0	41		12	18	72		1.5		162	.22	4,630	43	33	67	2.7	314	6.4
May 12-20-----	5,006	10	--	5.5	3.3	20		21	18	24		1.0		92	.13	1,240	27	10	61	1.7	150	6.5
May 21-28-----	782	15	--	9.0	4.4	18		36	15	24		1.5		105	.14	222	41	11	49	1.2	178	6.7
May 29-31, June 1-8-----	1,483	16	--	6.8	3.6	14		30	13	16		1.2		86	.12	344	32	7	48	1.1	134	6.8
June 9-14, 17-22, 29-----	611	18	--	8.8	4.5	18		36	15	24		1.2		108	.15	178	40	11	49	1.2	174	7.0
June 15-16, 23-28, 30-----	432	17	--	9.5	4.7	37		33	17	56		.2		157	.21	183	43	16	65	2.5	288	6.4
July 1-10-----	365	19	--	9.0	4.8	25		32	21	34		1.2		130	.18	128	42	16	56	1.7	207	6.7
July 11-20-----	181	20	--	8.5	4.7	23		42	15	28		1.2		121	.16	59.1	41	6	55	1.6	190	6.9
July 21-31-----	538	17	--	7.8	3.9	20		30	19	24		1.0		108	.15	157	36	11	55	1.5	168	6.4
Aug. 1-10-----	770	19	--	9.0	4.4	26		19	27	37		.5		132	.18	274	41	25	58	1.7	222	6.7
Aug. 11-20-----	165	21	--	8.8	4.7	21		34	20	27		1.0		120	.16	53.5	41	13	53	1.4	194	6.7
Aug. 21-25-----	138	20	--	8.0	4.1	23		38	14	28		1.0		117	.16	43.6	37	6	57	1.6	187	6.4
Aug. 27-31-----	152	16	--	9.8	5.0	44		30	14	71		.8		a186	.25	76.3	45	20	68	2.8	316	6.3
Sept. 1-10-----	176	20	--	7.0	4.0	22		38	15	25		.8		113	.15	53.7	34	3	59	1.6	183	6.7
Sept. 11-20-----	79.1	19	--	6.8	3.7	22		38	13	24		.8		108	.15	23.1	32	1	59	1.7	175	6.4
Sept. 21-30-----	65.0	19	--	6.8	3.8	21		42	12	22		.8		106	.14	18.6	33	0	58	1.6	173	6.7
Weighted average-----	994	14	--	7.5	4.0	22		22	19	32		0.9		111	0.15	298	35	17	58	1.6	190	--

a Residue on evaporation at 180°C.

NECHES RIVER BASIN--Continued

410. 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 1959.

Water temperatures: October 1947 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 156 ppm Mar. 6; minimum, 52 ppm Oct. 1-10.

Hardness: Maximum, 48 ppm Mar. 6; minimum, 18 ppm Oct. 1-10.

Specific conductance: Maximum daily, 295 micromhos Jan. 4; minimum daily, 61 micromhos Oct. 4.

Water temperatures: Maximum, 88°F July 1, 5-6, 11-13; minimum, 46°F Jan. 5-7, 11.

EXTREMES, 1947-59.--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 daily, 422 micromhos Jan. 25, 1957; minimum daily, 44 micromhos Sept. 22, 1958.

Water temperatures: Minimum, 37°F Jan. 30-31, 1948, Jan. 31, 1949.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-10, 1958-----	17,780	10		4.8	1.5	6.6	2.8	16	9.2	8.8	0.0	0.5		52	0.07	2,500	18	5	40	0.7	76	6.9
Oct. 11-20-----	7,197	13		7.0	2.4	12		22	12	16	.0	.5		74	.10	1,440	28	10	49	1.0	123	7.0
Oct. 21-31-----	1,615	14		8.5	2.8	17		28	15	22	.0	.2		94	.13	410	32	10	53	1.3	159	7.1
Nov. 1-10-----	1,597	18		9.8	2.9	20		29	17	27	.2	.8		110	.15	474	36	12	55	1.5	181	7.1
Nov. 11-20-----	1,438	18		10	2.8	22		33	16	28	.1	.8		114	.16	443	36	10	57	1.6	191	7.0
Nov. 21-30-----	2,788	18		9.5	2.7	25		34	17	30	.1	.5		120	.16	903	34	6	61	1.9	195	7.2
Dec. 1-10-----	1,914	16		8.8	3.5			36	18	28	.2	.8		117	.16	605	36	7	59	1.7	196	7.2
Dec. 11-20-----	1,227	18		8.8	3.6	25		40	17	28	.1	.8		121	.16	401	37	4	59	1.8	201	7.1
Dec. 21-31-----	1,972	16		8.5	3.6	25		34	18	30	.1	.5		119	.16	634	36	8	60	1.8	201	7.0
Jan. 1-10, 1959-----	1,529	20		9.0	3.8	25	2.6	32	20	35	.2	.8		132	.18	545	38	12	57	1.8	221	7.6
Jan. 11-20-----	1,945	19		9.0	3.7	28		32	21	35	.2	.0		a140	.19	735	38	12	62	2.0	218	6.8
Jan. 21-29-----	1,608	18		9.0	3.7	29		32	22	36	.2	.4		a139	.19	603	38	12	63	2.1	222	7.1
Jan. 30-31, Feb. 1-5-----	5,077	8.4		5.5	1.8	12		16	12	14	.1	.8		63	.09	864	21	8	54	1.1	111	6.8
Feb. 6-20-----	7,185	12		7.1	2.8	19		19	21	22	.2	.8		94	.13	1,820	29	14	58	1.5	159	6.8
Feb. 21-28-----	9,835	11		5.6	2.5	15		14	18	18	.2	.8		78	.11	2,070	24	13	57	1.3	134	6.6
Mar. 1-5, 7-10-----	7,724	12		7.2	2.6	19		13	26	22	.0	.8		96	.13	2,000	28	18	59	1.5	162	6.5
Mar. 6-----	5,660	14		13	3.8	33		16	32	50	.1	2.0		156	.21	2,380	48	35	60	2.0	273	7.1
Mar. 11-20-----	5,298	13		8.8	3.2	21		15	26	29	.0	.5		108	.15	1,540	35	22	57	1.6	192	6.4
Mar. 21-31-----	3,743	14		10	3.9	24		21	30	32	.0	.5		124	.17	1,250	41	24	56	1.6	218	6.5
Apr. 1-11-----	3,341	14		10	4.2	23	2.8	26	28	32	.2	.5		128	.17	1,150	42	21	52	1.5	221	7.1
Apr. 12-22-----	12,790	11		8.5	2.8	18		20	21	22	.2	1.0		94	.13	3,250	32	16	54	1.4	164	7.1
Apr. 23-30-----	24,500	9.4		5.0	1.8	8.4	2.6	16	13	10	.2	.5		59	.08	3,900	20	7	44	.8	92	6.6
May 1-4-----	10,880	11		8.0	2.9	13		18	18	18	.2	1.0		81	.11	2,380	32	17	47	1.0	144	6.2
May 5-20-----	8,604	12		10	3.8	22		22	23	32	.2	1.0		115	.16	2,670	40	22	54	1.5	206	6.0
May 21-31-----	12,030	9.4		7.5	3.0			22	12	26	.2	1.2		87	.12	2,830	31	13	55	1.3	162	6.4
June 1-10-----	6,216	14		9.0	3.2	14		30	11	20	.1	1.0		87	.12	1,460	36	11	46	1.0	155	6.4
June 11-20-----	7,007	14		8.0	3.4	12		30	11	16	.1	1.0		80	.11	1,510	34	10	43	.9	137	6.3
June 21-30-----	2,908	14		9.0	3.7	14		36	11	18	.1	1.0		89	.12	699	38	8	45	1.0	147	6.4
July 1-12-----	1,950	17		10	3.6	26		42	13	33	.3	1.0		125	.17	658	40	6	59	1.8	205	7.3
July 13-24-----	1,492	18		10	3.7	25		44	13	30	.3	.8		123	.17	495	40	4	57	1.7	199	6.7
July 25-31-----	7,977	12		7.8	2.4	17		26	14	21	.2	.5		88	.12	1,900	30	8	56	1.4	147	6.5
Aug. 1-10-----	4,862	13		6.0	1.9	13		22	14	13	.2	.8		73	.10	954	23	5	56	1.2	116	6.3
Aug. 11-20-----	2,345	15		7.0	2.5	14		25	18	14	.2	.8		84	.11	532	28	8	53	1.2	128	6.0
Aug. 21-31-----	1,545	17		7.8	3.2	18		30	17	20	.2	.8		99	.13	413	32	8	54	1.4	159	6.2
Sept. 1-10-----	1,451	16		9.5	3.7	27		32	18	37	.2	.8		128	.17	501	38	12	61	1.9	224	6.3
Sept. 11-20-----	1,077	20		9.5	3.7	23		36	17	28	.2	.8		120	.16	349	38	9	56	1.6	195	6.5
Sept. 21-30-----	535	20		10	4.2	22		44	15	27	.2	.8		121	.16	175	42	6	53	1.5	197	6.6
Weighted average	5,162	12		7.5	2.8	17		22	17	21	0.1	0.8		89	0.12	1,240	30	12	55	1.3	151	--

a Residue on evaporation at 180°C.

NECHES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN NECHES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25 C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Mar. 19, 1959	115	13		9.2	1.5	5.3	0.6	29	3.0	9.5	0.0	0.0		29	0.08	5	28	0.4		88	6.8

CYPRESS CREEK AT US HIGHWAY 190 NEAR WOODVILLE

415. VILLAGE CREEK NEAR KOUNTZE

Mar. 19, 1959	277	15		6.2	2.1	3.1	1.2	14	2.8	54	0.1	0.0		118	0.16	13	73	2.7		21.4	6.3
Apr. 17	1,890	9.0		3.2	1.7	8.7		10	3.6	16	.1	.5		49	.07	7	53	1.0		83	5.9

CYPRESS CREEK AT STATE HIGHWAY 326 NEAR KOUNTZE

Mar. 18, 1959		7.8		1.6	4.4	10.6		14	0.0	196	0.2	1.0		338	0.46	46	80	6.1		680	6.2
---------------	--	-----	--	-----	-----	------	--	----	-----	-----	-----	-----	--	-----	------	----	----	-----	--	-----	-----

a Field estimate.

TRINITY RIVER BASIN

625. TRINITY RIVER NEAR ROSSER, TEX.

LOCATION.--At gaging station at bridge on State Highway 34, 2.5 miles south of Rosser, Kaufman County, and 8.5 miles downstream from East Fork Trinity River.

DRAINAGE AREA.--8,162 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.

Water temperatures: October 1954 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 745 ppm Dec. 21-31; minimum, 174 ppm Apr. 19.

Hardness: Maximum, 197 ppm Feb. 26-28, Mar. 1-5; minimum, 104 ppm Apr. 19.

Specific conductance: Maximum daily, 1,280 micromhos Dec. 30; minimum daily, 266 micromhos May 3.

Water temperatures: Maximum, 87°F July 9, 11; minimum, 34°F Dec. 23, Jan. 3.

EXTREMES, 1954-59.--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 daily, 2,990 micromhos Oct. 13, 1956; minimum daily, 224 micromhos Nov. 6, 1957.

Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956, Dec. 23, 1958, Jan. 3, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-9, 11 1958-----	920	10		52	3.9			166	60	36	--	12		320	0.44	795	146	10	44	1.9	512	7.9
Oct. 10, 12-20-----	720	13		54	4.8			184	88	54	--	23		426	.58	828	154	3	54	2.9	676	7.6
Oct. 21-31-----	704	11		56	4.8			188	105	49	--	24		432	.59	821	159	5	55	3.1	691	7.5
Nov. 1-10-----	282	14		63	5.5			195	140	85	--	43		585	.80	445	180	20	61	4.2	926	7.8
Nov. 11-20-----	347	14		59	5.5			187	149	91	--	47		a598	.81	560	170	16	64	4.7	960	7.6
Nov. 21-30-----	361	15		63	5.5			204	147	87	--	42		a596	.81	581	180	12	62	4.4	958	7.1
Dec. 1-10-----	432	11		66	5.5			191	114	73	--	39		537	.73	626	187	30	54	3.3	849	7.0
Dec. 11-20-----	294	13		68	5.9			238	144	93	--	49		a638	.87	306	194	0	62	4.6	1,050	7.0
Dec. 21-31-----	284	14		66	6.6			288	178	105	--	43		a745	1.01	371	192	0	68	6.0	1,180	7.2
Jan. 1-10, 1959-----	360	14		66	6.0	130	14	180	167	90	0.9	53		667	.91	648	189	42	58	4.1	1,050	7.0
Jan. 11-20-----	312	14		62	5.5			202	167	98	--	55		695	.95	585	177	12	66	5.2	1,100	6.8
Jan. 21-31-----	299	14		62	6.1			235	184	104	--	57		a726	.99	586	180	0	69	5.9	1,160	7.0
Feb. 1-13-----	327	14		64	6.0			188	161	108	--	53		670	.91	592	184	30	64	4.9	1,060	7.4
Feb. 14-15-----	5,260	12		47	2.6			b136	36	14	--	11		a213	.29	3,030	128	16	28	.9	351	8.5
Feb. 16-25-----	1,192	8.8		66	4.4			175	93	36	--	15		375	.51	1,210	182	39	40	1.8	607	7.7
Feb. 26-28, Mar. 1-5-----	493	13		70	5.5			190	130	73	--	33		559	.76	744	197	42	53	3.2	873	8.0
Mar. 6-9, 11-13-----	1,513	8.8		54	3.8			140	64	32	--	14		312	.42	1,270	150	36	37	1.4	487	7.4
Mar. 10, 14-20-----	537	11		62	5.4			172	90	52	--	20		412	.56	597	176	36	46	2.2	659	7.4
Mar. 21-31-----	433	11		64	5.1			186	116	70	--	26		516	.70	603	180	28	54	3.2	824	6.9
Apr. 1-10-----	382	13		64	5.6	109	9.7	189	138	77	.8	39		576	.78	594	182	28	55	3.5	880	7.8
Apr. 11-18-----	433	12		63	5.7			187	122	76	--	30		544	.74	636	180	28	56	3.4	833	7.5
Apr. 19-----	6,510	10		40	1.1			110	34	8.0	--	9.1		a174	.24	3,060	104	14	28	.8	287	8.0
Apr. 20-30-----	1,278	8.2		63	4.9			168	95	43	--	18		412	.56	1,420	177	40	43	2.0	635	7.6
May 1-2, 5-10-----	460	13		56	5.6			185	108	74	--	26		508	.69	631	162	11	58	3.6	804	7.7
May 3-4, 11-12-----	4,682	10		43	3.5			120	50	14	--	7.9		a212	.29	2,680	122	23	31	1.0	367	7.9
May 13-20-----	779	11		60	5.0			167	99	48	--	15		412	.56	867	170	33	47	2.3	657	7.7
May 21-31-----	452	11		60	6.0			187	128	79	--	20		542	.74	661	174	21	58	3.6	871	7.0
June 1-5-----	870	16		62	6.2			149	166	100	--	29		a581	.79	1,360	180	58	61	4.2	988	7.5
June 6-8-----	2,083	13		49	3.8			145	67	37	--	15		a309	.42	1,740	138	19	45	1.9	508	7.8
June 9-22-----	449	15		60	5.2			188	122	82	--	27		a517	.70	627	171	17	59	3.8	847	7.4
June 23-30-----	2,881	11		53	4.2			146	82	31	--	9.4		341	.46	2,650	150	30	42	1.7	516	7.3
July 1-6, 9-11-----	386	12		55	5.5			168	90	64	--	21		640	.60	459	160	22	53	2.8	688	7.2
July 7-8, 12-20-----	332	20		57	6.5			200	137	105	--	23		424	.85	559	168	4	64	4.7	980	7.0
July 21-31-----	995	12		50	3.8			156	58	37	--	9.0		306	.42	822	140	13	43	1.8	499	6.7
Aug. 1-2, 13-----	466	14		51	3.8			167	78	50	--	12		a363	.49	457	142	6	52	2.6	597	7.4
Aug. 3-8-----	472	12		52	4.3			168	91	55	--	15		402	.55	512	147	10	54	2.9	638	7.3
Aug. 9-12, 14, 20-22-----	361	12		49	4.6			167	107	70	--	21		457	.62	445	142	4	61	3.7	734	6.9
Aug. 15-19, 23-31-----	250	16		49	5.3			187	150	109	--	28		613	.83	414	144	0	70	5.7	1,010	6.6
Sept. 1-10-----	294	19		48	5.1			181	162	104	--	34		660	.90	524	141	0	71	5.9	1,030	7.5
Sept. 11-20-----	192	18		42	6.0			189	126	108	--	44		621	.84	322	130	0	73	6.0	986	7.2
Sept. 21-30-----	262	19		35	5.8			202	136	125	--	43		695	.95	492	112	0	78	7.7	1,120	6.8
Weighted Average-----	664	12		56	4.6			168	97	54	--	22		425	0.58	762	158	21	52	2.8	678	--

a Calculated from determined constituents.

b Includes equivalent of 5 parts per million of carbonate (CO₃).

TRINITY RIVER BASIN--Continued

646. 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 1959.

Water temperatures: April 1956 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 4,260 ppm Feb. 4; minimum, 140 ppm June 24-27.

Hardness: Maximum, 300 ppm Feb. 4; minimum, 94 ppm June 24-27.

Specific conductance: Maximum daily, 10,100 micromhos Sept. 25; minimum daily, 217 micromhos June 25.

Water temperatures: Maximum, 91 °F Aug. 3, 6; minimum, freezing point Jan. 3-4.

EXTREMES, 1956-59.--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 daily, 22,000 micromhos Aug. 22, 1956; minimum daily, 157 micromhos Apr. 25, 1957.

Water temperatures: Maximum, 98°F Aug. 3, 1957; minimum, freezing point, Jan. 3-4, 1959.

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 1958 to September 1959

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	Non-carbonate					
Oct. 1-4, 11, 1958-----		13	0.01	76	5.2	218		225	48	315	0.4	8.0		804	1.09		211	26	69	6.6	1,440	8.2	
Oct. 5-10-----		12	.02	68	4.4	114		175	56	162	.4	5.5		524	.71		188	44	57	3.6	924	8.2	
Oct. 12-22-----		10	.02	77	6.3	383		246	50	560	.4	7.5		1,220	1.66		218	16	73	11	2,220	8.0	
Oct. 23-27-----		10	.09	52	3.3	55		131	59	63	.4	3.8		322	.44		143	36	45	2.0	540	7.9	
Oct. 28-31-----		12	.03	76	5.0	190		208	57	275	.4	5.0		749	1.02		210	40	66	5.7	1,330	7.9	
Nov. 1-4, 8-9, 18-20-----	9.6		.01	92	6.7	275		250	84	395	.4	6.5		al,000	1.36		257	52	70	7.5	1,800	8.0	
Nov. 5-7-----	8.4		.03	76	5.9	85		192	91	101	.4	5.1		482	.66		214	56	46	2.5	798	8.0	
Nov. 10-17-----	5.8		.02	93	10	699		310	61	1,040	.5	9.0		2,070	2.82		273	19	85	18	3,730	8.0	
Nov. 21-25-----	11		.04	89	7.6	475		250	85	700	.5	4.2		1,500	2.04		254	48	80	13	2,650	8.2	
Dec. 7-----		13	.03	75	4.2	108		180	85	140	.5	6.5		b521	.71		204	57	54	3.3	929	8.2	
Dec. 11, 18-20-----	6.4		.01	95	7.5	520		297	72	760	.5	9.0		1,620	2.20		268	24	81	14	2,900	8.2	
Dec. 21-31-----	6.2		.01	97	7.6	531		296	73	780	.6	9.6		1,650	2.24		274	31	81	14	2,980	8.2	
Jan. 1, 9-10, 1959-----	5.2		.01	100	7.7	389	5.1	277	98	580	.6	6.9		1,330	1.81		281	54	75	10	2,360	8.2	
Jan. 2-8-----	4.6		.01	88	6.0	215		248	82	295	.4	6.1		856	1.16		244	41	66	6.0	1,490	8.2	
Jan. 11-15, 18-31-----	3.8		--	95	9.1	555		292	89	810	--	8.0		1,710	2.33		274	36	81	15	3,100	8.2	
Jan. 16-17-----	6.4		--	85	8.4	145		189	121	195	--	6.0		674	.92		246	92	56	4.0	1,170	7.9	
Feb. 1-3-----	8.8		--	90	10	723		c298	88	1,060	.5	7.0		2,130	2.90		266	21	86	19	3,830	8.5	
Feb. 4-----	--		--	--	--	--		d384	--	2,350	--	--		4,260	5.79		300	0	--	--	7,480	8.6	
Feb. 5-10, 14-----	8.8		--	78	6.4	147		210	89	190	.5	7.3		654	.89		221	49	59	4.3	1,110	8.0	
Feb. 11-13-----	5.6		--	88	8.1	332		252	108	460	.5	6.0		1,130	1.54		253	46	74	9.0	2,030	8.0	
Feb. 15-20-----	12		--	54	4.0	36		140	58	32	.5	8.5		288	.39		151	36	34	1.3	455	7.7	
Feb. 21-28-----	12		--	96	6.5	114		244	79	158	.7	8.8		626	.85		266	66	48	3.0	1,040	8.2	
Mar. 1-5, 7-8-----	9.6		--	96	6.6	174		251	78	248	.6	9.2		772	1.05		266	61	59	4.7	1,330	8.1	
Mar. 6-----	12		--	86	9.9	595		e276	68	880	.7	8.5		1,800	2.45		255	28	84	16	3,240	8.6	
Mar. 9-15-----	10		.00	92	6.7	142		f216	98	198	.3	7.7		b661	.90		257	198	80	55	3.9	1,190	8.6
Mar. 16-21-----	7.0		.00	89	7.0	252		g242	75	365	.2	8.2		b922	1.25		251	52	69	6.9	1,710	8.7	
Mar. 22-----	9.0		--	42	3.2	54		110	46	67	.3	3.5		b279	.38		118	28	50	2.2	499	8.2	
Mar. 23-31-----	3.8		.00	82	7.6	343		h229	76	502	.3	6.0		1,130	1.54		236	48	76	9.7	2,120	8.5	
Apr. 1-2-----	--		--	--	--	--		276	--	772	--	--		--	--		252	26	--	--	2,930	7.9	
Apr. 3-5-----	10		.01	49	3.0	68	3.5	133	54	83	.6	4.9		b341	.46		135	26	51	2.5	611	7.6	
Apr. 6-9-----	9.6		.01	72	5.5	192		185	91	262	.6	3.0		769	1.05		202	50	67	5.9	1,320	8.0	
Apr. 10-11, 16-17-----	10		.03	58	4.0	69		147	58	88	.5	5.0		392	.53		161	40	48	2.4	650	7.7	
Apr. 12-15, 18-22-----	11		--	48	3.4	30		129	47	28	.5	5.7		254	.35		134	28	33	1.1	400	7.5	
Apr. 23-24-----	13		--	61	3.6	34		159	57	33	.4	3.8		296	.40		167	37	31	1.1	477	8.0	
Apr. 25-30, May 1-2-----	11		--	88	6.2	123		238	75	165	.3	6.3		618	.84		245	50	52	3.4	1,070	7.7	
May 3, 5-7, 12 at 6pm-----	11		.03	62	4.5	78		170	52	102	.4	4.8		416	.57		173	34	49	2.6	706	7.8	
May 4, 10-11, 12 at 6:48 am, 13-15-----	10		.07	39	2.3	17		112	27	14	.4	3.0		181	.25		107	15	25	.7	285	7.4	
May 8-----	--		--	--	--	--		206	--	230	--	--		--	--		214	45	--	--	1,260	7.9	
May 9-----	--		--	--	--	--		209	--	458	--	--		--	--		232	60	--	--	2,000	7.9	
May 16-18, 26-31-----	13		.03	70	4.8	44		183	60	51	.4	5.2		356	.48		194	44	33	1.4	570	7.7	

a Residue on evaporation at 180°C.

b Calculated from determined constituents.

c Includes equivalent of 12 parts per million of carbonate (CO₃).

d Includes equivalent of 27 parts per million of carbonate (CO₃).

e Includes equivalent of 13 parts per million of carbonate (CO₃).

f Includes equivalent of 10 parts per million of carbonate (CO₃).

g Includes equivalent of 14 parts per million of carbonate (CO₃).

h Includes equivalent of 8 parts per million of carbonate (CO₃).

TRINITY RIVER BASIN--Continued

646. RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25 C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
June 1, 3-4, 14-20, 1959		14	0.01	86	6.1	114		222	76	155	0.5	6.6		598	0.81		240	58	51	3.2	1,000	7.9	
June 5, 11-13-----		14	.02	64	3.9	48		170	59	52	.5	4.8		346	.47		176	36	37	1.6	558	7.5	
June 6-10-----		13	.03	45	2.6	19		129	35	13	.5	3.0		208	.28		123	17	23	.7	325	7.3	
June 21-----		--	--	--	--	--		179	--	--	--	--		--	--		204	58	--	--	--	1,260	7.6
June 22-23, 28-30-----		14	.03	48	3.0	30		133	42	30	.5	2.5		250	.34		132	23	33	1.2	401	7.6	
June 24-27-----		11	.09	34	2.1	12		102	21	8.0	.5	1.5		b140	.19		94	10	22	.5	239	7.5	
July 1-4-----		12	.04	66	5.1	52		164	49	77	.4	3.2		376	.51		186	51	38	1.6	633	6.5	
July 5, 7-9, 11-15-----		14	.02	80	7.3	168		201	76	24.5	.5	5.0		751	1.02		230	65	61	4.8	1,300	7.0	
July 16-20-----		9.8	--	74	8.2	288		196	78	42.5	.4	4.2		b984	1.34		218	58	74	8.5	1,790	7.3	
July 21-----		15	--	39	2.2	59		136	49	47	.7	4.5		b283	.38		106	0	55	2.5	459	8.0	
July 22-31, Aug. 1-2-----		13	--	64	4.4	128		156	83	168	.6	3.0		550	.75		178	50	61	4.2	933	7.5	
Aug. 3-6-----		13	--	65	6.1	261		184	72	372	.6	1.8		894	1.22		187	36	75	8.3	1,600	8.0	
Aug. 7, 9-15-----		10	--	70	7.9	534		196	74	800	.7	.5		1,590	2.16		207	46	85	16	2,880	7.8	
Aug. 16-28, 30-31-----		8.0	--	86	10	812		274	70	1,220	.7	.5		2,340	3.18		256	31	87	22	4,180	7.9	
Sept. 1-5, 17-23, 25-26-----		7.8	.02	88	16	1,360		323	77	2,050	.8	--		3,760	5.11		286	21	91	35	6,600	7.7	
Sept. 7-16, 28-29-----		7.8	.00	72	11	777		271	78	1,140	.6	1.5		2,220	3.05		224	2	88	23	3,970	8.1	
Sept. 30-----		--	--	--	--	--		159	--	465	--	--		--	--		122	0	--	--	--	1,790	8.0

b Calculated from determined constituents.

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 and 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 1959.

Water temperatures: February 1950 to September 1951, April 1953 to January 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 666 ppm Sept. 7-8, 10-16; minimum, 132 ppm Apr. 12-22.

Hardness: Maximum, 187 ppm Sept. 7-8, 10-16; minimum, 66 ppm Apr. 12-22.

Specific conductance: Maximum daily, 1,520 micromhos Sept. 15; minimum daily, 194 micromhos Apr. 13.

EXTREMES, 1945-50, 1953-59.--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 daily, 3,800 micromhos Oct. 30, 1956; minimum daily, 103 micromhos Nov. 9, 1946.

