TEXAS WATER COMMISSION

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CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1961

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in cooperation with the
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and Others

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INTRODUCTION

This report contains data on the chemical quality of the surface waters of Texas for the water year 1961. Results are presented for chemical analyses of water samples obtained daily from selected points throughout the State and also the results for miscellaneous samples obtained at various points during the period October 1, 1960, to September 30, 1961.

All natural water contains dissolved mineral matter. Water in contact with rocks and soils, even for 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 the same 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 sixteenth in a series of annual reports for water years 1946 through 1961 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, two earlier compilations were issued providing data for the water years 1938 through 1944 and 1938 through 1945, respectively. 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 Dallas, 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 Improvement Districts No. 1 and No. 2.

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 10 stations in the Rio Grande Basin were 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, 1960, to September 30, 1961. 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, specific conductance, 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 45 points on Texas streams and twice weekly at four sampling points in Trinity Bay near the mouth of the Trinity River. Samples were collected twice monthly at five points in a small area on Salt Croton and Haystack Creeks near Aspermont. In addition to the data on chemical quality included in this report, temperature data for streams at 38 of the sampling stations and sediment data for one of the sampling stations are available in the files of the U. S. Geological Survey, Austin, Texas. Records of chemical quality of streams at 54 additional sampling points for varying lengths of time have been published in previous reports of this series. The locations of the active and inactive stations are shown on the accompanying map, Plate 1, and the periods of operation of all the stations are shown on the bar graph (Figure 4). The five sampling points on Salt Croton and Haystack Creeks are indicated as a single location (44) 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 2 of the stations, samples were collected daily; at the others, from 1 to 31 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 31 of the International Boundary and Water Commission, together with streamflow 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. (See Figure 1.) At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are at SAR values of approximately 2.5, 6.5, and 11.

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

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

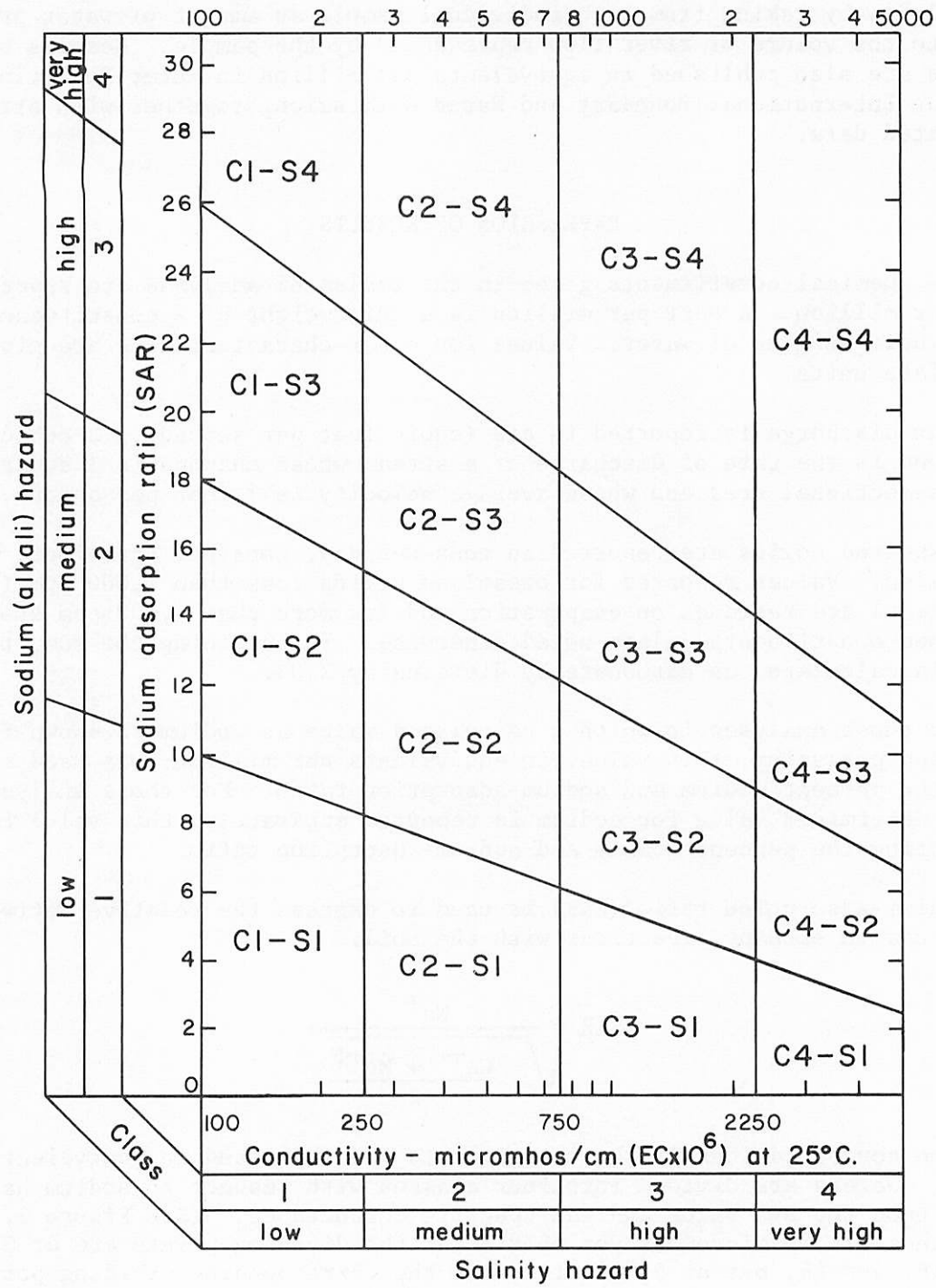

Figure 1

Diagram for Classification of Irrigation Waters

(After U. S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U. S. Dept. Agr. Handbook 60, p. 80.)

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

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

The discharge-weighted averages of analyses are reported for daily sampling stations for which discharge records are available. The weighted-average value 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 excessive for the southeast quarter of the State and were near median for the balance of the State during the 1961 water year. Moderate to locally large floods occurred somewhere in the State nearly every month. Only the western part of the State did not receive the heavy rains of October which kept base flow of streams high for the following few months. There were heavy rains over much of the State in June, and in September the effects of Hurricane Carla were felt in the coastal areas. Mean discharges for selected stations for the 1960 and 1961 water years, as well as for the period of record, are shown in Figure 2. 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 stations operated under the Texas Water Commission-U. S. Geological Survey sampling program during the 1961 water year.

Canadian River Basin

Rainfall in the Canadian River Basin in Texas, although above normal, was extremely erratic during the 1961 water year. At Amarillo, 50 percent of the year's total precipitation fell on a few days during the months of October, May,

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[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, 1960, Standard methods for the examination of water, sewage and industrial wastes.

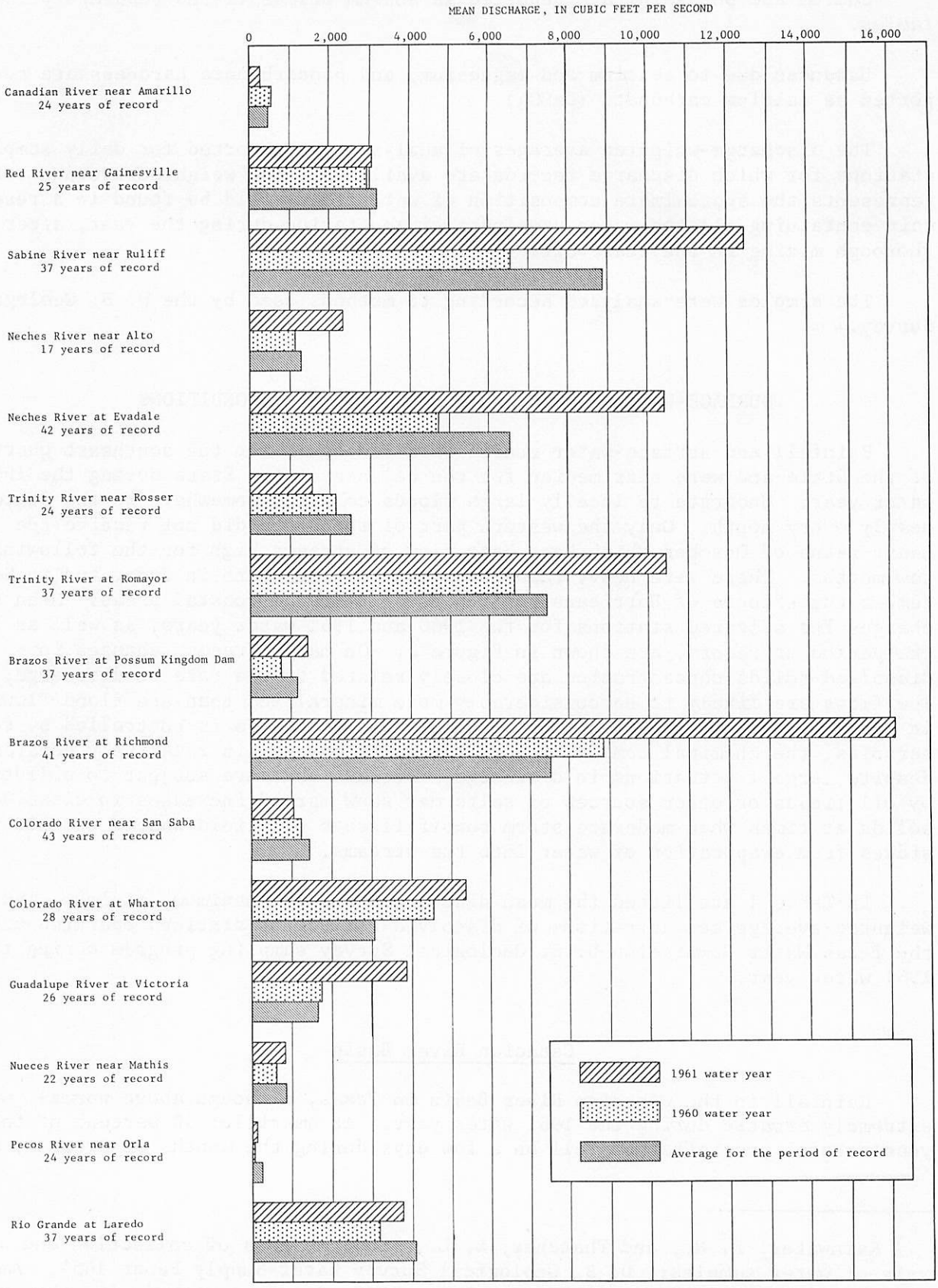

Figure 2.- Mean discharge at selected stations for the 1960 and 1961 water years and for the period of record

Table 1.--Mean discharge and maximum, minimum, and weighted-average concentrations of dissolved solids for the 1961 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
CANADIAN RIVER BASIN				
Canadian River near Amarillo	287	1,670	317	776
RED RIVER BASIN				
Salt Fork Red River near Hedley	--	968	347	--
Little Wichita River near Henrietta	51.4	2,440	59	243
Little Wichita River near Ringgold	80.6	1,340	55	187
Red River near Gainesville	3,044	5,630	463	1,820
Red River at Denison Dam near Denison	4,299	1,320	1,170	1,230
SULPHUR RIVER BASIN				
South Sulphur River near Cooper	387	1,040	68	129
SABINE RIVER BASIN				
Sabine River near Tatum	3,104	334	88	146
Sabine River near Ruliff	12,410	216	40	90
NECHES RIVER BASIN				
Neches River near Alto	2,327	304	42	94
Angelina River near Lufkin	2,353	267	42	74
Neches River at Evadale	10,410	128	46	77
TRINITY RIVER BASIN				
Trinity River near Rosser	1,582	701	233	328
Chambers Creek near Corsicana (a)	769	--	--	--
Richland Creek near Fairfield	--	7,900	102	--
Trinity River at Romayor	10,440	665	83	185
Trinity River near Moss Bluff	--	528	86	--
Old River near Cove	--	887	104	--
Trinity River at Anahuac	--	--	--	--
Trinity Bay near Anahuac	--	--	--	--
BRAZOS RIVER BASIN				
Double Mountain Fork Brazos River near Aspermont	398	6,450	761	1,180
Croton Creek near Jayton	31.4	--	--	--
Salt Croton Creek near Aspermont	9.95	--	--	--
Salt Fork Brazos River near Aspermont	253	114,000	1,230	5,030
Brazos River at Seymour	807	17,200	723	2,270
Hubbard Creek near Breckenridge	134	2,220	112	300
Brazos River at Possum Kingdom Dam near Graford	1,409	3,770	1,220	1,800
Brazos River at Whitney Dam near Whitney	2,054	1,430	783	1,040
Lampasas River at Youngsport (a)	717	--	--	--
Little River at Cameron	4,154	391	168	279
Brazos River at State Highway 21 near Bryan (b)	10,190	--	--	--
Yegua Creek near Somerville (a)	862	--	--	--
Navasota River near Bryan	1,373	1,380	52	143
Brazos River at Richmond	16,130	837	159	312
COLORADO RIVER BASIN				
Colorado River near Ira	43.5	57,900	234	660
Colorado River at Colorado City	71.9	48,600	302	1,010
Beals Creek near Westbrook	42.7	6,780	170	481
Colorado River near Silver	159	15,000	204	653
Colorado River near San Saba	1,073	817	156	357
Colorado River at Austin	2,502	297	258	276
Colorado River at Wharton	5,390	337	128	223
LAVACA RIVER BASIN				
Navidad River near Ganado	1,508	490	44	107
GUADALUPE RIVER BASIN				
Guadalupe River at Victoria	3,865	416	100	258
SAN ANTONIO RIVER BASIN				
San Antonio River at Goliad	994	725	85	347
SAN ANTONIO-NUECES COASTAL AREA				
Mission River at Refugio (a)	198	--	--	--
NUECES RIVER BASIN				
Nueces River near Mathis	847	332	200	266
RIO GRANDE BASIN				
Pecos River below Red Bluff Dam near Orla	c125	7,440	5,120	6,270
Pecos River near Girvin	33.5	18,300	1,410	12,600

a Station operation began in September 1961.
b Station operation began in August 1961.
c Discharge values adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

and July. Runoff of the Canadian River near Amarillo was only about half of that for the previous year and only about 60 percent of the 24-year average. Although there were days when the water was of better quality than at any time during the previous water year, the weighted average of dissolved-solids concentrations increased from 548 ppm in 1960 to 776 ppm in 1961.

Extremely low flow is maintained by drainage of sewage effluent down East Amarillo Creek from the Amarillo sewage disposal plant, and, in the past, analyses often showed nitrate concentrations in excess of 50 ppm. During the 1961 water year, however, only 4 composite samples had concentrations above 20 ppm, and the weighted average of nitrate concentrations was 7.5 ppm.

Red River Basin

Streamflow in the Red River Basin in Texas was near median during the 1961 water year, in spite of the heavy, statewide rains occurring in the last half of October and heavy local rains in December and June. The water of the Red River upstream from Lake Texoma, except during the flood periods, is of poor quality because of the presence of oil-field brines and drainage from natural deposits of salt and gypsum. The Little Wichita River, however, contributes water of good quality except during periods of low flow. The weighted averages of dissolved-solids concentrations for the two sampling stations on the Little Wichita River were 243 ppm near Henrietta and 187 ppm near Ringgold.

At the Gainesville station, just upstream from Lake Texoma, streamflow in 1961 was slightly greater than in 1960, but only 95 percent of the 25-year average. The weighted average of dissolved-solids concentrations, however, increased from 1,660 ppm in 1960 to 1,820 ppm in 1961. At Denison Dam, just below Lake Texoma, discharge was only 83 percent of the near average discharge of 1960 and the minimum dissolved-solids concentration for the year was higher than the maximum dissolved-solids concentration for the previous year. The weighted average was 1,230 ppm, the highest in the 18 years of chemical-quality record.

Sulphur River Basin

The results of sampling at the station on the South Sulphur River near Cooper shows water of good quality. The dissolved-solids concentrations ranged from 68 ppm, a new minimum for the period of record, to 1,040 ppm. Streamflow was about equal to the long-term average and the weighted average of dissolved-solids concentrations was 129 ppm.

Sabine River Basin

The Sabine River Basin drains an area of high rainfall in East Texas and Western Louisiana, and runoff was generally excessive during the 1961 water year. Heavy rainfall during the first few months of the water year resulted in average or excessive streamflow even during periods of normal or deficient precipitation. Deliberate impoundment of water in Lake Tawakoni, a new reservoir on the upper Sabine River, began on October 7 and by the end of the water year, contents had increased to 423,100 acre-feet, 45 percent of capacity.

The water of the basin is almost always low in dissolved solids, although often high in organic color and turbidity. At the Tatum station, where streamflow for the 1961 water year was 116 percent of the 23-year average, the weighted average of dissolved-solids concentrations was 146 ppm. At the downstream station near Ruliff, streamflow was 141 percent of the 36-year average, almost twice that of 1960; the weighted average of dissolved-solids concentrations decreased from 117 ppm in 1960 to 90 ppm in 1961. Since the beginning of chemical-quality records, water of better quality was available only in 1953, 1957, and 1958. A duration curve for the Sabine River near Ruliff (Figure 3) shows the percentage of time specific concentrations of dissolved solids were equaled or exceeded during the 1961 water year.

Neches River Basin

Rainfall in the Neches River Basin was well above normal during the 1961 water year, and streamflow was over twice that occurring in 1960. Heavy rains in mid-October ended 6 months of receding and deficient streamflow. Again, in December, January, and February, heavy rains caused minor flooding in the entire basin; in June, rains of 6 to 8 inches fell in a 2-day period on the 19th and 20th. In the lower basin the effects of Hurricane Carla were felt in September when Port Arthur had the highest tides on record for that city.

The water in the entire Neches River Basin is usually of good quality except where polluted by oil-field or other industrial wastes. A decrease in the weighted average of dissolved-solids concentrations accompanied the 1961 increase in runoff. At the station on the Neches River near Alto the weighted average dropped from 122 ppm in 1960 to 94 ppm in 1961 when streamflow was 183 percent of the long-term average. Downstream, on the Angelina River near Lufkin, the weighted average of dissolved-solids concentrations was 74 ppm, the lowest since chemical-quality records began in 1954. Streamflow was 182 percent of the long-term average. At the station on the Neches River at Evadale, dissolved-solids concentrations ranged from a minimum of 46 ppm to a maximum of 128 ppm with a weighted average of 77 ppm. Since chemical-quality records began in 1947, water of better quality was available only in the 1953 water year. A duration curve for the Neches River at Evadale is given in Figure 3 and shows the percentage of time during which specified concentrations of dissolved solids were equaled or exceeded during the 1961 water year.

Trinity River Basin

During the 1961 water year, streamflow in the upper Trinity River Basin above Fort Worth and Dallas was deficient to the extent that many small streams were completely dry for long periods. Ordinarily, flow in the lower basin is partially controlled by reservoirs located above these two cities. In 1961, however, extremely high rainfall in the Fort Worth-Dallas area during December, January, and June together with severe flooding in the Richland and Chambers Creeks area from December through March and during July produced excessive flow in the lower Trinity River Basin.

At the station on the Trinity River near Rosser, below Fort Worth and Dallas but above Richland and Chambers Creeks, streamflow was only about 60 percent of the long-term average. Because the cities of Fort Worth and Dallas

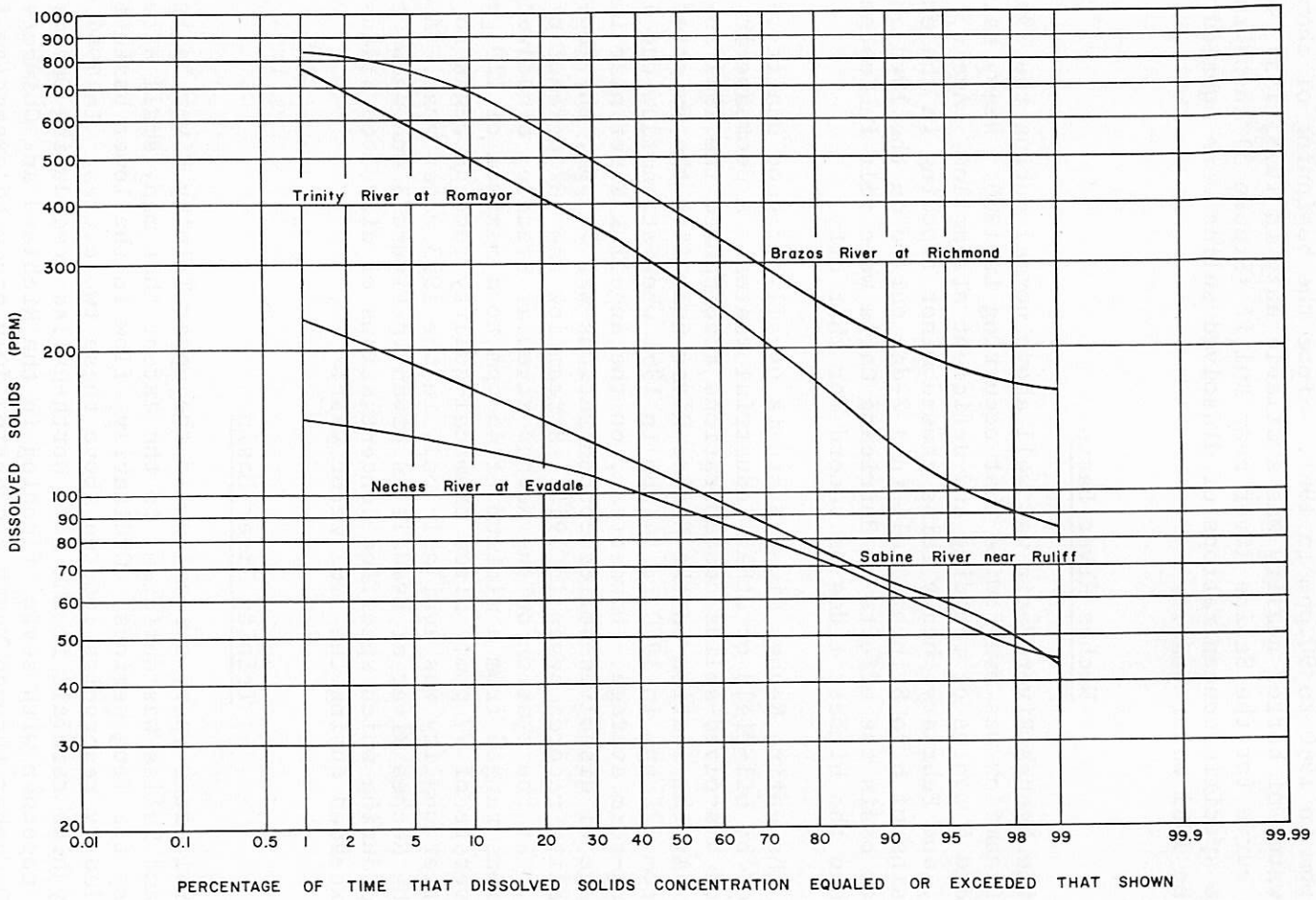

Figure 3

Duration Curves for Dissolved Solids for Four Selected Stations, 1961 Water Year

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divert considerable water for municipal supply and return about 60 percent of it as sewage effluent, samples of low flow taken at Rosser in past years have shown nitrate concentrations in excess of 100 ppm. In 1961, however, nitrate concentrations ranged only from 0.2 ppm to 51 ppm with a weighted average of 9.0 ppm. The weighted average of dissolved-solids concentrations was 328 ppm.

A new sampling station was placed in operation in September 1961 on Chambers Creek near Corsicana.

Downstream, at the station on the Trinity River at Romayor, average discharge was 10,440 cfs as compared with the 1960 average of 6,621 cfs and the 37-year average of 7,450 cfs. The minimum dissolved-solids concentration was 83 ppm, the maximum was 665 ppm, and the weighted average was 185 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 1961 water year is given in Figure 3.

Brazos River Basin

Rainfall and streamflow in the Brazos River Basin were generally excessive during the 1961 water year, and in most streams throughout the basin water of better quality was available than in the 1960 water year.

Streamflow of the Double Mountain Fork Brazos River near Aspermont during 1961 was 215 percent of the long-term average and 267 percent of the 1960 mean discharge. The weighted average of dissolved-solids concentrations, however, increased from 977 ppm in 1960 to 1,180 ppm in 1961. Over 35 percent of the year's total flow occurred during a 2-day period in October as a result of heavy rainstorms in the area. At the station near Aspermont on the Salt Fork Brazos River, almost 35 percent of the year's total discharge also occurred during the same 2-day period. For the year, flow was 164 percent of the long-term average, and the weighted average of dissolved-solids concentrations decreased from 5,660 ppm in 1960 to 5,030 ppm in 1961.