Water temperatures (1953-58): Maximum, 98°F July 18, 27, 1953; minimum, 38°F Jan. 18, 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-10, 1958	4,813	15		44	4.0	37		124	40	43	--	3.5		264	0.36	3,430	126	25	39	1.4	434	8.0
Oct. 11-20	1,691	16		56	5.2	73		154	50	98	--	5.5		397	.54	1,810	161	35	50	2.5	681	7.9
Oct. 21-31	1,420	14		59	5.3	84		165	62	104	--	7.5		434	.59	1,660	169	34	52	2.8	742	7.8
Nov. 1-10	961	14		53	5.0	75		148	50	97	--	7.0		392	.53	1,020	152	31	52	2.6	675	7.7
Nov. 11-20	754	15		58	5.5	75		156	58	98	--	3.5		407	.55	829	167	39	49	2.5	691	7.8
Nov. 21-30	1,072	11		55	6.3	116		145	63	161	--	3.5		506	.69	1,460	163	44	61	3.9	897	7.8
Dec. 1-14	1,321	16		51	6.9	135		143	73	178	--	7.2		555	.75	1,980	156	38	65	4.7	964	7.5
Dec. 15-31	860	16		55	6.8	115		146	73	151	--	8.5		506	.69	1,170	165	46	60	3.9	883	7.8
Jan. 1-15, 1959	1,073	16		53	7.3	125	6.3	140	75	177	0.3	8.5		555	.75	1,610	162	48	62	4.3	958	7.5
Jan. 16-31	824	13		56	8.0	144		150	89	185	--	10		595	.81	1,320	172	50	64	4.8	1,040	7.8
Feb. 1-6	2,469	15		36	3.4	65		89	41	88	--	6.2		a299	.41	1,990	104	31	57	2.8	534	8.0
Feb. 7-15, 19-20	4,450	17		46	6.6	115		115	70	155	--	8.2		511	.69	6,140	142	48	64	4.2	811	7.9
Feb. 16-18	17,300	12		24	2.3	34		60	31	41	--	4.1		a178	.24	8,310	70	20	51	1.8	313	7.7
Feb. 21-28	9,192	14		39	3.9	35		110	44	35	--	5.3		a230	.31	5,710	114	24	40	1.4	395	7.8
Mar. 1-8	2,382	16		46	5.5	58		122	56	72	--	4.8		344	.47	2,210	138	38	48	2.2	555	7.7
Mar. 9-20	3,354	14		49	6.5	91		129	70	114	--	8.4		438	.60	3,970	149	44	57	3.2	735	7.7
Mar. 21-31	1,673	13		51	5.7	62		137	58	77	--	5.5		366	.50	1,650	150	38	47	2.2	593	7.8
Apr. 1-9	1,814	16		59	8.0	101	5.1	147	73	140	.4	4.8		516	.70	2,530	180	60	54	3.3	856	7.8
Apr. 10-11	10,530	20		29	4.1	43		82	37	53	--	3.8		a230	.31	6,540	90	22	51	2.0	393	7.8
Apr. 12-22	23,990	12		22	2.8	19		64	20	23	--	2.0		a132	.18	8,550	66	14	38	1.0	235	7.3
Apr. 23-30	13,800	14		38	3.8	26		110	35	27	--	3.7		a202	.27	7,530	110	20	34	1.1	355	7.6
May 1-7, 13-15	7,442	14		48	5.1	49		128	48	64	--	2.5		a294	.40	5,910	141	36	43	1.8	521	7.6
May 8-12, 16-20	16,980	9.8		32	3.0	18		96	20	22	--	2.5		a154	.21	7,060	92	14	30	.8	284	7.5
May 21-31	21,250	11		34	3.4	19		94	27	24	--	1.5		a166	.23	9,520	99	22	29	.8	296	7.4
June 1-10	5,083	22		43	5.1	44		118	46	54	--	3.5		286	.39	3,930	128	32	43	1.7	461	7.2
June 11-17, 29-30	10,700	16		42	3.8	26		125	35	25	--	4.5		230	.31	6,640	120	18	32	1.0	359	7.2
June 18-28	3,505	21		48	5.0	52		143	41	65	--	2.8		308	.42	2,910	140	24	45	1.9	512	7.4
July 1-9	13,670	22		42	3.8	26		128	35	24	--	1.5		226	.31	8,340	120	16	32	1.0	350	7.8
July 10-25	1,502	19		58	5.8	66		166	46	88	--	3.5		372	.51	1,510	168	32	46	2.2	626	6.8
July 26-31	9,658	13		28	3.0	52		83	35	63	--	3.0		a238	.32	6,210	82	14	58	2.5	414	7.3
Aug. 1-5, 9-16	2,202	17		40	4.2	56		116	40	71	--	2.2		308	.42	1,830	118	22	51	2.2	501	7.3
Aug. 6-8, 17-20, 22	1,413	17		50	5.6	71		140	45	99	--	2.2		382	.52	1,460	148	34	51	2.5	639	7.5
Aug. 21, 23-25	948	20		57	6.0	112		171	46	157	--	.8		a483	.66	1,240	166	26	59	3.8	832	7.9
Aug. 26-31	1,545	13		43	4.5	73		133	53	86	--	.2		357	.49	1,490	126	17	56	2.8	579	7.8
Sept. 1-6, 9	939	19		51	6.2	93		162	57	114	--	1.8		435	.59	1,100	152	20	57	3.3	741	7.6
Sept. 7-8, 10-16	752	11		62	7.9	171		187	75	232	--	1.8		666	.91	1,350	187	34	67	5.4	1,180	7.6
Sept. 17-30	518	13		60	7.4	157		205	63	203	--	1.5		614	.84	855	180	12	65	5.1	1,100	7.6
Weighted average	4,909	14		38	4.1	42		107	37	54	--	3.4		249	0.34	3,300	112	24	45	1.7	425	--

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued
671. 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 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 693 ppm Dec. 5-8; minimum, 143 ppm Apr. 12-20.
Hardness: Maximum, 194 ppm Sept. 17-24, 27-30; minimum, 69 ppm Apr. 12-20.
Specific conductance: Maximum daily, 1,270 micromhos Dec. 6; minimum daily, 235 micromhos Apr. 18.
EXTREMES, 1949-59.--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 daily, 7,630 micromhos Aug. 27, 1952; minimum daily, 127 micromhos Oct. 7, 1949.
REMARKS.--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 1958 to September 1959

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	Non-carbonate				
Oct. 1-8, 27-28, 1958		10		38	3.1		30	114	26	36		2.0		218	0.30		108	14	38	1.3	356	7.6
Oct. 9-16		12		48	4.2		46	139	35	60		3.0		292	.40		137	23	42	1.7	490	7.8
Oct. 17-26, 29-31		11		58	5.3		79	169	48	104		4.0		408	.55		166	28	51	2.7	699	7.9
Nov. 1-15		17		58	5.1		83	164	48	111		5.5		420	.57		166	31	52	2.8	725	7.6
Nov. 16-30		12		60	5.4		89	164	55	121		2.5		433	.59		172	37	53	2.9	769	7.6
Dec. 2-4, 9-15		17		53	7.0		121	149	73	155		8.0		544	.74		161	39	62	4.1	926	7.3
Dec. 5-8		17		61	8.0		173	172	62	252		.5		693	.94		185	44	67	5.5	1,210	7.0
Dec. 19-31		16		59	6.9		110	160	67	148		7.0		514	.70		176	44	58	3.6	890	7.4
Jan. 1-14, 1959		14		60	9.0	133	6.4	159	75	192	0.5	4.0		611	.83		186	56	60	4.2	1,030	7.8
Jan. 15-28		12		60	7.9		149	164	75	204		6.6		645	.88		182	48	64	4.8	1,090	7.6
Jan. 29-31, Feb. 1		12		45	5.0		88	111	47	127		5.6		403	.55		133	42	59	3.3	705	8.1
Feb. 2-8	9.4			27	2.6		44	71	27	60		3.4		a208	.28		78	20	55	2.2	384	7.6
Feb. 9-12, 16		12		43	4.7		76	104	54	105		5.2		374	.51		127	42	57	2.9	632	7.4
Feb. 13-15, 17-28		12		42	3.2		35	115	44	35		4.8		a233	.32		118	24	39	1.4	402	7.6
Mar. 1-8		16		43	4.9		49	116	41	66		4.0		304	.41		127	32	46	1.9	486	7.9
Mar. 10-14, 20-24		16		52	6.8		85	130	70	112		6.9		435	.59		158	51	54	3.0	728	7.5
Mar. 15-19, 26-31		14		50	4.9		50	141	42	65		4.8		313	.43		145	30	43	1.8	524	7.9
Apr. 1-11		14		56	6.1	78	5.1	146	61	112		4.2		430	.58		164	45	50	2.6	730	7.9
Apr. 12-20	9.0			24	2.2		23	67	20	30		1.8		a143	.19		69	14	42	1.2	255	7.0
Apr. 21-30		11		36	3.2		30	101	33	35		2.8		a201	.27		103	20	39	1.3	347	7.5
May 1-5		13		40	4.1		32	111	33	42		2.5		a222	.30		117	26	37	1.3	400	7.1
May 6-8		13		60	6.2		61	150	67	80		3.6		a365	.50		175	52	43	2.0	655	7.4
May 9-20	9.8			32	3.3		28	96	22	36		2.0		a180	.24		93	15	39	1.3	333	7.2
May 21-31		10		36	3.2		23	101	26	29		2.0		a179	.24		103	20	32	1.0	327	7.2
June 1-2, 4-12, 14		15		40	3.5		34	123	35	34		2.5		236	.32		114	13	39	1.4	390	7.2
June 13, 17-20		16		54	5.2		53	157	43	68		3.0		332	.45		156	28	43	1.9	564	7.3
June 21-30		14		50	4.5		60	142	43	78		3.0		334	.45		144	27	48	2.2	574	7.3
July 1-4, 6		10		38	3.4		21	101	34	24		2.0		a182	.25		109	26	29	.9	337	6.2
July 7, 9-13		18		56	5.0		44	152	47	56		2.8		330	.45		160	36	37	1.5	532	6.7
July 15-24		14		49	4.8		39	133	30	60		2.0		a264	.36		142	33	37	1.4	488	6.5
July 25-30	9.2			28	2.4		30	72	26	40		2.8		a173	.24		80	21	45	1.5	333	6.3
Aug. 1-10		14		39	4.2		55	114	34	74		2.2		300	.41		115	21	51	2.2	492	7.2
Aug. 11-20		13		46	5.0		54	133	34	75		2.2		315	.43		136	26	46	2.0	521	7.3
Aug. 21-31		13		44	4.5		57	134	34	74		2.2		320	.44		128	18	49	2.2	521	7.1
Sept. 1-10		16		46	4.8		69	152	36	86		1.2		350	.48		134	10	53	2.6	595	6.5
Sept. 11-16		13		59	6.4		106	185	50	142		.2		a468	.64		174	22	57	3.5	827	8.2
Sept. 17-24, 27-30	8.8			66	7.0		152	218	69	194		.8		a605	.82		194	15	63	4.7	1,060	7.4

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued

672. 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 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 583 ppm Jan. 15-28; minimum, 105 ppm Feb. 6, 15-16.

Hardness: Maximum, 187 ppm Jan. 1-14; minimum, 50 ppm Feb. 6, 15-16.

Specific conductance: Maximum daily, 1,480 micromhos Jan. 25; minimum daily, 128 micromhos Oct. 12.

EXTREMES, 1949-59.--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 daily, 18,000 micromhos Oct. 15, 17, 1956; minimum daily, 101 micromhos Apr. 29, 1957.

REMARKS.--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 1958 to September 1959

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	Non-carbonate				
Oct. 1-14, 1958-----		16		24	3.0	17		87	9.8	20	--	0.5		a133	0.18		72	1	34	0.9	224	7.5
Oct. 15-31-----		14		27	3.3	25		91	21	27	--	.5		173	.24		81	6	40	1.2	263	7.3
Nov. 1-15-----		14		31	4.0	30		105	15	40	--	.5		a186	.25		94	8	41	1.3	327	7.4
Nov. 16-30-----		12		35	4.7	36		118	17	49	--	.5		a212	.29		107	10	42	1.5	380	7.5
Dec. 1-10-----		13		42	5.7	51		134	24	73	--	.5		a275	.37		128	18	46	1.9	495	8.2
Dec. 11-20-----		13		54	7.3	86		153	42	128	--	1.0		433	.59		164	39	53	2.9	731	8.2
Dec. 21-31-----		13		57	8.5	112		149	61	166	--	1.8		530	.72		177	55	58	3.7	893	8.2
Jan. 1-14, 1959-----	9.4			60	9.1	115	5.6	163	61	179	0.3	1.0		560	.76		187	54	56	3.7	947	8.1
Jan. 15-28-----	4.2			60	8.0	139		161	59	206	--	1.1		585	.80		182	50	62	4.5	1,020	8.0
Jan. 29-31, Feb. 7-10--	6.6			23	2.9	24		64	20	34	--	1.0		a142	.19		69	17	43	1.3	274	6.8
Feb. 1-5-----	9.6			34	5.1	61		100	35	84	--	1.2		306	.42		106	24	56	2.6	514	7.2
Feb. 6, 15-16-----	9.8			17	1.8	17		61	11	17	--	1.0		a105	.14		50	0	42	1.0	187	7.2
Feb. 11-14, 17-28-----	11			26	3.3	29		98	15	32	--	1.2		a166	.23		78	0	45	1.4	299	7.1
Mar. 1-7-----	11			25	2.9	26		99	10	27	--	1.2		a152	.21		74	0	43	1.3	275	7.2
Mar. 8-20-----	11			34	4.5	38		124	15	48	--	1.0		233	.32		103	2	44	1.6	384	7.4
Mar. 21-31-----	12			45	5.8	57		138	34	79	--	1.0		327	.44		136	24	48	2.1	549	7.5
Apr. 1-9-----	11			50	6.4	65	4.1	152	39	92	.3	1.2		370	.50		152	27	47	2.3	616	7.8
Apr. 10-15-----	11			18	2.1	23		69	14	22	--	1.2		a125	.17		54	0	48	1.4	218	7.2
Apr. 16-30-----	12			28	3.2	32		99	20	36	--	1.2		a181	.25		83	2	46	1.6	321	7.6
May 1-11-----	13			37	4.2	39		120	28	46	--	1.2		a227	.31		110	11	43	1.6	402	7.5
May 12-17-----	10			22	2.6	24		75	18	26	--	1.2		a141	.19		66	4	44	1.3	252	7.2
May 18-31-----	12			32	3.4	34		110	20	39	--	1.2		214	.29		94	4	44	1.5	345	7.2
June 1-14-----	16			36	4.5	31		122	25	35	--	1.2		a209	.28		108	8	39	1.3	363	7.3
June 15-16-----	20			45	5.7	58		130	50	71	--	2.8		a316	.43		136	30	48	2.1	519	7.8
June 18-23, 25-30-----	16			42	5.1	39		133	36	44	--	1.5		271	.37		126	17	40	1.5	420	7.4
July 1-9, 13, 16-25-----	17			43	5.1	41		143	30	48	--	.8		278	.38		128	11	41	1.6	432	7.5
July 10-12, 14-15, 26-28-----	16			36	4.2	35		127	23	38	--	.8		238	.32		107	3	41	1.5	361	7.4
July 29-31-----	22			26	3.5	22		103	9.6	23	--	.8		a158	.21		79	0	38	1.1	250	7.6
Aug. 1-4, 6-10-----	22			34	5.0	35		135	14	40	--	.5		226	.31		105	0	42	1.5	350	7.9
Aug. 11-17, 19-26-----	21			45	5.9	58		142	30	82	--	.8		330	.45		137	20	48	2.2	543	7.8
Aug. 27-31, Sept. 1-4--	22			26	4.0	28		99	12	34	--	1.0		a176	.24		81	0	51	1.4	290	7.6
Sept. 5-12-----	19			40	5.3	50		140	19	68	--	.8		286	.39		122	7	41	2.0	467	7.9
Sept. 14-30-----	21			53	6.6	75		165	37	105	--	.5		397	.54		159	24	51	2.6	665	7.9

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued
673. 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 1959.
EXTREMES, 1949-56.--Dissolved solids: Maximum, 18,400 ppm Aug. 1-13, 1956; minimum, 140 ppm Apr. 12-19, 1955.

Hardness: Maximum, 3,550 ppm Oct. 21-31, 1952; minimum, 45 ppm Apr. 12-19, 1955.
Specific conductance: Maximum daily, 33,700 micromhos Sept. 26, 1956; minimum daily, 199 micromhos Apr. 15, 1955.

REMARKS.--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 1958 to September 1959

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	Non-carbonate				
Oct. 8, 1958-----	--	--	--	--	--	--	--	109	--	59	--	--	--	--	--	--	113	24	--	--	433	8.0
Oct. 16, 23, 29-----	13	--	--	56	5.2	--	--	88	163	51	115	--	3.5	--	412	0.56	161	28	54	3.0	725	8.1
Nov. 6, 13-----	20	64	--	64	11	158	--	167	71	235	--	7.0	--	a674	.92	204	68	63	4.8	1,160	8.2	
Nov. 20, 25-----	18	--	--	59	6.5	104	--	157	56	150	--	2.0	--	a485	.66	174	45	57	3.4	840	8.1	
Dec. 4, 11, 18-----	15	--	--	58	7.2	158	--	150	78	218	--	6.0	--	a639	.87	174	51	66	5.2	1,120	8.0	
Dec. 26, 31-----	15	--	--	62	57	538	--	153	165	890	--	7.0	--	1,810	2.46	389	264	75	12	3,250	8.1	
Jan. 8, 1959-----	--	--	--	--	--	--	--	160	--	415	--	--	--	--	--	247	116	--	--	1,770	7.8	
Jan. 15-----	--	--	--	--	--	--	--	161	--	250	--	--	--	--	--	192	60	--	--	1,220	8.2	
Jan. 21-----	--	--	--	--	--	--	--	152	--	628	--	--	--	--	--	320	196	--	--	2,460	8.1	
Jan. 29-----	--	--	--	--	--	--	--	168	--	295	--	--	--	--	--	209	72	--	--	1,430	7.9	
Feb. 5-----	--	--	--	--	--	--	--	77	--	109	--	--	--	--	--	95	32	--	--	562	7.7	
Feb. 12-----	--	--	--	--	--	--	--	88	--	140	--	--	--	--	--	116	44	--	--	709	7.6	
Feb. 19-----	--	--	--	--	--	--	--	51	--	38	--	--	--	--	--	64	22	--	--	282	7.2	
Feb. 26-----	--	--	--	--	--	--	--	100	--	36	--	--	--	--	--	108	26	--	--	365	7.6	
Mar. 5, 12, 19, 26-----	24	--	--	50	6.2	81	--	134	58	108	0.4	4.0	--	398	.54	150	40	54	2.9	689	7.4	
Apr. 1, 3, 6, 8-----	15	--	--	56	7.6	102	5.3	147	58	148	.3	3.5	--	468	.64	171	50	56	3.4	829	8.2	
Apr. 10, 13, 15, 17, 20, 21, 26, 29-----	9.8	--	--	25	2.6	27	--	69	21	36	--	2.0	--	157	.21	73	17	44	1.3	282	7.8	
May 1, 4, 6, 8, 11-----	14	--	--	39	5.0	42	--	108	38	55	--	3.2	--	249	.34	118	29	43	1.7	447	7.7	
May 12, 15, 18-19, 22, 25, 27-28-----	9.6	--	--	31	3.3	25	--	96	22	30	--	2.0	--	170	.23	91	12	38	1.1	315	7.4	
June 1, 3, 8, 9, 12, 13, 15-----	18	--	--	38	4.3	41	--	107	38	51	.3	2.5	--	246	.33	112	25	44	1.7	429	7.5	
June 17, 19, 22, 24, 26, 29-----	18	--	--	45	4.6	46	--	125	41	59	.3	2.5	--	a294	.40	131	29	43	1.7	484	7.3	
July 1, 3, 6, 10, 13, 14, 17-----	18	--	--	42	4.3	52	--	126	38	64	.3	2.0	--	a300	.41	122	19	48	2.0	482	7.6	
July 20, 21, 24-----	22	--	--	51	7.1	94	--	153	52	126	.3	2.0	--	429	.58	156	30	57	3.3	743	7.8	
July 26, 29, 31-----	12	--	--	30	3.1	37	--	79	23	56	.3	.8	--	201	.27	88	23	48	1.7	354	7.5	
Aug. 3, 5-----	17	--	--	19	3.8	42	--	64	14	61	.3	1.8	--	190	.26	63	11	57	2.3	320	7.8	
Aug. 7, 12, 14, 17, 19, 21, 24, 28, 31-----	16	--	--	46	5.2	92	--	127	42	132	.4	2.5	--	a412	.56	136	32	59	3.4	707	7.8	
Aug. 26-----	--	--	--	--	--	--	--	103	--	770	--	--	--	--	--	302	218	--	--	2,750	7.8	
Sept. 2, 4, 7, 9, 11-----	22	--	--	46	5.7	107	--	139	45	149	--	.5	--	a444	.60	138	24	63	4.0	780	7.9	
Sept. 14, 16, 18-----	24	--	--	62	11	211	--	176	77	308	--	.2	--	780	1.06	200	56	70	6.5	1,390	8.1	
Sept. 21, 25-----	25	--	--	72	48	560	--	164	156	920	--	.5	--	1,860	2.53	377	242	76	13	3,330	8.1	
Sept. 22-----	--	--	--	--	--	--	--	126	--	2,400	--	--	--	--	--	830	726	--	--	7,690	7.9	

a Residue on evaporation at 180°C.

TRINITY RIVER BASIN--Continued

67/1. TRINITY RAY AT MOUTH OF TRINITY RIVER NEAR ANADARK, TEX.

LOCATION:--At four sampling stations in Trinity Ray opposite mouth of Trinity River near Anadark, Chambers County. Station 2-- In Anadark Channel immediately below detour. Station 3-- In Anadark Channel about 1 1/2 miles west of Station 6. Station 6-- In Anadark Channel at south end. Station 7-- In Trinity Ray about 1 1/2 miles west of Station 6. Station 8-- In Anadark Channel about 1 1/2 miles southwest of Station 2. Station 9-- In Anadark Channel at south end. RECORDS AVAILABLE:--Chemical analyses: October 1930 to September 1939.

Date of Collection	Specific conductance, microhm-cm. at 25°C, and chloride, in parts per million, water year October 1938 to September 1939									
	Conductance, Station 2	Chloride								
Oct. 8, 1938-----	6430	50								
Oct. 16-----	602	96								
Oct. 23-----	755	123								
Oct. 29-----	829	130								
Nov. 6-----	1,050	200								
Nov. 13-----	7,990	2,550								
Nov. 20-----	880	144								
Nov. 25-----	806	144								
Dec. 4-----	1,160	230								
Dec. 11-----	1,030	185								
Dec. 18-----	1,210	265								
Dec. 26-----	2,720	700								
Dec. 31-----	3,830	1,060								
Jan. 8, 1939-----	1,980	692								
Jan. 15-----	1,680	308								
Jan. 21-----	2,690	660								
Jan. 29-----	1,720	375								
Feb. 5-----	416	90								
Feb. 12-----	461	98								
Feb. 19-----	255	34								
Feb. 26-----	367	39								
Mar. 5-----	397	62								
Mar. 12-----	649	98								
Mar. 19-----	849	164								
Mar. 26-----	680	85								
Apr. 1-----	654	88								
Apr. 3-----	741	124								
Apr. 6-----	733	117								
Apr. 8-----	801	131								
Apr. 10-----	275	53								
Apr. 13-----	289	57								
Apr. 15-----	211	28								
Apr. 17-----	273	38								
Apr. 20-----	281	35								
Apr. 21-----	258	32								
Apr. 24-----	252	32								
Apr. 26-----	346	40								
Apr. 29-----	328	30								
May 1-----	351	30								
May 4-----	411	49								
May 6-----	455	60								
May 8-----	446	49								
May 11-----	458	61								
May 12-----	279	29								
May 15-----	326	40								
May 18-----	355	40								
May 19-----	295	31								
May 22-----	316	26								
May 25-----	327	34								
May 27-----	311	27								
May 28-----	290	32								
June 1-----	397	60								
June 3-----	349	37								
June 5-----	380	41								
June 8-----	573	100								
June 9-----	489	63								
June 12-----	437	51								
June 13-----	639	109								
June 15-----	389	33								
June 17-----	352	29								
June 19-----	454	52								
June 22-----	592	91								
June 24-----	708	112								
June 26-----	491	72								
June 29-----	357	77								
Oct. 8, 1938-----	6430	50	648	63	430	58	612	427	627	95
Oct. 16-----	602	96	609	123	821	138	755	122	755	122
Oct. 23-----	755	123	756	128	837	132	796	122	796	122
Oct. 29-----	829	130	826	128	837	132	796	122	796	122
Nov. 6-----	1,050	200	1,070	210	1,010	192	1,010	192	1,010	192
Nov. 13-----	7,990	2,550	6,090	1,790	2,750	720	2,750	720	2,750	728
Nov. 20-----	880	144	821	138	901	166	875	155	875	155
Nov. 25-----	806	144	805	146	795	141	833	154	833	154
Dec. 4-----	1,160	230	1,090	212	1,320	285	9,710	3,160	1,030	185
Dec. 11-----	1,030	185	1,020	182	1,070	180	1,185	394	1,030	185
Dec. 18-----	1,210	265	1,230	252	1,260	255	3,550	1,020	1,260	255
Dec. 26-----	2,720	700	2,720	720	4,650	1,280	1,280	800	4,650	1,280
Dec. 31-----	3,830	1,060	3,800	1,060	3,800	1,060	15,300	5,280	3,800	1,060
Jan. 8, 1939-----	1,980	692	1,750	410	2,130	532	1,970	472	2,260	575
Jan. 15-----	1,680	308	1,270	260	1,430	315	2,260	575	1,430	315
Jan. 21-----	2,690	660	2,530	670	2,560	670	2,580	800	2,560	670
Jan. 29-----	1,720	375	1,700	365	2,280	560	2,960	800	2,280	560
Feb. 5-----	416	90	426	92	460	92	456	94	460	94
Feb. 12-----	461	98	474	101	520	110	582	121	520	121
Feb. 19-----	255	34	255	34	253	34	264	36	253	36
Feb. 26-----	367	39	371	40	377	40	373	40	377	40
Mar. 5-----	397	62	457	66	467	69	394	62	467	69
Mar. 12-----	649	98	634	97	636	98	636	98	636	98
Mar. 19-----	849	164	845	164	828	156	818	155	828	155
Mar. 26-----	680	85	700	86	688	86	686	84	688	84
Apr. 1-----	654	88	626	87	632	87	1,000	198	632	87
Apr. 3-----	741	124	744	124	744	124	744	123	744	123
Apr. 6-----	733	117	736	117	729	115	776	114	729	114
Apr. 8-----	801	131	818	136	803	132	809	134	803	134
Apr. 10-----	275	53	306	61	324	64	276	53	288	58
Apr. 13-----	289	57	288	58	288	58	288	58	288	58
Apr. 15-----	211	28	211	27	211	28	211	24	211	24
Apr. 17-----	273	38	273	38	270	38	267	37	270	37
Apr. 20-----	281	35	281	35	279	34	279	34	279	34
Apr. 21-----	258	32	262	32	293	44	257	32	293	44
Apr. 24-----	252	32	254	32	251	32	291	42	251	42
Apr. 26-----	346	40	347	40	367	42	352	42	367	42
Apr. 29-----	328	30	322	30	339	32	340	32	339	32
May 1-----	351	30	351	30	352	30	351	30	351	30
May 4-----	411	49	411	49	430	52	414	50	414	50
May 6-----	455	60	468	66	451	60	448	73	451	73
May 8-----	446	49	449	49	447	49	449	49	449	49
May 11-----	458	61	486	67	442	57	453	59	442	59
May 12-----	279	29	278	29	280	29	290	30	280	29
May 15-----	326	40	324	40	324	40	324	40	324	40
May 18-----	355	40	375	46	352	41	343	39	352	41
May 19-----	295	31	311	36	305	32	305	30	305	30
May 22-----	316	26	316	26	313	26	316	32	313	32
May 25-----	327	34	322	36	326	36	489	81	326	36
May 27-----	311	27	306	27	305	26	320	30	305	30
May 28-----	290	32	292	31	287	31	287	31	287	31
June 1-----	397	60	351	40	314	36	431	72	314	36
June 3-----	349	37	359	38	347	36	369	42	347	42
June 5-----	380	41	384	42	380	41	379	41	380	41
June 8-----	573	100	404	50	409	49	388	103	409	49
June 9-----	489	63	479	60	477	63	510	70	477	63
June 12-----	437	51	436	51	436	51	435	51	436	51
June 13-----	639	109	639	109	639	109	639	109	639	109
June 15-----	389	33	387	33	386	34	386	34	386	34
June 17-----	352	29	341	28	346	29	354	29	346	29
June 19-----	454	52	404	39	400	38	404	40	404	40
June 22-----	592	91	533	76	463	36	462	57	462	57
June 24-----	708	112	568	76	585	89	600	62	585	89
June 26-----	491	72	487	76	487	76	502	75	487	75
June 29-----	357	77	363	85	357	77	357	85	357	77

TRINITY RIVER BASIN--Continued

674. 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 1958 to September 1959--Continued

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
July 1, 1959-----	700	132	588	104	591	103	667	116
July 3-----	321	27	319	27	324	27	447	46
July 6-----	388	32	518	71	386	32	386	31
July 10-----	388	38	386	38	461	59	388	37
July 13-----	463	59	463	59	561	81	513	72
July 14-----	518	72	662	109	518	72	583	90
July 17-----	583	83	576	82	577	84	582	85
July 20-----	963	183	756	122	754	123	780	125
July 21-----	648	99	647	100	646	100	645	99
July 24-----	851	172	843	169	845	170	851	169
July 26-----	435	67	439	67	435	67	438	67
July 29-----	313	49	296	43	316	50	304	48
July 31-----	307	57	301	57	299	56	301	57
Aug. 3-----	303	57	320	62	301	57	301	58
Aug. 5-----	324	60	328	60	326	60	343	64
Aug. 7-----	564	100	569	100	556	98	555	97
Aug. 10-----	569	102	569	103	569	103	566	102
Aug. 12-----	578	104	582	105	579	104	583	105
Aug. 14-----	695	120	701	127	695	126	693	126
Aug. 17-----	722	133	712	133	704	131	709	131
Aug. 19-----	790	156	796	157	790	155	891	179
Aug. 21-----	815	157	721	134	783	152	757	143
Aug. 24-----	628	126	667	129	756	151	761	153
Aug. 26-----	1,300	312	1,300	310	2,350	632	1,110	258
Aug. 28-----	567	102	562	100	593	105	600	106
Aug. 31-----	570	95	514	95	510	93	510	92
Sept. 2-----	660	122	665	125	674	127	670	126
Sept. 4-----	690	134	709	138	649	121	650	121
Sept. 7-----	682	129	682	130	708	140	722	142
Sept. 9-----	877	181	848	172	988	216	1,160	267
Sept. 11-----	886	168	872	167	918	178	944	186
Sept. 14-----	1,510	370	1,510	370	1,800	455	1,850	480
Sept. 16-----	1,260	265	1,250	265	1,180	248	1,220	260
Sept. 18-----	1,430	318	1,430	315	1,420	310	1,420	310
Sept. 21-----	4,470	1,320	5,400	1,620	1,450	320	8,390	2,680
Sept. 22-----	8,040	2,550	8,050	2,550	8,860	2,820	9,130	2,950
Sept. 25-----	5,460	1,620	5,380	1,620	6,470	2,000	7,420	2,320
Sept. 28-----	2,210	570	2,280	600	5,770	1,750	5,550	1,680

TRINITY RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
428. WEST FORK TRINITY RIVER NEAR JACKSBORO																					
Apr. 21, 1959	34	9.0	38	9.4	9.0	74	12	181	0.3	1.2	0.31	377	0.31	134	73	60	3.4	738	5.9		
LAKE ANON G. CARTER 6 MILES SOUTHWEST OF BOWIE																					
Apr. 21, 1959	1.0	24	4.9	8.0	5.4	90	8.8	14	0.0	0.5	111	0.15	80	6	17	0.4	220	5.9			
502. ELM FORK TRINITY RIVER RESERVOIR 6-0 NEAR MUEENSTER																					
Jan. 15, 1959	5.0	38	4.0	47	132	25	77	0.5	2.5	284	0.40	161	36	39	1.6	489	7.9				
Apr. 22	3.2	62	3.9	27	149	27	68	.1	1.2	273	.37	171	49	31	1.2	514	7.7				
July 14	18	45	4.0	43	108	26	74	--	2.0	265	.36	129	40	42	1.6	468	7.6				
503. ELM FORK TRINITY RIVER NEAR MUEENSTER																					
Jan. 15, 1959	0.8	10	190	17	175	230	55	480	0.2	0.0	1,040	1.41	544	356	41	3.3	1,920	7.7			
Apr. 22	.7	13	210	16	178	240	47	518	.2	.2	1,100	1.50	590	394	40	3.2	2,020	7.5			
515. CLEAR CREEK NEAR SANGER																					
Apr. 22, 1959	8.7	9.4	90	14	80	161	66	180	0.3	0.0	519	0.71	282	150	38	2.1	951	7.7			
HICKORY CREEK AT US HIGHWAY 77 NEAR LEWISVILLE																					
Apr. 22, 1959	2.0	54	5.0	27	141	31	46	0.1	0.2	234	0.32	155	40	27	0.9	437	7.9				
SOUTH PRONG CREEK AT US HIGHWAY 77 NEAR WAKAHACHEE																					
Apr. 22, 1959	11	84	0.9	5.7	1.2	218	21	7.2	0.1	15	253	0.34	213	35	5	0.2	440	7.6			
MILL CREEK AT MILFORD																					
Apr. 22, 1959	1.0	80	1.0	6.1	1.0	216	20	8.0	0.1	7.7	240	0.33	204	27	6	0.2	431	7.5			

SAN JACINTO RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Mar. 18, 1959	74.0	20		50	4.8	40		132	7.6	81	0.2	0.0		269	0.37	144	36	37	1.4	499	7.5
680. WEST FORK OF SAN JACINTO RIVER NEAR CONROE																					
685. SPRING CREEK NEAR SPRING																					
Mar. 18, 1959	21.0	15		23	4.1	30		64	6.4	57	0.1	0.0		167	0.23	74	22	47	1.5	312	7.4
690. CYPRESS CREEK NEAR WESTFIELD																					
Mar. 18, 1959	1.0	9.6		31	5.8	101		118	25	140	0.4	0.2		371	0.50	102	5	68	4.4	693	7.3

BRAZOS RIVER BASIN

805. 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 1959.