Streamflow of the Brazos River at Seymour, downstream from the junction of the Double Mountain and Salt Forks of the Brazos River, was 183 percent of the long-term average flow. This excessive discharge and the improved quality of the water contributed by the Salt Fork Brazos River resulted in a decrease in the weighted average of dissolved-solids concentrations from 2,510 ppm in 1960 to 2,270 ppm in 1961. At the station on Hubbard Creek near Breckenridge, dissolved-solids concentrations ranged from 112 ppm to 2,220 ppm with a weighted average of 300 ppm.

Inflow to Possum Kingdom Reservoir in 1961 was well above the long-term average and outflow was 188 percent of that in 1960. However, the weighted average of dissolved-solids concentrations in the water released from the reservoir increased from 1,400 ppm to 1,800 ppm, the highest in the 19 years of chemical-quality records. Increases in discharge and in dissolved-solids concentrations also were characteristic of the water released from Lake Whitney, although the Lake Whitney water is generally of better quality than that stored in Possum Kingdom Reservoir.

Three new sampling stations in the Brazos River Basin were placed in operation in August and September 1961. They were Lampasas River at Youngsport, Brazos River at State Highway 21 near Bryan, and Yegua Creek near Somerville.

Water discharge of the Brazos River at Richmond for the 1961 water year was more than twice the average for the 41-year period of record and 182 percent of the 1960 average. Flood flows occurred in several months during the year. In September heavy rains occurring to the east of the center of Hurricane Carla caused some flooding. The weighted average of dissolved-solids concentrations was 312 ppm with concentrations ranging from 159 ppm to 837 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 1961 water year is given in Figure 3.

Colorado River Basin

Streamflow for the 1961 water year was near average in the upper Colorado River Basin, deficient in the middle portion of the basin, and excessive in the coastal section. Flash floods and major rises occurred in the upper Colorado River Basin in October, June, and July owing to heavy rains in the area. On October 19, Lake J. B. Thomas began to spill for the first time since construction was completed in September 1952. It spilled again in July. Downstream from Lake J. B. Thomas on the Colorado River near Ira, the weighted average of dissolved-solids concentrations was 660 ppm, a considerable decrease from the 3,930 ppm of 1960 and the 4,990 ppm of 1959. Streamflow of the Colorado River at Colorado City was six times that of 1960, but only 114 percent of the long-time average; the weighted average of dissolved-solids concentrations decreased from 2,570 ppm in 1960 to 1,010 ppm in 1961.

Beals Creek is less mineralized than the upstream part of the Colorado River; at Westbrook the dissolved-solids concentrations ranged from 170 ppm to 6,780 ppm with a weighted average of 481 ppm. Downstream from Beals Creek on the Colorado River near Silver, streamflow for the year was 313 percent of that for 1960 and the weighted average of dissolved-solids concentrations decreased from 1,000 ppm to 653 ppm.

The station on the Colorado River near San Saba measures inflow to Lake Buchanan, the uppermost of the six Highland lakes. During 14 years of chemical-quality records, the weighted average of dissolved-solids concentrations has ranged from 184 ppm to 380 ppm. For 1961 the weighted average was 357 ppm.

The station at Austin measures the chemical quality of water that has been thoroughly mixed by passage through the six Highland lakes. It has been observed that only gradual changes occur. Water discharge for the 1961 water year was almost equal to the 63-year average; dissolved-solids concentrations ranged from 258 ppm to 297 ppm with a weighted average of 276 ppm.

Streamflow below Austin is ordinarily maintained by releases from the Highland lakes. In the 1961 water year, however, rainfall was heavy in the lower basin and streamflow of the Colorado River at Wharton was 177 percent of the long-term average. Any inflow from tributary streams is of the same good quality as that released from the lakes so there is little significant change in the

chemical composition. The weighted average of dissolved-solids concentrations was 223 ppm, only slightly less than the 231 ppm of 1960.

Lavaca River Basin

The only station in operation in the Lavaca River Basin during the 1961 water year was near Ganado on the Navidad River. This was only the second year of chemical-quality record, but there are 22 years of streamflow records. Streamflow for the year was 185 percent of that in 1960 and almost three times the long-term average mainly owing to heavy rains occurring in October and February and the rains accompanying Hurricane Carla in September. There were no record-breaking floods caused by the hurricane because the rains were of low intensity and fell over a 3-day period. Dissolved-solids concentrations at Ganado ranged from 44 ppm to 490 ppm with a weighted average of 107 ppm.

Guadalupe River Basin

The Guadalupe River heads in the Edwards Plateau and flows southeasterly across the Balcones fault zone. A relatively high base flow is maintained by natural springs in the drainage area. Streamflow of the Guadalupe River at Victoria was more than twice the 26-year average, mainly owing to heavy local rains in October and June. October was the wettest month in Victoria's history with 17.25 inches of rain. Again in June rains of 3 to 9 inches fell in the lower basin.

Water in the Guadalupe River is of the calcium bicarbonate type and is almost always of good quality. During the 1961 water year dissolved-solids concentrations ranged from 100 ppm to 416 ppm with a weighted average of 258 ppm. Water of better average quality was available only in 1957 when drouth-breaking rains occurred.

San Antonio River Basin

The San Antonio River flows roughly parallel to the Guadalupe River and the two streams intersect a few miles upstream from the mouth of the Guadalupe River. Heavy rains caused flash floods and major rises in the San Antonio River Basin in October, but by June the need for moisture was critical after an extremely dry March through May period. There were other flood periods in June and July; average streamflow for the year was excessive.

Dissolved-solids concentrations of the San Antonio River at Goliad ranged from 85 ppm to 725 ppm. The weighted average for 1961 was 347 ppm compared with the 460 ppm of 1960.

San Antonio-Nueces Coastal Area

In September 1961 a new sampling station was placed in operation on the Mission River at Refugio. Twenty-two years of streamflow records are available for this station; streamflow for the 1961 water year was 198 cfs which is almost 250 percent of the long-term average. However, sampling was during a 2-week

period of low flow and the water had high concentrations of sodium and chloride probably because of oil-field drainage.

Nueces River Basin

Rainfall in the Nueces River Basin was well above average during the 1961 water year. The only sampling station in the basin, Nueces River near Mathis, measures the quality of the water released from Lake Corpus Christi. Storage in the reservoir was at or above spillway level from October 17 through March 20, and during at least a part of every other month during the year except May and September. At the end of the water year the storage in the lake was 169,600 acre-feet, or about 90 percent of capacity. Mean discharge for the year was 98 percent of the long-term average.

Past records indicate that considerable variation in chemical quality occurs at upstream points in the Nueces River Basin, but mixing of flood flows in Lake Corpus Christi results in water that is always of good quality. The weighted averages for the 14 years of chemical-quality record have ranged from 208 ppm to 343 ppm. The weighted average for the 1961 water year was 266 ppm.

Rio Grande Basin

During the 1961 water year streamflow in the Rio Grande Basin was deficient although it was greater than during the 1960 water year. Discharge of the Pecos River below Red Bluff Dam near Orla was only about 50 percent of the 24-year average, but about twice as great as in 1960. Storage in Red Bluff Reservoir increased for the first 5 months of the water year from 85,400 acre-feet to 131,800 acre-feet, but decreased during the remainder of the year to 50,000 acre-feet. The quality of the stored water, although always moderately saline, was better than for the previous year. The weighted average of dissolved-solids concentrations decreased from 7,710 ppm in 1960 to 6,270 ppm in 1961. Downstream on the Pecos River near Girvin, the water was more saline, with a weighted average of 12,600 ppm.

With near-normal rainfall in the lower Rio Grande Basin, the quality of the water remained at about the same level as in 1960. The range is dissolved-solids concentrations of the outflow from Falcon Reservoir was from 503 ppm to 596 ppm in the 1960 water year and from 509 ppm to 575 ppm in the 1961 water year.

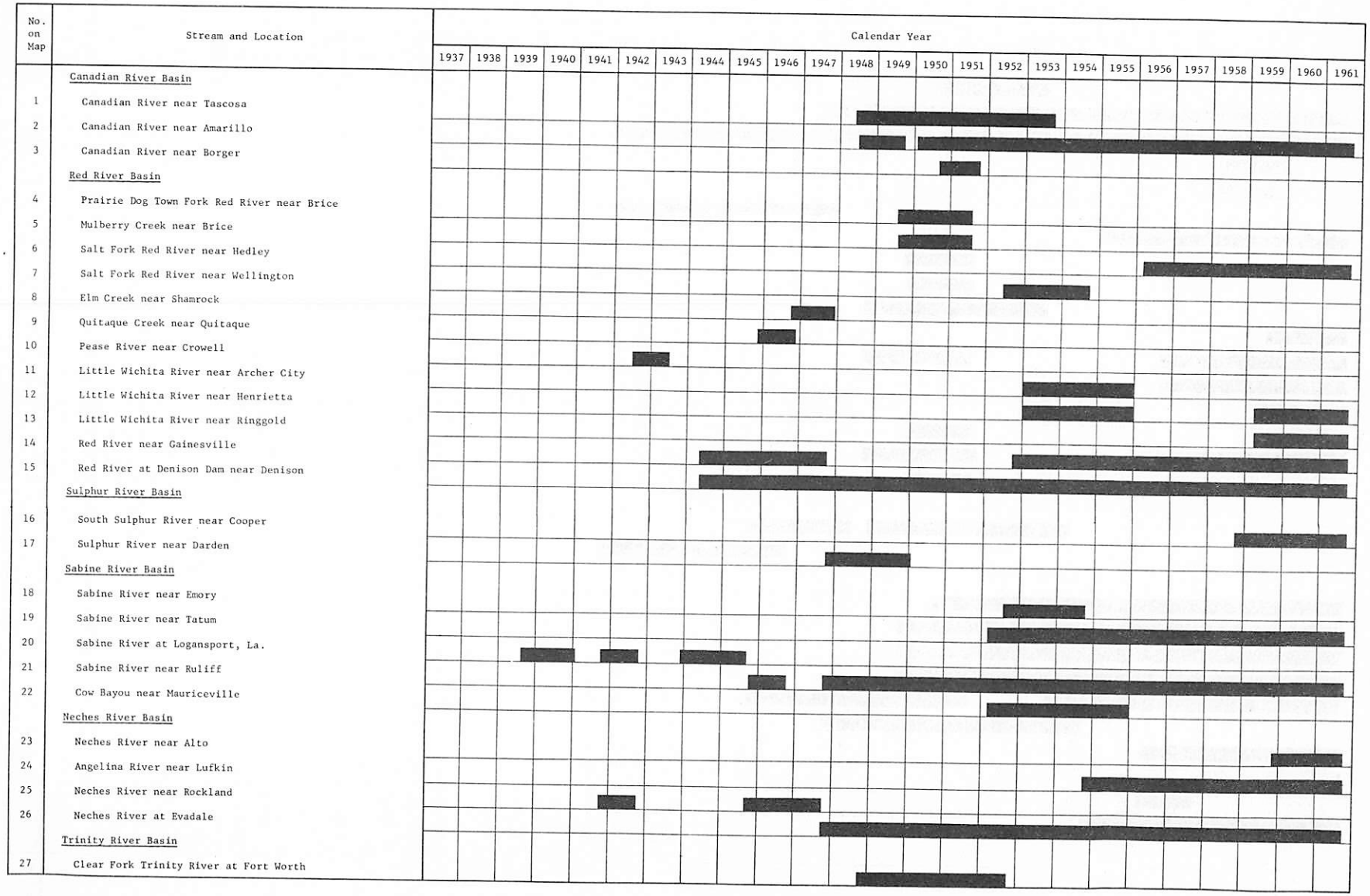


Figure 4.– Periods of operation of quality-of-water sampling stations in Texas — Continued

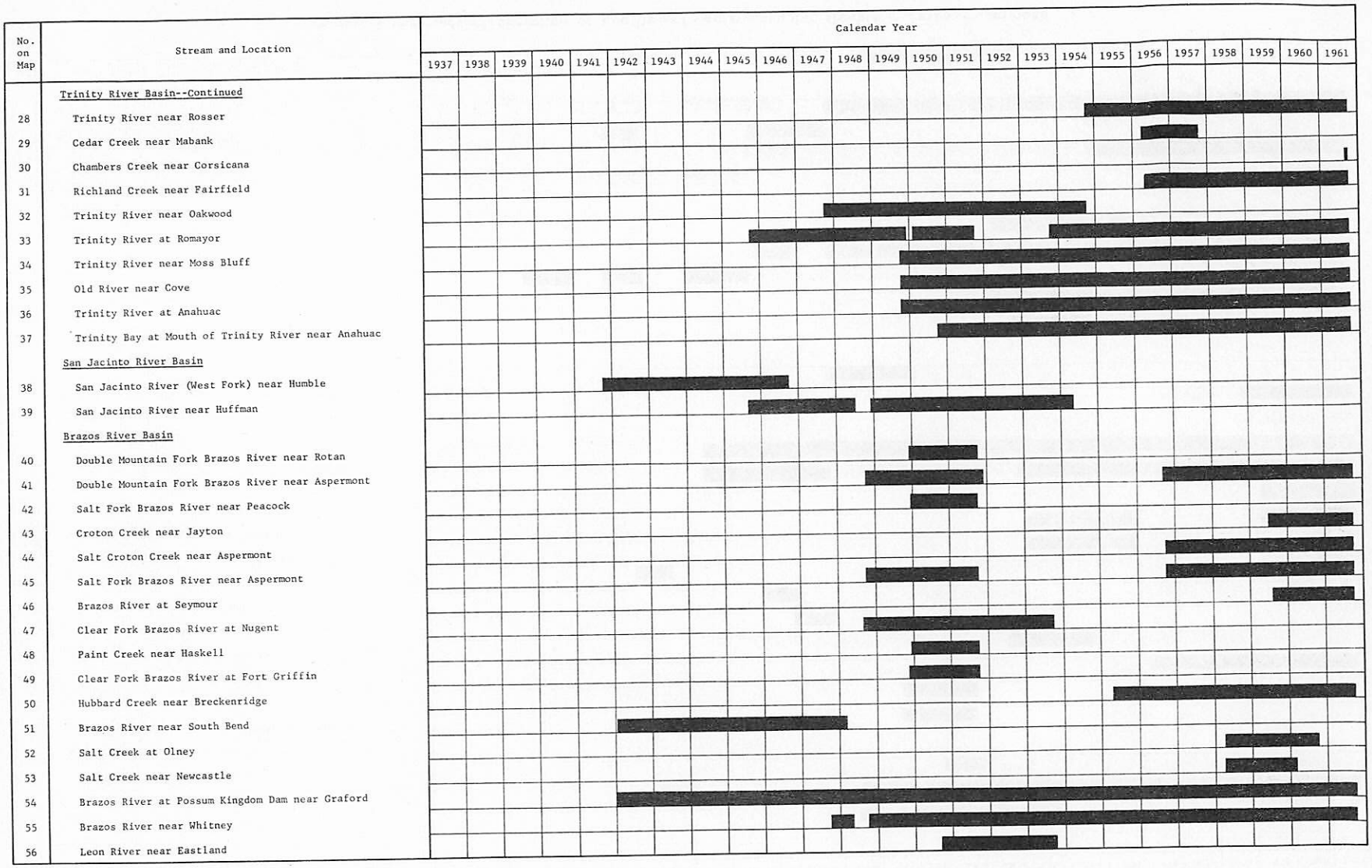


Figure 4.- Periods of operation of quality-of-water sampling stations in Texas — Continued

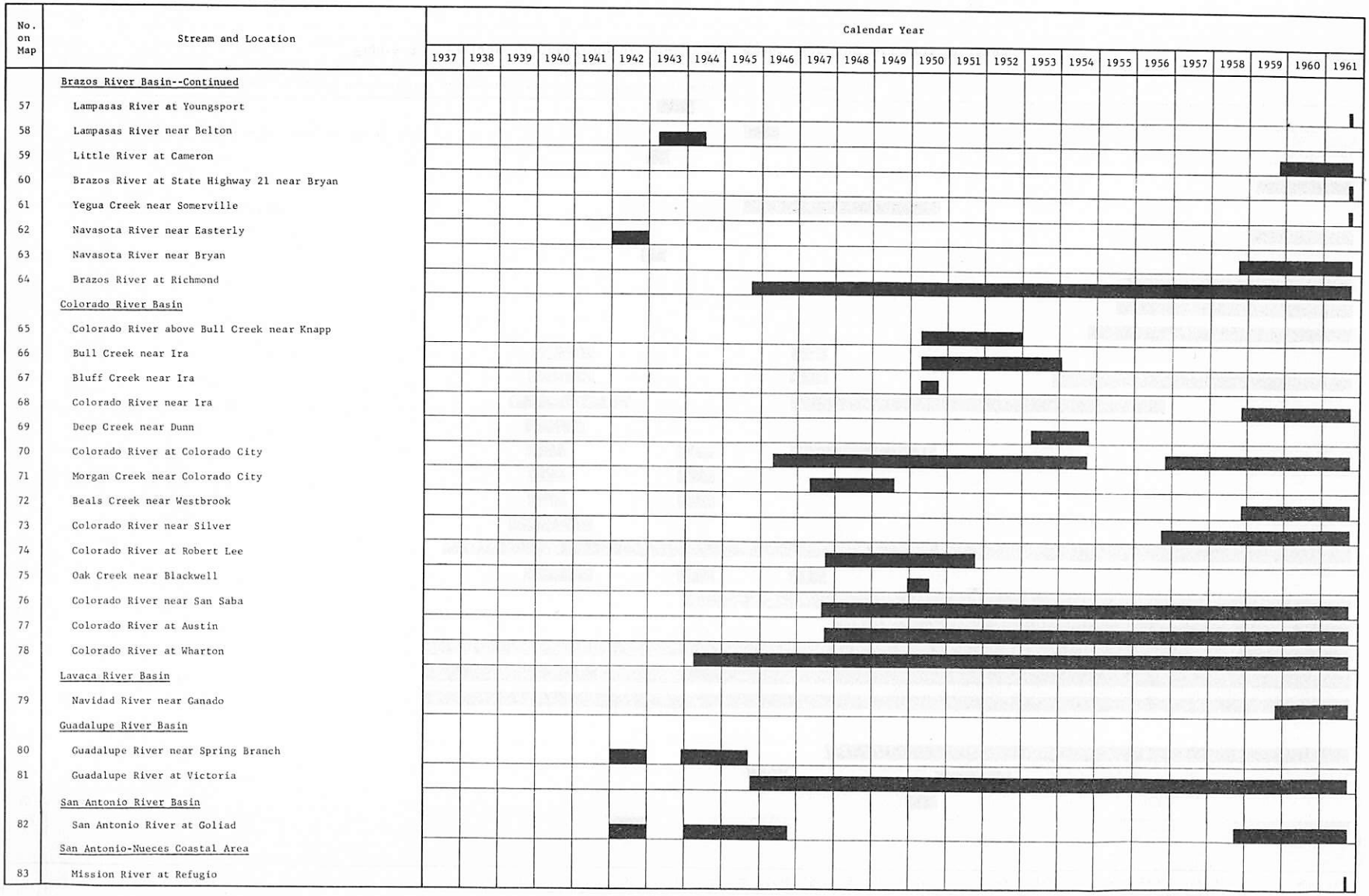
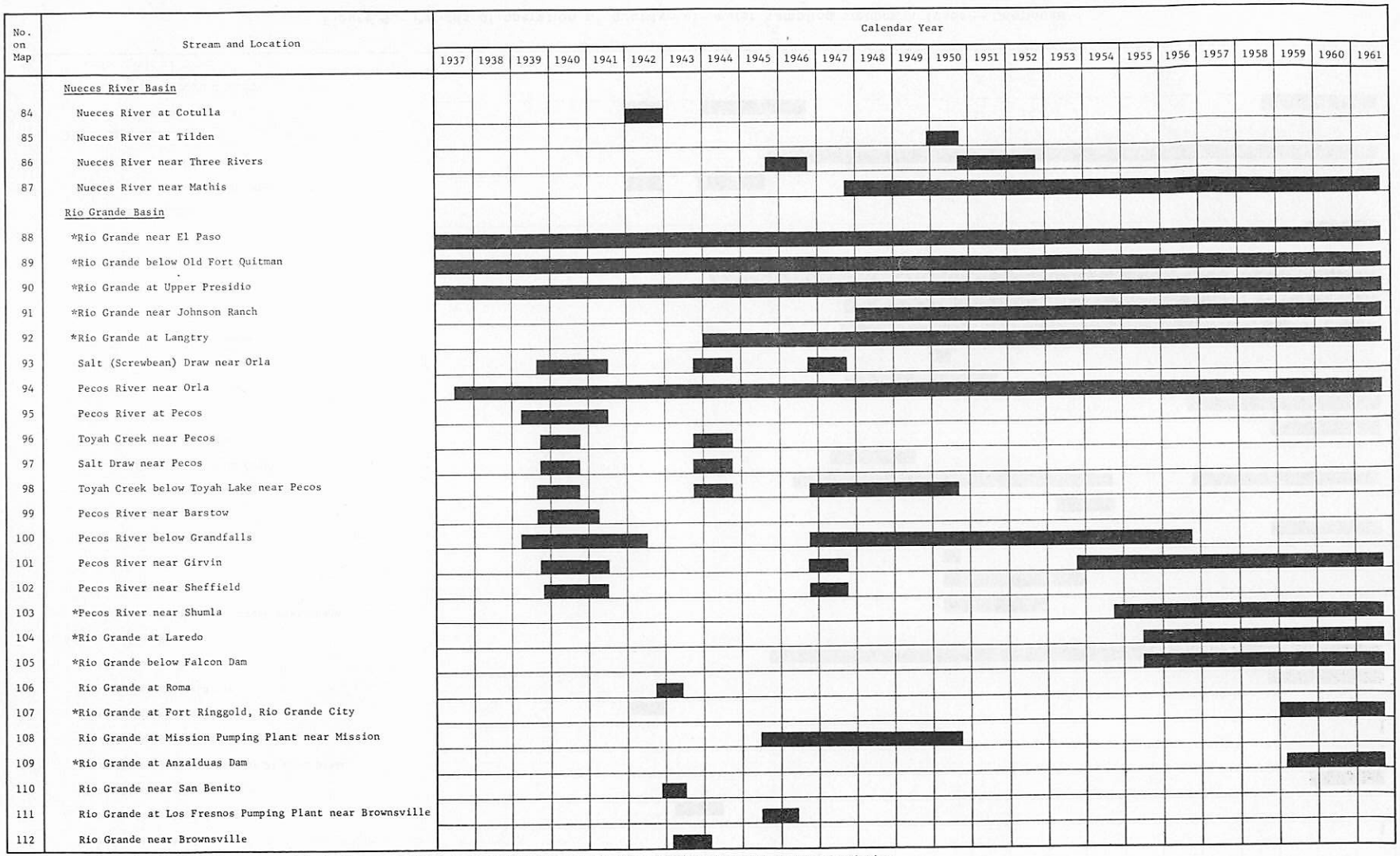


Figure 4.– Periods of operation of quality-of-water sampling stations in Texas — Continued



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

Figure 4. – Periods of operation of quality-of-water sampling stations in Texas

TABLES OF ANALYSES

On the following pages, the number preceding a station name is permanently assigned to the station by the U. S. Geological Survey and identifies the station in the national network.