Water temperatures: November 1949 to November 1951, October 1956 to September 1959.

Sediment records: November 1949 to September 1951.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 4,840 ppm Aug. 1-7; minimum, 715 ppm July 1-6.

Hardness: Maximum, 2,210 ppm Mar. 16-31; minimum, 273 ppm May 11-15, 18-21.

Specific conductance: Maximum daily, 6,890 micromhos Aug. 3; minimum daily, 860 micromhos July 3.

Water temperatures: Maximum, 94°F June 18; minimum, 34°F Jan. 5, 15, Feb. 1-2.

EXTREMES, 1948-51, 1956-59.--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 daily, 10,400 micromhos Feb. 25, 1958; minimum daily, 735 micromhos Oct. 24, 1957.

Water temperatures (Nov. 1949-51, 1956-59): Maximum, 96°F July 20, 1951; minimum, Freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957.

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. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-3, 12-13, 1958--	72.4	10		169	17	215		106	500	248		3.0		1,210	1.65	237	492	404	49	4.2	1,850	8.0
Oct. 4-11, 14-20-----	8.27	11		405	50	629		116	1,130	930		.0		3,210	4.37	71.7	1,220	1,120	53	7.8	4,700	7.9
Oct. 21-31-----	.77	14		570	75	555		80	1,620	840		.8		3,710	5.05	7.71	1,730	1,660	41	5.8	4,930	7.5
Nov. 1-13-----	.28	13		640	86	529		109	1,800	805		1.0		3,930	5.34	2.97	1,950	1,860	37	5.2	5,050	7.6
Nov. 14-22-----	54.3	11		167	20	262		126	474	332		4.0		1,330	1.81	195	498	395	53	5.1	2,120	7.8
Nov. 23-30-----	14.6	12		385	54	697		140	1,100	1,020		1.0		3,340	4.54	132	1,180	1,070	56	8.8	4,930	7.9
Dec. 1-15-----	1.65	14		575	72	790		144	1,600	1,180		1.0		4,300	5.85	19.2	1,730	1,610	50	8.3	5,850	8.0
Dec. 16-31-----	.59	16		630	73	665		154	1,780	950		1.0		4,190	5.70	6.67	1,870	1,750	44	6.7	5,400	8.0
Jan. 1-15, 1959-----	.46	12		660	82	558	9.1	142	1,760	910		.0		4,060	5.52	5.04	1,980	1,870	38	5.4	5,320	8.0
Jan. 16-31-----	.28	11		685	93	603		136	1,820	990		.0		4,270	5.81	3.23	2,090	1,980	39	5.7	5,590	8.1
Feb. 1-10-----	a .32	13		665	103	452		120	1,550	960		.0		3,800	5.17	3.28	2,080	1,980	32	4.3	5,510	7.7
Feb. 11-20-----	a .09	12		690	110	345		122	1,330	1,020		.5		3,570	4.86	.87	2,170	2,070	26	3.2	5,690	7.8
Feb. 21-28-----	.20	11		690	106	334		124	1,250	1,050		.0		3,500	4.76	1.89	2,160	2,060	25	3.1	5,730	7.7
Mar. 1-15-----	.11	13		690	96	556		107	1,970	840		2.0		4,220	5.74	1.25	2,120	2,030	36	5.3	5,300	7.5
Mar. 16-31-----	a .23	12		720	101	596		122	2,000	940		.5		4,430	6.02	2.75	2,210	2,110	37	5.5	5,590	7.7
Apr. 1-7-----	a .14	12		680	106	574	10	83	2,030	860	0.5	.5		4,310	5.86	1.63	2,130	2,060	37	5.4	5,400	7.3
Apr. 8-----	175	11		283	24	175		90	736	242		5.6		1,520	2.07	718	805	731	32	2.7	2,110	7.6
Apr. 9-13-----	25.3	9.4		442	46	406		78	1,240	580		1.5		2,760	3.75	189	1,290	1,230	41	4.9	3,690	7.5
Apr. 14-30-----	.63	13		680	98	553		123	1,950	830		1.0		4,180	5.68	7.11	2,100	2,000	36	5.2	5,200	7.6
May 1-4, 7-----	21.4	15		555	72	506		101	1,560	760		2.2		3,520	4.79	203	1,680	1,600	40	5.4	4,560	7.6
May 5-6, 8-10-----	212	16		232	25	246		172	653	280		2.0		1,540	2.09	881	682	541	44	4.1	2,200	7.6
May 11-15, 18-21-----	135	16		83	16	222		172	280	228		1.5		966	1.31	352	273	132	64	5.8	1,520	7.7
May 16-17, 22-----	115	20		135	22	270		144	412	330		3.0		1,260	1.71	391	428	310	58	5.7	2,000	7.9
May 23-31-----	3.92	17		470	80	587		116	1,410	860		2.0		3,480	4.73	36.8	1,500	1,410	46	6.6	4,680	7.3
June 1-----	.60	--		--	--	--		77	--	870		--		--	--	--	2,000	1,940	--	--	5,310	7.8
June 2-3, 11-12, 23, 30--	1,535	16		255	27	212		103	706	275		1.2		1,540	2.09	6,380	747	662	38	3.4	2,190	7.5
June 4-10-----	2,933	16		105	16	136		128	300	145		3.0		790	1.07	6,260	328	223	47	3.3	1,230	7.5
June 13-22-----	29.4	17		350	50	637		104	1,010	940		.5		3,060	4.16	243	1,080	994	56	8.4	4,540	7.5
June 24-29-----	751	15		134	17	148		113	374	172		3.2		947	1.29	1,920	404	312	44	3.2	1,420	7.5
July 1-6-----	4,604	15		110	14	99		110	318	88		3.0		715	.97	8,890	332	242	39	2.4	1,060	7.4
July 7-9-----	258	16		160	19	180		106	454	218		1.5		1,100	1.50	766	477	390	45	3.6	1,630	7.6
July 10-13-----	207	16		282	27	298		96	760	420		1.2		1,850	2.52	1,030	814	736	44	4.5	2,650	7.5
July 14-22-----	749	15		258	19	167		89	700	200		1.5		1,400	1.90	2,830	722	648	33	2.7	1,930	7.2
July 23-31-----	31.9	18		415	39	802		104	1,170	1,160		1.0		3,660	4.98	315	1,200	1,110	59	10	5,230	7.4
Aug. 1-7-----	4.96	18		590	80	969		103	1,600	1,530		1.0		4,840	6.58	64.8	1,800	1,720	54	9.9	6,690	7.2
Aug. 8-12-----	948	14		166	17	110		96	446	126		3.2		953	1.30	2,440	484	406	33	2.2	1,310	7.6
Aug. 13-14-----	52.0	23		195	27	257		111	565	338		2.0		1,460	1.99	205	598	506	48	4.6	2,140	7.9
Aug. 15-31-----	5.01	20		485	70	717		100	1,340	1,120		1.0		3,800	5.17	51.4	1,500	1,420	51	8.0	5,240	7.8
Sept. 1-16-----	a .12	20		685	94	559		105	1,930	860		2.8		4,200	5.71	1.36	2,100	2,010	37	5.3	5,210	7.2
Sept. 17-30-----	a .19	18		685	97	518		125	1,910	810		.8		4,100	5.58	2.10	2,110	2,010	35	4.9	5,080	7.2
Weighted average-----	219	15		153	18	149		113	429	168		2.6		999	1.36	591	456	363	42	3.0	1,460	--

a Includes days of less than 0.05 cubic feet per second discharge.

BRAZOS RIVER BASIN--Continued

812. CROTON CREEK NEAR JAYTON, TEX.

LOCATION.--At gaging station, 300 feet upstream from county road ford, 1 1/2 miles upstream from mouth and about 8 miles northeast of Jayton, Stonewall County.
DRAINAGE AREA.--310 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May to September 1959.

Chemical analyses, in parts per million, May to September 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Dissolved solids			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate					
May 6, 1959-----	17.0					4,780		--	2,820	7,530						3,230	--	76		22,600	--	1.009
July 9-----	10					500		73	871	755						955	895	53		3,810	7.1	--
July 17-----	.05					4,180		--	2,710	6,760						--	--	--		20,400	--	1.006
July 18-----	--					5,490		--	3,040	9,020						--	--	--		25,400	--	1.009
July 22-----	.37					3,240		--	2,700	5,100						--	--	--		16,900	--	1.004
Aug. 13-----	.25					3,300		--	2,580	5,280						--	--	--		16,800	--	1.004
Aug. 14-----	.04					3,610		--	2,720	5,800						--	--	--		18,100	--	1.005
Aug. 15-----	0					3,790		--	2,770	6,040						--	--	--		18,700	--	1.005
Aug. 16-----	0					3,920		--	2,850	6,560						--	--	--		19,400	--	1.006
Aug. 17-----	0					3,940		--	2,800	6,370						--	--	--		19,200	--	1.005
Aug. 18-----	0					3,950		--	2,840	6,560						--	--	--		19,700	--	1.006
Aug. 19-----	0					4,260		--	2,910	6,860						--	--	--		20,400	--	1.006
Aug. 20-----	22					3,270		--	2,590	5,030						2,740	--	72		16,700	--	1.004
Aug. 21-----	4.11					1,260		73	2,060	1,980						2,190	2,130	56		8,340	7.5	--
Aug. 22-----	.58					2,070		--	2,310	3,270						2,580	--	64		12,100	--	1.001
Aug. 24-----	.04					2,270		--	2,380	3,640						2,670	--	65		13,000	--	1.002
Aug. 25-----	0					2,920		--	2,620	4,640						3,000	--	68		15,600	--	1.003
Aug. 28-----	0					5,490		--	2,860	8,430						--	--	--		24,600	--	1.008

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

BRAZOS RIVER BASIN--Continued

813. 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 March 1959.

Chemical analyses, in parts per million, October 1958 to March 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25 C)	pH	Density at 20°C
													Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate					
Oct. 22, 1958-----	0.34			--	--	90,000		--	3,050	142,000						10,300	--	95	--	182,000	--	1.180
Nov. 21-----	.46			--	--	89,000		--	3,180	140,000						10,100	--	95	--	181,000	--	1.178
Dec. 17-----	.28			--	--	88,300		--	3,200	141,000						9,670	--	95	--	150,000	--	1.179
Jan. 21, 1959-----	.31			--	--	85,500		--	3,280	139,000						9,950	--	95	--	148,000	--	1.176
Feb. 19-----	.28			--	--	90,300		--	3,130	143,000						9,710	--	95	--	150,000	--	1.184
Mar. 17-----	--			1,790	1,470	99,000		32	2,870	158,000						10,500	10,500	95	420	173,000	7.2	1.198
Mar. 26-----	.30	24		1,810	1,280	92,400		38	3,010	147,000						9,780	9,750	95	406	150,000	7.5	1.187

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

BRAZOS RIVER BASIN--Continued

813.5. 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 March 1959.

Chemical analyses, in parts per million, October 1958 to March 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25 C)	pH	Density at 20°C
													Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate					
Oct. 22, 1958-----	0.57					91,100			3,270	144,000						9,720		95		182,000		1.183
Nov. 21-----	1.15					88,100			3,440	138,000					9,350		95		181,000		1.176	
Dec. 17-----	.70					85,200			3,440	135,000					8,800		95		148,000		1.171	
Jan. 21, 1959-----	.76					89,600			3,520	140,000					9,000		96		167,000		1.178	
Feb. 19-----	.64					91,600			3,390	145,000					9,120		96		150,000		1.184	
Mar. 26-----	.74	25		1,720	1,110	95,300		41	3,010	150,000			251,000	407	8,860	8,820	96	441	151,000	7.4	1.191	

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

814. SALT CROTON CREEK AT WEIR D NEAR ASPERMONT, TEX.

LOCATION:--About 500 feet upstream from Haystack Creek and 1,000 feet upstream from Ragging station, about 20 miles northwest of Aspermont, Stonewall County. RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (calculated)		Hardness as CaCO ₃	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25 C)	pH	Density at 20°C
													Tons per acre-foot	Tons per day					
October 9, 1958	0.74								149,000	3,110				149,000	9,910		184,000		1.191
Oct. 22	.71								152,000	2,800				152,000	9,450		185,000		1.196
Nov. 6	.73								148,000	3,150				148,000	9,760		184,000		1.189
Nov. 21	.72								141,000	3,070				141,000	9,480		182,000		1.181
Dec. 5	.82								144,000	3,440				144,000	9,870		183,000		1.185
Dec. 17	.66								141,000	3,380				141,000	9,170		150,000		1.178
Jan. 6, 1959	1.03								143,000	3,410				143,000	9,910		150,000		1.181
Jan. 21	.56								139,000	3,500				139,000	9,280		149,000		1.175
Feb. 4	1.16								121,000	3,760				121,000	8,510		160,000		1.151
Feb. 19	.67								154,000	2,920				154,000	9,030		152,000		1.196
Mar. 11	.53								157,000	2,940				157,000	9,330		152,000		1.201
Mar. 26	.40								159,000	2,370				159,000	9,500		152,000		1.203
Apr. 7	.92								158,000	3,240				158,000	8,990	8,960	152,000	7.5	1.201
Apr. 23	.87								155,000	2,880				155,000	9,270		149,000		1.198
May 6	.85								156,000	2,800				156,000	8,880		148,000		1.057
May 19	.63								156,000	2,710				156,000	8,840		148,000		1.199
June 2	1.96								27,800	1,940				27,800	3,100		59,100		1.033
June 19	.60								160,000	2,880				160,000	9,730		155,000		1.203
July 9	31.0								8,130	1,170				8,130	1,470		21,800		1.009
July 22	.75								140,000	3,620				140,000	9,420		153,000		1.178
Aug. 5	.38								160,000	2,670				160,000	10,200		149,000		1.202
Aug. 12	.51								60,100	3,240				60,100	6,670		100,000		1.074
Aug. 20	.47								107,000	3,880				107,000	8,380		124,000		1.134
Aug. 30	.36								160,000	2,790				160,000	9,890		150,000		1.203
Sept. 18	.59								100,000	2,930				100,000	10,300		157,000		1.204

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

BRAZOS RIVER BASIN--Continued

814.5. HAYSTACK CREEK 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 1959.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate					
October 9, 1958-----	0.17	--	--	--	--	40,300	--	--	4,600	63,700	--	--	--	--	--	6,900	--	93	--	120,000	--	1.079
Oct. 22-----	.12	--	--	--	--	39,900	--	--	4,610	63,200	--	--	--	--	--	6,910	--	93	--	119,000	--	1.078
Nov. 6-----	.20	--	--	--	--	38,600	--	--	4,440	59,800	--	--	--	--	--	6,600	--	93	--	116,000	--	1.076
Nov. 21-----	.22	--	--	--	--	35,200	--	--	4,220	55,500	--	--	--	--	--	6,170	--	93	--	110,000	--	1.070
Dec. 5-----	.23	--	--	--	--	36,400	--	--	4,400	57,100	--	--	--	--	--	6,390	--	93	--	112,000	--	1.072
Dec. 17-----	.26	--	--	--	--	35,300	--	--	4,230	55,200	--	--	--	--	--	5,990	--	93	--	97,000	--	1.069
Jan. 1, 1959-----	.20	--	--	--	--	37,400	--	--	4,220	57,800	--	--	--	--	--	6,190	--	93	--	100,000	--	1.073
Jan. 21-----	.17	--	--	--	--	44,900	--	--	4,610	70,300	--	--	--	--	--	6,730	--	94	--	112,000	--	1.088
Feb. 4-----	.28	--	--	--	--	37,500	--	--	4,400	58,100	--	--	--	--	--	6,190	--	93	--	109,000	--	1.075
Feb. 19-----	.19	--	--	--	--	38,200	--	--	4,330	59,500	--	--	--	--	--	6,370	--	93	--	103,000	--	1.076
Mar. 11-----	.22	--	--	--	--	39,500	--	--	4,540	61,700	--	--	--	--	--	6,860	--	93	--	104,000	--	1.078
Mar. 26-----	.18	53	--	1,840	573	44,300	77	4,800	4,800	68,900	--	--	121,000	179	6,950	6,880	93	231	111,000	7.9	1.089	
Apr. 7-----	.43	46	--	1,660	494	43,500	87	4,280	4,280	67,300	241	--	117,000	172	6,170	6,100	94	241	110,000	7.9	1.084	
Apr. 23-----	.17	20	--	1,710	506	38,500	72	4,370	4,370	60,300	154	--	105,000	154	6,350	6,290	93	210	103,000	7.5	1.078	
May 6-----	.11	--	--	--	--	30,900	--	--	4,140	48,500	--	--	--	--	5,880	--	92	--	87,200	--	1.061	
May 19-----	.10	--	--	--	--	45,500	--	--	5,050	71,500	--	--	--	--	7,440	--	93	--	112,000	--	1.091	
June 2-----	.21	--	--	--	--	21,600	--	--	3,440	33,600	--	--	--	--	4,840	--	91	--	68,200	--	1.042	
June 19-----	a .06	--	--	--	--	44,400	--	--	4,870	69,000	--	--	--	--	6,990	--	93	--	113,000	--	1.087	
July 9-----	1.96	--	--	--	--	5,160	--	--	2,230	8,120	--	--	--	--	2,530	--	82	--	23,600	--	1.010	
July 22-----	a .01	--	--	--	--	41,500	--	--	4,870	65,600	--	--	--	--	7,200	--	93	--	108,000	--	1.083	
Aug. 5-----	.17	--	--	--	--	58,400	--	--	5,110	90,800	--	--	--	--	8,340	--	94	--	125,000	--	1.115	
Aug. 12-----	.03	--	--	--	--	39,100	--	--	4,310	61,700	--	--	--	--	7,200	--	92	--	102,000	--	1.078	
Aug. 20-----	.04	--	--	--	--	38,900	--	--	4,600	60,800	--	--	--	--	6,860	--	93	--	102,000	--	1.078	
Aug. 30-----	.14	--	--	--	--	48,600	--	--	5,250	75,700	--	--	--	--	7,550	--	93	--	115,000	--	1.096	
Sept. 18-----	a .06	--	--	--	--	44,400	--	--	4,880	68,900	--	--	--	--	7,350	--	93	--	114,000	--	1.089	

a Field estimate.

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

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 1959.
 REMARKS--Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (calculated)		Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 9, 1958	0.88	--	--	--	--	84,300	--	--	3,660	132,000	--	--	--	9,320	9,120	--	95	178,000	--	1.170	
Oct. 23	.73	--	--	--	--	94,500	--	--	2,930	148,000	--	--	--	9,760	9,760	--	95	183,000	--	1.189	
Nov. 6	.73	--	--	--	--	85,600	--	--	3,470	135,000	--	--	--	9,450	9,450	--	95	179,000	--	1.174	
Nov. 21	.83	--	--	--	--	79,300	--	--	3,690	126,000	--	--	--	9,220	9,220	--	95	174,000	--	1.160	
Dec. 5	.81	--	--	--	--	81,700	--	--	3,690	129,000	--	--	--	8,860	8,860	--	95	176,000	--	1.163	
Dec. 17	.78	--	--	--	--	81,300	--	--	3,480	128,000	--	--	--	8,510	8,510	--	95	146,000	--	1.153	
Jan. 6, 1959	1.08	--	--	--	--	82,600	--	--	3,440	132,000	--	--	--	8,750	8,750	--	95	146,000	--	1.156	
Jan. 21	.83	--	--	--	--	84,400	--	--	3,610	133,000	--	--	--	8,730	8,730	--	95	147,000	--	1.168	
Feb. 4	1.36	--	--	--	--	71,800	--	--	3,820	113,000	--	--	--	8,230	8,230	--	95	155,000	--	1.142	
Feb. 19	.72	--	--	--	--	88,000	--	--	3,700	139,000	--	--	--	9,180	9,180	--	95	149,000	--	1.177	
Mar. 11	.90	--	--	--	--	92,300	--	--	3,180	145,000	--	--	--	9,270	9,270	--	96	150,000	--	1.186	
Mar. 26	.73	28	--	1,780	1,180	88,100	54	3,300	3,400	140,000	--	--	234,000	9,290	9,290	9,250	95	149,000	7.5	1.181	
Apr. 7	1.34	26	--	1,710	1,010	84,600	50	3,280	3,280	133,000	--	--	228,000	8,420	8,420	8,380	96	147,000	7.6	1.169	
Apr. 23	.86	--	--	--	--	93,400	--	--	3,200	147,000	--	--	--	9,260	9,260	--	96	147,000	--	1.188	
May 6	.58	--	--	--	--	25,400	--	--	2,860	40,900	--	--	--	4,680	4,680	--	92	77,200	--	1.051	
May 19	.71	--	--	--	--	89,400	--	--	3,100	142,000	--	--	--	8,980	8,980	--	96	147,000	--	1.181	
June 2	2.95	--	--	--	--	16,700	--	--	1,980	26,400	--	--	--	2,810	2,810	--	93	57,000	--	1.031	
June 19	.36	--	--	--	--	89,700	--	--	3,140	144,000	--	--	--	9,640	9,640	--	95	131,000	--	1.183	
July 9	36.6	--	--	--	--	6,450	--	--	1,450	10,200	--	--	--	1,840	1,840	--	88	27,300	--	1.012	
July 17	280	--	--	--	--	1,450	--	--	640	2,800	--	--	--	--	--	--	--	9,240	--	--	
July 22	.51	--	--	--	--	66,500	--	--	3,310	104,000	--	--	--	8,310	8,310	--	95	133,000	--	1.131	
Aug. 5	.55	--	--	--	--	98,800	--	--	2,710	155,000	--	--	--	9,830	9,830	--	96	149,000	--	1.200	
Aug. 12	.47	--	--	--	--	57,000	--	--	3,130	44,900	--	--	--	5,680	5,680	--	92	85,000	--	1.057	
Aug. 20	.57	--	--	--	--	28,000	--	--	3,960	89,800	--	--	--	7,990	7,990	--	94	135,000	--	1.114	
Aug. 30	.48	--	--	--	--	49,500	--	--	4,560	78,300	--	--	--	7,420	7,420	--	94	117,000	--	1.099	
Sept. 18	.82	--	--	--	--	96,900	--	--	2,990	153,000	--	--	--	9,780	9,780	--	96	156,000	--	1.196	

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

BRAZOS RIVER BASIN--Continued

816. 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 June 1959.

Chemical analyses, in parts per million, October 1958 to June 1959

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH	Density at 20°C
													Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate					
Oct. 9, 1958-----	0.29					39,700			3,850	62,600						7,750		92		119,000		1.078
Nov. 5-----	.79					72,700			3,770	117,000						8,890		95		169,000		1.147
Dec. 4-----	.78					74,700			3,620	119,000						8,880		95		171,000		1.149
Jan. 7, 1959-----	1.34					77,200			3,580	122,000						8,840		95		143,000		1.154
Feb. 5-----	1.08					76,400			3,640	120,000						8,330		95		159,000		1.152
Mar. 12-----	.55					93,800			3,290	149,000						9,570		96		151,000		1.191
Apr. 8-----	18.2	29		921	296	27,200		57	1,850	43,000			73,300	105		3,520	3,470	94	200	82,700	7.3	1.053
May 5-----	14.3					8,670			1,730	13,400						2,220		89		33,000		1.016
May 20-----	.21					34,500			2,780	53,900						5,290		93		94,300		1.067
June 18-----	a .05					35,100			3,570	56,600						6,360		92		98,300		1.069

a Field estimate

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

LOCATION.--At gaging station at bridge on U. S. Highway 83, 5 1/2 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 1959.
 Water temperatures: October 1948 to September 1951, October 1956 to September 1959.
 EXTREMES, 1958-59.--Dissolved solids: Maximum, 99,200 ppm Mar. 30-31; minimum, 2,130 ppm Aug. 8-12.
 Hardness: Maximum, 6,200 ppm Mar. 30-31; minimum, 440 ppm Aug. 8-12.
 Specific conductance: Maximum daily, 115,000 micromhos Mar. 30; minimum daily, 2,870 micromhos July 2.
 Water temperatures: Maximum, 95°F July 5; minimum, freezing point on Dec. 13, Feb. 6.
 EXTREMES, 1948-51, 1956-59.--Dissolved solids: Maximum, 99,200 ppm Mar. 30-31, 1959; minimum, 1,280 ppm June 2-4, 1957.
 Hardness: Maximum, 6,200 ppm Mar. 30-31, 1959; minimum, 372 ppm May 19-23, 24 (12-10 p.m.), 1951.
 Specific conductance: Maximum daily, 115,000 micromhos Mar. 30, 1959; minimum daily, 1,820 micromhos June 3, 1957.
 Water temperatures: Maximum, 95°F July 5, 1959; minimum, freezing point on many days during winter months.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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)	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	Non-carbonate						
Oct. 1-4, 12-13, 1958--	31.8	11		534	110	3,780		105	1,310	6,060		--	11,900	16.3	1,020	1,780	1,700	82	39	18,500	7.0	1.007	
Oct. 5-9-----	4.00	9.4		885	197	8,590		116	2,190	13,700		--	25,600	35.4	276	3,020	2,920	86	68	36,400	7.8	1.017	
Oct. 10-11, 14-31-----	2.33	11		1,120	297	13,600		156	2,800	21,700		--	39,600	55.3	249	4,020	3,890	88	93	53,900	7.5	1.027	
Nov. 1-15-----	5.75	13		1,300	302	15,100		139	3,030	24,200		--	44,000	61.6	683	4,490	4,370	88	98	58,600	7.6	1.030	
Nov. 16-30-----	1.91	9.0		1,140	261	13,700		140	2,630	21,900		--	39,700	55.4	205	3,920	3,800	88	95	53,600	7.8	1.027	
Dec. 1-15-----	.61	14		1,250	296	16,300		132	3,100	25,900		--	46,900	65.8	77.2	4,340	4,230	89	108	56,400	7.9	1.032	
Dec. 16-31-----	.88	11		1,290	323	19,100		175	3,030	30,300		--	54,100	76.4	129	4,550	4,400	90	123	63,600	7.8	1.038	
Jan. 1-20, 1959-----	.72	10		1,270	343	19,800	--	176	3,080	30,800		--	55,400	78.3	108	4,580	4,400	90	127	65,100	7.8	1.039	
Jan. 21-31-----	.72	12		1,340	392	20,200		157	3,180	32,200		--	57,400	81.2	112	4,960	4,830	90	125	69,500	7.2	1.040	
Feb. 1-6-----	1.75	11		1,380	462	29,200		143	3,050	46,400		--	80,600	116	381	5,340	5,230	92	173	89,300	7.8	1.057	
Feb. 7-28-----	.44	13		1,360	388	18,100		164	3,280	29,000		--	52,200	73.5	62.0	4,990	4,850	89	112	63,900	7.8	1.036	
Mar. 1-14-----	.36	14		1,410	341	15,300		148	3,490	24,700		--	45,500	63.9	44.2	4,920	4,800	87	96	56,900	8.0	1.032	
Mar. 15-29-----	.41	12		1,440	352	15,600		159	3,520	24,900		--	45,900	64.5	50.8	5,040	4,910	87	95	57,000	8.0	1.033	
Mar. 30-31-----	.60	24		1,570	556	36,100		90	3,510	57,400		--	99,200	145	161	6,200	6,130	93	199	101,000	7.3	1.072	
Apr. 1-7, 9-18-----	5.78	11		1,400	381	18,300	--	129	3,350	29,600		--	53,100	75.0	829	5,060	4,950	89	112	64,900	7.2	1.038	
Apr. 8-----	49.0	12		742	188	12,400		86	1,620	19,800		--	34,800	48.5	4,600	2,620	2,550	91	106	46,300	7.5	1.024	
Apr. 19-20-----	17.0	14		510	114	5,980		100	1,210	9,500		--	17,400	23.9	799	1,740	1,660	88	62	26,000	7.8	1.011	
Apr. 21-30-----	.59	9.7		1,310	326	15,200		148	3,210	24,200		--	44,300	62.1	70.6	4,610	4,490	88	97	55,500	7.4	1.031	
May 1-4-----	18.0	13		1,190	290	19,700		89	2,740	31,300		--	55,300	78.1	2,690	4,160	4,090	91	133	64,500	7.2	1.039	
May 5-8, 11-----	86.6	14		546	98	4,200		111	1,340	6,380		--	12,900	17.7	3,020	1,770	1,670	84	44	19,300	7.6	1.007	
May 9-10, 15, 19-20-----	31.4	16		339	70	2,170		134	881	3,420		--	6,960	9.48	590	1,130	1,020	81	28	11,000	7.6	1.002	
May 12-14, 16-18, 21-22-----	12.1	13		711	176	6,760		109	1,770	10,800		--	20,300	28.0	663	2,470	2,380	86	59	28,400	7.4	1.013	
May 23-26-----	1.70	9.6		1,190	371	21,900		112	2,650	35,000		--	61,200	86.8	281	4,490	4,400	91	142	69,800	7.4	1.043	
May 27-31-----	1.78	17		1,090	302	12,900		171	2,560	20,700		--	37,700	52.6	181	3,960	3,820	88	89	47,800	7.5	1.026	
June 1-2-----	124	22		1,150	328	18,400		123	2,580	29,400		--	51,900	73.2	17,380	4,220	4,120	90	123	63,300	7.2	1.037	
June 3-4, 10-11-----	4,003	19		292	52	1,540		127	734	2,430		--	5,130	6.98	55,450	942	838	78	22	8,160	8.0	--	
June 5-9-----	1,555	16		182	27	644		118	479	970		2.0	2,380	3.24	9,990	565	468	71	12	3,900	7.7	--	
June 12-20-----	51.4	19		590	147	4,230		114	1,530	6,800		--	13,400	18.4	1,860	2,080	1,980	82	40	19,900	7.7	1.008	
June 21-22-----	79.0	--		--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	32,600	--	--
June 23-----	1,740	16		430	50	2,830		113	1,110	4,380		--	8,870	12.1	41,670	1,280	1,190	83	34	13,700	7.8	1.004	
June 24-28, July 2-7, 13-16-----	728	15		142	26	680		119	373	1,030		2.0	2,330	3.17	4,580	462	364	76	14	3,950	7.9	--	
June 29-30, July 1-----	353	17		310	60	1,690		124	784	2,680		--	5,600	7.62	5,340	1,020	918	78	23	8,910	7.8	--	
July 8-12, 17-----	214	14		315	50	1,650		123	780	2,600		--	5,470	7.44	3,160	992	890	78	23	8,750	7.4	--	
July 18, 21-22-----	237	23		450	64	1,950		109	1,120	3,100		--	6,760	9.19	4,330	1,390	1,300	75	23	10,200	7.7	--	
July 19-20-----	278	23		325	28	688		74	816	1,070		3.0	2,990	4.07	2,240	926	866	62	9.8	4,490	7.7	--	
July 23-31-----	12.7	15		752	174	5,380		105	1,970	8,610		--	17,000	23.4	583	2,590	2,510	82	46	23,500	7.3	1.011	
Aug. 1-4-----	1.60	15		860	164	7,140		111	2,100	11,400		--	21,700	29.9	93.7	2,820	2,730	85	58	29,000	7.2	1.012	
Aug. 5-7-----	.43	23		1,190	252	11,900		97	2,930	18,900		--	35,200	49.0	40.9	4,000	3,930	87	82	42,900	7.6	1.024	
Aug. 8-12-----	648	24		140	22	609		123	362	910		3.5	2,130	2.90	3,730	440	339	75	13	3,530	8.2	--	
Aug. 13-14, 22-23-----	40.2	14		230	44	1,220		112	645	1,870		1.0	4,080	5.55	643	755	663	78	19	6,540	7.8	--	
Aug. 15-21, 24-25-----	20.0	16		454	82	2,410		108	1,200	3,810		--	8,020	10.9	433	1,470	1,380	78	27	12,000	7.7	1.003	
Aug. 26-31, Sept. 1-3-----	2.29	16		834	193	6,170		99	2,070	9,970		--	19,300	26.6	119	2,870	2,790	82	50	27,400	7.5	1.013	
Sept. 4-13-----	.32	21		1,450	334	16,100		121	3,550	25,700		--	47,200	66.3	40.8	4,990	4,890	88	99	57,500	6.4	1.033	
Sept. 14-30-----	1.53	14		1,780	346	11,600		159	2,990	19,800		--	36,600	51.0	151	5,860	5,730	81	66	46,600	6.3	1.025	
Weighted average-----	126	17		263	47	1,540		121	666	2,420		--	5,020	6.83	1,710	850	750	80	23	7,700	--	--	

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

- 58 -

BRAZOS RIVER BASIN--Continued
823. BRAZOS RIVER AT SEYMOUR, TEX.