The heading "Chemical analyses, in parts per million, water year October 1960 to September 1961" has been used throughout the following tables. These tables have been prepared utilizing pre-printed 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 and which do not, in some cases, constitute chemical analyses. 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 [Brazos 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 Co. bridge, and 19 miles north of Amarillo, Potter County.
DRAINAGE AREA.--19,445 square miles, of which 4,069 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: July 1948 to October 1949, February 1950 to September 1961.
Water temperatures: August 1949 to September 1961.
Sediment records: August 1949 to September 1952.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,670 ppm Jan. 21-31; minimum, 317 ppm Aug. 19.
Hardness: Maximum, 506 ppm Jan. 21-31; minimum, 62 ppm Aug. 19.
Specific conductance: Maximum daily, 2,960 micromhos Jan. 27; minimum daily, 473 micromhos Aug. 19.
Water temperatures: Maximum, 73°F July 17, Aug. 11, 18; minimum, freezing point on many days during winter months.
EXTREMES, 1948-61.--Dissolved solids: Maximum, 3,000 ppm Mar. 21, 1957; minimum, 252 ppm Sept. 21-30, 1957.
Hardness: Maximum, 974 ppm Mar. 21, 1957; minimum, 62 ppm Aug. 19, 1961.
Specific conductance: Maximum daily, 4,490 micromhos Mar. 21, 1957; minimum daily, 359 micromhos July 6, 1958.
Water temperatures (1949-61): 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 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as CaCO3: Calcium, magnesium	Hardness as CaCO3: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-15, 1960	88.1	22		83	33	303		220	306	345	0.9	16		1,220	1.66	290	342	162	66	7.1	2,010	7.0
Oct. 16-17, 21-25	671	12		36	13	141		180	132	114	.6	3.0		551	.75	998	144	0	68	5.1	918	7.5
Oct. 18-20	5,513	12		22	7.7	94		166	76	51	.5	2.2		a347	.47	5,170	86	0	70	4.4	584	7.7
Oct. 26-31	287	16		68	25	207		220	237	202	.7	9.3		887	1.21	687	272	92	62	5.5	1,440	7.3
Nov. 1-10	71.4	22		88	34	327		253	328	360	.8	14		1,300	1.77	251	360	152	66	7.5	2,120	7.3
Nov. 11-20	46.5	26		94	38	368		288	348	415	1.1	5.7		1,440	1.96	181	391	155	67	8.1	2,370	7.3
Nov. 21-30	44.0	27		101	39	395		302	382	442	1.0	.0		1,540	2.09	183	412	165	68	8.5	2,490	7.4
Dec. 1-11	78.0	23		100	39	383		255	384	440	1.0	14		1,510	2.05	318	410	201	67	8.2	2,470	7.2
Dec. 12-20	342	16		80	31	302		270	320	298	.9	8.0		1,190	1.62	1,100	327	106	67	7.2	1,970	7.6
Dec. 21-31	150	18		88	32	314		280	344	308	.9	12		1,250	1.70	506	351	122	66	7.3	2,040	7.2
Jan. 1-10, 1961	93.3	21		100	38	335		286	376	350	.9	15		1,380	1.88	348	406	172	64	7.2	2,220	7.3
Jan. 11-20	64.9	22		102	41	349		280	382	382	1.0	16		1,430	1.94	251	423	194	64	7.4	2,320	7.2
Jan. 21-31	44.1	24		122	49	402		309	442	460	1.0	20		1,670	2.27	199	506	253	63	7.8	2,660	6.9
Feb. 1-9	89.7	20		104	41	365		279	382	412	.9	14		1,480	2.01	358	428	200	65	7.7	2,390	7.6
Feb. 10-20	49.5	19		92	36	326		257	368	340	.9	13		1,320	1.80	176	378	167	65	7.3	2,140	7.4
Feb. 21-22	357	17		74	30	245		224	328	220	.7	5.3		1,030	1.40	993	308	124	63	6.1	1,650	8.1
Feb. 23-28	529	12		70	28	165		196	280	135	.6	4.5		818	1.11	1,170	290	129	55	4.2	1,270	7.6
Mar. 1-10	318	15		80	33	166		202	299	150	.6	8.1		895	1.22	768	335	170	52	4.0	1,380	7.5
Mar. 11-20	397	14		84	32	190		210	298	188	.6	6.1		959	1.30	1,030	341	169	55	4.5	1,500	7.2
Mar. 21-25, 27-31	476	14		66	26	210		229	273	178	.8	5.6		900	1.22	1,160	272	84	63	5.5	1,440	7.5
Mar. 26	575	--		--	--	--		219	--	100	--	--		--	--	--	193	14	--	--	985	7.6
Apr. 1-10	209	19		80	33	243		250	296	242	1.0	9.3		1,050	1.43	593	335	130	61	5.8	1,710	7.0
Apr. 11-20	218	19		82	34	272		251	356	248	.9	8.6		1,140	1.55	671	344	139	63	6.4	1,840	7.1
Apr. 21-30	207	16		86	34	218		218	364	188	.8	5.7		1,020	1.39	570	354	176	57	5.0	1,600	7.0
May 1-14	180	18		88	38	237		218	392	210	.8	7.8		1,100	1.50	535	376	198	58	5.3	1,740	7.7
May 15-30	47.9	25		90	44	287		222	408	295	1.0	5.6		1,260	1.71	163	406	224	61	6.2	2,080	6.9
May 31	323	--		46	16	--		245	68	46	--	--		--	--	--	181	0	--	--	581	7.0
June 1-3	23.9	32		47	18	85		190	94	78	1.2	12		493	.67	31.8	192	36	49	2.7	791	6.8
June 4-13	57.5	31		80	35	262		210	338	265	1.0	16		1,130	1.54	175	344	172	62	6.1	1,820	7.7
June 14-17	16.5	40		58	28	140		274	109	130	1.8	46		732	1.00	32.6	260	35	64	3.8	1,200	6.8
June 18-30	124	29		65	30	279		220	334	250	1.0	11		1,110	1.51	372	286	105	68	7.2	1,780	6.6
July 1-4, 11	381	34		77	28	213		245	220	222	1.4	28		978	1.33	1,010	307	106	60	5.3	1,550	7.0
July 5-10	537	36		58	21	129		247	115	110	1.5	39		661	.90	958	231	28	55	3.7	1,070	7.2
July 12, 15	2,255	22		28	10	77		171	61	51	.8	1.2		a335	.46	2,040	111	0	60	3.2	560	7.7
July 13-14, 16-31	393	20		45	17	187		211	202	140	1.0	5.4		734	1.00	779	182	10	69	6.0	1,190	7.3
Aug. 1-13	72.7	39		74	28	188		248	203	185	1.8	35		920	1.25	181	300	96	58	4.7	1,420	6.7
Aug. 14-18	973	15		38	14	154		174	177	111	.8	2.8		a599	.81	1,570	152	10	69	5.4	980	7.5
Aug. 19	1,500	--		--	--	110		166	57	31	.6	3.0		317	.43	1,280	62	0	79	6.1	473	7.8
Aug. 20-24	210	18		48	16	172		196	219	117	1.1	5.8		708	.96	401	186	26	67	5.5	1,130	7.4
Aug. 25-31	86.1	22		70	25	232		210	280	212	1.3	14		976	1.33	227	272	100	65	6.1	1,490	7.1
Sept. 1-10	512	16		60	22	160		184	265	109	.8	5.6		782	1.06	1,080	240	89	59	4.5	1,170	7.6
Sept. 11-20	523	17		49	19	158		188	227	104	.9	5.7		693	.94	979	200	46	63	4.9	1,080	7.5
Sept. 21-30	517	14		60	23	143		182	248	101	.8	3.8		748	1.02	1,040	244	95	56	4.0	1,090	7.6
Weighted average	287	17		57	22	180		206	221	153	0.8	7.5		776	1.06	601	232	64	63	5.1	1,240	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN CANADIAN RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
EAST AMARILLO CREEK NEAR AMARILLO[1]																						
Oct. 31, 1960	14.3	48		58	32	157		387	73	121	2.3	59		740	1.01		276	0	55	4.1	1,160	6.8
Dec. 28	11.0	57		53	30	161		492	79	80	2.9	.5		705	.96		256	0	58	4.4	1,160	7.5
Jan. 30, 1961	14.2	50		54	28	181		570	39	90	2.7	.5		725	.99		250	0	61	5.0	1,210	7.4
Feb. 28	13.2	57		58	27	105		292	80	80	2.4	51		604	.82		256	16	47	2.9	1,130	7.2
Apr. 14	17.6	64		53	28	122		322	69	103	2.3	31		630	.86		247	0	52	3.4	976	7.9
May 1	13.9	70		47	33	121		268	80	93	2.2	93		671	.91		253	34	51	3.3	1,000	8.0
June 7	25.6	38		47	20	77		206	50	72	1.6	50		457	.62		200	30	46	2.4	756	7.9
July 3	15.8	41		53	22	90		254	60	69	2.0	56		518	.70		222	14	47	2.6	819	7.6

[1] Part of the flow of East Amarillo Creek is effluent from a sewage treatment plant.

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 July 1961.
Water temperatures: March 1956 to July 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 968 ppm June 26-29, July 6; minimum, 347 ppm Oct. 10-16.
Hardness: Maximum, 447 ppm May 19-24; minimum, 174 ppm Oct. 10-16.
Specific conductance: Maximum daily, 1,780 micromhos Jan. 25; minimum daily, 519 micromhos Oct. 10.
Water temperatures: Maximum, 95°F May 22; minimum, freezing point Jan. 10, 25-27, Feb. 2.
EXTREMES, 1956-61.--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, 373 micromhos June 7-8, 1960.
Water temperatures: Maximum, 97°F June 2, 1960; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station. No flow during much of the period.

Chemical analyses, in parts per million, October 1960 to July 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-7, 1960		35		89	35	126		118	339	132	0.8	2.0		841	1.14		366	270	43	2.9	1,230	7.7
Oct. 8-9, 17-23		28		92	29	110		158	288	110	.6	1.2		751	1.02		348	219	41	2.6	1,120	7.7
Oct. 10-16		19		50	12	49		135	90	52	.6	2.8		347	.47		174	64	38	1.6	565	7.6
Oct. 24-26, 29		34		90	29	110		152	284	114	.5	1.2		788	1.07		344	219	41	2.6	1,130	7.6
Nov. 1		40		81	28	122		164	244	135	.6	1.8		754	1.03		317	182	46	3.0	1,140	7.8
Dec. 29		28		90	30	135		189	256	152	.7	3.2		829	1.13		348	193	46	3.1	1,280	7.7
Jan. 1-10, 1961		24		104	32	131		202	276	156	.6	1.8		865	1.18		391	226	42	2.9	1,310	7.6
Jan. 11-20		25		92	30	128		186	264	142	.7	2.0		820	1.12		353	200	44	3.0	1,220	7.6
Jan. 21-28, 30-31		25		108	34	134		208	300	152	.7	1.8		893	1.21		410	239	42	2.9	1,330	7.6
Feb. 1		--		--	--	--		147	--	109	--	--		--	--		252	132	--	--	948	7.9
Feb. 2-7		27		89	37	133		144	316	151	.8	1.5		893	1.21		374	256	44	3.0	1,300	7.8
Feb. 8-11		26		71	27	114		152	224	124	.7	2.2		698	.95		288	164	46	2.9	1,050	7.9
Feb. 12-20		31		81	34	130		160	270	148	.8	2.5		831	1.13		342	211	45	3.1	1,230	7.7
Feb. 21-28		30		79	34	131		155	274	146	.8	2.2		828	1.13		337	210	46	3.1	1,220	7.8
Mar. 1-10		32		91	40	144		176	332	149	.7	4.5		893	1.21		392	248	44	3.2	1,310	7.6
Mar. 11-20		29		94	38	122		188	294	135	.8	4.5		845	1.15		391	237	40	2.7	1,260	7.8
Mar. 21-31		29		84	35	132		178	284	137	.7	4.2		805	1.09		354	208	45	3.0	1,220	7.7
Apr. 1, 11		58		60	35	132		114	272	142	.8	2.2		a758	1.03		294	200	49	3.4	1,150	7.7
May 19-24		49		100	48	129		78	460	128	1.0	.8		a954	1.30		447	383	38	2.7	1,380	7.6
June 3-8		44		74	29	109		108	264	122	.9	1.8		742	1.01		304	215	44	2.7	1,080	7.7
June 9-14		43		91	43	153		81	412	169	.8	.5		a952	1.29		404	338	45	3.3	1,410	7.5
June 15-20		32		73	22	92		151	192	102	.8	2.8		629	.86		272	149	42	2.4	931	7.8
June 26-29, July 6		46		92	39	143		78	380	169	.8	.5		968	1.32		390	326	44	3.1	1,370	7.5

a Calculated from determined constituents.