LOCATION--At gauging station at bridge on U. S. Highways 277 and 283, three-quarters of a mile upstream from Wichita Valley Railway bridge, 1 mile southwest of Courthouse in Seymour, Baylor County, and at mile 832.
DRAINAGE AREA--14,480 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE--Chemical analyses: August to September 1939.
Water temperatures: August to September 1939.
Remarks--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1938 to September 1939 given in Water-Supply Paper 103E.

Chemical analyses, in parts per million, August to September 1939

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 (micro-mhos at 25 C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Aug. 1-8, 1939	34.9	22		595	94	1,830		66	1,460	2,850	--	--		6,780	9.22	639	1,620	1,370	71	20	9,830	7.2
Aug. 9, 22-25	136	11		400	67	1,500		102	1,090	2,350	--	--		5,470	7.44	2,010	1,270	1,190	72	18	8,210	7.9
Aug. 10-11, 19-21	655	16		295	42	930		101	822	1,410	0.8	2.0		3,570	4.86	6,310	908	826	69	13	5,450	7.6
Aug. 12-18	330	13		189	24	485		92	536	700	.7	2.5		2,000	2.72	1,780	570	494	63	8.8	3,150	7.9
Aug. 26-31	17.4	14		622	103	2,670		97	1,670	4,230	--	--		9,360	12.8	440	1,980	1,900	75	26	13,400	7.3
Sept. 1-2, 4-13	44.06	12		665	83	1,900		101	1,370	2,920	--	--		6,800	9.23	74.5	1,500	1,420	33	21	9,970	7.7
Sept. 3	17.0	11		214	37	837		72	614	1,280	.4	2.5		3,030	4.12	139	686	627	73	14	4,870	7.8
Sept. 16-30	0	13		533	96	2,000		120	1,530	3,090	--	--		7,340	10.0	--	1,720	1,630	72	21	10,500	7.8

a Includes days of less than 0.05 cubic feet per second discharge.

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 1959.

Water temperatures: April 1955 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 2,420 ppm Apr. 16-30; minimum, 143 ppm July 16.

Hardness: Maximum, 1,140 ppm Apr. 16-30; minimum, 80 ppm July 16.

Specific conductance: Maximum daily, 3,900 micromhos May 4; minimum daily, 254 micromhos July 16.

EXTREMES, 1955-59.--Dissolved solids: Maximum, 3,100 ppm June 13, 1958; minimum, 118 ppm Feb. 6-8, 1957.

Hardness: Maximum, 1,140 ppm Apr. 16-30, 1959; minimum, 72 ppm Feb. 6-8, 1957.

Specific conductance: Maximum daily, 5,600 micromhos June 13, 1958; minimum daily, 121 micromhos Apr. 27, 1957.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-12, 1958-----	2.39	9.0		70	15	107		153	60	198	0.1	2.0		536	0.73	3.46	236	110	50	3.0	985	8.1
Oct. 13-27-----	1.23	7.6		124	22	146		193	138	292	.1	4.0		829	1.13	2.75	400	242	44	3.2	1,480	8.0
Oct. 28-31, Nov. 1-16--	a .10	7.2		171	38	172		170	319	360	.2	6.2		1,140	1.55	.31	583	444	39	3.1	1,940	7.8
Nov. 17-30-----	a0	6.4		201	44	193		224	374	370	.2	9.6		1,310	1.78	--	682	499	38	3.2	2,150	7.9
Dec. 1-15-----	a0	6.8		208	45	176		236	370	355	.2	8.1		1,290	1.75	--	704	510	35	2.9	2,180	7.9
Dec. 16-31-----	a0	7.8		192	41	209		194	358	400	--	8.2		1,310	1.78	--	648	488	41	3.6	2,160	7.9
Jan. 1-15, 1959-----	a0	5.5		200	52	195	5.8	223	366	418	.2	8.5		1,350	1.85	--	713	530	37	3.2	2,250	7.8
Jan. 16-31-----	2.05	8.6		255	51	237		279	408	495	--	13		1,600	2.18	8.86	846	617	38	3.6	2,610	7.7
Feb. 1-14-----	.31	9.9		230	60	262		147	490	528	.4	16		1,670	2.27	1.40	820	700	41	4.0	2,670	7.9
Feb. 15-28-----	.68	6.4		262	61	303		209	412	675	.4	12		1,830	2.49	3.36	904	733	42	4.4	3,030	7.9
Mar. 1-17-----	a .25	6.2		305	71	379		211	514	820	.4	15		2,210	3.01	1.49	1,050	880	44	5.1	3,550	7.9
Mar. 18-31-----	a0	7.7		288	72	388		121	608	790	.4	15		2,230	3.03	--	1,010	916	45	5.3	3,500	7.5
Apr. 1-15-----	a0	7.6		310	77	381	5.6	151	660	810	.4	11		2,340	3.18	--	1,090	966	43	5.0	3,690	7.6
Apr. 15-30-----	a0	5.8		325	81	389		144	702	850	.4	6.8		2,420	3.29	--	1,140	1,030	41	5.0	3,780	7.9
May 1-8-----	a0	5.6		298	76	438		94	631	900	.3	5.4		2,400	3.26	--	1,060	979	47	5.9	3,810	7.5
May 9-11, 22-23-----	1,291	8.8		46	6.2	44		97	17	95	.2	4.5		270	.37	941	140	61	40	1.6	538	7.5
May 12-21, 24-26-----	45.2	8.4		58	8.6	75		98	27	164	.2	3.0		392	.53	47.8	180	100	47	2.4	774	7.3
May 27-31, June 1-----	5.43	7.6		89	15	109		107	100	230	.3	2.8		607	.83	8.90	284	196	45	2.8	1,140	7.1
June 2-8-----	810	8.8		44	7.8	44		94	14	102	.2	3.0		270	.37	590	142	65	40	1.6	544	7.1
June 9-20-----	7.48	14		42	18	117		152	58	262	.2	3.8		640	.87	12.9	304	179	46	2.9	1,200	7.9
June 21-24-----	229	13		124	25	185		171	101	402	.2	3.8		938	1.28	580	412	272	49	4.0	1,680	7.7
June 25-26-----	145	9.8		58	10	81		105	20	178	.2	4.0		413	.56	162	186	100	49	2.6	805	7.5
June 27-30, July 1-3---	243	11		43	6.2	40		112	17	76	.3	2.0		250	.34	164	133	41	39	1.5	464	7.7
July 4-15-----	24.0	9.8		54	8.8	70		116	27	139	.3	2.2		368	.50	23.8	170	76	47	2.3	702	7.1
July 16-----	251	6.8		28	2.5	20		79	12	31	.1	3.5		143	.19	96.9	80	15	35	1.0	254	7.6
July 17, Aug. 2-9-----	16.5	9.8		84	16	142		132	67	285	.5	2.8		672	.91	29.9	276	168	53	3.7	1,220	7.8
July 18-31-----	55.3	12		42	8.3	48		103	22	94	.4	2.2		280	.38	41.8	139	6	43	1.8	517	7.5
Aug. 1, 16-20-----	1.20	11		72	15	94		155	73	170	.5	1.0		b533	.72	1.73	241	114	46	2.6	894	7.7
Aug. 10-15-----	11.6	11		57	11	69		116	36	143	.4	1.0		385	.52	12.1	187	92	44	2.2	710	7.6
Aug. 21-31-----	a0	7.6		92	20	108		152	129	202	.5	.8		b677	.92	--	312	187	43	2.7	1,110	7.5
Sept. 1-30-----	a4.00	9.8		108	20	142		153	126	278	.2	14		b839	1.14	9.06	352	226	47	3.3	1,370	7.6
Weighted average-----	47.9	9.4		51	8.4	56		104	24	121	0.2	3.6		325	0.44	42.0	162	76	43	1.9	628	--

a Includes days of less than 0.05 cubic feet per second discharge.

b Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued

881. SALT CREEK AT OLNEY, TEX.

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 1958 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 3,670 ppm Apr. 23-26; minimum, 101 ppm Sept. 3.

Hardness: Maximum, 962 ppm June 27-30, July 1-8; minimum, 69 ppm Sept. 3.

Specific conductance: Maximum daily, 7,980 micromhos Apr. 26; minimum daily, 182 micromhos Sept. 3.

EXTREMES, April 1958 - September 1959.--Dissolved solids: Maximum, 19,300 ppm July 4-5, 1958; minimum, 101 ppm Sept. 3, 1959.

Hardness: Maximum, 4,040 ppm July 4-5, 1958; minimum, 69 ppm Sept. 3, 1959.

Specific conductance: Maximum daily, 30,400 micromhos July 5, 1958; minimum daily, 182 micromhos Sept. 3, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate						
Oct. 1-7, 1958-----	a0.01	5.6		50	12	218		107	12	388	0.4	1.0			740	1.01	0.02	174	87	73	7.2	1,440	7.8	
Oct. 9-10, 18, 26, 29--	0	4.8		57	16	228		104	10	430	.2	1.2			798	1.09	--	208	123	70	6.8	1,560	7.9	
Oct. 11, 19-24-----	a .03	6.4		28	8.6	132		108	6.2	210	.3	1.5		b484	.66	.04	106	17	73	5.6	881	7.5		
Oct. 12-17-----	a .03	6.4		31	5.7	71		96	5.4	120	.2	1.8		289	.39	.02	101	22	60	3.1	560	7.5		
Oct. 27-28, 30-31,																								
Nov. 1-4-----	0	2.1		165	37	581		59	27	1,240	.2	.8		2,080	2.83	--	564	515	69	11	3,970	7.2		
Nov. 6, 14-27-----	a .08	4.6		173	41	943		70	59	1,790	.5	6.5		3,050	4.15	.66	600	542	77	17	5,600	7.1		
Nov. 28-30, Dec. 3-6--	0	2.8		37	7.7	116		96	10	202	.3	2.0		b447	.61	--	124	46	67	4.5	833	7.6		
Dec. 1-2-----	a .05	3.9		24	3.5	36		66	6.4	63	.2	2.5		b187	.25	.03	74	20	51	1.8	336	7.3		
Dec. 7-12, 15-16-----	0	3.6		32	7.5	149		120	10	230	.4	1.5		b527	.72	--	111	13	74	6.2	965	8.2		
Dec. 14, 17-22-----	0	2.8		79	19	320		85	17	625	.3	1.2		1,110	1.51	--	275	206	72	8.4	2,160	7.9		
Dec. 29-31, Jan. 1-2,																								
1959-----	a .04	6.1		31	4.5	36	2.5	94	86	60	.2	3.0		195	.27	.02	96	19	45	1.6	378	8.2		
Jan. 7-15-----	0	2.5		27	6.7	96	2.5	98	8.8	156	.3	1.5		b374	.51	--	95	14	68	4.3	690	8.1		
Jan. 16-17, 19-20-----	0	1.8		77	20	256		84	16	528	.3	.8		941	1.28	--	274	205	67	6.7	1,850	7.9		
Jan. 18, 21-31-----	a .01	3.5		40	11	138		137	14	224	.5	1.2		b530	.72	.01	145	32	67	5.0	965	8.2		
Feb. 1, 4-8, 10-14-----	0	2.3		36	10	123		136	17	189	.5	1.8		b468	.64	--	131	20	67	4.7	855	8.1		
Feb. 17-18-----	0	3.3		100	32	344		154	26	690	.4	2.8		1,270	1.73	--	381	255	66	7.7	2,430	7.4		
Feb. 15-16, 20-----	0	2.1		38	13	158		121	21	262	.5	1.5		b611	.83	--	148	50	70	5.7	1,090	7.7		
Mar. 28-30-----	a .07	6.3		38	7.3	82		102	18	140	.2	3.5		345	.47	.07	125	42	59	3.2	677	7.5		
Apr. 1-3-----	0	7.0		48	13	175	5.0	136	31	288	.3	1.0		635	.86	--	174	62	68	5.8	1,230	6.8		
Apr. 4-----	0	--		--	--	--	--	48	--	1,030	--	--		--	--	--	420	380	--	--	--	3,290	7.4	
Apr. 8-15, 19-----	a .20	6.4		110	24	717		51	37	1,310	1.0	2.0		2,230	3.03	1.20	373	331	81	16	4,150	7.0		
Apr. 17-18-----	0	6.0		77	16	460		85	25	790	.7	3.0		1,400	1.90	--	258	188	79	12	2,650	6.9		
Apr. 23-26-----	0	3.9		194	56	1,140		55	61	2,190	.6	--		3,670	4.99	--	714	670	78	19	6,670	7.0		
May 5, 8-----	.90	6.4		42	4.0	31		130	9.8	50	1.1	1.0		208	.28	.51	121	15	36	1.2	404	7.6		
May 6-7-----	0	6.7		37	6.4	135		105	12	221	.3	1.8		472	.64	--	119	33	71	5.4	931	7.1		
May 9-----	0	6.5		168	39	770		56	38	1,530	.5	1.1		2,590	3.52	--	580	534	74	14	4,810	7.0		
May 10-14-----	a2.42	7.4		50	11	275		82	17	482	.4	3.0		885	1.20	5.79	170	103	78	9.2	1,770	7.3		
May 15-20-----	a .23	4.5		132	30	682		74	25	1,310	.6	2.0		2,220	3.02	1.38	453	392	77	14	4,190	7.2		
May 22, 25-26, June 2-3	0	6.6		30	3.7	38		102	8.0	56	.3	2.0		b210	.29	--	90	6	48	1.8	368	6.9		
May 23, 27-31-----	0	6.8		26	4.8	89		117	10	120	.5	2.5		b339	.46	--	84	0	70	4.2	605	7.0		
June 1, 4-5-----	a .23	7.8		142	36	931		83	40	1,710	.6	6.0		2,910	3.96	1.81	502	434	80	18	5,230	6.9		
June 6-20-----	0	7.2		138	34	765		53	27	1,470	.5	3.0		2,470	3.36	--	484	441	77	15	4,570	6.9		
June 21, 26-----	1.35	13		80	16	227		82	17	475	.4	4.5		873	1.19	3.18	266	198	65	6.1	1,720	7.6		
June 22-25-----	20.6	5.5		33	6.0	59		100	6.8	102	.3	1.0		263	.36	14.6	107	25	54	2.5	513	7.6		
June 27-30, July 1-8--	a .02	5.0		280	64	901		55	39	2,010	.5	--		3,330	4.53	.18	962	916	67	13	6,090	6.8		
July 9-16-----	a .24	5.8		120	28	479	7.4	102	22	960	.5	2.5		1,680	2.28	1.09	414	331	71	10	3,170	7.1		
July 17-18-----	0	9.0		104	36	521		65	30	1,030	.4	2.5		1,760	2.39	--	408	354	74	11	3,340	7.3		
July 19-22-----	a .02	8.4		76	10	349		65	7.6	655	.5	3.0		1,140	1.55	.06	230	177	77	10	2,210	7.3		
Aug. 30-31, Sept. 1-2--	a .22	8.8		103	22	612		69	34	1,120	.9	6.0		1,940	2.64	1.15	348	291	79	14	3,620	7.0		
Sept. 3-----	20.0	6.0		25	1.7	9.8		84	2.6	12	.1	2.5		101	.14	5.45	69	1	23	.5	182	7.7		
Sept. 4-12-----	0	9.8		34	5.5	163		112	13	250	.6	2.8		b558	.76	--	108	16	77	6.8	1,020	7.3		
Sept. 24-30-----	a .46	7.2		70	15	486		72	29	850	.9	3.0		1,500	2.04	1.86	236	177	82	14	2,810	7.2		
Weighted average-----	c0.36	6.0		41	7.7	125		94	9.8	225	0.3	1.7		463	0.63	0.45	134	57	67	4.7	890	--		

a Includes days of less than 0.05 cubic feet per second discharge.
 b Residue on evaporation at 180°C.
 c Represents 100 percent of flow for the water year. No flow on many days.

BRAZOS RIVER BASIN--Continued

882. 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 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 2,170 ppm Apr. 14-16; minimum, 51 ppm July 18-19.

Hardness: Maximum, 661 ppm Apr. 14-16; minimum, 22 ppm July 18-19.

Specific conductance: Maximum daily, 3,940 micromhos Apr. 14; minimum daily, 72 micromhos July 19.

EXTREMES, April 1958 to September 1959.--Dissolved solids: Maximum, 4,350 ppm June 21-30, July 1-5, 1958; minimum, 51 ppm July 18-19, 1959.

Hardness: Maximum, 1,230 ppm June 21-30, July 1-5, 1958; minimum, 22 ppm July 18-19, 1959.

Specific conductance: Maximum daily, 11,000 micromhos June 24, 1958; minimum daily, 72 micromhos July 19, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-11, 1958-----	a0	5.0		60	12	135		118	12	270	0.3	1.5		554	0.75	--	199	102	60	4.1	1,100	7.9
Oct. 12-----	2.20	6.6		122	22	332		94	22	720	.3	3.0		1,270	1.73	7.54	395	319	65	7.3	2,470	8.0
Oct. 13-31-----	a .01	3.8		72	15	195		100	16	400	.3	1.0		752	1.02	.02	241	159	64	5.5	1,480	7.9
Nov. 1-15-----	a0	3.2		70	15	218		87	15	440	.4	.8		b874	1.19	--	236	164	67	6.2	1,580	7.6
Nov. 16-30-----	a0	2.5		70	15	219		92	14	440	.3	.2		b884	1.20	--	236	160	67	6.2	1,570	7.5
Dec. 1-13-----	a0	2.1		74	18	225		82	17	468	.5	2.0		847	1.15	--	258	192	65	6.1	1,680	7.6
Dec. 14-31-----	a0	5.1		92	22	266		142	21	538	.3	1.0		1,020	1.39	--	320	204	64	6.5	1,980	7.7
Jan. 1-4, 9-15, 1959---	a0	3.7		85	22	232	9.3	120	20	495	.3	1.0		927	1.26	--	302	204	62	5.8	1,820	8.0
Jan. 5-6-----	a0	7.8		152	37	427		c190	42	890	.4	3.5		1,650	2.24	--	531	375	64	8.1	3,090	8.6
Jan. 7-8-----	a0	5.7		62	16	159		88	14	340	.2	.8		641	.87	--	220	148	61	4.7	1,290	8.2
Jan. 16-31-----	a0	3.5		113	28	288		168	17	615	.3	1.0		1,150	1.56	--	397	260	61	6.3	2,220	8.0
Feb. 1-10-----	a0	7.4		90	22	274		131	22	552	.3	1.5		1,030	1.40	--	315	208	65	6.7	2,010	8.1
Feb. 11-20-----	a0	5.6		82	22	283		132	21	552	.4	.5		1,030	1.40	--	295	187	68	7.2	2,010	8.0
Feb. 21-28-----	a0	4.0		98	26	287		156	15	588	.5	.5		1,100	1.50	--	352	224	64	6.7	2,150	7.6
Mar. 1-4, 7-13-----	a0	6.3		90	25	335		108	32	660	.3	2.2		1,200	1.63	--	328	239	69	8.0	2,330	7.9
Mar. 5-6, 14-15-----	a0	6.4		82	21	216		106	23	458	.3	2.0		861	1.17	--	291	204	62	5.5	1,700	8.1
Mar. 16-31-----	a0	4.1		120	30	384		79	29	820	.3	7.0		1,430	1.94	--	423	358	66	8.1	2,710	7.5
Apr. 1-10, 18-----	a0	6.0		37	6.8	64		63	17	133	.2	4.5		300	.41	--	120	69	54	2.6	598	6.9
Apr. 11-13-----	a0	5.2		52	10	97		100	22	194	.3	3.0		432	.59	--	170	88	55	3.2	860	7.8
Apr. 14-16-----	a0	4.1		194	43	568		56	95	1,240	.5	--		2,170	2.95	--	661	615	65	9.6	3,940	7.5
Apr. 17-----	a0	7.0		--	--	24		38	6.8	36	.3	5.2		--	--	--	42	11	55	1.6	193	7.4
Apr. 19-25-----	a0	4.0		54	9.7	116		100	28	222	.5	2.5		486	.66	--	174	92	59	3.8	962	7.0
Apr. 26-30-----	a0	4.7		96	22	294		81	51	600	.6	3.0		1,110	1.51	--	330	264	66	7.0	2,110	6.6
May 1-8-----	a0	8.9		123	27	391		59	65	800	.5	2.7		1,470	2.00	--	418	370	67	8.3	2,810	7.1
May 9-11-----	a37.7	9.5		18	3.0	27		62	8.0	38	.3	3.2		137	.19	13.9	57	6	51	1.6	262	6.6
May 12-16-----	a 3.38	11		48	8.4	117		100	14	218	.4	5.7		472	.64	4.31	154	72	62	4.1	942	7.3
May 17-31-----	a .17	6.2		64	13	171		139	17	320	.5	1.5		661	.90	.30	213	99	64	5.1	1,320	7.2
June 1-21-----	a0	3.9		52	12	165		106	11	310	.5	2.0		608	.83	--	179	92	67	5.4	1,220	6.9
June 22, 27-28-----	30.1	8.3		13	3.1	19		43	4.6	32	.3	1.5		103	.14	8.37	45	10	48	1.3	190	6.6
June 23-24-----	156	13		42	7.4	103		82	14	194	.3	4.0		418	.57	176	136	68	62	3.8	797	7.4
June 25-26, 29-30-----	13.9	11		32	5.7	52		84	7.6	97	.3	2.2		249	.34	9.34	103	34	52	2.2	482	7.2
July 1-6, 8-9-----	a1.78	14		36	7.5	67		88	9.8	130	.2	1.8		309	.42	1.49	121	49	55	2.7	578	7.5
July 7-----	2.90	14		20	5.0	42		71	7.6	65	.3	3.8		193	.26	1.51	71	13	56	2.2	336	7.4
July 10, 16-----	a1.75	14		46	9.5	116		83	12	229	.2	2.8		470	.64	2.22	154	86	62	4.1	889	7.5
July 11-15, 17, 22-23---	a1.94	11		34	7.0	58		82	9.6	114	.2	1.8		276	.38	1.45	114	46	53	2.4	520	7.3
July 18-19-----	170	13		5.4	2.1	5.8		26	3.6	5.0	--	3.2		51	.07	23.4	22	1	37	.5	72	7.0
July 20-21, 24-31-----	3.36	8.8		22	4.3	26		63	11	45	.2	2.8		151	.21	1.37	73	21	44	1.3	277	6.7
Aug. 1-10-----	a0	11		33	6.3	41		111	12	65	.4	2.5		b244	.33	--	108	17	45	1.7	408	7.6
Aug. 11-22-----	a0	5.2		37	6.8	53		108	17	88	.6	4.0		b290	.39	--	120	32	49	2.1	495	7.3
Aug. 23-30-----	a0	12		48	8.3	78		103	27	138	.6	18		381	.52	--	154	70	52	2.7	707	7.9
Aug. 31, Sept. 1-----	a0	7.6		7.5	3.5	13		38	6.2	14	.2	4.1		75	.10	--	33	2	46	1.0	126	7.4
Sept. 2-4-----	a34.3	9.8		14	3.4	21		53	7.4	28	.2	2.9		113	.15	10.5	49	6	48	1.3	197	7.6
Sept. 5-12-----	a3.72	12		29	5.0	41		90	7.6	70	.2	2.6		211	.29	2.12	93	19	49	1.8	394	7.4
Sept. 13-30-----	a0	6.1		38	6.8	56		126	10	91	.3	1.9		b291	.40	--	123	20	50	2.2	517	7.7
Weighted average-----		3.12	12		22	4.5	45	58	8.3	81	0.3	3.2		205	0.28	1.73	73	26	57	2.3	382	--

a Includes days of less than 0.05 cubic feet per second discharge.

b Residue on evaporation at 180°C.

c Includes equivalent of 12 parts per million of carbonate (CO₃).

BRAZOS RIVER BASIN--Continued

886. BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.

LOCATION.--Immediately below Possum Kingdom Dam, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Grafard, 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 1959.

Water temperatures: October 1949 to September 1955.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 1,370 ppm Sept. 1-30; minimum, 996 ppm Mar. 1-31.

Hardness: Maximum, 425 ppm Sept. 1-30; minimum, 328 ppm Dec. 1-31.

Specific conductance: Maximum daily, 2,350 micromhos Sept. 29; minimum daily, 1,730 micromhos June 4.

EXTREMES, 1942-59.--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 daily, 5,720 micromhos Jan. 7, 1956; minimum daily, 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.--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 1958 to September 1959 given in Water-Supply Paper 1632. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
														Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, mag-ne-sium	Non-carbon-ate				
Oct. 1-31, 1958-----	658	10		122	20	276		122	234	455		1.5		1,180	1.60	2,100	386	286	61	6.1	2,040	7.7
Nov. 1-30-----	352	7.8		110	19	249		119	211	408		1.0		1,060	1.44	1,010	352	255	61	5.8	1,900	7.8
Dec. 1-31-----	196	8.8		102	18	238		115	191	392		.8		1,010	1.37	534	328	234	61	5.7	1,770	7.3
Jan. 1-31, 1959-----	217	10		103	19	232		118	197	382		.0		1,000	1.36	586	335	238	60	5.5	1,770	7.8
Feb. 1-28-----	77.5	7.6		104	19	232		118	198	382		.5		1,000	1.36	209	338	241	60	5.5	1,780	7.9
Mar. 1-31-----	68.1	10		104	19	229		114	195	382		1.0		996	1.35	183	338	244	60	5.4	1,780	7.7
Apr. 1-30-----	77.7	8.8		105	20	233	7.1	119	195	392		.8		1,020	1.39	214	344	246	59	5.5	1,780	7.4
May 1-31-----	232	7.8		104	17	238		119	203	380		1.0		1,010	1.37	633	330	232	61	5.7	1,790	7.5
June 1-30-----	1,060	8.6		110	20	240		124	215	392		.5		1,050	1.43	3,010	356	255	59	5.5	1,840	7.4
July 1-31-----	2,080	9.0		118	22	277		126	256	438		.8		1,180	1.60	6,630	385	282	61	6.1	1,990	7.7
Aug. 1-31-----	225	12		125	22	292		128	264	465		1.2		1,240	1.69	753	402	298	61	6.3	2,120	7.2
Sept. 1-30-----	208	12		134	22	327		125	294	515		1.8		1,370	1.86	769	425	322	63	6.9	2,310	7.4
Weighted average----	458	9.2		115	21	264		123	235	425		0.9		1,130	1.54	1,400	374	272	61	5.9	1,950	--

926. BRAZOS RIVER AT WHITNEY DAM NEAR WHITNEY, TEX.

LOCATION.--Immediately below Whitney Dam, 4.0 miles upstream from Iron Creek, 3.4 miles upstream from gaging station near Whitney, and 7.4 miles southwest of Whitney, Hill County.

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 1959.

Water temperatures: October 1947 to May 1948, October 1948 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 947 ppm Feb. 1-28; minimum, 845 ppm Aug. 1-31.

Hardness: Maximum, 328 ppm Apr. 1-30; minimum, 283 ppm Aug. 1-31.

Specific conductance: Maximum daily, 1,690 micromhos May 9; minimum daily, 1,290 micromhos July 26.

Water temperatures: Maximum, 88°F June 17; minimum, 39°F Jan. 4, 21.

EXTREMES, 1947-59.--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 daily, 2,660 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.

Water temperatures: Maximum, 92°F July 21, 28-29, 1957; minimum, freezing point Jan 28-29, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-31, 1958-----	536	9.6		100	16	193		126	174	318	--	1.2		885	1.20	1,280	316	212	57	4.7	1,550	7.8
Nov. 1-30-----	571	9.8		94	16	198		131	167	318	--	1.0		930	1.26	1,430	300	193	59	5.0	1,540	8.0
Dec. 1-31-----	553	11		94	16	201		136	166	322	--	.2		925	1.26	1,380	300	189	59	5.1	1,570	8.2
Jan. 1-31, 1959-----	530	11		96	18	191	5.8	133	173	322	0.3	.5		913	1.24	1,310	314	204	56	4.7	1,560	8.2
Feb. 1-28-----	596	11		93	18	196		114	176	322	--	.5		947	1.29	1,520	306	212	58	4.9	1,560	7.6
Mar. 1-31-----	612	11		99	18	199		134	178	325	--	.5		a896	1.22	1,480	321	211	57	4.8	1,570	7.8
Apr. 1-30-----	614	8.4		100	19	192	5.6	140	185	318	.3	.5		a898	1.22	1,490	328	213	56	4.6	1,600	7.9
May 1-31-----	633	7.4		98	19	190		141	174	310	--	2.0		946	1.29	1,620	322	207	56	4.6	1,560	7.7
June 1-30-----	615	11		94	19	191		140	170	308	--	1.0		909	1.24	1,510	312	198	57	4.7	1,500	7.2
July 1-31-----	1,557	11		86	17	181		134	152	290	--	1.0		850	1.16	3,570	284	174	58	4.7	1,400	7.2
Aug. 1-31-----	711	11		87	16	177		137	138	290	--	2.2		845	1.15	1,620	283	170	58	4.6	1,400	7.6
Sept. 1-30-----	625	11		89	17	192		132	160	308	--	1.2		863	1.17	1,460	292	184	59	4.9	1,450	7.5
Weighted average----	681	10		93	17	191		134	165	309	--	1.0		893	1.21	1,640	302	192	58	4.8	1,500	--

a Calculated from determined constituents.

BRAZOS RIVER BASIN--Continued

1110. NAVASOTA RIVER NEAR BRYAN, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 190, 2.5 miles upstream from Shepherd Creek, and 17 miles northeast of Bryan, Brazos County.
DRAINAGE AREA.--1,439 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.

Water temperatures: October 1958 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 928 ppm Sept. 20-25; minimum, 72 ppm Feb. 15.

Hardness: Maximum, 226 ppm Sept. 20-25; minimum, 27 ppm Feb. 15.

Specific conductance: Maximum daily, 2,370 micromhos Sept. 22; minimum daily, 114 micromhos Feb. 15.

Water temperatures: Maximum, 89 °F Aug. 4; minimum, 38°F Jan. 4-5.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-10, 1958-----	311	16		22	4.5	73		66	20	110	--	1.5		a299	0.41	251	73	19	68	3.7	499	7.0
Oct. 11-20-----	91.1	18		30	6.4	68		92	29	101	--	1.5		a319	.43	78.5	101	26	59	2.9	531	7.2
Oct. 21-31-----	428	12		16	3.5	29		52	19	38	--	.5		144	.20	166	54	12	53	1.7	258	6.9
Nov. 1-16-----	53.2	16		29	6.7	52		78	39	77	0.1	.5		a282	.38	40.5	100	36	53	2.3	471	7.4
Nov. 17-----	459	8.8		17	3.1	20		32	33	26	.2	1.0		125	.17	155	55	29	44	1.2	188	7.0
Nov. 18-30-----	85.3	17		27	7.2	41		57	46	65	.1	.5		232	.32	53.4	97	50	48	1.8	410	7.2
Dec. 1-7-----	217	18		26	6.5	40		52	48	61	--	.5		226	.31	132	92	49	49	1.8	388	7.1
Dec. 8-17-----	95.0	17		45	9.5	78		109	51	126	--	.2		a416	.57	107	152	62	53	2.7	694	7.7
Dec. 18-31-----	62.2	17		41	7.8	52		102	47	81	--	.2		a315	.43	52.9	134	51	46	1.9	523	7.7
Jan. 1-10, 1959-----	159	18		28	8.2	43	4.5	57	59	68	.4	.5		258	.35	111	104	57	46	1.8	441	7.7
Jan. 11-20-----	59.6	20		34	9.8	56		58	69	90	--	.2		308	.42	49.6	125	78	49	2.2	529	7.7
Jan. 21-31-----	40.5	20		38	11	67		65	79	107	--	.2		354	.48	38.7	140	86	51	2.5	616	7.8
Feb. 1-13-----	95.1	18		40	12	73		62	85	120	--	.5		378	.51	97.1	150	98	52	2.6	677	7.8
Feb. 14, 16-18-----	2,241	9.6		16	4.1	36		35	29	53	--	1.0		166	.23	1,000	57	28	58	2.1	303	7.4
Feb. 15-----	3,400	8.2		8.4	1.5	13		25	14	14	--	1.2		72	.10	661	27	6	52	1.1	114	7.5
Feb. 19-20-----	3,825	13		22	5.2	81		50	20	134	--	1.0		301	.41	3,110	76	36	70	4.0	570	7.8
Feb. 21-28-----	1,134	15		38	9.0	181		74	37	302	--	1.2		619	.84	1,900	132	72	75	6.9	1,200	7.6
Mar. 1-7, 10-11-----	210	17		46	12	170		79	67	282	--	2.2		635	.86	360	164	100	69	5.8	1,190	7.7
Mar. 8-9, 12-16-----	258	13		34	9.5	93		71	54	150	--	1.2		390	.53	272	124	66	62	3.6	718	7.6
Mar. 17-31-----	61.0	15		46	13	117		85	74	195	--	.8		503	.68	82.8	168	99	60	3.9	928	7.5
Apr. 1-7-----	65.6	16		49	15	106	4.6	78	88	186	.2	.2		503	.68	89.1	184	120	55	3.4	908	7.5
Apr. 8-10, 12-17-----	2,524	8.4		14	3.6	28		33	22	42	--	1.2		135	.18	920	50	23	55	1.7	253	6.9
Apr. 11, 18-21-----	3,212	8.8		21	4.6	53		44	26	88	--	.5		224	.30	1,940	71	35	62	2.8	422	7.0
Apr. 22-30-----	954	12		28	5.7	66		76	32	99	--	1.5		281	.38	724	93	31	61	3.0	518	7.3
May 1-8-----	304	15		34	9.0	72		83	49	113	--	1.5		334	.45	274	122	54	56	2.9	617	7.8
May 9-13, 19-23-----	791	12		23	5.9	51		65	27	79	--	1.0		231	.31	493	82	28	58	2.5	439	6.9
May 14-18-----	3,548	8.6		12	3.2	22		41	14	30	--	1.0		111	.15	1,060	43	10	53	1.5	206	6.6
May 24-31-----	2,201	8.8		13	3.6	24		43	16	33	--	1.0		120	.16	713	47	12	52	1.5	228	7.1
June 1-6-----	592	16		27	6.0	57		79	28	85	--	2.0		284	.39	454	92	27	57	2.6	470	7.4
June 7-17-----	757	14		22	4.3	36		69	22	50	--	1.2		184	.25	376	73	16	52	1.8	335	7.5
June 18-25-----	122	17		37	8.8	59		98	44	91	--	2.0		a336	.46	111	128	48	50	2.3	552	7.4
June 26-30-----	3,508	12		16	3.0	34		47	16	50	--	1.2		155	.21	1,470	52	14	59	2.1	285	6.7
July 1-7-----	1,669	17		22	3.9	39		81	15	51	.3	1.2		189	.26	852	71	5	54	2.0	323	7.1
July 8-20-----	65.0	18		40	8.7	63		99	44	102	.3	1.0		a346	.47	42.0	136	55	50	2.3	576	7.1
July 21-24, 28-30-----	88.0	15		46	9.6	77		114	45	128	.4	.8		a406	.55	96.5	154	61	52	2.7	680	7.0
July 25-27, 31-----	240	13		52	12	124		120	48	212	--	.2		520	.71	337	179	80	60	4.0	974	7.0
Aug. 1-10-----	198	16		46	7.5	188		99	27	315	--	2.0		a712	.97	381	146	65	74	6.8	1,220	7.4
Aug. 11-23-----	15.7	16		46	9.5	206		107	30	342	--	1.8		a766	1.04	32.5	154	66	74	7.2	1,310	7.1
Aug. 24-31-----	12.5	15		36	8.8	134		103	32	211	--	1.8		a518	.70	17.5	126	42	70	5.2	905	7.1
Sept. 1-10-----	43.4	16		36	9.2	106		95	42	167	--	0.8		a457	.62	53.6	128	50	64	4.1	786	6.9
Sept. 11-19-----	22.4	15		30	6.6	80		67	27	137	--	.8		329	.45	19.9	102	47	63	3.4	626	7.3
Sept. 20-25-----	17.8	13		66	15	263		87	44	480	--	3.8		928	1.26	44.6	226	154	72	7.6	1,760	7.3
Sept. 26-30-----	40.4	14		28	5.7	101		67	25	165	--	.5		372	.51	40.6	94	38	70	4.5	709	7.1
Weighted average-----	529	12		21	4.9	52		55	25	80	--	1.1		226	0.31	323	73	28	61	2.6	414	--

a Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued

1140. 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 and 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 1959.

Water temperatures: November 1950 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 718 ppm Apr. 1-7; minimum, 171 ppm Apr. 11-22.

Hardness: Maximum, 288 ppm Apr. 1-7; minimum, 100 ppm Oct. 1-9.

Specific conductance: Maximum daily, 1,230 micromhos Dec. 25, Apr. 4; minimum daily, 235 micromhos Oct. 1, Apr. 20.

Water temperatures: Maximum, 86°F on several days during summer months; minimum, 39°F Jan. 4.

EXTREMES, 1945-59.--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 daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.

Water temperatures (1950-59): Maximum, 91°F Aug. 5, 1951; minimum, 39°F Jan. 4, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-9, 1958-----	7,501	16		33	4.2	27	3.9	101	25	40	--	1.5		a201	0.27	4,070	100	17	36	1.2	342	7.8
Oct. 10-14, 21-25-----	2,593	14		51	8.4	48	4.8	145	47	73	--	2.0		330	.45	2,310	152	42	38	1.6	556	7.4
Oct. 19-20, 26-31-----	2,799	13		73	14	98	5.0	160	96	160	--	.5		563	.77	4,250	240	108	46	2.7	934	7.6
Nov. 1-10-----	2,365	14		59	10	61	4.8	158	66	90	--	1.8		402	.55	2,570	188	58	41	1.9	671	8.0
Nov. 11-20-----	2,181	10		64	13	73	4.6	168	85	110	--	1.5		464	.63	2,730	213	76	42	2.2	782	8.0
Nov. 21-30-----	2,018	10		62	11	72	5.3	158	72	114	--	.8		454	.62	2,470	200	70	43	2.2	754	7.9
Dec. 1-10-----	1,870	9.0		80	16	106	5.0	185	106	175	--	.5		615	.84	3,110	266	114	46	2.8	1,050	7.7
Dec. 11-20-----	1,692	10		78	15	95	4.9	191	100	150	--	1.5		578	.79	2,640	256	100	44	2.6	982	7.7
Dec. 21-31-----	1,544	7.0		87	16	117	4.9	196	117	192	--	1.0		679	.92	2,830	283	122	47	3.0	1,160	7.6
Jan. 1-10, 1959-----	1,635	11		81	16	98	4.8	215	99	149	0.3	1.5		605	.82	2,670	268	92	44	2.6	988	8.1
Jan. 11-20-----	1,437	8.8		77	16	104	4.7	195	107	158	--	1.5		623	.85	2,420	258	98	46	2.8	1,000	8.0
Jan. 21-31-----	1,185	7.6		81	18	107	5.9	214	111	166	--	.1		636	.86	2,030	276	100	45	2.8	1,050	8.0
Feb. 1-10-----	2,236	5.8		69	14	104	4.8	158	106	154	--	1.2		546	.74	3,300	230	100	49	3.0	941	8.1
Feb. 11-20, 28-----	7,725	12		50	8.2	53	4.5	127	61	82	--	2.0		350	.48	7,300	158	54	41	1.8	594	8.0
Feb. 21-27-----	7,893	12		37	4.7	29	4.9	99	42	40	--	2.8		a221	.30	4,710	112	31	35	1.2	379	7.8
Mar. 1-10-----	3,235	14		63	10	104	5.9	131	76	170	--	2.2		a509	.69	4,450	198	90	52	3.2	919	7.9
Mar. 11-20-----	2,087	12		72	13	102	5.3	158	99	158	--	2.2		a542	.74	3,050	233	104	48	2.9	965	8.0
Mar. 21-31-----	1,298	9.0		79	16	108	4.9	182	108	168	--	.8		641	.87	2,250	263	114	47	2.9	1,030	7.9
Apr. 1-7-----	1,320	9.2		84	19	124	5.1	188	125	198	.3	.5		718	.98	2,560	288	134	48	3.2	1,160	8.1
Apr. 8-10-----	6,350	12		62	11	69	5.1	142	74	116	--	2.5		a422	.57	7,240	200	83	42	2.1	752	8.2
Apr. 11-22-----	26,950	11		35	4.6	16	4.0	108	23	22	--	2.0		a171	.23	12,440	106	18	24	.7	298	7.6
Apr. 23-30-----	10,530	13		36	5.2	29	4.7	97	35	47	--	1.8		a220	.30	6,250	112	32	35	1.2	395	7.2
May 1-11-----	3,238	12		48	8.4	53	4.8	129	56	78	--	1.0		a324	.44	2,830	154	49	42	1.9	585	7.3
May 12-18-----	10,780	9.4		45	6.4	43	4.3	118	44	67	--	2.0		a279	.38	8,120	139	42	39	1.6	514	7.4
May 19-31-----	11,830	11		37	4.8	24	4.0	111	29	33	--	2.5		a200	.27	6,390	112	21	31	1.0	359	7.9
June 1-7, 13-16-----	6,208	17		36	4.4	24	4.0	110	32	27	--	2.8		217	.30	3,640	108	18	32	1.0	341	7.5
June 8-12, 17-20-----	6,191	16		50	7.2	44	4.4	130	50	65	--	2.0		322	.44	5,380	154	48	37	1.5	532	7.2
June 21-28-----	2,730	15		63	11	67	4.6	166	68	99	--	1.0		436	.59	3,210	202	66	41	2.1	716	7.4
June 29-30, July 1-10--	7,395	15		45	7.1	35	4.3	127	38	52	--	3.0		276	.38	5,510	142	38	34	1.3	468	7.3
July 11-16-----	3,470	15		46	8.7	54	5.8	129	45	84	--	2.0		336	.46	3,150	151	46	43	1.9	566	7.3
July 17-31-----	2,643	14		72	15	105	5.2	162	99	166	--	1.5		574	.78	4,100	241	108	48	2.9	963	7.3
Aug. 1-3, 6-10-----	3,806	14		66	12	91	5.4	155	81	151	--	.5		497	.68	5,110	214	87	47	2.7	859	7.6
Aug. 4-5-----	4,905	24		48	7.6	41	4.1	147	38	62	--	1.5		a298	.41	3,950	152	31	36	1.4	497	7.9
Aug. 11-20-----	1,431	15		78	14	117	5.3	181	93	196	--	.5		628	.85	2,430	252	104	50	3.2	1,080	7.4
Aug. 21-31-----	1,419	14		70	14	91	5.0	189	80	146	--	.2		524	.71	2,010	232	77	45	2.6	896	7.3
Sept. 1-10-----	1,683	15		66	15	110	4.8	175	89	162	--	.8		a549	.75	2,490	226	82	51	3.2	939	7.6
Sept. 11-20-----	1,310	13		62	13	78	4.4	173	68	122	--	.8		450	.61	1,590	208	66	44	2.3	775	7.2
Sept. 21-30-----	932	14		69	16	89	4.6	208	77	127	--	.5		500	.68	1,260	238	68	44	2.5	850	7.3
Weighted average----	4,450	12		49	8.0	49	4.5	130	51	74	--	1.9		323	0.44	3,880	156	49	40	1.7	553	--

a Calculated from determined constituents.

BRAZOS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Jan. 26, 1959-----	a0.07					1,790	232	346	2,780							580	390		8,950	8.2	
DOUBLE MOUNTAIN FORK BRAZOS RIVER AT US HIGHWAY 84 AT JUSTICEBURG																					
DOUBLE MOUNTAIN FORK BRAZOS RIVER 10 MILES SOUTH OF CLAIREMONT																					
Jan. 30, 1959-----	0					453	130	1,470	445							1,280	1,170		3,730	8.2	
ROUGH CREEK AT MOUTH NEAR ROTAN																					
Aug. 19, 1959-----	a0.2					31	6.3	95	935	36						1,000	922	6	1,730	7.4	
DOUBLE MOUNTAIN FORK BRAZOS RIVER AT STATE HIGHWAY 70 NEAR ROTAN																					
Jan. 30, 1959-----	0.23			764	116	4,090	97	2,080	6,400							2,380	2,300		20,100	8.1	
DOUBLE MOUNTAIN FORK BRAZOS RIVER AT US HIGHWAY 380 NEAR OLD GLORY																					
Jan. 29, 1959-----						529	160	1,720	595							1,610	1,480		4,470	8.0	
DOUBLE MOUNTAIN FORK BRAZOS RIVER AT STATE HIGHWAY 24 NEAR RULE																					
Jan. 29, 1959-----	0					396	126	1,260	500							1,260	1,160		3,640	8.2	
DOUBLE MOUNTAIN FORK BRAZOS RIVER ABOVE SALT FORK BRAZOS RIVER																					
Jan. 29, 1959-----	0.10			900	185	5,300	133	2,180	8,610							3,010	2,900		25,300	8.1	
808. WHITE RIVER NEAR CROSBYTON																					
June 18, 1959-----	1.25					57	11	54	22										613		
809. WHITE RIVER BELOW FALLS NEAR CROSBYTON																					
June 18, 1959-----	1.91					61	11	51	22										570		
RED MID CREEK NEAR CLAIREMONT																					
Aug. 21, 1959-----	0					26	7.1	79	451	30						518	454	10	1,050	7.5	

a Field estimate.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Jan. 27, 1959	0.15			1,190	803	56,600	101	5,120	87,300								5,380	5,380		143,000	7.8
Mar. 16						67,300	85	5,980	104,000								6,270	6,200	96	152,000	7.8
SALT FORK BRAZOS RIVER AT FM ROAD 948 NEAR CLAIRENTON																					
Jan. 27, 1959	0					2,680	167	1,640	4,440								2,280	2,140		14,800	8.0
DUCK CREEK AT MOUTH NEAR JAYTON																					
Jan. 28, 1959						283	166	1,330	360								1,620	1,480		3,560	8.1
SALT FORK BRAZOS RIVER 5 MILES WEST OF JAYTON																					
Jan. 28, 1959	1.7					642	174	1,320	880								1,370	1,430		5,050	8.1
SALT FORK BRAZOS RIVER AT US HIGHWAY 380 WEST OF JAYTON																					
Jan. 27, 1959	1.7					3,410	209	1,870	5,330								2,220	2,050		17,000	8.1
SALT FORK BRAZOS RIVER AT KENT-STONEMALL COUNTY LINE NEAR JAYTON																					
Jan. 28, 1959	1.0					8,210	177	2,180	12,900								2,750	2,600		34,900	8.0
SALT FORK BRAZOS RIVER AT US HIGHWAY 380 NEAR SWENSON																					
Jan. 28, 1959	0.8					5,930	176	2,350	9,390								2,950	2,810		27,200	8.0
SALT FORK BRAZOS RIVER 1/2 MILE ABOVE CROTON CREEK																					
Jan. 28, 1959						4,320	154	2,160	7,080								2,970	2,860		21,400	7.9
810.5. SHORT CROTON CREEK AT MOUTH NEAR JAYTON																					
Aug. 15, 1959	0					13,100		3,780	20,400											49,400	
811. CROTON CREEK BELOW MOUTH OF SHORT CROTON CREEK NEAR JAYTON																					
Aug. 15, 1959	0					2,540		2,820	3,890								3,030		65	14,200	

a Field estimate.

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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	Specific conductance (micro-mhos at 25 C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
SALT CROTON CREEK AT FALLS NEAR ASPERMONT																					
Mar. 11, 1959	0.69					92,100			3,410	147,000							9,320		95	110,000	
May 6	--					10,400			1,990	16,300							2,730		89	18,700	
July 22	.20					5,930			1,580	9,500							2,040		86	25,500	
Jan. 29, 1959	a0.20					1,940		257	2,370	3,590							3,720	3,510		13,200	8.1
BRAZOS RIVER JUST BELOW CONFLUENCE OF DOUBLE MOUNTAIN AND SALT FORKS NEAR RULE																					
Jan. 29, 1959	1.8					6,500		118	2,490	10,500							3,360	3,260		29,800	8.1
NORTH CROTON CREEK AT COUNTY ROAD CROSSING 11 MILES SOUTHWEST OF GUTHRIE																					
Mar. 17, 1959	a0.04			1,390	312	9,000	109	4,170	14,100								4,750	4,660	80	38,500	7.3
NORTH CROTON CREEK AT MOUTH NEAR KNOX CITY																					
Aug. 18, 1959	a0.1					30	6.6	56	462	40							494	448	11	1,040	7.1
BRAZOS RIVER BELOW NORTH CROTON CREEK																					
Jan. 29, 1959	2.1					4,320		111	2,040	7,280							2,660	2,570		22,100	8.2
MUSTANG CREEK AT MOUTH NEAR KNOX CITY																					
Aug. 18, 1959	0					1,980		124	3,440	2,280							3,430	3,330	50	10,700	7.7
BRAZOS RIVER AT STATE HIGHWAY 283 NEAR KNOX CITY																					
Jan. 29, 1959	2.1					3,210		104	1,970	5,080							2,330	2,240		16,300	8.2
BRAZOS RIVER AT FM ROAD 209 NEAR GRAHAM																					
Jan. 30, 1959	7.6					1,290		192	1,040	1,970							1,220	1,060		7,610	8.0
CLEAR FORK BRAZOS RIVER AT STATE HIGHWAY 70 NEAR ROBY																					
Jan. 30, 1959	0.6			640	125	1,770		242	2,210	2,450							2,120	1,920		10,300	8.1

a Field estimate.

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25° C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate						
Jan. 30, 1959-----	2.0					1,520	180	2,330	2,010							2,120	1,970			9,220	8.0			
CLEAR FORK BRAZOS RIVER AT FM ROAD 126 SOUTH OF HAMLIN																								
Jan. 30, 1959-----	2.8			310	150	941	200	1,930	1,230							1,890	1,730			6,680	8.0			
CLEAR FORK BRAZOS RIVER AT US HIGHWAY 180 NEAR LUEDERS																								
Jan. 30, 1959-----				355	146	486	266	1,260	718							1,490	1,270			4,410	8.0			
HUBBARD CREEK AT US HIGHWAY 180 NEAR BRECKENRIDGE																								
Jan. 30, 1959-----						499	162	115	1,300							1,000	867			4,310	7.9			
LAKE CISCO AT DAM NEAR CISCO																								
Mar. 12, 1959-----		2.2		38	3.6	4.5	4.5	128	12	6.0	0.2	0.2			b141	0.19			110	5	8	0.2	349	8.0
BIG SANDY CREEK AT US HIGHWAY 180 NEAR BRECKENRIDGE																								
Jan. 30, 1959-----							245	148	60	505						392	270			2,040	8.2			
LAKE DANIEL NEAR BRECKENRIDGE																								
Mar. 12, 1959-----		1.3		36	4.1	1.4	123	9.6	18	0.2	0.0	0.0			b150	0.20			107	6	22	0.6	274	7.7
CLEAR FORK BRAZOS RIVER AT FM ROAD 701 BETWEEN ELIASVILLE AND SOUTH BEND																								
Jan. 30, 1959-----	6.4			195	52	363	224	90	860							700	517			3,110	8.1			
883. OAK CREEK NEAR GRAHAM																								
May 12, 1959-----		12		16	4.0	10	63	12	8.0	0.4	2.5				96	0.13			56	3	28	0.6	163	7.4
July 20-----		16		13	1.8	3.6	33	4.0	4.0	.4	1.2				77	.10			40	0	14	.2	110	7.1

b Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25 C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
LAKE GRAHAM NEAR GRAHAM																						
Oct. 9, 1958-----		5.2		58	11	93		141	13	186	0.2	0.5		436	0.59		190	74	52	2.9	86-	7.8
Nov. 12-----		3.8		62	12	92		148	14	190	.2	.5		448	.61		204	82	50	2.8	89	7.8
Dec. 10-----		2.5		63	12	93		153	14	190	.2	.0		450	.61		206	81	49	2.8	90	8.1
Jan. 9, 1959-----		2.4		63	14	99		156	15	202	.4	.0		473	.64		214	86	50	2.9	92	7.8
Feb. 11-----		2.2		64	12	101		158	15	200	.3	.0		472	.64		209	80	51	3.0	93	8.0
Mar. 11-----		1.2		66	12	107		162	15	211	.3	.2		493	.67		214	81	52	3.2	95	8.1
Apr. 8-----		1.2		67	15	106		167	17	215	.2	.8		504	.69		228	92	50	3.0	1,000	7.9
May 13-----		1.6		68	15	114		160	16	235	.2	.0		529	.72		231	100	52	3.3	1,030	7.9
June 10-----		2.0		64	15	114		139	15	240	.3	.0		518	.70		221	107	53	3.3	1,070	7.5
July 15-----		2.9		58	13	100		126	14	210	.4	.8		461	.63		198	94	52	3.1	927	7.1
Aug. 11-----		2.8		54	12	92		124	11	192	.3	.2		425	.58		184	82	52	3.0	852	7.0
Sept. 9-----		2.8		56	12	95		126	11	198	.3	.5		b480	.65		189	86	52	3.0	854	7.4
BARTON CREEK NEAR US HIGHWAY 80 NEAR GORDON																						
Apr. 21, 1959-----		0.7		97	51	208		146	426	242	0.2	0.0		1,100	1.50		452	332	50	4.3	1,730	7.1
LAKE LEON NEAR EASTLAND																						
Mar. 12, 1959-----		3.0		48	6.6	26		137	24	46	0.2	0.1		b236	0.32		147	35	28	0.9	415	8.1
991. LEON RIVER NEAR DE LEON																						
Apr. 21, 1959-----		9.6		119	26	165		215	78	358	0.2	0.2		862	1.17		404	228	47	3.6	1,580	7.4
BELTON RESERVOIR NEAR BELTON																						
Mar. 30, 1959-----		5.8	0.03	55	11	32		184	30	47	0.4	1.0		b289	0.39		182	31	27	1.0	484	8.2
SAN GABRIEL RIVER AT STATE HIGHWAY 29 NEAR GEORGETOWN																						
May 16, 1959-----		6.0		62	14	13		203	28	25	0.2	1.1		b 276	0.38		212	46	12	0.4	451	7.0
1100. YEGUA CREEK NEAR SOMERVILLE																						
Mar. 20, 1959-----	31	19		108	30	101		110	272	168	0.5	0.0		b803	1.09		393	303	36	2.2	1,200	7.6
NAVASOTA RIVER AT STATE HIGHWAY 90 NEAR NAVASOTA																						
Mar. 20, 1959-----		14		42	10	90		102	55	140	0.5	2.0		b435	0.59		146	62	57	3.2	737	7.2

b Residue on evaporation at 180°C.

SAN BERNARD RIVER BASIN
MISCELLANEOUS ANALYSES OF STREAMS IN SAN BERNARD RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
SAN BERNARD RIVER AT US HIGHWAY 90 NEAR SEALY																					
Mar. 17, 1959-----	a5	15	0.30	9.0	2.4	26	25	7.0	43	0.1	1.0	116	0.16	32	12	64	2.0	209	7.2		
SAN BERNARD RIVER AT US HIGHWAY 90A AT EAST BERNARD																					
Apr. 25, 1959-----		11		11	2.8	9.8	0.5	41	5.4	14	0.2	1.2	76	0.10	39	5	35	0.7	135	6.4	
WEST BERNARD RIVER AT STATE HIGHWAY 60 AT HUNGERFORD																					
Apr. 25, 1959-----		14		20	4.3	23	107	4.4	17	0.2	0.2	136	0.18	68	0	42	1.2	244	6.3		

a Field estimate.

COLORADO RIVER BASIN

1195. COLORADO RIVER NEAR IRA, TEX.

LOCATION.--At gaging station at bridge on State Highway 350, 3 3/4 miles downstream from Bluff Creek, 4 miles upstream from Willow Creek, 4.5 miles southwest of Ira, Scurry County, and at mile 825.

DRAINAGE AREA.--3,617 square miles, approximately, of which 2,590 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1959.

Water temperatures: November 1958 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 39,100 ppm Mar. 14-25; minimum, 255 ppm June 4-6.

Hardness: Maximum, 3,830 ppm Mar. 14-25; minimum, 102 ppm June 4-6.

Specific conductance: Maximum daily, 55,500 micromhos Mar. 25; minimum daily, 450 micromhos June 5.