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 1959 to September 1961.
Water temperatures: December 1952 to January 1956, March 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 2,440 ppm June 1-8; minimum, 59 ppm Oct. 15-16.
Hardness: Maximum, 666 ppm June 1-8; minimum, 29 ppm Oct. 15-16.
Specific conductance: Maximum daily, 5,050 micromhos May 31; minimum daily, 66 micromhos Oct. 15.
EXTREMES, 1952-56, 1959-61.--Dissolved solids: Maximum, 4,120 ppm June 2, 1960; minimum, 57 ppm May 19, 1955.
Hardness: Maximum, 1,060 ppm June 2, 1960; minimum, 25 ppm Feb. 20, 1955.
Specific conductance: Maximum daily, 7,520 micromhos June 2, 1960; minimum daily, 66 micromhos Oct. 15, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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): Parts per million	Dissolved solids (calculated): Tons per acre-foot	Dissolved solids (calculated): Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-14, 1960	a1.21	--		--	--	--		107	--	140	--	--		--	--	--	100	12	--	--	645	7.6
Oct. 15-16	789	7.3		6.8	2.9	8.8		34	4.0	9.2	0.3	2.8		59	0.08	126	29	1	40	0.7	104	6.6
Oct. 17-19	429	9.4		9.8	3.1	14		48	5.2	15	.3	1.8		83	.11	96.1	37	0	45	1.0	146	6.6
Oct. 20-25	260	10		21	5.5	53		88	6.4	78	.3	1.8		b232	.32	163	75	3	61	2.7	411	7.4
Oct. 26	336	16		12	3.4	14		62	4.2	12	.3	1.2		93	.13	84.4	44	0	40	.9	154	7.2
Oct. 27-31	176	11		22	6.4	58		83	9.2	90	.2	1.5		b257	.35	122	81	13	61	2.8	446	7.0
Nov. 1-15	5.64	15		26	7.3	61		92	7.4	102	.3	1.0		b280	.38	4.26	95	19	58	2.7	504	7.4
Nov. 16-30	a .07	--		--	--	--		104	--	105	--	--		--	--	--	101	16	--	--	533	7.3
Dec. 1-6	0	12		28	8.1	66		103	7.2	108	.3	1.0		b306	.42	--	103	19	58	2.8	540	7.3
Dec. 7, 10	148	9.9		18	6.0	44		80	6.0	64	.3	2.2		189	.26	75.5	70	4	58	2.3	359	7.5
Dec. 8, 11	312	8.1		12	4.0	23		55	5.2	31	.4	2.2		113	.15	95.2	46	1	52	1.5	214	7.0
Dec. 9	299	9.5		36	11	142		74	9.8	262	.4	4.5		511	.69	413	135	74	70	5.3	1,000	7.1
Dec. 12-20	164	11		19	6.1	48		64	6.6	82	.3	2.5		206	.28	91.2	72	20	59	2.5	400	7.1
Dec. 21-31	2.54	--		--	--	--		74	--	80	--	--		--	--	--	76	15	--	--	405	7.0
Jan. 1-9, 1961	16.5	12		26	7.3	61		90	7.8	102	.2	2.2		262	.36	11.7	95	21	58	2.7	495	7.9
Jan. 10	95.0	9.6		16	3.5	29		62	6.2	40	.3	2.8		137	.19	35.1	54	4	53	1.7	246	7.6
Jan. 11-20	14.9	9.4		30	9.4	84		90	9.0	148	.3	2.8		337	.46	13.6	114	40	62	3.4	649	7.8
Jan. 21-31	a .43	8.8		28	8.7	73		107	8.2	118	.4	1.5		300	.41	.35	106	18	60	3.1	569	7.9
Feb. 1-6	a .30	8.6		28	8.4	67		106	8.0	109	.3	1.2		282	.38	.23	104	18	58	2.9	535	7.7
Feb. 7-8, 12-14	78.2	9.0		35	9.2	100		88	9.6	182	.3	2.8		391	.53	82.6	126	54	63	3.9	768	7.4
Feb. 9-11	126	9.7		44	12	137		74	11	270	.3	3.8		524	.71	178	160	99	65	4.7	1,040	7.5
Feb. 15-28	2.61	11		32	8.6	86		90	10	152	.3	2.8		347	.47	2.45	116	42	62	3.5	666	7.5
Mar. 1-10	0	--		--	--	--		97	--	157	--	--		--	--	--	121	42	--	--	699	7.1
Mar. 11-15	0	--		--	--	--		104	--	158	--	--		--	--	--	125	40	--	--	720	7.2
Mar. 16-25	102	9.5		32	8.2	91		88	8.2	162	.4	2.2		356	.48	98.0	114	42	64	3.7	695	7.0
Mar. 26-29	17.2	10		25	6.6	62		83	7.8	104	.4	2.0		259	.35	12.0	90	22	60	2.8	506	6.9
Mar. 30-31	90.0	9.9		19	4.8	40		74	6.8	60	.4	2.0		179	.24	43.5	67	6	57	2.1	341	7.0
Apr. 1	201	11		30	8.0	74		85	15	130	--	--		310	.42	168	108	38	60	3.1	584	6.9
Apr. 2-3	92.5	11		39	12	127		70	10	250	.3	1.0		484	.66	121	147	90	65	4.6	983	6.9
Apr. 4-6	20.3	12		28	8.6	89		86	10	154	.3	.8		344	.47	18.9	106	35	65	3.8	675	6.7
Apr. 7-15	a .77	10		34	10	103		91	10	186	.3	1.0		399	.54	.83	126	52	64	4.0	789	6.6
Apr. 16-30	0	12		38	11	107		111	11	190	.3	.8		425	.58	--	140	49	62	3.9	832	7.1

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

3150. LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1-4, 7-9, 1961	24.7	9.2		18	5.4	32		92	8.6	31	0.6	1.8		149	0.20	9.94	67	0	49	1.5	262	7.8
May 5-6	3.55	9.0		31	9.1	73		114	10	118	.2	2.2		308	.42	2.95	115	22	58	3.0	587	7.7
May 10-26	a .46	8.8		54	15	140		136	13	265	.4	1.2		564	.77	.70	196	84	61	4.4	1,090	7.7
May 27	2.70	--		82	23	--		152	--	490	--	--		--	--	--	299	174	--	--	1,780	7.6
May 28-31	.25	--		160	47	--		116	--	1,170	--	--		--	--	--	592	498	--	--	3,850	7.0
June 1-8	a .50	--		--	--	--		94	--	1,450	--	--		2,440	3.32	3.29	666	589	--	--	4,590	7.0
June 9-15	17.9	5.7		108	37	483		104	17	970	.5	1.2		1,670	2.27	80.7	422	336	71	10	3,220	7.1
June 16	108	--		--	--	--		71	--	455	--	--		--	--	--	208	150	--	--	1,600	7.0
June 17-24	86.6	7.9		26	7.9	92		76	8.0	158	.3	2.2		339	.46	79.3	98	35	67	4.0	651	7.3
June 25, 28-30	141	8.3		25	7.5	66		68	8.0	122	.3	1.2		270	.37	103	94	38	60	3.0	526	6.8
June 26-27	1,130	6.3		10	3.2	16		42	2.8	24	.2	1.2		85	.12	259	38	4	48	1.1	159	6.8
July 1-10	1.99	13		30	8.8	91		84	9.2	162	.3	1.8		357	.49	1.92	111	42	64	3.8	680	7.1
July 11	126	12		74	21	306		114	17	580	.6	6.9		1,070	1.46	364	271	178	71	8.1	2,030	7.5
July 12-18	35.8	12		28	8.4	104		112	8.4	160	.5	2.8		b399	.54	38.6	104	12	68	4.4	729	7.5
July 19-31	a4.29	11		46	14	188		108	9.2	342	.4	1.5		b726	.99	8.41	172	84	70	6.2	1,290	7.4
Aug. 1-18	0	14		46	13	169		154	10	282	.5	.2		b660	.90	--	168	42	69	5.7	1,170	7.3
Aug. 19, 21-24	13.4	8.9		16	4.6	43		76	6.0	57	.4	1.8		b191	.26	6.91	59	0	61	2.4	325	6.9
Aug. 20	35.0	--		9.2	2.7	19		52	4.6	20	--	--		--	--	--	34	0	55	1.4	171	6.4
Aug. 25-31	0	11		25	6.9	61		114	6.0	87	.4	.2		b267	.36	--	91	0	59	2.8	475	7.0
Sept. 1-4	a1.30	13		26	8.3	66		126	7.0	92	.4	1.8		b294	.40	1.03	99	0	59	2.9	516	7.3
Sept. 5	104	8.5		16	5.2	32		78	4.2	42	.3	2.8		149	.20	41.8	61	0	53	1.8	288	6.5
Sept. 6 (12 p.m.-12 m.)	358	8.6		63	16	255		92	16	480	.5	7.3		891	1.21	861	223	148	71	7.4	1,700	7.4
Sept. 6 (12 m.-12 p.m.), 7-12	86.6	9.6		24	6.6	67		97	6.0	102	.4	2.5		b291	.40	68.0	87	8	63	3.1	512	7.2
Sept. 13	276	9.1		15	3.8	29		73	4.0	35	.3	3.0		135	.18	101	53	0	54	1.7	252	6.9
Sept. 14	662	8.8		31	7.7	95		104	9.2	154	.5	2.8		360	.49	643	109	24	65	4.0	693	7.2
Sept. 15-16	508	11		22	5.6	47		88	4.6	71	.3	3.0		208	.28	285	78	6	57	2.3	398	7.2
Sept. 17-30	a4.71	12		24	5.7	43		96	4.6	65	.3	2.2		204	.28	2.59	85	5	53	2.1	386	6.9
Weighted average	51.4	9.3		22	6.2	59		71	6.6	100	0.3	2.2		243	0.33	33.7	80	22	61	2.9	458	--

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

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 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,340 ppm Oct. 8-15; minimum, 55 ppm Oct. 16-17.
Hardness: Maximum, 316 ppm Oct. 8-15; minimum, 26 ppm Oct. 16-17.
Specific conductance: Maximum daily, 3,120 micromhos June 11; minimum daily, 93 micromhos Oct. 16.
EXTREMES, 1959-61.--Dissolved solids: Maximum, 4,440 ppm June 3, 1960; minimum, 38 ppm Sept. 4, 1959.
Hardness: Maximum, 1,150 ppm June 3, 1960; minimum, 19 ppm Sept. 4, 1959.
Specific conductance: Maximum daily, 7,860 micromhos June 3, 1960; minimum daily, 60 micromhos Sept. 4, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961.

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-4, 1960	18.6	5.2		24	7.1	82		94	7.6	127	0.4	4.0		a323	0.44	16.2	89	12	67	3.8	588	7.1
Oct. 5, 7	13.4	9.0		49	14	236		79	20	430	.5	.5		a876	1.19	31.7	180	116	74	7.6	1,530	6.9
Oct. 6	8.80	--		--	--	--		78	--	185	--	--		--	--	--	86	22	--	--	766	6.8
Oct. 8-15	26.0	6.4		89	23	395		85	18	770	.4	.2		1,340	1.82	94.1	316	247	73	9.7	2,570	6.7
Oct. 16-17	1,046	7.4		6.5	2.4	8.4		32	4.2	8.0	.3	2.2		55	.07	155	26	0	41	.7	99	6.6
Oct. 18-19	558	9.4		11	3.3	22		47	4.2	31	.3	1.2		105	.14	158	41	2	54	1.5	192	6.5
Oct. 20-24	434	10		20	5.7	50		80	6.0	76	.3	1.8		209	.28	245	73	8	60	2.5	390	6.6
Oct. 25-27	623	9.9		12	3.4	20		55	4.4	25	.3	.8		103	.14	173	44	0	49	1.3	185	6.6
Oct. 28-31	163	10		17	4.7	33		70	5.6	48	.4	1.5		154	.21	67.8	62	4	54	1.8	290	7.3
Nov. 1-5	9.36	12		24	6.8	47		81	6.8	81	.3	1.0		219	.30	5.53	88	21	54	2.2	420	7.1
Nov. 6-20	b .42	11		29	8.5	57		98	6.6	101	.3	.2		262	.36	.30	107	27	53	2.4	507	7.2
Nov. 21-30	0	12		34	10	63		131	6.6	105	.2	.2		295	.40	--	126	18	52	2.4	573	6.9
Dec. 1-6	0	13		35	11	63		156	5.6	106	.4	.5		302	.41	--	132	21	51	2.4	581	6.5
Dec. 7-11	289	8.3		17	5.4	39		69	6.6	60	.3	1.2		172	.23	134	65	8	57	2.1	335	6.5
Dec. 12	1,180	7.5		11	3.3	20		50	5.6	24	.4	2.5		99	.13	315	41	0	51	1.4	184	6.8
Dec. 13-31	80.5	9.5		20	5.8	42		74	7.6	67	.3	1.8		190	.26	41.3	74	13	55	2.1	367	6.6
Jan. 1-8, 12, 1961	27.6	11		23	7.0	50		76	8.8	86	.3	2.0		225	.31	16.8	86	24	56	2.3	418	7.3
Jan. 9-11	224	12		17	4.5	30		65	6.4	45	.3	2.0		149	.20	90.1	61	8	52	1.7	264	7.5
Jan. 13-15	20.7	10		37	11	108		69	9.6	215	.3	2.8		428	.58	23.9	138	81	63	4.0	832	7.4
Jan. 16-31	1.95	10		27	7.2	59		83	8.4	104	.3	1.2		258	.35	1.36	97	29	57	2.6	491	7.3
Feb. 1-7	5.69	9.3		29	7.8	58		93	9.2	102	.3	1.2		263	.36	4.04	104	28	55	2.5	502	7.3
Feb. 8-16	92.6	9.7		38	9.8	115		88	13	210	.3	3.5		442	.60	111	136	64	65	4.3	845	7.2
Feb. 17-28	3.96	9.7		34	9.0	86		100	12	150	.3	1.2		351	.48	3.75	122	40	60	3.4	675	7.2
Mar. 1-16	b .17	9.2		35	11	85		118	13	146	.4	.5		358	.49	.16	132	36	58	3.2	695	6.8
Mar. 17-18	28.0	--		44	13	--		80	--	327	--	1.2		--	--	--	164	98	60	3.1	1,320	7.3
Mar. 19-27, 29-30	89.5	8.4		31	8.1	81		90	11	142	.5	1.5		328	.45	79.3	111	37	61	3.3	655	6.9
Mar. 28	26.0	11		51	11	161		92	10	306	.5	2.6		598	.81	42.0	172	96	67	5.3	1,240	7.4
Mar. 31, Apr. 1	520	10		16	5.1	30		65	8.8	44	.2	2.5		149	.20	209	61	8	52	1.7	279	7.4
Apr. 2	241	11		24	8.0	55		75	9.2	99	.2	2.8		246	.33	160	93	31	57	2.5	476	7.2
Apr. 3-5	66.7	10		39	13	116		83	12	228	.2	1.8		461	.63	83.0	151	83	63	4.1	921	7.0
Apr. 6-20	b4.03	11		32	9.9	77		110	12	130	.2	1.8		328	.45	3.57	120	30	58	3.1	642	6.9
Apr. 21-30	b1.30	7.6		37	12	85		140	13	140	.3	.8		365	.50	1.28	142	28	57	3.1	706	6.9
May 1	513	--		--	--	--		54	--	91	--	--		--	--	--	66	22	--	--	403	7.1
May 2-3	144	8.1		12	4.4	24		61	7.4	29	.1	2.8		118	.16	45.9	48	0	52	1.5	209	6.9
May 4-8	132	8.8		18	5.8	36		60	8.8	62	.1	2.8		170	.23	60.6	69	20	53	1.9	321	6.8
May 9-19	9.39	12		26	8.5	50		114	8.8	73	.2	2.8		a256	.35	6.49	100	6	52	2.2	438	7.0
May 20-21	8.95	--		13	4.3	24		70	8.0	24	.3	2.2		--	--	--	50	0	51	1.5	211	7.2
May 22-31	.38	11		54	16	218		94	21	405	.4	2.8		774	1.05	.79	200	124	70	6.7	1,500	7.1

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

3154. LITTLE WICHITA RIVER NEAR RINGGOLD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-8, 1961--------	b1.44	--		--	--	--		108	--	480	--	--		--	--	--	252	164	--	--	1,740	6.9
June 9-10------------	29.5	6.4		38	11	101		93	10	192	0.3	2.2		410	0.56	32.7	140	64	61	3.7	809	6.7
June 11-16-----------	24.0	6.8		82	24	330		91	13	660	.4	1.8		1,160	1.58	75.2	303	228	70	8.2	2,270	7.0
June 17-24-----------	72.6	7.4		26	7.4	77		68	7.4	140	.3	1.5		300	.41	58.8	96	40	64	3.4	596	7.2
June 25-28-----------	1,586	6.7		8.0	3.5	10		42	2.4	13	.1	1.5		66	.09	283	34	0	39	.7	122	6.7
June 29-30-----------	64.5	10		22	6.6	49		71	6.8	86	.3	1.2		217	.30	37.8	82	24	56	2.4	411	6.6
July 1-11------------	10.1	14		28	8.6	62		94	8.0	108	.3	1.2		a296	.40	8.07	105	28	56	2.6	519	7.2
July 12--------------	127	14		80	24	364		96	18	700	.5	5.1		1,250	1.70	429	298	220	73	9.2	2,410	7.4
July 13-17-----------	20.6	11		32	9.9	138		100	9.2	230	.4	3.5		a512	.70	28.5	120	38	71	5.5	925	7.5
July 18-27-----------	17.5	10		34	10	106		95	8.0	190	.4	1.2		407	.55	19.2	126	48	65	4.1	787	7.3
July 28-31-----------	3.10	11		48	14	200		103	11	365	.4	1.0		701	.95	5.87	178	93	71	6.5	1,340	7.2
Aug. 1-15------------	b .11	8.6		48	12	189		116	9.6	335	.5	.8		660	.90	.20	170	74	71	6.3	1,300	6.7
Aug. 16, 21----------	18.3	8.2		25	6.6	99		76	8.6	165	.4	.8		a380	.52	18.8	90	27	71	4.5	686	6.9
Aug. 17-20, 22-31-----	b10.3	8.4		13	3.4	30		62	6.0	38	.3	1.0		130	.18	3.62	46	0	59	1.9	239	6.5
Sept. 1--------------	0	--		17	4.3	31		82	6.0	36	.8	1.0		--	--	--	60	0	53	1.7	261	7.6
Sept. 2-5------------	b12.9	8.9		24	6.4	88		98	9.0	131	.5	1.8		a328	.45	11.4	86	6	69	4.1	609	7.3
Sept. 6--------------	230	13		60	18	263		92	12	500	.4	1.8		913	1.24	567	224	148	72	7.6	1,740	7.5
Sept. 7-11-----------	93.5	9.4		23	6.3	63		96	58	95	.4	2.0		a265	.36	66.9	83	5	62	3.0	485	7.2
Sept. 12-14----------	245	10		18	4.7	42		84	5.4	55	.4	1.8		178	.24	118	64	0	58	2.3	335	6.9
Sept. 15-30----------	b86.0	12		23	5.8	42		96	4.8	62	.3	2.2		199	.27	46.2	81	3	53	2.0	378	7.1
Weighted average----	80.6	8.8		18	5.4	43		63	6.9	72	0.3	1.8		187	0.25	40.7	67	15	58	2.3	354	--

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

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 Co. bridge, 5 miles downstream from Fish Creek, 7 miles north of Gainesville, Cooke County.
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 1961.
Water temperatures: October 1952 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 5,630 ppm July 16-18; minimum, 463 ppm Sept. 16-20.
Hardness: Maximum, 1,450 ppm July 16-18; minimum, 168 ppm Sept. 16-20.
Specific conductance: Maximum daily, 8,400 micromhos July 16-17; minimum daily, 683 micromhos Sept. 19.
Water temperatures: Maximum, 87°F Aug. 27-29, 31; minimum, freezing point Jan. 26.
EXTREMES, 1944-46, 1952-61.--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 (1952-61): Maximum, 95°F July 13, 1954; minimum, freezing point on several days during winter months.
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 1961 available in district office at Oklahoma City, Okla. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-2, 1960	1,480	--	--	134	38	426		116	292	720	--	3.2	--	1,750	2.38	6,990	490	395	65	8.4	2,870	8.0
Oct. 3-10	649	--	--	228	51	717		134	556	1,170	--	--	--	2,910	3.96	5,100	780	670	67	11	4,640	7.9
Oct. 11-16	1,586	--	--	210	38	552		148	496	860	--	1.8	--	2,350	3.20	10,060	680	558	64	9.2	3,770	8.1
Oct. 17-28	23,580	14	0.00	110	28	206	8.0	122	260	340	0.3	2.5	0.46	1,070	1.46	68,120	390	290	53	4.5	1,730	7.9
Oct. 29-31	9,307	--	--	164	39	360		146	398	580	--	2.0	--	1,680	2.28	42,220	570	450	58	6.6	2,700	8.0
Nov. 1	4,780	--	--	244	54	557		a192	561	920	--	1.7	--	2,690	3.66	34,720	830	672	59	8.4	3,960	8.3
Nov. 2	3,880	--	--	166	40	357		156	392	580	--	3.0	--	1,830	2.49	19,170	580	452	57	6.4	2,690	8.2
Nov. 3-20	1,931	15	.00	264	73	690	9.0	198	708	1,150	.3	--	.66	3,150	4.28	16,420	960	798	61	9.7	4,810	7.9
Nov. 21-30	1,030	--	--	294	79	815		176	767	1,340	--	--	--	3,710	5.05	10,320	1,060	916	63	11	5,450	8.0
Dec. 1-9	1,128	--	--	274	82	823		b212	812	1,270	--	--	--	3,570	4.86	10,870	1,020	846	64	11	5,200	8.3
Dec. 10	4,880	--	--	192	59	540		b166	494	880	--	2.3	--	2,430	3.30	32,020	720	584	62	8.8	3,650	8.3
Dec. 11	6,440	--	--	147	38	396		b148	346	640	--	3.0	--	1,730	2.35	30,080	525	404	62	7.5	2,710	8.3
Dec. 12-16	8,284	--	--	91	26	230		128	184	380	--	3.1	--	1,030	1.40	23,040	335	230	60	5.5	1,710	8.1
Dec. 17	2,960	--	--	264	112	1,060		b192	817	1,710	--	--	--	4,320	5.88	34,530	1,120	962	67	14	6,450	8.3
Dec. 18	2,820	--	--	190	43	499		b172	444	800	--	3.9	--	2,210	3.01	16,830	650	509	63	8.5	3,420	8.3
Dec. 19	2,470	--	--	274	62	795		c196	675	1,280	--	--	--	3,380	4.60	22,540	940	779	65	11	5,040	8.4
Dec. 20	2,170	--	--	85	24	221		134	161	360	--	5.6	--	958	1.30	5,610	310	200	61	5.4	1,590	8.2
Dec. 21-30	1,620	18	.00	300	71	940	6.3	c232	741	1,520	.3	--	.76	3,920	5.33	17,150	1,040	850	66	13	5,910	8.3
Dec. 31	1,210	--	--	192	48	545		b210	468	850	--	2.9	--	2,340	3.18	7,640	675	502	64	9.1	3,560	8.3
Jan. 1-4, 1961	1,895	--	--	262	70	816		242	655	1,300	--	--	--	3,370	4.58	17,240	940	742	65	12	5,110	7.4
Jan. 5-8	2,418	--	--	198	53	563		206	450	920	--	.1	--	2,370	3.22	15,470	710	541	63	9.2	3,760	7.1
Jan. 9-10	2,260	--	--	256	61	770		208	634	1,230	--	--	--	3,210	4.37	19,590	890	720	65	11	4,940	8.0
Jan. 11	1,870	--	--	196	50	617		180	471	990	--	3.2	--	2,500	3.40	12,620	695	548	66	10	3,980	8.2
Jan. 12-20	1,283	14	.00	280	64	760	6.7	236	654	1,260	.3	--	.76	3,440	4.68	11,920	960	766	63	11	5,150	7.8
Jan. 21-31	911	--	--	298	94	926		268	886	1,420	--	--	--	3,820	5.20	9,400	1,130	910	64	12	5,780	7.9
Feb. 1-5	823	--	--	258	89	782		d260	652	1,290	--	--	--	3,420	4.65	7,600	1,010	796	63	11	5,150	8.5
Feb. 6	898	--	--	180	55	531		c190	440	860	--	2.6	--	2,340	3.18	5,670	675	519	63	8.9	3,620	8.4
Feb. 7-23	1,351	7.8	.00	248	68	734	5.5	232	617	1,180	.3	--	.61	3,220	4.38	11,750	900	710	64	11	4,810	7.7
Feb. 24	930	--	--	166	45	462		c194	410	720	--	4.8	--	2,000	2.72	5,020	600	441	63	8.2	3,130	8.6
Feb. 25-28	1,392	--	--	260	64	716		e230	616	1,160	--	--	--	3,140	4.27	11,800	910	721	63	10	4,780	8.4
Mar. 1-16	983	10	.00	258	82	840	7.4	204	714	1,350	.3	--	.54	3,610	4.91	9,580	980	813	65	12	5,430	7.9
Mar. 17	888	--	--	200	61	516		f180	503	850	--	2.2	--	2,470	3.36	5,920	750	602	60	8.2	3,770	8.5
Mar. 18	996	--	--	82	16	58		d192	127	75	--	1.4	--	497	.68	1,340	270	112	32	1.5	783	8.5
Mar. 19-20	4,200	--	--	236	74	738		176	569	1,250	--	--	--	3,210	4.37	36,400	895	751	64	11	4,830	8.0
Mar. 21-27	6,396	--	--	143	46	366		a152	354	600	--	2.3	--	1,720	2.34	29,700	545	420	59	6.8	2,710	8.4

a Includes the equivalent of 4 parts per million of carbonate (CO_3).
b Includes the equivalent of 2 parts per million of carbonate (CO_3).
c Includes the equivalent of 6 parts per million of carbonate (CO_3).
d Includes the equivalent of 12 parts per million of carbonate (CO_3).
e Includes the equivalent of 8 parts per million of carbonate (CO_3).
f Includes the equivalent of 10 parts per million of carbonate (CO_3).