Water temperatures: Maximum, 88°F Apr. 25, May 17, June 28-29; minimum, freezing point Dec. 14.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, November 1958 to September 1959

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	Non-carbonate					
Nov. 1-6, 1958-----	0.25	1.2		465	172	6,220		93	1,400	9,830		--		18,100	24.9	12.2	1,870	1,790	88	63	27,500	7.9	
Nov. 7-13, 25-30-----	.42	3.6		514	169	6,490		105	1,410	10,300		--		18,900	26.0	21.4	1,980	1,890	88	63	28,500	7.6	
Nov. 14-24-----	2.35	3.9		387	128	4,450		98	1,110	7,050		--		13,200	18.1	83.8	1,490	1,410	87	50	20,600	7.2	
Dec. 1-15-----	.30	2.2		553	186	7,210		153	1,550	11,400		--		21,000	28.9	17.0	2,140	2,020	88	68	31,100	7.8	
Dec. 16-31-----	.39	3.8		568	205	7,380		188	1,580	11,700		--		21,500	29.6	22.6	2,260	2,110	88	67	32,100	7.9	
Jan. 1-15, 1959-----	.39	5.2		591	226	8,110		184	1,770	12,860		--		23,600	32.6	24.9	2,400	2,250	88	72	33,400	7.7	
Jan. 16-31-----	.39	3.7		619	226	8,440		161	1,860	13,300		--		24,500	33.9	25.8	2,470	2,340	88	74	35,000	7.5	
Feb. 1-14-----	.46	2.7		630	231	8,650		159	1,940	13,600		--		25,100	34.7	31.2	2,520	2,390	88	75	35,500	7.9	
Feb. 15-28-----	.38	2.3		669	251	9,160		144	2,110	14,400		--		26,700	36.9	27.4	2,700	2,580	88	77	37,400	7.7	
Mar. 1-13-----	.23	3.8		744	308	10,600		137	2,470	16,700		--		30,900	42.9	19.2	3,120	3,010	88	83	41,600	7.9	
Mar. 14-25-----	.18	3.4		955	353	13,500		129	3,020	21,200		--		39,100	54.6	19.0	3,830	3,730	88	95	49,900	7.7	
Mar. 26-31-----	3.53	4.4		659	239	8,270		127	2,220	12,900		--		74,400	33.7	233	2,630	2,520	87	70	33,900	7.8	
Apr. 1-5-----	.26	3.3		688	290	9,080	--	114	2,410	14,200		--		26,700	37.0	18.7	2,910	2,820	87	73	36,800	7.1	
Apr. 6-18-----	1.52	4.8		446	160	5,560		100	1,510	8,660		--		16,400	22.5	67.3	1,770	1,690	87	57	24,300	7.3	
Apr. 19-30-----	a .12	3.1		726	300	9,800		84	2,340	15,500		--		28,700	39.8	9.30	3,040	2,980	88	77	39,200	6.9	
May 1-4, 18-23-----	a1.12	3.7		523	216	7,100		80	1,560	11,200		--		20,700	28.5	62.6	2,190	2,130	88	66	29,200	6.7	
May 5-9-----	11.0	4.9		168	59	1,850		107	480	2,900		--		5,510	7.49	164	662	574	86	31	9,260	7.2	
May 10-17-----	a .44	4.8		293	116	3,870		93	889	6,110		--		11,300	15.5	13.4	1,210	1,130	87	48	17,600	7.3	
June 1-3, 7-----	57.2	10		54	11	321		90	90	502		3.0		1,040	1.41	161	180	106	80	10	1,910	6.9	
June 4-6-----	75.7	12		34	4.1	53		108	27	69		2.8		255	.35	52.1	102	13	53	2.3	467	7.1	
June 8-11-----	1.05	11		168	53	1,960		102	416	3,100		--		5,760	7.83	16.3	637	554	87	34	9,400	6.8	
June 12-15-----	a .10	7.9		269	91	3,260		96	701	5,200		--		9,580	13.1	2.59	1,040	966	87	44	14,900	7.1	
June 20-26-----	9.49	7.8		122	40	1,100		87	267	1,780		3.0		3,360	4.57	86.1	469	398	84	22	5,770	7.1	
June 27-30-----	2.48	8.3		199	77	2,360		101	546	3,760		--		7,000	9.55	46.9	813	730	86	36	11,300	7.5	
July 1-4, 15-16, 18-19-----	8.31	7.9		145	48	1,520		88	374	2,420		--		4,560	6.20	102	560	488	86	28	7,710	7.2	
July 5-14-----	.74	8.4		279	106	3,330		87	718	5,350		--		9,830	13.4	19.6	1,130	1,060	86	4.3	15,400	6.9	
July 17-----	80.0	18		50	11	300		109	88	452		4.8		978	1.33	211	170	80	79	10	1,790	6.8	
July 20-28-----	a .78	7.2		284	96	3,190		89	716	5,120		--		9,460	12.9	19.9	1,100	1,030	86	42	14,800	6.8	
Aug. 17-20, 31-----	5.84	12		303	81	3,180		68	716	5,100		--		9,420	12.9	149	1,090	1,030	86	42	15,000	7.6	
Sept. 1-6, 10-12, 30-----	.94	--		--	--	--		45	--	13,400		--		--	--	--	2,360	2,330	--	--	--	34,100	6.2
Weighted average-----	b2.76	9.7		155	50	1,670		100	406	2,640		--		4,990	6.79	37.2	592	510	86	30	7,650	--	

a Includes days of less than 0.05 cubic feet per second discharge.

b Represents 98 percent of runoff for water year October 1958 to September 1959. No flow on many days.

1210. 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 1959.
 Water temperatures: November 1952 to September 1954, November 1956 to September 1959.
 EXTREMES, 1958-59.--Dissolved solids: Maximum, 19,000 ppm Apr. 1-7; minimum, 385 ppm July 2-3, 13-14.
 Hardness: Maximum, 2,560 ppm Apr. 1-7; minimum, 110 ppm July 2-3, 13-14.
 Specific conductance: Maximum daily, 30,500 micromhos May 1; minimum daily, 605 micromhos July 2.
 Water temperatures: Maximum, 93°F June 19; minimum, freezing point Dec. 30-31, Jan. 4.
 EXTREMES, 1946-54, 1956-59.--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 daily, 45,800 micromhos Apr. 1-10, 1952; minimum daily, 245 micromhos May 14, 1957.
 Water temperatures (1956-59): Maximum, 93°F July 30, 1957, Aug. 19, 1958, June 19, 1959; minimum, freezing point on several days during December and January.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-5, 1958-----	6.42	5.4		92	29	897		87	216	1,420		0.5		2,700	3.67	46.8	348	277	85	21	4,900	7.7
Oct. 6-20-----	3.64	3.1		153	52	1,610		82	367	2,580		--		4,810	6.54	47.3	596	528	85	29	8,340	7.7
Oct. 21-31-----	2.25	3.8		242	83	2,640		88	610	4,240		--		7,860	10.7	47.7	946	874	86	37	13,100	7.3
Nov. 1-20-----	3.01	3.6		294	104	3,120		92	735	5,030		--		9,330	12.7	75.8	1,160	1,070	85	40	15,200	7.2
Nov. 21-30-----	1.53	3.0		361	140	3,820		104	896	6,220		--		11,500	15.7	47.5	1,480	1,390	85	43	18,500	7.6
Dec. 1-15-----	1.01	2.3		407	158	4,470		128	1,090	7,200		--		13,400	18.4	36.5	1,660	1,560	85	48	21,000	7.6
Dec. 16-31-----	1.20	2.1		466	170	4,780		138	1,170	7,740		--		14,400	19.7	46.7	1,860	1,750	85	48	22,400	7.5
Jan. 1-15, 1959-----	1.73	3.0		496	175	5,180		137	1,250	8,370		--		15,500	21.3	72.4	1,960	1,840	85	51	23,600	7.4
Jan. 16-31-----	1.97	2.9		470	188	4,950		131	1,250	8,020		--		14,900	20.5	79.3	1,950	1,840	85	49	23,100	8.2
Feb. 1-13-----	1.81	4.1		461	184	4,840		131	1,290	7,790		--		14,600	20.0	71.4	1,910	1,800	85	48	22,200	7.8
Feb. 14-26-----	2.48	3.5		486	195	5,260		133	1,420	8,420		--		15,800	21.7	106	2,010	1,910	85	51	23,800	7.6
Feb. 27-28, Mar. 1-3-----	3.50	4.4		407	165	4,040		115	1,110	6,550		--		12,300	15.8	116	1,690	1,600	84	43	19,200	7.9
Mar. 4-14-----	1.01	4.0		515	188	5,620		124	1,490	8,960		--		16,800	23.1	45.8	2,060	1,960	86	54	25,200	7.7
Mar. 15-25-----	a .11	2.7		574	246	6,150		118	1,700	9,890		--		18,600	25.6	5.52	2,440	2,350	85	54	27,600	7.5
Mar. 26-31-----	a6.53	4.0		432	179	4,200		116	1,280	6,750		--		12,900	17.7	227	1,810	1,720	83	43	19,700	7.2
Apr. 1-7-----	2.81	4.4		598	260	6,330	--	87	1,680	10,100		--		19,000	26.2	144	2,560	2,490	84	54	27,300	7.3
Apr. 8-20-----	7.55	3.6		417	161	4,360		86	1,250	6,950		--		13,200	18.1	269	1,700	1,630	85	46	20,000	7.2
Apr. 21-30-----	a .55	4.9		505	198	5,660		75	1,550	9,010		--		17,000	23.4	25.2	2,070	2,010	86	54	24,800	6.9
May 1-4-----	a3.88	5.2		515	213	5,530		81	1,550	8,860		--		16,700	22.9	175	2,160	2,090	85	52	24,300	6.9
May 5-11-----	32.4	5.0		162	61	1,650		96	497	2,580		--		5,000	6.80	437	655	576	85	28	8,360	7.5
May 12-23-----	3.15	4.1		251	104	2,910		74	793	4,610		--		8,710	11.9	74.1	1,050	993	86	39	13,900	6.7
May 24-31-----	a .05	--		--	--	--		83	--	6,850		--		--	--	--	1,550	1,480	--	--	19,300	6.5
June 1-3, 9-11-----	149	12		100	29	764		101	215	1,220		2.5		2,390	3.25	961	368	286	82	17	4,190	7.3
June 4-----	1,590	11		40	5.0	116		110	41	170		.4		437	.59	1,880	120	30	68	4.6	793	7.4
June 5-6, 8, 26-27-----	85.0	8.8		68	14	358		117	102	568		3.0		1,180	1.60	271	227	131	77	10	2,140	7.7
June 7, 24-25-----	197	11		44	4.9	154		112	54	225		.2		568	.75	291	130	38	72	5.9	1,000	7.4
June 12-19-----	2.41	11		183	61	1,750		83	430	2,840		--		5,320	7.24	34.6	708	640	84	29	8,860	7.0
June 20-23, 28-30-----	13.4	6.3		111	31	954		72	237	1,540		1.0		2,920	3.97	106	404	346	84	21	5,100	6.9
July 1, 4-9-----	150	12		70	17	457		104	116	730		2.0		1,460	1.99	591	244	160	80	13	2,580	7.7
July 2-3, 13-14-----	450	13		36	5.0	99		104	34	144		2.2		385	.52	468	110	26	66	4.1	687	7.5
July 6-12-----	19.1	11		112	33	940		109	244	1,500		1.0		2,900	3.94	150	415	326	83	20	5,040	7.1
July 15, 17-20-----	93.6	9.2		51	12	341		87	94	530		1.2		1,080	1.47	273	176	105	81	11	1,980	7.6
July 16, 21-31-----	4.06	6.0		112	35	1,060		74	278	1,690		1.5		3,220	4.38	35.3	424	363	85	22	5,510	7.0
Aug. 1-10-----	a .01	10		210	76	2,170		51	549	3,500		--		6,540	8.89	.18	836	794	85	33	10,400	6.9
Aug. 11-31-----	a .24	9.6		252	84	2,640		57	687	4,220		--		7,920	10.8	5.13	974	928	85	37	12,300	6.6
Sept. 1-29-----	a1.03	9.3		422	145	4,300		60	1,080	6,970		--		13,000	17.8	36.2	1,650	1,600	85	46	19,500	6.6
Sept. 30-----	2.50	6.0		140	42	1,030		76	293	1,700		.5		3,250	4.42	21.9	522	460	81	20	5,620	7.5
Weighted average-----	20.2	11		89	24	641		104	178	1,010		--		2,010	2.73	110	310	226	82	16	3,300	--

a Includes days of less than 0.05 cubic feet per second discharge.

COLORADO RIVER BASIN--Continued
1238. BEALS CREEK NEAR WESTBROOK, TEX.

LOCATION:--At gaging station at bridge on State Highway 163, 1.5 miles downstream from Crystal Creek, 11 miles south of Westbrook, Mitchell County, and 12 miles upstream from mouth.
DRAINAGE AREA:--10,800 square miles, approximately, of which 7,045 square miles is probably noncontributing.
RECORDS AVAILABLE:--Chemical analyses: November 1958 to September 1959.
Water temperatures: November 1958 to September 1959.
EXTREMES:--Dissolved solids: Maximum, 8,440 ppm Aug. 18-20, 27-28; minimum, 180 ppm July 2, 12.
Hardness: Maximum, 2,640 ppm Aug. 18-20, 27-28; minimum, 84 ppm July 2, 12.
Specific conductance: Maximum daily, 13,900 microhos Aug. 20; minimum daily, 283 microhos July 12.
Water temperatures: Maximum, 92°F July 22, 28; minimum, 33°F Dec. 30-31, Jan. 21.
REMARKS:--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

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		Per cent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium				
Nov. 1-5, 1958	4.88	3.11	51	26	186	99	100	145	285	0.4	4.0	750	1.02	9.88	234	139	63	5.3	1,380	8.2	
Nov. 6	21.10	6.2	28	5.9	42	83	27	35	287	1.1	2.5	220	10	13.5	94	26	50	1.9	1,370	7.7	
Nov. 14	44.15	4.5	124	109	526	217	52	527	870	1.2	1.5	2,330	3.16	76.0	758	582	61	8.8	3,780	7.9	
Nov. 15, 21-30	3.66	7.9	86	42	222	127	41	217	380	0.8	1.2	1,800	2.45	18.0	337	235	62	6.0	1,890	7.3	
Nov. 16-20	a. 10	2.9	120	112	608	153	153	471	670	1.2	1.5	2,460	3.35	27.8	514	377	66	8.9	2,890	7.5	
Dec. 1-8	a. 10	2.9	120	112	608	153	153	471	670	1.2	1.5	2,460	3.35	27.8	514	377	66	8.9	4,090	7.7	
Dec. 16-18, 22-23	a. 17	1.8	149	193	949	194	194	928	950	3.0	3.0	3,810	5.18	1.75	760	634	64	9.6	4,090	7.9	
Dec. 26-31	a. 117	3.4	148	213	1,080	158	158	1,070	1,670	2.0	2.0	4,260	5.79	1.84	1,250	1,120	55	13	6,720	6.8	
Jan. 6, 12-20, 1959	a. 14	3.1	144	217	1,160	152	152	1,120	1,730	9.7	9.7	4,440	6.04	1.68	1,250	1,130	67	14	6,910	6.9	
Jan. 21-31	4.2	7.0	146	238	1,170	190	190	1,180	1,770	6.5	6.5	4,610	6.27	2.61	1,340	1,190	65	14	7,100	7.9	
Feb. 1-3	2.90	9.0	146	228	1,240	174	174	1,190	1,850	7.0	7.0	4,750	6.46	37.2	1,300	1,160	67	15	7,250	8.2	
Feb. 10-27	9.25	9.0	64	42	273	133	133	230	405	7.2	7.2	1,100	1.50	27.5	332	223	66	6.5	1,940	7.8	
Feb. 28, Mar. 1	1.63	8.7	117	134	720	231	231	682	1,100	9.8	9.8	2,910	3.96	4.95	893	704	64	10	4,740	7.5	
Mar. 2-6	a. 08	7.4	137	199	1,080	186	186	1,010	1,630	6.0	6.0	4,160	5.66	.90	1,160	1,010	67	14	6,540	7.2	
Mar. 5-13	1.60	9.8	86	74	405	118	118	419	612	8	2.5	1,670	2.27	7.21	519	422	63	7.7	2,800	8.2	
Mar. 28, Apr. 8	2.50	6.2	200	280	1,440	32	32	1,520	2,180	2.0	2.0	5,780	7.86	39.0	1,650	1,460	65	15	8,490	8.4	
Mar. 29-31, Apr. 1-3	4.6	4.8	166	225	1,100	101	101	1,060	1,690	7	2.2	4,390	5.97	5.45	1,340	1,100	64	13	6,760	8.6	
Apr. 9-13, Apr. 1-3	1.80	9.2	44	26	194	101	101	180	258	7	2.2	764	1.04	3.71	217	134	66	5.7	1,360	8.1	
Apr. 17	1.10	4.5	128	133	739	4204	4204	699	1,120	.0	.0	2,920	3.97	.79	866	699	65	11	4,640	8.6	
Apr. 18	.15	9.6	24	7.8	64	230	230	47	54	2.2	2.2	271	.37	3.44	92	0	60	2.9	6,140	8.0	
May 1, 3	4.70	8.9	79	50	283	138	138	274	435	7.6	7.6	271	1.65	44.8	402	290	60	6.2	4,79	7.9	
May 5-6, 10-16	13.7	8.9	79	50	283	138	138	274	435	7.6	7.6	271	1.65	44.8	402	290	60	6.2	2,120	7.5	
May 7-8	50.0	12	98	74	383	204	204	372	580	11	11	1,210	1.65	44.8	402	290	60	6.2	2,120	7.5	
May 9	79.0	9.4	52	18	141	126	126	115	202	3.0	3.0	1,630	2.22	220	382	220	60	7.1	2,800	7.3	
May 17-20	1.05	5.7	176	170	852	172	172	824	1,410	5.0	5.0	3,530	4.80	10.0	1,140	997	62	4.3	1,100	8.0	
June 1-2	29.6	10	34	9.3	65	124	124	48	780	1.5	1.5	332	.44	398	123	22	53	2.5	3,170	7.4	
June 3-5	4.56	10	77	36	202	142	142	214	310	3.7	3.7	632	1.46	398	123	22	53	2.5	550	7.7	
June 6-21	7.08	7.5	100	53	352	114	114	315	575	2	2	1,460	1.99	17.6	468	374	56	4.8	1,600	7.7	
June 22, 28-30	3.05	9.9	31	10	63	116	116	52	74	2.5	2.5	299	.41	12.0	149	118	62	7.1	2,510	7.7	
June 23	185	11	58	26	159	119	119	152	240	3.4	3.4	767	1.04	125	125	154	54	2.5	513	7.7	
June 24-27	60.6	11	58	26	159	119	119	152	240	3.4	3.4	767	1.04	125	125	154	58	4.4	1,250	7.5	

a. Includes days of less than 0.05 cubic feet per second discharge.
b. Includes equivalent of 10 parts per million of carbonate (CO₃).
c. Includes equivalent of 18 parts per million of carbonate (CO₃).
d. Includes equivalent of 15 parts per million of carbonate (CO₃).
e. Residue on evaporation at 180°C.

Chemical analyses, in parts per million, November 1958 to September 1959--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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 1, 4-8, 10, 14, 20-22, 1959-----	22.2	11		73	49	288		117	246	465	--	3.5		1,190	1.62	71.3	384	288	62	6.4	2,050	7.7
July 2, 12-----	164	10		24	3.9	33		96	22	37	--	1.5		180	.24	79.7	84	6	46	1.5	317	7.8
July 3, 23-25-----	21.4	6.6		117	128	555		142	545	950	--	2.0		2,370	3.22	137	818	702	60	8.4	3,970	7.0
July 9, 11-----	41.0	9.4		43	15	141		100	81	218	--	1.2		e577	.78	63.9	169	87	64	4.7	1,010	7.4
July 13, 17-19-----	467	7.3		35	12	69		97	62	100	--	1.8		e348	.47	439	137	58	52	2.6	602	7.3
July 15-16-----	48.0	11		159	325	1,260		127	1,170	2,240	--	--		5,230	7.11	678	1,730	1,630	61	13	8,060	7.6
July 26-31, Aug. 1-2---	1.61	7.0		138	200	850		115	812	1,470	--	4.0		3,540	4.81	15.4	1,170	1,070	61	11	5,600	6.9
Aug. 18-20, 27-28-----	al.34	5.7		253	488	2,090		118	2,030	3,520	--	--		8,440	11.6	30.5	2,640	2,540	63	18	12,400	6.5
Sept. 30-----	91.0	10		34	6.8	23		127	26	27	--	1.0		184	.25	45.2	113	9	31	.9	320	7.7
Weighted average-----	f15.9	8.9		48	29	153		117	138	233	--	2.3		680	0.92	29.2	239	143	58	4.3	1,130	--

a Includes days of less than 0.05 cubic feet per second discharge.

e Residue on evaporation at 180°C.

f Represents 91 percent of runoff for water year October 1958 to September 1959. No flow on many days.

COLORADO RIVER BASIN--Continued

1239. 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 1959.

Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 12,800 ppm Apr. 21-30; minimum, 314 ppm June 3.
Hardness: Maximum, 2,330 ppm Apr. 21-30; minimum, 128 ppm July 2-4.
Specific conductance: Maximum daily, 20,300 micromhos May 1; minimum daily, 394 micromhos July 2.
Water temperatures: Maximum, 88°F June 15; minimum, freezing point Dec. 15, Feb. 1-3, 5.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 12,800 ppm Apr. 21-30 1959; minimum, 180 ppm June 1-4, 1957.
Hardness: Maximum, 2,330 ppm Apr. 21-30, 1959; minimum, 93 ppm Apr. 29-30, 1957.
Specific conductance: Maximum daily, 20,300 micromhos May 1, 1959; minimum daily, 202 micromhos June 2, 1957.
Water temperatures: Maximum, 88°F May 24, June 8, 1958, June 15, 1959; minimum, freezing point Dec. 15, 1958, Feb. 1-3, 5, 1959.
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. During periods of change in stage, the concentrations of dissolved constituents are subject to wide variations, and sampling at times has not defined properly the chemical quality at this station. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-7, 1958-----	15.0	9.8		74	16		382	101	169	582	0.3	2.0		1,290	1.75	52.2	250	168	77	11	2,330	7.9	
Oct. 8-12-----	7.74	9.4		130	29		637	103	346	980	.4	1.5		2,180	2.96	45.6	444	359	76	13	3,770	7.8	
Oct. 13-14, 17-21-----	30.4	6.0		80	18		292	101	208	430	.4	2.5		1,090	1.48	89.5	274	190	70	7.7	1,910	7.5	
Oct. 15-16-----	21.5	10		46	12		152	97	106	215	.6	1.8		620	.84	36.0	164	85	67	5.2	1,060	8.0	
Oct. 22-31, Nov. 1-10-----	7.85	5.0		138	36		547	119	395	830	.5	2.5		2,010	2.73	42.6	492	395	71	11	3,390	7.7	
Nov. 11-20-----	7.01	3.8		192	49		612	122	560	940	.5	.8		2,420	3.29	45.8	680	580	66	10	3,930	8.0	
Nov. 21-30-----	4.24	2.7		200	68		778	129	590	1,240	.7	.0		2,940	4.00	33.7	778	673	68	12	4,840	8.0	
Dec. 1-10-----	2.00	3.1		272	97	1,090		136	852	1,730	.9	.2		4,110	5.59	22.2	1,080	966	69	14	6,580	8.0	
Dec. 11-20-----	1.52	5.6		322	86	1,260		143	938	1,980	--	.5		4,660	6.34	19.1	1,160	1,040	70	16	7,450	7.8	
Dec. 21-31-----	1.84	5.0		348	79	1,130		158	936	1,800	--	.0		4,380	5.96	21.8	1,190	1,060	67	14	6,990	7.9	
Jan. 1-10, 1959-----	1.64	4.6		395	82	1,210	12	172	1,070	1,950	.4	.0		4,810	6.54	21.3	1,320	1,180	66	14	7,520	8.0	
Jan. 11-20-----	1.86	8.2		390	93	1,230		108	1,080	2,000	--	--		4,850	6.60	24.4	1,360	1,270	66	15	7,550	8.0	
Jan. 21-31-----	2.05	6.1		420	98	1,400		142	1,140	2,260	--	--		5,390	7.33	29.8	1,450	1,330	68	16	8,320	8.1	
Feb. 1-10-----	2.38	7.0		435	99	1,490		150	1,210	2,380	--	--		5,700	7.75	36.6	1,490	1,370	69	17	8,630	8.1	
Feb. 11-20-----	1.98	5.6		445	102	1,590		136	1,190	2,580	--	--		5,980	8.13	32.0	1,530	1,420	69	18	9,280	8.0	
Feb. 21-28-----	2.15	7.0		455	109	2,030		123	1,930	2,750	--	--		7,340	9.98	42.6	1,580	1,480	74	22	9,640	7.8	
Mar. 1-10-----	2.36	7.2		489	133	2,300		113	1,960	3,290	--	--		8,240	11.2	52.5	1,770	1,670	74	24	11,200	8.0	
Mar. 11-20-----	.40	7.9		557	150	2,870		118	1,830	4,430	--	--		9,900	13.5	10.7	2,010	1,910	76	28	14,300	7.9	
Mar. 21-31, Apr. 1-6-----	a .14	7.0		646	172	3,640	19	105	1,870	5,860	--	--		12,300	16.7	4.65	2,320	2,230	77	33	18,000	7.6	
Apr. 7-20-----	2.78	7.0		513	169	2,660		78	1,550	4,310	--	--		9,250	12.6	69.4	1,980	1,910	75	26	14,000	7.0	
Apr. 21-30-----	.64	6.8		591	207	3,900		82	1,760	6,310	--	--		12,800	17.5	22.1	2,330	2,260	78	35	18,200	6.9	
Apr. 1-4, 6-10-----	33.3	6.6		369	122	2,270		105	1,030	3,690	--	--		7,540	10.3	678	1,420	1,340	78	26	11,500	7.0	
May 5, 16-----	18.5	9.4		108	28	468		89	247	760	--	--		1,660	2.26	82.9	384	312	73	10	2,890	7.9	
May 11-15, 17-20-----	13.7	6.6		152	56	952		107	457	1,500	--	--		3,180	4.32	118	610	522	77	17	5,350	7.3	
May 21-27-----	1.00	5.6		218	77	1,270		87	686	2,010	--	--		4,310	5.86	11.6	860	789	76	19	6,980	7.5	
May 28-31, June 1-2-----	0	7.2		309	116	1,940		82	993	3,090	--	--		6,500	8.87	--	1,250	1,180	77	24	10,200	7.5	
June 3 (12 p.m.-12 m.)--	118	14		49	11	49		154	43	70	--	2.5		b314	.43	100	166	40	39	1.6	568	8.2	
June 3 (12 m.-12 p.m.),																							
4 (12 p.m.-4 p.m.)----	557	16		108	26	591		137	222	930	--	8.0		1,970	2.68	2,960	376	264	77	13	3,440	8.0	
June 4 (4 p.m.-12 p.m.)--	3,270	20		74	16	284		193	138	400	--	1.8		1,030	1.40	9,090	250	92	71	7.8	1,810	8.2	
June 5-7-----	694	14		52	11	126		129	82	180	--	5.2		544	.74	1,020	174	69	61	4.2	958	7.9	
June 8-15-----	56.0	12		82	21	423		108	191	652	--	2.8		1,440	1.96	218	291	202	76	11	2,550	7.6	
June 16-23, 25-----	68.8	12		132	37	695		109	335	1,100	--	3.0		2,370	3.22	440	482	392	76	14	3,990	7.6	
June 24, 26-30-----	108	13		64	17	248		119	146	365	--	6.3		950	1.29	277	230	132	70	7.1	1,640	7.6	

a Includes days of less than 0.05 cubic feet per second discharge.
b Calculated from determined constituents.

Chemical analyses, in parts per million, water year October 1938 to September 1959--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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 1, 2 (12 m.-12 p.m.), 5-9, 1959--	101	10		81	34		333	120	210	530	--	1.5		1,260	1.71	344	342	244	68	7.8	2,190	7.6
July 2 (12 p.m.-12 m.), 3-4-----	610	10		39	7.4		77	113	43	110	--	3.8		350	.48	576	128	36	57	3.0	623	7.4
July 10-11, 16-17, 26-27-----	65.7	17		94	35		396	128	237	628	--	3.5		1,470	2.00	261	378	274	69	8.8	2,380	7.6
July 12, 13 (12 p.m.-9 a.m.), 18 (12 m.-12 p.m.), 19 (12 p.m.-10 a.m.), 23-24-----	360	15		68	21		235	120	138	370	--	4.0		967	1.32	940	256	158	67	6.4	1,600	7.7
July 13 (9 a.m.-12 p.m.), 14, 25-----	275	16		48	12		134	122	72	201	--	4.0		571	.78	424	170	70	63	4.5	975	7.8
July 15, 28-31-----	35.0	16		120	33		507	130	276	810	--	2.0		1,830	2.49	173	435	328	72	11	3,080	7.5
July 18 (12 p.m.-12 m.)	742	17		42	13		95	128	70	130	--	4.8		6435	.59	871	160	55	56	3.2	765	7.9
July 19 (10 a.m.-12 p.m.), 20-22-----	173	15		50	13		177	114	86	268	--	3.5		683	.93	319	178	85	68	5.8	1,190	7.7
Aug. 1-7-----	1.11	15		182	56		829	125	500	1,320	--	2.5		2,970	4.04	8.90	684	582	72	14	4,790	7.5
Aug. 8-17-----	.39	14		288	79		1,400	116	782	2,250	--	--		4,870	6.62	5.13	1,040	948	74	19	7,550	7.5
Aug. 18-31-----	a .04	14		418	99		2,090	101	1,180	3,320	--	--		7,170	9.75	.77	1,450	1,370	76	24	10,700	7.2
Sept. 1-9-----	0	13		518	130		2,590	98	1,500	4,130	--	--		8,930	12.2	--	1,830	1,750	76	26	13,600	7.4
Sept. 10-----	29.0	15		48	9.5		70	128	61	99	--	4.8		6370	.50	29.0	159	54	49	2.4	649	8.1
Sept. 11-14-----	.68	8.8		154	31		254	72	441	385	--	3.0		1,310	1.78	2.41	512	452	52	4.9	2,100	7.5
Sept. 15-30-----	a .01	9.0		224	51		500	62	675	780	--	4.0		2,270	3.09	.06	768	718	59	7.8	3,590	7.2
Weighted average-----	35.7	13		84	23		345	126	189	534	--	--		1,270	1.73	122	304	200	71	8.6	2,120	--

a Includes days of less than 0.05 cubic feet per second discharge.
 b Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

1470. 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 1959.

Water temperatures: September 1947 to September 1959.

Sediment records: December 1950 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 818 ppm May 21-23, 30-31; minimum, 220 ppm Sept. 29-30.

Hardness: Maximum, 344 ppm May 21-23, 30-31; minimum, 114 ppm Sept. 29-30.

Specific conductance: Maximum daily, 2,010 micromhos July 17; minimum daily, 262 micromhos June 30.

Water temperatures: Maximum, 90°F July 4, Aug. 4, 30; minimum, 35°F Dec. 15.

EXTREMES, 1947-59.--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 daily, 3,420 micromhos Sept. 20, 1947; minimum daily, 161 micromhos Sept. 11, 1952.

Water temperatures: Maximum, 98°F Aug. 3, 1956; minimum, freezing point Jan. 29, 1948, Jan. 30, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate					
Oct. 1-2, 1958-----	931	11		80	19	127		170	125	200	--	2.5		a648	0.88	1,630	278	138	50	3.3	1,160	8.0	
Oct. 3-10-----	304	11		60	17	59		199	49	93	--	2.5		422	.57	346	220	56	37	1.7	708	8.2	
Oct. 11-20-----	180	12		54	23	47		234	37	70	--	2.0		361	.49	175	229	37	31	1.3	643	8.2	
Oct. 21-31-----	193	11		58	22	53		245	40	75	--	2.0		388	.53	202	235	34	33	1.5	686	8.2	
Nov. 1-10-----	234	10		61	21	61		230	51	90	--	3.0		416	.57	263	238	50	36	1.7	733	8.1	
Nov. 11-20-----	199	10		65	23	53		241	62	77	--	2.0		414	.56	222	256	59	31	1.4	723	8.1	
Nov. 21-30-----	177	9.8		69	24	67		250	70	97	--	1.2		468	.64	224	270	66	35	1.8	812	8.2	
Dec. 1-15-----	177	14		62	25	69		253	65	92	--	2.5		466	.63	223	258	50	37	1.8	791	8.2	
Dec. 16-31-----	161	12		67	26	77		267	67	106	--	2.8		494	.67	215	274	55	38	2.0	857	8.2	
Jan. 1-11, 1959-----	165	9.6		71	28	77	4.2	268	80	112	0.3	2.2		526	.72	234	292	72	36	2.0	896	8.2	
Jan. 12-20-----	150	8.2		70	27	76		263	75	110	--	2.0		512	.70	207	286	70	37	1.9	873	8.1	
Jan. 21-31-----	143	7.2		61	29	85		228	81	130	--	1.5		520	.71	201	271	84	41	2.3	914	8.2	
Feb. 1-10-----	124	6.8		66	29	80		260	72	119	--	2.0		510	.69	171	284	70	38	2.1	896	8.2	
Feb. 11-20-----	120	5.2		54	29	68		238	60	101	--	.5		442	.60	143	254	58	37	1.8	796	8.2	
Feb. 21-28-----	125	6.0		60	28	69		257	60	100	--	1.2		456	.62	154	264	54	36	1.9	813	8.2	
Mar. 1-10-----	115	10		54	28	62		235	54	95	--	2.5		448	.61	139	250	57	35	1.7	776	7.8	
Mar. 11-20-----	90.4	9.0		52	27	62		241	48	89	--	2.0		436	.59	106	240	43	36	1.7	747	7.9	
Mar. 21-31-----	73.4	8.0		51	30	61		244	48	94	--	1.2		438	.60	86.8	250	50	35	1.7	766	7.8	
Apr. 1-10-----	65.6	8.8		51	29	61	4.0	249	46	95	.2	.8		440	.60	77.9	246	42	35	1.7	773	8.0	
Apr. 11-20-----	107	14		50	33	49		250	42	83	--	2.5		422	.57	122	260	56	29	1.3	729	7.8	
Apr. 21-30-----	98.8	14		52	30	60		245	47	93	--	2.0		440	.60	117	253	52	34	1.6	765	7.8	
May 1-11-----	76.4	14		47	30	51		251	38	75	--	1.8		390	.53	80.4	241	36	32	1.4	687	7.8	
May 12-20-----	130	14		55	29	78		258	45	118	--	1.5		487	.66	171	256	44	40	2.1	855	7.9	
May 21-23, 30-31-----	246	8.2		82	34	149		207	156	238	--	.8		818	1.11	543	344	175	48	3.5	1,350	7.7	
May 24-29-----	876	8.0		70	20	81		131	126	136	--	1.8		a507	.69	1,200	256	149	41	2.2	894	7.5	
June 1-3, 10-12-----	584	14		85	31	155		155	170	262	--	2.8		a796	1.08	1,260	340	212	50	3.6	1,410	7.8	
June 4-----	4,910	18		58	21	50		171	86	77	--	2.0		a396	.54	5,250	231	91	32	1.4	674	7.7	
June 5-9-----	9,776	13		42	7.5	34		116	32	56	--	2.5		265	.36	6,990	136	41	35	1.3	435	7.6	
June 13-24-----	229	16		59	16	114		184	66	169	--	2.5		567	.77	351	213	62	54	3.4	953	7.9	
June 25-30, July 1-2-----	2,434	14		39	8.5	29		132	25	42	--	2.0		237	.32	1,560	132	24	32	1.1	391	7.6	
July 3-9-----	479	14		52	14	46	5.5	151	50	87	.3	1.5		a344	.47	445	187	64	34	1.5	612	7.7	
July 10-19-----	375	9.2		73	23	189		143	130	308	--	.5		a803	1.09	813	276	160	60	5.0	1,470	7.6	
July 20-31-----	6,522	13		42	6.4	28		125	20	48	--	1.8		227	.31	4,000	131	29	32	1.1	380	7.4	
Aug. 1-10-----	419	14		44	8.3	28		140	22	47	--	1.8		252	.34	285	144	29	30	1.0	410	7.9	
Aug. 11-20-----	101	14		50	16	31		188	22	57	--	.8		286	.39	188.0	191	37	26	1.0	493	7.5	
Aug. 21-31-----	51.2	14		46	23	35		219	23	58	--	.2		320	.44	44.2	210	30	27	1.0	551	7.5	
Sept. 1-10-----	44.3	19		38	26	47		234	25	60	--	1.0		a331	.45	39.6	202	10	33	1.4	580	8.0	
Sept. 11-20-----	41.8	17		39	28	43		243	24	57	--	.8		335	.46	37.8	212	14	30	1.3	573	7.9	
Sept. 21-28-----	41.8	16		44	28	44		266	22	56	--	.8		a342	.47	38.6	225	7	30	1.3	606	7.7	
Sept. 29-30-----	1,345	--		--	--	--		124	--	42	--	--		--	--	--	114	12	--	--	--	365	7.8
Weighted average-----	593	13		48	12	45		148	40	72	--	2.0		315	0.43	504	170	48	37	1.5	536	--	

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

1580. COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from Lamar Street bridge 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 183.

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 1959.

Water temperatures: October 1947 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 287 ppm Aug. 5; minimum, 221 ppm Oct. 1-31.

Hardness: Maximum, 181 ppm Feb. 1-28, Apr. 1-30; minimum, 164 ppm Oct. 1-31.

Specific conductance: Maximum daily, 573 micromhos Jan. 2; minimum daily, 268 micromhos July 14.

Water temperatures: Maximum 80°F Sept. 30; minimum, 48°F Jan. 5.

EXTREMES, 1947-59.--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 daily, 591 micromhos July 1, 1948; minimum daily, 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.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

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 1958 to September 1959

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	Non-carbonate				
Oct. 1-31, 1958-----	1,477	10		44	13	19		179	19	26	0.1	2.0		a221	0.30	881	164	17	20	0.6	387	8.2
Nov. 1-30-----	906	10		47	14	19		190	22	24	.3	4.2		236	.32	577	175	20	19	.6	419	8.2
Dec. 1-31-----	448	14		40	16	22		176	22	29	.3	4.8		239	.33	289	166	22	22	.7	413	8.2
Jan. 1-31, 1959-----	953	11		46	15	22	3.3	188	25	32	.3	7.0		274	.37	705	176	22	21	.7	451	8.1
Feb. 1-28-----	986	9.4		46	16	23		190	26	32	.3	1.8		a248	.34	660	181	25	21	.7	437	8.2
Mar. 1-31-----	800	9.8		42	15	25		169	26	36	.2	4.0		252	.34	544	166	28	24	.8	431	8.1
Apr. 1-30-----	1,711	9.0		46	16	18	3.5	182	25	31	.3	3.8		255	.35	1,180	181	32	17	.6	434	8.1
May 1-31-----	2,341	8.6		44	15	23		177	25	34	.2	2.0		250	.34	1,580	172	26	22	.8	429	8.1
June 1-30-----	1,778	7.4		44	15	32		176	27	46	.3	2.5		272	.37	1,310	172	28	29	1.0	474	7.8
July 1-31-----	2,241	9.2		42	15	18		162	24	32	.2	1.8		245	.33	1,480	166	34	19	.6	417	7.0
Aug. 1-4, 6-31-----	3,342	9.4		42	16	21		176	24	33	.3	1.0		245	.33	2,210	171	27	21	.7	414	7.8
Aug. 5-----	3,430	--		--	--	--		181	--	58	--	--		287	.39	2,660	175	26	--	--	501	7.9
Sept. 1-30-----	2,535	11		40	16	27		177	24	38	.2	.8		250	.34	1,710	166	21	26	.9	432	7.9
Weighted average----	1,631	9.6		43	15	23		177	24	34	0.2	2.3		249	0.34	1,100	169	24	23	0.8	428	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

1620. 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 1959.

Water temperatures: October 1945 to September 1948, March 1950 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 302 ppm Dec. 1-31; minimum, 118 ppm May 24-25.

Hardness: Maximum, 210 ppm Dec. 1-31; minimum, 82 ppm May 24-25.

Specific conductance: Maximum daily, 604 micromhos Sept. 10; minimum daily, 190 micromhos Apr. 11.

Water temperatures: Maximum, 93°F June 18; minimum, 39°F Jan. 5.

EXTREMES, 1944-59.--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 daily, 765 micromhos Feb. 5, 1957; minimum daily, 146 micromhos Sept. 27, 1957.

Water temperatures (1945-48, 1950-59): Maximum, 95°F July 26, 1954; minimum, 38°F Jan. 17, 1957.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-31, 1958-----	2,244	10		46	10	18	4.2	168	28	25	--	2.2		249	0.34	1,500	156	18	20	0.6	395	8.0
Nov. 1-30-----	2,311	10		50	11	18	3.2	176	32	26	--	3.8		253	.34	1,580	170	26	18	.6	431	7.9
Dec. 1-31-----	876	6.4		58	16	25	3.3	218	36	37	--	3.0		302	.41	714	210	32	20	.8	522	8.0
Jan. 1-31, 1959-----	1,065	5.8		52	15	26	3.4	191	36	36	0.3	2.5		287	.39	825	191	34	22	.8	490	7.6
Feb. 1-28-----	2,504	9.6		49	11	20	3.9	166	34	28	--	2.8		250	.34	1,690	168	32	20	.7	417	8.1
Mar. 1-31-----	1,199	10		50	15	25	3.6	194	37	35	--	2.0		298	.41	965	186	28	22	.8	487	8.2
Apr. 1-9, 23-30-----	1,954	9.6		50	13	24	3.8	182	36	35	--	2.5		270	.37	1,420	178	30	22	.8	462	7.8
Apr. 10-11, 14, 19-20--	16,900	12		30	3.1	6.8	3.3	98	11	8.2	--	2.2		a 125	.17	5,700	88	7	14	.3	217	7.6
Apr. 12-13, 15-18, 21-22-----	12,090	12		38	4.6	11	3.6	115	25	14	--	3.2		a 168	.23	5,480	114	20	17	.4	292	7.5
May 1-23, 26-31-----	2,638	11		48	13	20	3.2	176	28	31	--	3.2		254	.35	1,810	174	30	20	.7	439	7.4
May 24-25-----	8,820	11		26	4.1	7.9	2.6	93	7.6	11	--	1.8		a 118	.16	2,810	82	6	17	.4	204	7.8
June 1-30-----	1,837	11		38	13	20	3.3	152	26	30	--	1.2		226	.31	1,120	148	24	22	.7	390	7.6
July 1-31-----	1,260	11		39	15	21	3.8	156	28	35	.2	1.8		242	.33	823	159	31	22	.7	410	7.0
Aug. 1-31-----	2,597	11		44	15	21	3.4	175	26	38	--	2.2		255	.35	1,790	172	28	21	.7	432	7.8
Sept. 1-30-----	2,563	13		42	15	24	3.6	175	28	38	--	1.5		254	.35	1,760	166	23	23	.8	446	7.8
Weighted average-----	2,372	11		43	11	18	3.5	159	27	27	--	2.5		231	0.31	1,480	152	22	20	0.6	393	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
1180. LAKE J. B. THOMAS NEAR VINCENT																						
Aug. 12, 1959-----		2.6	0.00	32	7.2	65		169	62	32	0.9	0.2		285	0.39		110	0	56	2.7	477	7.4
1230. LAKE COLORADO CITY NEAR COLORADO CITY																						
Nov. 6, 1958-----		3.9		39	8.4	37		164	38	26	0.5	0.1		a241	0.33		132	0	38	1.4	411	8.2
1255. OAK CREEK RESERVOIR NEAR BLACKWELL																						
Nov. 6, 1958-----		1.6		44	9.2	13		134	35	21	0.1	0.2		190	0.26		148	38	16	0.5	350	7.9
1265. COLORADO RIVER AT BALLINGER																						
June 20, 1959-----	10	6.4		77	24	182		104	203	275	0.4	0.2		a831	1.13		290	206	58	4.6	1,410	6.7
1320. LAKE NASWORTHY NEAR SAN ANGELO																						
Nov. 6, 1958-----		7.6		56	14	39		210	27	56	0.3	1.0		a310	0.42		197	25	30	1.2	549	7.9
1345. SAN ANGELO RESERVOIR AT SAN ANGELO																						
Nov. 6, 1958-----		1.3		40	7.2	10		158	8.4	9.5	0.1	0.4		a162	0.22		129	0	15	0.4	290	8.0
SOUTH FORK JIM NED CREEK AT US HIGHWAY 84 NEAR GOLDSBORO																						
June 21, 1959-----		9.4		65	7.7	30		170	9.6	76	0.2	1.5		283	0.38		194	54	25	0.9	525	7.8
ROUGH CREEK AT US HIGHWAY 84 NEAR GOLDSBORO																						
June 21, 1959-----	b0	7.8		39	3.6	2.9	4.9	141	3.0	2.8	0.1	1.8		135	0.18		112	0	5	0.1	234	7.0
1420. HORDS CREEK AT COLEMAN																						
June 21, 1959-----	0	7.8		53	15	21		216	24	25	0.2	1.0		253	0.34		194	17	19	0.7	448	7.6
1435. PECAN BAYOU AT BROWNWOOD																						
June 21, 1959-----	0.2	12		61	9.6	30		191	39	42	0.2	1.2		a294	0.40		192	35	26	0.9	494	7.8
1445. SAN SABA RIVER AT MENARD																						
Nov. 5, 1958-----	12	16		66	23	20		301	18	25	0.3	1.8		318	0.43		259	12	14	0.5	548	8.0

a Residue on evaporation at 180°C.
b Field estimate.

COLORADO RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
1460. SAN SABA RIVER AT SAN SABA																						
Apr. 21, 1959-----	76	12		54	27	20		281	22	25	0.2	1.5		a306	0.42		246	15	15	0.6	543	7.7
CUMMINS CREEK AT FM ROAD 109 NEAR COLUMBUS																						
Mar. 17, 1959-----	b100	16		68	4.3	25		211	20	34	0.3	0.0		a280	0.38		187	14	23	0.8	470	7.7
Apr. 9-----		9.0		30	1.4	8.2	3.2	92	6.0	12		2.5			.16		81	5	17	.4	212	7.5
COLORADO RIVER AT US HIGHWAY 90A NEAR EAGLE LAKE																						
Apr. 26, 1959-----		12		61	12	20		207	32	28	0.3	2.8		270	0.37		202	32	18	0.6	478	7.8
EAGLE LAKE AT EAGLE LAKE																						
Apr. 26, 1959-----	b0	17		40	7.2	12		153	10	14	0.2	0.2		176	0.24		129	4	17	0.5	314	6.7
1625. COLORADO RIVER NEAR BAY CITY																						
Apr. 25, 1959-----	3,160	11		54	9.7	22		177	36	26	0.2	2.5		248	0.34		175	30	21	0.7	439	7.3

a Residue on evaporation at 180°C.
b Field estimate.

LAVACA RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN LAVACA RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Apr. 10, 1959-----	1,480	11		30	1.5	11		92	11	9.5		4.5		124	0.17	81	6	22	0.5	221	7.5
1635. LAVACA RIVER AT HALLETTSVILLE																					
Apr. 10, 1959-----		7.8		35	3.1	26		101	14	40		4.4		180	0.24	100	17	36	1.1	341	7.3
BRUSHY CREEK AT US HIGHWAY 77 NEAR YOAKUM																					
Apr. 10, 1959-----		11		30	1.2	6.6	3.9	97	6.6	6.5		2.5		116	0.16	80	0	14	0.3	200	7.5
NAVIDAD RIVER AT US HIGHWAY 77 NEAR SCHULENBERG																					
Apr. 26, 1959-----		23		138	2.7	65	3.8	409	30	95	0.4	1.2		560	0.76	356	20	28	1.5	915	
NAVIDAD RIVER AT US HIGHWAY 90A NEAR HALLETTSVILLE																					

GUADALUPE RIVER BASIN

1765. 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 & New Orleans Railroad bridge, 10 miles upstream from Coloto Creek, and at mile 51.
 DRAINAGE AREA.--5,161 square miles.
 RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1959.
 Water temperatures: November 1950 to September 1959.
 EXTREMES, 1958-59.--Dissolved solids: Maximum, 376 ppm Mar. 1-10; minimum, 216 ppm May 23-26.
 Hardness: Maximum, 252 ppm Dec. 21-31; minimum, 148 ppm Apr. 9-20.
 Specific conductance: Maximum daily, 801 micromhos Jan. 23; minimum daily, 298 micromhos Apr. 16.
 Water temperatures: Maximum, 86°F Aug. 5-6; minimum, 44°F Jan. 5.
 EXTREMES, 1945-46, 1948-59.--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 daily, 1,950 micromhos Jan. 11-17, 1946; minimum daily, 184 micromhos Oct. 24, 1956.
 Water temperatures (1950-59): Maximum, 90°F Aug. 4, 27, 1952; minimum, 40°F Feb. 1-2, 1951.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate					
Oct. 1-10, 1958-----	2,129	15		50	10	16	3.5	184	20	24		3.8		a232	0.32	1,330	166	15	17	0.5	406	7.9	
Oct. 11-20-----	1,615	18		64	15	23	2.8	232	27	33		6.2		322	.44	1,400	221	31	18	.7	530	7.7	
Oct. 21-28-----	1,436	17		70	16	23	2.5	255	27	32		8.3		332	.45	1,290	240	32	17	.6	560	7.8	
Oct. 29-31, Nov. 1-10--	3,112	14		57	12	17	2.9	200	25	24		5.5		274	.37	2,300	192	28	16	.5	446	7.9	
Nov. 11-20-----	1,884	17		64	15	20	2.4	238	25	27		7.3		303	.41	1,540	221	26	16	.6	523	8.1	
Nov. 21-30-----	1,607	15		70	17	25	2.3	260	28	35		7.3		338	.46	1,470	244	32	18	.7	574	7.9	
Dec. 1-10-----	1,491	15		70	18	26	2.3	264	29	36		7.5		344	.47	1,380	248	32	18	.7	586	7.9	
Dec. 11-20-----	1,393	14		57	18	25	2.1	228	30	37	0.3	7.7		315	.43	1,180	216	29	20	.7	535	8.1	
Dec. 21-31-----	1,465	14		73	17	26	2.3	274	28	37		7.0		356	.48	1,410	252	28	18	.7	592	8.1	
Jan. 1-10, 1959-----	1,363	15		73	16	29	2.3	277	29	41		6.7		366	.50	1,350	248	21	20	.8	609	8.1	
Jan. 11-20-----	1,251	13		55	18	28	1.7	225	27	42		7.7		304	.41	1,030	211	26	22	.8	550	8.2	
Jan. 21-31-----	1,205	12		67	18	31	1.8	259	32	46		7.4		a342	.47	1,110	241	28	22	.9	616	7.9	
Feb. 1-10-----	1,649	15		58	15	29	2.8	223	29	42		4.9		310	.42	1,380	206	24	23	.9	537	8.1	
Feb. 11-20-----	2,510	15		54	12	30	3.3	189	31	42		4.2		294	.40	1,990	184	29	26	1.0	506	8.1	
Feb. 21-28-----	1,686	14		64	13	26	3.1	219	36	34		5.8		312	.42	1,420	213	34	21	.8	524	8.0	
Mar. 1-10-----	1,523	15		72	16	33	2.8	257	39	48		6.1		376	.51	1,550	246	35	22	.9	617	8.1	
Mar. 11-20-----	1,245	15		71	17	33	2.4	262	35	50		6.3		372	.51	1,250	247	32	22	.9	633	8.2	
Mar. 21-31-----	1,152	14		64	18	30	2.2	249	32	42		5.0		338	.46	1,050	234	30	22	.8	576	8.1	
Apr. 1-8-----	1,155	12		56	18	28	2.3	226	33	42		4.8		318	.43	992	214	28	22	.8	539	8.1	
Apr. 9-20-----	5,634	13		46	8.0	20	3.7	153	25	28		3.0		235	.32	3,570	148	22	22	.7	389	7.7	
Apr. 21-30-----	2,228	15		57	11	22	4.0	194	30	33		3.2		285	.39	1,710	187	28	20	.7	466	8.0	
May 1-10-----	1,755	15		68	15	29	3.0	236	34	43		5.4		348	.47	1,650	231	38	21	.8	582	7.3	
May 11-20-----	1,463	15		70	15	30	2.5	242	36	42		6.1		352	.48	1,390	236	38	21	.8	588	7.3	
May 21-22, 27-31-----	1,246	14		64	15	29	2.8	233	31	41		4.6		332	.45	1,120	221	30	22	.8	559	7.4	
May 23-26-----	2,758	9.6		46	9.1	19	3.0	164	19	27		2.5		a216	.29	1,610	152	18	21	.7	393	7.6	
June 1-9-----	1,157	17		66	18	31	2.4	246	33	46		4.4		360	.49	1,120	238	37	22	.9	584	7.4	
June 10-20-----	965	16		62	14	30	2.7	230	33	40		3.6		320	.44	834	212	24	23	.9	541	8.0	
June 21-30-----	1,295	16		58	15	30	2.3	228	30	39		3.0		310	.42	1,080	206	19	24	.9	530	7.9	
July 1-10-----	1,825	18		54	10	18	2.8	198	22	22		4.7		256	.35	1,260	176	13	18	.6	429	7.5	
July 11-20-----	990	18		58	13	19	2.8	222	21	25		4.0		280	.38	748	198	16	17	.6	462	7.7	
July 21-31-----	1,075	18		66	14	25	2.6	246	27	34		4.1		322	.44	935	222	20	19	.7	537	7.7	
Aug. 1-4-----	834	20		60	17	27	2.9	233	28	44		4.0		318	.43	716	220	28	21	.8	531	7.4	
Aug. 5-16, 26-28-----	825	19		55	15	24	2.8	215	27	37		2.5		a288	.39	642	198	22	20	.7	480	7.5	
Aug. 17-25, 29-31-----	824	18		--	17	28	2.7	--	29	44		2.5		--	--	--	--	--	--	--	--	--	--
Sept. 1-10-----	807	20		60	18	27	2.5	236	30	39		3.0		320	.44	697	224	30	21	.8	540	7.2	
Sept. 11-20-----	715	20		61	17	27	2.4	241	29	38		2.5		316	.43	610	222	24	21	.8	531	7.9	
Sept. 21-30-----	696	18		59	17	27	2.3	237	30	38		2.8		a311	.42	584	217	23	21	.8	523	7.4	
Weighted average	1,580	15		60	14	25	2.8	219	28	35		5.0		303	0.41	1,290	207	28	21	0.8	511	--	

a Calculated from determined constituents.

GUADALUPE RIVER BASIN--Continued

1885. SAN ANTONIO RIVER AT GOLIAD, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 183, 1.3 miles southeast of Courthouse in Goliad, Goliad County, and 10 miles upstream from Manahuilla Creek.

DRAINAGE AREA.--3,918 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1945 to September 1946, September 1958 to September 1959.

Water temperatures: September 1958 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 808 ppm Sept. 18; minimum, 159 ppm Oct. 30-31, Nov. 1.

Hardness: Maximum, 362 ppm Mar. 21-31; minimum, 96 ppm Oct. 30-31, Nov. 1.

Specific conductance: Maximum daily, 1,390 micromhos Apr. 3; minimum daily, 260 micromhos Oct. 31.

Water temperatures: Maximum, 87°F Sept. 21; minimum, 45°F Jan. 4.

EXTREMES, 1945-46, 1958-59.--Dissolved solids: Maximum, 808 ppm Sept. 18, 1959; minimum, 159 ppm Oct. 30-31, Nov. 1, 1958.

Hardness: Maximum, 362 ppm Mar. 21-31, 1959; minimum, 96 ppm Oct. 30-31, Nov. 1, 1958.

Specific conductance: Maximum daily, 1,390 micromhos Apr. 3, 1959; minimum daily, 208 micromhos Apr. 24, 1946.

Water temperatures (1958-59): Maximum, 87°F Sept. 21, 1959; minimum, 45°F Jan. 4, 1959.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	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	Non-carbonate				
Oct. 1-10, 1958-----	1,291	15		60	12		35	192	0	51	41	0.3	7.0	322	0.44	1,120	199	42	28	1.1	528	8.2
Oct. 11-20-----	824	16		74	15		42	227	3	64	52	.3	6.1	392	.53	872	246	55	27	1.2	635	8.3
Oct. 21-29-----	894	18		76	15		48	230	4	65	60	.3	7.8	419	.57	1,010	251	62	29	1.3	676	8.3
Oct. 30-31, Nov. 1-----	4,403	15		31	4.5		17	102	0	21	16	.2	4.2	a159	.22	1,890	96	12	27	.7	271	7.8
Nov. 2-10-----	2,419	16		60	12		25	189	0	45	32	.2	6.9	298	.41	1,950	199	44	21	.8	485	8.0
Nov. 11-20-----	1,296	16		74	15		33	233	0	57	42	.3	8.3	368	.50	1,290	246	55	22	.9	601	8.1
Nov. 21-30-----	836	17		83	18		43	256	8	68	51	.3	9.6	434	.59	980	281	58	25	1.1	694	8.4
Dec. 1-10-----	662	17		90	19		58	286	4	77	68	.4	12	499	.68	892	302	62	29	1.4	797	8.3
Dec. 11-20-----	575	17		94	21		67	291	8	82	83	.4	13	544	.74	845	321	69	31	1.6	879	8.3
Dec. 21-31-----	516	20		96	21		87	275	20	90	107	.4	13	604	.82	841	326	67	37	2.1	965	8.7
Jan. 1-10, 1959-----	504	20		95	19	73	73	285	11	92	90	.4	13	571	.78	777	315	63	33	1.8	909	8.5
Jan. 11-20-----	459	19		100	20		81	304	7	98	94	.4	15	602	.82	746	332	71	35	1.9	955	8.4
Jan. 21-31-----	434	18		101	22		80	286	15	101	96	.5	18	604	.82	708	342	83	34	1.9	956	8.5
Feb. 1-10-----	467	23		98	19		78	294	0	97	96	.5	15	589	.80	743	322	82	34	1.9	942	8.1
Feb. 11-20-----	504	23		96	19		75	281	7	94	90	.5	14	568	.77	773	318	76	34	1.8	910	8.3
Feb. 21-28-----	592	22		89	18		76	277	6	85	87	.4	14	545	.74	871	296	59	36	1.9	886	8.4
Mar. 1-10-----	466	22		96	19		81	285	7	95	97	.6	14	597	.81	751	318	72	36	2.0	938	8.4
Mar. 11-20-----	398	21		103	20		88	312	0	101	111	.6	14	637	.87	685	339	84	36	2.1	1,010	8.2
Mar. 21-31-----	338	19		107	23		89	310	4	111	118	.6	13	660	.90	602	362	101	35	2.0	1,050	8.3
Apr. 1-9-----	369	20		104	24	90	90	310	0	115	127	.4	13	689	.94	686	358	104	35	2.1	1,070	8.1
Apr. 10, 12-13, 15-17--	1,157	16		55	10		44	168	0	51	52	.4	11	353	.48	1,100	178	40	35	1.4	560	7.8
Apr. 11, 14, 18-21-----	859	19		74	15		73	217	0	78	96	.4	12	505	.69	1,180	246	68	39	2.0	809	7.7
Apr. 22-30-----	406	20		98	22		77	297	0	102	101	.5	11	606	.82	664	335	92	33	1.8	960	8.0
May 1-2-----	370	21		101	22		100	280	19	109	122	.5	14	703	.96	702	342	82	39	2.4	1,050	8.5
May 3-5-----	1,757	20		46	7.0		40	133	2	52	39	.4	9.1	a280	.38	1,330	144	31	38	1.4	475	8.3
May 6-11-----	541	16		74	16		54	218	2	75	70	.4	11	a425	.58	621	250	68	32	1.5	729	8.3
May 12-20-----	450	20		92	20		78	286	0	94	96	.5	13	605	.82	735	312	77	35	1.9	932	8.2
May 21-31-----	542	15		63	12		55	199	0	62	64	.4	8.2	412	.56	603	206	44	36	1.7	658	8.0
June 1-5, 8-12-----	344	21		89	17		89	273	0	97	106	.5	11	586	.80	544	292	68	40	2.3	921	8.1
June 6-7-----	757	17		43	5.8		28	148	0	25	28	.3	5.7	a226	.31	462	131	10	32	1.1	397	8.0
June 13-26-----	243	20		101	23		108	305	0	125	136	.5	9.4	688	.94	451	346	96	40	2.5	1,100	7.9
June 27-30-----	535	15		74	16		78	227	0	86	97	.4	7.9	517	.70	747	250	64	40	2.1	829	7.6
July 1-10-----	478	20		72	16		58	226	0	73	71	.4	11	459	.62	592	246	60	34	1.6	717	7.8
July 11-18-----	272	21		87	20		65	260	0	93	88	.4	6.7	556	.76	408	299	86	32	1.6	826	7.9
July 19-31-----	279	21		92	20		86	278	0	107	107	.5	8.2	609	.83	459	312	84	38	2.1	947	7.8
Aug. 1-10-----	212	20		90	22		82	276	0	99	110	.5	10	598	.81	342	315	89	36	2.0	939	7.9
Aug. 11-20-----	204	24		86	22		88	267	0	109	110	.5	9.2	602	.82	332	305	86	39	2.2	936	7.9
Aug. 21-29-----	247	23		92	21		93	290	0	106	114	.5	10	627	.85	418	316	78	39	2.3	978	8.0
Aug. 30-31, Sept. 1-5--	243	23		78	18		73	246	0	90	87	.4	9.7	516	.70	339	268	67	37	1.9	813	8.1
Sept. 6-17-----	226	23		92	19		90	284	0	104	107	.6	11	610	.83	372	308	75	39	2.2	960	8.0
Sept. 18-----	199	--		--	--		--	269	0	--	216	--	--	808	1.10	434	290	70	--	--	1,300	8.1
Sept. 19-30-----	222	23		90	19		93	283	0	96	114	.5	14	605	.82	363	302	70	40	2.3	988	7.8
Weighted average----	597	18		77	16		57	b242	--	73	70	0.4	10	457	0.62	737	258	60	32	1.5	732	--

a Calculated from determined constituents.

b Includes equivalent of individual carbonate values shown above.

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

Chemical analyses, in parts per million, water year October 1958 to September 1959

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) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
1720. SAN MARCOS RIVER AT LULING																			
Feb. 23, 1959	340	11	80	17	52	357	24	45	0.2	0.0	405	0.55	270	0	29	1.4	706	7.4	
1724. PLUM CREEK AT LOCKHART																			
Feb. 23, 1959	18	94	5.4	76	283	71	67	1.1	23	494	0.67	256	24	39	2.1	826	7.4		
1835. SAN ANTONIO RIVER NEAR FALLS CITY																			
Apr. 10, 1959	633	16	90	20	61	2664	94	75	0.3	22	508	0.69	306	90	30	1.5	852	8.5	
ECLETO CREEK AT STATE HIGHWAY 123 TWELVE MILES SOUTH OF SEGUIN																			
May 4, 1959	10	12	3.7	10	4.5	74	0.2	4.0	0.1	0.5	81	0.11	45	0	30	0.6	141	6.3	
1870. ESCONDIDO RESERVOIR NO. 1 NEAR KENEDY																			
Feb. 10, 1959	1.9	33	2.8	6.8	6.5	120	7.2	4.8	0.4	3.2	126	0.17	94	0	13	0.3	236	7.5	
1875. ESCONDIDO CREEK AT KENEDY																			
May 3, 1959	0	10	54	4.8	38	168	17	56	0.4	1.0	264	0.36	154	17	35	1.3	487	7.4	

a Includes equivalent of 8 parts per million carbonate (CO₃).

MISSION RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN MISSION RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
May 3, 1959-----		3.4		72	17	154	250	24	250	0.4	0.0	0.0		644	0.88	250	44	57	4.2	1,220	7.7

MEDIO CREEK AT US HIGHWAY 181 NEAR BEEVILLE

ARKANSAS RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
May 3, 1959-----		30		80	9.5	25	313	6.4	20	0.3	0.2	0.2		325	0.44	238	0	18	0.7	553	7.1

PAPALOTE CREEK AT US HIGHWAY 181 NEAR SKIDMORE

ARKANSAS RIVER AT WELDER MILDLIFE REFUGE NEAR SINTON

Mar. 14, 1959-----		11		40	8.2	89	125	16	146	0.2	3.0			374	0.51	134	31	59	3.4	720	6.9
--------------------	--	----	--	----	-----	----	-----	----	-----	-----	-----	--	--	-----	------	-----	----	----	-----	-----	-----

NUECES RIVER BASIN

2110. NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Wesley Seale Dam, 0.6 mile upstream from gaging station at bridge on State Highway 359, and 4 miles southwest of Mathis, San Patricio County.

DRAINAGE AREA.--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1959.

Water temperatures: October 1947 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 362 ppm Aug. 1-31; minimum, 237 ppm Nov. 1-30.

Hardness: Maximum, 174 ppm May 1-31; minimum, 136 ppm Nov. 1-30.

Specific conductance: Maximum daily, 699 micromhos July 21; minimum daily, 370 micromhos Nov. 15.

Water temperatures: Maximum, 91°F Aug. 8-9; minimum, 48°F Jan. 5-9.

EXTREMES, 1947-59.--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 daily, 1,040 micromhos July 1, 1948; minimum daily, 233 micromhos July 30, 1949.

Water temperatures: Maximum, 94°F July 27, 1948; minimum, 38°F Jan. 31, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-31, 1958-----	4,168	20		53	5.3	26	8.3	189	22	27	0.1	1.5		280	0.38	3,150	154	0	26	0.9	430	8.1
Nov. 1-30-----	3,372	16		46	5.0	22	6.4	168	21	24	--	1.8		237	.32	2,160	136	0	25	.8	386	7.7
Dec. 1-31-----	325	15		48	5.5	26	6.3	172	24	27	.2	2.5		254	.35	223	142	2	27	.9	410	8.0
Jan. 1-31, 1959-----	394	17		51	6.0	31	6.1	182	28	34	--	2.0		276	.38	294	152	2	30	1.1	450	8.0
Feb. 1-28-----	155	14		54	6.3	30	6.2	190	28	35	.2	1.5		285	.39	119	160	4	28	1.0	465	8.2
Mar. 1-31-----	111	14		54	7.1	34	6.5	194	30	39	--	2.0		296	.40	88.7	164	4	30	1.2	485	8.0
Apr. 1-30-----	87.5	12		56	8.2	35	6.4	198	35	42	.2	1.0		309	.42	73.0	173	10	30	1.2	512	8.0
May 1-30-----	95.3	11		56	8.3	43	6.3	195	37	51	--	.8		318	.43	81.8	174	14	34	1.4	544	8.0
June 1-30-----	114	9.8		54	8.0	53	6.8	194	39	66	--	1.0		342	.47	105	168	8	40	1.8	581	7.9
July 1-31-----	845	15		52	8.8	60	7.9	189	41	74	.2	1.2		a353	.48	805	166	10	43	2.0	599	7.0
Aug. 1-31-----	132	16		53	9.0	60	8.7	189	42	77	--	2.0		362	.49	129	169	14	42	2.0	602	7.8
Sept. 1-30-----	98.5	15		54	9.2	58	9.1	194	42	73	--	1.5		358	.49	95.2	172	14	41	1.9	615	7.4
Weighted average-----	829	17		50	5.7	29	7.4	181	25	33	--	1.6		274	0.37	613	148	0	29	1.0	439	--

a Calculated from determined constituents.

NUECES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Mar. 30, 1959	al	60		20	7.8	381		6683	127	149	3.4	0.2		1,080	1,447	82	0	91	18	1,580	8.9
1943. NUECES RIVER NEAR TILDEN																					
Feb. 16, 1959	85	2.3		72	14	65		199	52	110	0.2	7.7		6443	0.60	237	74	37	1.8	769	8.0
Mar. 30	7.2	4.5		67	15	107		196	67	164		1.5		522	.71	228	68	51	3.1	962	8.1
FRIO RIVER AT TILDEN																					
Feb. 16, 1959		2.1		56	23	288		300	138	330	0.6	3.5		989	1.35	234	0	73	8.2	1,760	8.2
Mar. 30		4.5		40	25	567		526	212	555		1.0		1,660	2.26	203	0	86	17	2,880	8.2
SAN MIGUEL CREEK AT STATE HIGHWAY 173 NORTH OF TILDEN																					
Feb. 16, 1959		4.4		107	21	89		285	156	106	0.3	0.0		635	0.86	354	120	35	2.0	1,040	8.0
2070. FRIO RIVER AT CALLIHAM																					
Jan. 30, Feb. 1-6, 1959		7.8		94	19	220		253	129	315		5.1		928	1.26	312	105	60	5.4	1,580	8.1
ATASCOSA RIVER AT PLEASANTON																					
Feb. 18, 1959		12		130	42	178		287	298	240	0.4	0.0		1,040	1.41	497	262	44	3.5	1,740	8.1
OLMOS CREEK AT US HIGHWAY 281 NEAR WHITSETT																					
Apr. 19, 1959		16		68	2.4	78		141	143	36	0.5	1.0		436	0.59	180	64	48	2.5	695	7.7
SAN CHRISTOVAL CREEK AT US HIGHWAY 281 NEAR WHITSETT																					
Apr. 19, 1959		20		37	1.8	20		124	34	4.2	0.3	0.2		178	0.24	100	0	31	0.9	294	6.4
SULPHUR CREEK AT STATE HIGHWAY 9 AT OAKVILLE																					
Apr. 19, 1959		17		94	14	239		376	97	285	0.5	0.0		932	1.27	292	0	64	6.1	1,640	7.3
NUECES RIVER AT US HIGHWAY 59 NEAR GEORGE WEST																					
Apr. 19, 1959		17		102	19	269		323	162	342	0.4	1.3		1,070	1.46	332	68	64	6.4	1,860	7.3

a Field estimate.

b Includes equivalent of 54 parts per million carbonate (CO₃).

c Residue on evaporation at 180°C.

RIO GRANDE BASIN

3640. 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 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1958	31	316	--		112	21	195	--	225	365	176	--	(b)	0.21	1,039	1.41		366	182	54	4.4	1,580	7.8
November	21	110	--		134	30	302	--	273	518	268	--	(b)	.28	1,465	1.99		460	236	59	6.1	2,150	8.3
December	31	82.0	--		144	32	347	--	287	582	303	--	(b)	.37	1,614	2.20		491	256	61	6.8	2,390	8.0
January 1959	31	65.2	22		142	32	396	14	295	594	356	1.0	(b)	.32	1,747	2.38		487	246	63	7.8	2,600	7.9
February	17	60.2	--		137	31	358	--	299	561	314	--	0.6	.34	1,635	2.22		472	227	62	7.2	2,430	8.0
March	26	825	--		78	15	95	--	193	192	78	--	.6	.15	612	.83		257	98	44	2.6	926	7.9
April	30	650	--		93	19	143	--	220	261	128	--	.6	.14	807	1.10		310	130	50	3.5	1,240	8.1
May	31	728	--		92	19	151	--	210	259	138	--	(b)	.14	823	1.12		306	134	52	3.8	1,260	8.0
June	30	1,020	--		89	17	132	--	214	237	117	--	(b)	.14	736	1.00		291	116	50	3.4	1,150	7.8
July	31	1,010	19		89	17	134	8.6	201	252	116	.8	.0	.17	773	1.05		294	129	49	3.4	1,180	8.0
August	31	1,080	--		91	18	130	--	214	245	112	--	.6	.11	769	1.05		301	126	48	3.3	1,150	8.1
September	28	567	--		101	20	163	--	240	299	138	--	.6	.17	888	1.21		334	137	51	3.9	1,340	8.2

a Includes equivalent of any carbonate (CO₃) present.

b Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued

3705. 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 Water Bulletin Number 28).

RECORDS AVAILABLE.--Chemical analyses: 1933 to 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
October 1958	0	193	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	4	21.7	--	--	178	43	442	--	279	613	522	--	1.9	0.48	2,030	2.76	--	620	391	61	7.7	3,070	8.0	
December	5	4.9	--	--	246	62	623	--	293	744	879	--	3.1	.50	2,843	3.87	--	867	627	61	9.2	4,280	7.8	
January 1959	4	.5	14	--	643	169	1,410	18	290	1,200	2,760	0.8	1.2	.48	7,013	9.54	--	2,300	2,060	57	13	9,970	7.8	
February	4	.2	--	--	694	188	1,490	--	256	1,220	3,030	--	1.2	.54	7,550	10.3	--	2,510	2,300	56	13	10,600	7.9	
March	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	0	26.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June	0	2.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	1	20.3	12	--	165	8.6	6.7	6.6	140	340	4.6	.8	.6	.03	657	.89	--	448	333	3.1	.1	840	7.8	
August	2	99.5	--	--	80	16	144	--	208	224	131	--	1.2	.20	755	1.03	--	264	93	54	3.8	1,150	8.0	
September	3	4.1	--	--	424	137	1,630	--	253	1,720	2,260	--	1.2	.89	6,622	9.01	--	1,620	1,410	69	18	9,310	8.0	

RIO GRANDE BASIN--Continued

3715. 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 28).

RECORDS AVAILABLE.--Chemical analyses: 1935 to 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate						
October 1958	16	225					95		143		96					571	0.78		240	122	46	2.7	918		
November	9	10.2					415		215		628					2,097	2.85		734	358	55	6.7	3,200		
December	4	.6					1,150		232		2,110					6,491	8.83		2,320	2,130	52	10	8,680		
January 1959	0	0					--		--		--					--	--		--	--	--	--	--	--	
February	0	0					--		--		--					--	--		--	--	--	--	--	--	
March	0	0					--		--		--					--	--		--	--	--	--	--	--	
April	0	0					--		--		--					--	--		--	--	--	--	--	--	
May	0	1.5					--		--		--					--	--		--	--	--	--	--	--	
June	3	20.4					59		171		23					386	.52		174	34	42	1.9	595		
July	5	25.7	14		88	5.7	58	5.9	151	227	11	0.8	3.1	0.06		528	.72		244	120	33	1.6	713	8.0	
August	7	51.9					69		162		43					454	.62		196	63	43	2.1	689		
September	3	6.9					95		159		85					570	.78		230	100	47	2.7	886		

RIO GRANDE BASIN--Continued

3750. 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 28).

RECORDS AVAILABLE.--Chemical analyses: 1948 to 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
October 1958	0	18,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	5	2,230	--	--	--	127	--	200	--	87	--	--	--	--	892	1.21	--	384	220	42	2.8	1,270	--	--
December	5	1,030	--	--	--	174	--	197	--	122	--	--	--	--	1,154	1.57	--	461	300	45	3.5	1,590	--	--
January 1959	4	742	26	--	149	23	179	7.8	210	501	119	1.7	5.6	0.36	1,163	1.58	--	467	294	45	3.6	1,610	7.8	--
February	5	462	--	--	--	--	217	--	190	--	163	--	--	--	1,340	1.82	--	506	351	48	4.2	1,860	--	--
March	7	345	--	--	--	--	229	--	153	--	172	--	--	--	1,377	1.87	--	488	362	51	4.5	1,890	--	--
April	6	285	--	--	--	--	229	--	153	--	174	--	--	--	1,363	1.85	--	488	362	51	4.5	1,900	--	--
May	8	512	--	--	--	--	157	--	162	--	103	--	--	--	978	1.33	--	371	238	48	3.6	1,380	--	--
June	8	620	--	--	--	--	157	--	156	--	102	--	--	--	989	1.35	--	376	248	48	3.5	1,400	--	--
July	9	1,290	24	--	111	10	116	7.0	168	342	67	1.3	.6	.23	792	1.08	--	320	182	43	2.8	1,120	7.8	--
August	7	2,040	--	--	--	--	69	--	151	--	33	--	--	--	627	.85	--	298	174	34	1.7	869	--	--
September	9	2,360	--	--	--	--	76	--	183	--	46	--	--	--	544	.74	--	239	89	41	2.1	799	--	--

RIO GRANDE BASIN--Continued

3775. 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 28).

RECORDS AVAILABLE.--Chemical analyses: 1944 to 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1958	5	21,700	--		68	6.6	37	--	153	123	17	--	4.3	0.11	363	0.49		196	72	29	1.2	561	7.8
November	4	3,090	--		105	13	89	--	183	270	61	--	1.9	.16	681	.93		318	168	38	2.2	1,000	8.1
December	5	1,360	--		121	22	138	--	186	398	101	--	4.3	.30	943	1.28		394	242	43	3.0	1,320	7.8
January 1959	4	1,070	22		118	22	134	6.3	194	378	95	1.3	4.3	.29	915	1.24		386	226	43	3.0	1,300	7.9
February	4	795	--		119	24	137	--	189	382	104	--	3.7	.20	916	1.25		396	242	43	3.0	1,320	8.0
March	3	643	--		108	26	139	--	173	372	106	--	1.9	.32	914	1.24		374	233	45	3.1	1,310	7.9
April	5	566	--		97	25	127	--	160	341	101	--	1.2	.24	831	1.13		347	216	44	3.0	1,230	8.0
May	3	1,110	--		76	11	100	--	177	237	44	--	1.2	.14	602	.82		234	89	48	2.9	886	8.0
June	4	1,130	--		89	13	75	--	165	238	50	--	1.9	.15	585	.80		278	142	37	2.0	869	8.0
July	6	2,360	18		94	10	72	5.5	183	222	39	1.0	1.2	.13	570	.78		276	126	36	1.9	834	7.9
August	4	2,160	--		97	12	89	--	180	250	53	--	1.2	.20	661	.90		292	145	40	2.3	945	7.9
September	4	3,200	--		78	8.6	53	--	179	134	33	--	3.1	.16	450	.61		229	82	34	1.5	669	8.0

RIO GRANDE BASIN--Continued

4101. 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 1959.

Water temperatures: March 1953 to September 1959.

EXTREMES, 1958-59.--Dissolved solids: Maximum, 6,220 ppm Oct. 1-31; minimum, 4,240 ppm Nov. 23-30.

Hardness: Maximum, 1,860 ppm Sept. 1-30; minimum, 1,510 ppm Nov. 1-22.

Specific conductance: Maximum daily, 10,600 micromhos Oct. 3; minimum daily, 5,660 micromhos Nov. 28.

Water temperatures: Maximum, 79°F on many days during August and September; minimum, 44°F on several days in January.

EXTREMES, 1937-59.--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 daily, 24,200 micromhos Sept. 28, 30, 1953; minimum daily, 1,610 micromhos June 2, 1948.

Water temperatures (1953-59): Maximum, 81°F Aug. 1-4, 1958; minimum, 40°F on several days during winter months.

REMARKS.--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 1958 to September 1959 given in Water-Supply Paper 1632. 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 1958 to September 1959.

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	Non-carbonate				
Oct. 1-31, 1958-----	3.23	18		400	135	1,670		175	1,310	2,600		--		6,220	8.46	54.2	1,550	1,410	70	18	9,670	7.2
Nov. 1-22-----	4.00	21		398	125	1,290		179	1,280	2,010		--		5,210	7.09	56.3	1,510	1,360	65	14	8,000	6.8
Nov. 23-30-----	3.40	15		418	116	893		143	1,340	1,380		4.0		4,240	5.77	38.9	1,520	1,400	56	10	6,280	7.2
Dec. 1-31-----	3.97	15		448	120	913		164	1,480	1,360		4.0		4,420	6.01	47.4	1,610	1,480	55	9.9	6,350	8.1
Jan. 1-31, 1959-----	3.72	14		455	141	916	24	166	1,490	1,430		2.5		4,550	6.19	45.7	1,720	1,580	53	9.6	6,520	8.1
Feb. 1-28-----	4.19	13		455	138	1,100		149	1,590	1,640		3.0		5,010	6.81	56.7	1,700	1,580	58	12	6,990	8.0
Mar. 1-31-----	81.2	12		445	131	1,000		143	1,490	1,530		3.0		4,680	6.36	1,030	1,650	1,530	57	11	6,740	8.1
Apr. 1-30-----	200	11		448	127	1,010	30	139	1,470	1,620		2.0		4,790	6.51	2,590	1,640	1,530	57	11	6,890	7.6
May 1-31-----	4.11	14		470	157	1,310		152	1,610	2,030		--		5,670	7.71	62.9	1,820	1,690	61	13	8,310	7.3
June 1-30-----	164	14		448	132	1,120		141	1,500	1,720		2.5		5,010	6.81	2,220	1,660	1,550	60	12	7,190	7.2
July 1-31-----	172	14		450	118	1,130		135	1,500	1,690		1.0		4,970	6.76	2,310	1,610	1,500	60	12	7,040	7.1
Aug. 1-31-----	261	17		482	153	1,200		130	1,620	1,870		2.5		5,410	7.36	3,810	1,830	1,720	59	12	7,470	7.5
Sept. 1-30-----	108	17		505	145	1,390		130	1,700	2,130		--		5,950	8.09	1,740	1,860	1,750	61	14	8,460	7.7
Weighted average----	84.4	14		463	135	1,150		136	1,550	1,760		2.2		5,140	6.99	1,170	1,710	1,600	59	12	7,280	--

RIO GRANDE BASIN--Continued

4465. 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 1959.

Water temperatures: October 1953 to January 1959.

EXTREMES, 1958-59.--Hardness: Maximum, 4,940 ppm Sept. 1-30; minimum, 1,910 ppm July 18-24.

Specific conductance: Maximum daily, 25,600 micromhos Sept. 5, 9; minimum daily, 7,100 micromhos July 19-20.

EXTREMES, 1939-41, 1946-47, 1953-59.--Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.

Specific conductance: Maximum daily, 29,100 micromhos Aug. 13, 1958; minimum daily, 790 micromhos Apr. 26, 1957.

Water temperatures (1953-59): 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 1958 to September 1959 given in Water-Supply Paper 1632.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Non-carbonate				
Oct. 1-13, 1958-----	68.2	--	--	--	--	1,960		163	1,980	3,020				--	--	--	2,210	2,080	66	18	11,500	7.9
Oct. 14-31-----	35.7	--	--	--	--	2,790		163	2,740	4,270				--	--	--	3,000	2,870	67	22	15,500	7.9
Nov. 1-30-----	33.0	--	--	--	--	3,490		150	3,280	5,430				--	--	--	3,670	3,550	67	25	18,700	7.4
Dec. 1-31-----	30.5	--	--	--	--	3,910		177	3,540	6,000				--	--	--	3,790	3,640	69	28	20,200	7.8
Jan. 1-31, 1959-----	31.2	--	--	--	--	4,020		200	3,590	6,190				--	--	--	3,960	3,800	69	28	20,600	7.6
Feb. 1-28-----	30.5	--	--	--	--	3,890		188	3,660	6,140				--	--	--	4,040	3,890	68	27	20,500	8.0
Mar. 1-31-----	26.1	--	--	--	--	4,330		172	3,890	6,780				--	--	--	4,230	4,090	69	29	22,200	8.1
Apr. 1-30-----	24.1	--	--	--	--	4,510		118	3,940	7,070				--	--	--	4,330	4,230	69	30	22,700	7.3
May 1-31-----	24.3	5.4		733	533	4,120		67	3,750	6,440				15,600	21.4	1,020	4,020	3,960	69	28	21,200	7.2
June 1-30-----	16.8	7.2		615	451	3,080		49	3,100	4,960				12,200	16.7	553	3,390	3,350	66	23	17,200	7.2
July 1-17-----	23.8	6.3		655	412	3,470		56	3,360	5,280				13,200	18.1	848	3,330	3,280	69	26	17,900	6.9
July 18-24-----	43.1	1.9		460	186	1,390		80	1,830	2,150				6,060	8.24	705	1,910	1,850	61	14	8,640	8.0
July 25-31-----	14.0	4.7		478	317	2,370		94	2,520	3,610				9,350	12.8	353	2,500	2,420	67	21	13,100	7.0
Aug. 1-31-----	10.3	--	--	--	--	4,690		53	4,420	7,360				--	--	--	4,730	4,690	68	30	22,700	7.3
Sept. 1-30-----	10.3	--	--	--	--	4,960		62	4,590	7,910				--	--	--	4,940	4,890	69	31	23,900	7.2
Weighted average-----	26.1	--	--	--	--	3,620		138	3,370	5,640				--	--	--	3,670	3,560	68	26	18,900	--

RIO GRANDE BASIN--Continued

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 28).

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1958	3	533	--		134	48	282	--	169	354	463	--	6.2	0.15	1,449	1.97		530	392	54	5.3	2,290	7.9
November	5	282	--		140	60	360	--	180	375	603	--	5.6	.20	1,718	2.34		596	449	57	6.4	2,790	8.1
December	5	241	--		156	67	416	--	188	425	696	--	3.7	.25	1,999	2.72		667	513	58	7.0	3,150	7.9
January 1959	4	215	5		170	75	475	7.0	187	473	798	0.8	3.7	.23	2,212	3.01		732	578	58	7.6	3,530	7.9
February	4	202	--		171	81	510	--	177	500	859	--	3.7	.28	2,351	3.20		760	616	59	8.0	3,730	8.0
March	5	187	--		175	82	517	--	174	496	878	--	2.5	.27	2,484	3.38		772	629	59	8.1	3,800	7.9
April	4	174	--		163	77	502	--	156	487	840	--	1.9	.24	2,268	3.08		724	596	60	8.1	3,650	8.0
May	4	227	--		154	76	500	--	137	476	840	--	.6	.20	2,300	3.13		696	584	61	8.2	3,590	7.9
June	5	262	--		158	77	536	--	142	506	880	--	.6	.26	2,366	3.22		710	593	62	8.7	3,760	8.0
July	4	633	14		104	40	262	5.9	153	257	430	.8	1.2	.13	1,257	1.71		424	300	57	5.5	2,060	7.9
August	4	258	--		99	42	255	--	159	253	418	--	3.1	.09	1,229	1.67		421	291	57	5.4	1,980	8.2
September	5	433	--		82	26	149	--	160	144	248	--	2.5	.10	803	1.09		308	177	51	3.7	1,310	8.0

RIO GRANDE BASIN--Continued

4590. 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 28).

RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1958	31	29,630	--	--	--	--	39	--	153	--	27	--	--	--	379	0.52		202	78	29	1.2	570	--
November	30	8,220	--	--	--	--	59	--	168	--	57	--	--	--	497	.68		250	112	34	1.6	755	--
December	31	4,330	--	--	--	--	81	--	180	--	87	--	--	--	593	.81		282	135	38	2.1	908	--
January 1959	31	3,560	12	--	85	20	87	3.5	183	184	99	0.8	6.8	0.13	619	.84		294	144	39	2.2	958	7.8
February	28	3,150	--	--	--	--	90	--	159	--	112	--	--	--	601	.82		276	146	42	2.4	948	--
March	31	2,470	--	--	--	--	115	--	161	--	104	--	--	--	662	.90		284	152	47	3.0	1,020	--
April	30	2,180	--	--	--	--	97	--	162	--	123	--	--	--	629	.86		282	150	43	2.5	995	--
May	31	2,870	--	--	--	--	91	--	165	--	110	--	--	--	609	.83		270	134	42	2.4	939	--
June	30	3,770	--	--	--	--	69	--	156	--	85	--	--	--	473	.64		235	108	39	2.0	777	--
July	31	4,440	22	--	72	12	67	4.7	153	148	69	.8	5.0	.11	496	.67		228	103	38	1.9	758	7.9
August	31	2,880	--	--	--	--	81	--	153	--	88	--	--	--	546	.74		237	112	43	2.3	837	--
September	30	4,750	--	--	--	--	54	--	162	--	43	--	--	--	429	.58		215	82	35	1.6	660	--

RIO GRANDE BASIN--Continued

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 28).

RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1958	12	32,500	--		58	9.4	49	--	136	103	52	--	1.9	0.15	367	0.50		184	72	37	1.6	591	7.8
November	12	19,000	--		60	8.9	40	--	137	98	39	--	2.5	.10	347	.47		186	73	32	1.3	551	8.0
December	6	7,570	--		63	9.6	40	--	149	105	36	--	4.3	.11	360	.49		196	74	31	1.2	561	7.9
January 1959	12	3,460	6		69	9.1	40	3.9	159	105	39	0.8	5.0	.07	375	.51		209	78	29	1.2	589	7.8
February	10	6,030	--		66	12	42	--	162	109	41	--	5.0	.13	388	.53		215	82	30	1.2	610	8.0
March	12	5,640	--		72	9.4	44	--	165	106	46	--	4.3	.14	421	.57		219	84	30	1.3	636	7.8
April	12	3,110	--		74	13	51	--	168	129	53	--	3.7	.18	411	.56		238	100	32	1.4	688	8.0
May	12	5,290	--		73	14	57	--	160	143	60	--	3.7	.11	483	.66		238	107	34	1.6	727	7.8
June	10	4,250	--		72	14	62	--	153	150	68	--	3.1	.09	468	.64		238	112	36	1.8	750	7.9
July	13	3,720	13		69	16	69	3.9	138	160	79	.6	1.2	.13	504	.69		236	123	38	2.0	782	7.8
August	9	1,950	--		66	16	72	--	125	171	82	--	.6	.15	510	.69		231	128	40	2.1	784	7.9
September	14	4,600	--		65	16	74	--	126	165	82	--	1.2	.14	494	.67		228	124	41	2.1	788	7.9

RIO GRANDE BASIN--Continued

RIO GRANDE AT FORT RINGGOLD, RIO GRANDE CITY

LOCATION.--At gaging station about 1 mile downstream from Rio Grande City, Starr County, 3.9 miles below the mouth of the Rio San Juan, and 1,014.3 river miles below the American Dam at El Paso.

DRAINAGE AREA.--180,396 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 28).

RECORDS AVAILABLE.--Chemical analyses: January to September 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, January to September 1959

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	Non-carbonate				
January 1959	31	4,130	6		74	9.1	50	4.3	164	113	53	0.6	5.6	0.15	419	0.57		221	87	32	1.5	656	7.9
February	28	6,560	--		62	15	45	--	160	113	45	--	5.0	.07	399	.54		215	84	31	1.3	621	8.0
March	31	6,150	--		73	12	48	--	165	117	51	--	4.3	.05	435	.59		231	96	31	1.4	658	7.8
April	30	3,240	--		78	13	60	--	173	136	69	--	3.7	.11	481	.65		247	106	35	1.7	755	7.8
May	31	5,180	--		75	14	62	--	163	146	67	--	4.3	.09	501	.68		246	112	35	1.7	763	8.0
June	30	4,210	--		75	16	69	--	160	155	78	--	3.1	.11	501	.68		251	120	38	1.9	803	7.9
July	31	3,800	12		71	16	73	4.3	145	164	80	.6	2.5	.16	516	.70		242	123	39	2.1	810	7.9
August	31	2,130	--		72	16	86	--	146	169	99	--	1.9	.21	353	.75		246	126	43	2.4	876	8.1
September	27	4,630	--		68	16	76	--	136	166	85	--	1.2	.16	511	.69		236	124	41	2.2	809	8.0

RIO GRANDE BASIN--Continued

RIO GRANDE AT ANZALDUAS DAM

LOCATION.--At gaging station 0.5 mile below Anzalduas Dam, Hidalgo County, 12.2 miles upstream from Hidalgo, and 1,077.1 river miles below the American Dam at El Paso.
DRAINAGE AREA.--182,138 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 28).

RECORDS AVAILABLE.--Chemical analyses: March to September 1959.

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 1958 to September 1959 given in International Boundary and Water Commission Water Bulletin Numbers 28 and 29.

Chemical analyses, in parts per million, March to September 1959

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 (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
March 1959	9	3,830	12		73	13	71	5.1	154	134	87	0.6	3.7	0.15	520	0.71		234	108	39	2.0	796	7.8
April	8	762	--		87	18	115	--	167	176	159	--	3.7	.24	692	.94		292	155	46	2.9	1,110	8.0
May	9	987	--		81	18	115	--	159	180	148	--	3.1	.25	678	.92		276	146	48	3.0	1,070	8.0
June	8	1,300	--		85	20	129	--	159	198	174	--	1.9	.28	721	.98		295	164	49	3.3	1,180	7.9
July	8	603	13		83	21	130	4.7	154	208	168	.6	1.2	.30	746	1.01		292	166	49	3.3	1,180	7.8
August	8	15.3	--		80	21	143	--	138	206	194	--	.6	.34	765	1.04		286	173	52	3.7	1,230	8.0
September	7	1,350	--		74	19	109	--	141	193	137	--	.6	.19	628	.85		264	148	47	2.9	1,010	8.1

RIO GRANDE BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean di-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
														Parts per mil- lion	Tons per acre- foot	Cal- cium, magne- sium	Non- carbon- ate				
Oct., 20, 1958-----	12	0.03	54	8.2	7.2	194	6.4	7.8	0.2	8.7	206	0.28	168	9	9	0.2	333	7.8			

LAKE HALL, NEAR DEL RIO