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Mar. 28, 1961	5,450	--	--	98	26	200		e144	198	325	--	2.5	--	984	1.34	14,480	350	232	55	4.6	1,570	8.5
Mar. 29	4,510	--	--	172	56	429		d172	444	700	--	3.2	--	1,980	2.69	24,110	660	518	59	7.3	2,980	8.5
Mar. 30-31	5,090	--	--	134	38	312		172	309	500	--	.4	--	1,530	2.08	21,030	490	349	58	6.1	2,360	8.2
Apr. 1-2	13,450	--	--	107	35	273		132	243	455	--	.0	--	1,300	1.77	47,210	410	302	59	5.9	2,060	8.1
Apr. 3-5	7,233	--	--	90	28	225		132	202	362	--	.0	--	1,050	1.43	20,510	340	232	59	5.3	1,680	7.3
Apr. 6-10	3,206	--	--	172	49	442		168	446	700	--	1.2	--	1,980	2.69	17,140	630	492	60	7.6	3,130	8.0
Apr. 11-30	1,623	13	0.00	232	71	624	5.0	184	630	990	0.3	1.7	0.67	2,750	3.74	12,050	870	719	61	9.2	4,210	8.1
May 1-3	896	--	--	258	92	727		204	686	1,220	--	--	--	3,440	4.68	8,320	1,020	853	61	9.9	4,960	8.2
May 4-5	1,635	--	--	164	54	436		142	399	740	--	2.5	--	2,130	2.90	9,400	630	514	60	7.5	3,190	7.8
May 6-7	2,780	--	--	72	20	124		e126	122	210	--	4.9	--	700	.95	5,250	260	156	51	3.4	1,110	8.4
May 8	4,030	--	--	112	26	253		a136	221	418	--	3.9	--	1,240	1.69	13,490	385	274	59	5.6	1,920	8.5
May 9-21	1,546	13	.00	188	37	440	3.9	164	381	760	.3	2.0	1.3	2,020	2.75	8,430	620	486	60	7.7	3,230	8.1
May 22-26	2,228	--	--	120	34	290		150	258	480	--	3.6	--	1,420	1.93	8,540	440	317	59	6.0	2,200	7.8
May 27-31	1,327	--	--	234	74	717		a168	649	1,160	--	--	--	3,250	4.42	11,640	890	752	64	10	4,700	8.4
June 1-3	814	--	--	212	66	644		128	590	1,050	--	--	--	2,750	3.74	6,040	800	695	64	9.9	4,330	7.9
June 4	947	--	--	164	49	456		a136	415	750	--	1.2	--	1,960	2.67	5,010	610	498	62	8.0	3,210	8.4
June 5-7	1,513	--	--	125	36	325		128	262	560	--	.1	--	1,430	1.94	5,840	460	355	61	6.6	2,410	7.8
June 8	14,700	--	--	224	66	580		a160	580	960	--	3.8	--	2,690	3.66	106,800	830	699	60	8.8	4,140	8.4
June 9	13,200	--	--	117	34	240		a128	294	380	--	5.2	--	1,210	1.65	43,120	430	325	55	5.0	1,960	8.3
June 10-11	17,000	--	--	93	26	150		132	210	240	--	.1	--	839	1.14	38,510	340	232	49	3.5	1,370	7.5
June 12-15	8,422	--	--	126	35	240		a132	325	378	--	1.9	--	1,250	1.70	28,420	460	352	53	4.9	1,980	8.3
June 16	6,150	--	--	83	25	156		100	185	265	--	2.5	--	821	1.12	13,630	310	228	52	3.9	1,350	8.2
June 17-20	6,505	--	--	120	32	224		128	305	350	--	1.7	--	1,170	1.59	20,550	430	325	53	4.7	1,850	8.2
June 21-25	2,516	--	--	136	39	223		160	345	350	--	.5	--	1,270	1.73	8,630	500	369	49	4.3	1,900	7.6
June 26-27	2,005	--	--	194	57	377		168	425	680	--	.2	--	2,030	2.76	10,990	720	582	53	6.1	3,030	8.0
June 28-29	5,475	--	--	104	29	229		128	242	370	--	.1	--	1,140	1.55	16,850	380	275	57	5.1	1,790	7.8
June 30	4,790	--	--	67	21	142		104	135	238	--	2.6	--	764	1.04	9,880	255	170	55	3.9	1,170	8.2
July 1	3,110	--	--	88	27	172		c118	175	300	--	3.0	--	964	1.31	8,090	330	233	53	4.1	1,530	8.4
July 2	2,320	--	--	180	48	453		b168	455	720	--	2.8	--	2,110	2.87	13,220	645	507	60	7.7	3,170	8.3
July 3-15	1,102	12	.00	224	63	703	7.6	160	580	1,150	.5	--	.42	2,890	3.93	8,600	820	689	65	11	4,470	7.8
July 16-18	2,143	--	--	416	100	1,340		132	1,210	2,120	--	--	--	5,630	7.66	32,580	1,450	1,340	61	15	8,050	8.0
July 19-20	5,010	--	--	348	68	957		124	920	1,540	--	--	--	4,230	5.75	57,220	1,150	1,050	64	12	6,170	7.5
July 21-24	2,645	--	--	324	51	823		118	845	1,300	--	--	--	3,660	4.98	26,140	1,020	924	64	11	5,360	8.2
July 25	7,410	--	--	184	26	481		112	452	740	--	6.9	--	2,100	2.86	42,010	565	473	65	8.8	3,150	8.2
July 26-27	7,045	--	--	119	30	269		112	230	475	--	2.9	--	1,330	1.81	25,300	420	328	58	5.7	2,110	7.9
July 28-31	2,942	--	--	154	32	405		116	380	640	--	2.9	--	1,840	2.50	14,620	515	420	63	7.8	2,800	8.2

a Includes the equivalent of 4 parts per million of carbonate (CO_3).
b Includes the equivalent of 2 parts per million of carbonate (CO_3).
c Includes the equivalent of 6 parts per million of carbonate (CO_3).
d Includes the equivalent of 12 parts per million of carbonate (CO_3).
e Includes the equivalent of 8 parts per million of carbonate (CO_3).

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 1-22, 1961-------	583	--	--	208	61	636		90	575	1,050	--	--	--	2,770	3.77	4,360	770	696	64	10	4,410	7.8
Aug. 23-25------------	1,213	--	--	130	40	302		134	275	530	--	2.4	--	1,450	1.97	4,750	490	380	57	5.9	2,390	7.9
Aug. 26-31------------	671	--	--	216	54	581		144	530	960	--	1.1	--	2,560	3.48	4,640	760	642	62	9.2	4,040	8.1
Sept. 1-8-------------	562	--	--	204	66	626		146	520	1,050	--	--	--	2,700	3.67	4,100	780	660	64	9.8	4,300	8.0
Sept. 9---------------	1,970	--	--	138	38	370		136	320	610	--	.6	--	1,610	2.19	8,560	500	388	62	7.2	2,640	7.9
Sept. 10--------------	1,620	--	--	184	54	526		120	395	930	--	1.7	--	2,290	3.11	10,020	680	582	63	8.8	3,650	7.9
Sept. 11-14-----------	1,022	--	--	133	38	360		116	290	620	--	1.6	--	1,590	2.16	4,390	490	395	61	7.1	2,590	8.0
Sept. 15--------------	2,570	--	--	80	20	178		138	152	280	--	.0	--	834	1.13	5,790	280	167	58	4.6	1,400	7.8
Sept. 16-20-----------	5,412	--	--	48	12	95		118	66	146	--	3.6	--	463	.63	6,770	168	72	55	3.2	785	8.0
Sept. 21--------------	1,430	--	--	64	17	135		120	115	215	--	1.7	--	655	.89	2,530	230	132	56	3.9	1,120	8.0
Sept. 22-28-----------	585	--	--	96	29	240		144	198	395	--	1.6	--	1,100	1.50	1,740	360	242	59	5.5	1,830	8.1
Sept. 29-30-----------	456	--	--	133	38	344		174	272	575	--	--	--	1,500	2.04	1,850	490	348	60	6.7	2,500	8.1
Weighted average----	3,044	--	--	158	43	399		148	390	644	--	--	--	1,820	2.48	14,960	571	450	60	7.3	2,830	--

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 1961.
Water temperatures: October 1945 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,320 ppm Sept. 1-30; minimum, 1,170 ppm Oct. 1-31.
Hardness: Maximum, 452 ppm Sept. 1-30; minimum, 408 ppm Feb. 1-28.
Specific conductance: Maximum daily, 2,340 micromhos Jan. 11; minimum daily, 1,940 micromhos Oct. 3, 9, 11.
EXTREMES, 1944-61.--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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1960	12,040	9.4		110	33	263		128	286	410	--	0.4		1,170	1.59	38,030	410	305	58	5.7	2,010	7.6
Nov. 1-30	3,244	6.6		110	33	275		123	291	428	0.2	.8		1,200	1.63	10,510	410	309	59	5.9	2,060	7.8
Dec. 1-31	4,998	10		114	31	273		124	290	425	.3	1.5		1,210	1.65	16,330	412	310	59	5.8	2,080	7.7
Jan. 1-31, 1961	4,959	9.9		117	33	278		130	304	430	.4	1.5		1,240	1.69	16,600	428	321	59	5.8	2,120	7.8
Feb. 1-28	2,124	11		114	30	274		131	298	415	.5	.5		1,210	1.65	6,940	408	300	59	5.9	2,050	7.5
Mar. 1-31	2,697	13		118	34	274		135	306	425	.3	2.0		1,240	1.69	9,030	434	324	58	5.7	2,110	7.7
Apr. 1-30	6,077	9.4		122	30	281		140	298	435	.4	.5		1,250	1.70	20,510	428	314	59	5.9	2,150	7.5
May 1-31	2,433	9.6		119	35	286		143	310	440	.4	2.2		1,270	1.73	8,340	441	324	59	5.9	2,170	7.4
June 1-30	3,016	10		124	33	289		146	304	450	.4	2.8		1,290	1.75	10,500	450	326	59	5.9	2,160	7.5
July 1-31	3,415	11		121	33	288		146	296	450	.4	.8		1,270	1.73	11,710	438	318	59	6.0	2,170	7.1
Aug. 1-31	2,745	10		125	32	292		150	304	452	.4	1.0		1,290	1.75	9,560	444	320	59	6.0	2,140	7.8
Sept. 1-30	3,593	11		120	37	300		138	312	470	.3	2.8		1,320	1.80	12,810	452	338	59	6.2	2,210	7.7
Weighted average	4,299	9.9		117	33	278		134	297	431	0.3	1.2		1,230	1.67	14,280	428	318	59	5.8	2,100	--

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 1961.
Water temperatures: October 1958 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,040 ppm Oct. 27; minimum, 68 ppm June 24-25.
Hardness: Maximum, 340 ppm Feb. 1-5; minimum, 42 ppm June 24-25.
Specific conductance: Maximum daily, 1,690 micromhos Oct. 27; minimum daily, 92 micromhos Dec. 11.
Water temperatures: Maximum, 94°F Aug. 2, 6-7; minimum, 40°F Jan. 28.
EXTREMES, 1958-61.--Dissolved solids: Maximum, 1,120 ppm Nov. 1, 1959; minimum, 68 ppm June 24-25, 1961.
Hardness: Maximum, 340 ppm Feb. 1-5, 1961; minimum, 42 ppm June 24-25, 1961.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 1, 1959; minimum daily, 92 micromhos Dec. 11, 1960.
Water temperatures: Maximum, 97°F Aug. 6, 1960; minimum, 40°F Mar. 2, 4, 1960, Jan. 28, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-4, 1960	15.5	17		38	3.5	33		130	25	32	0.5	2.8		216	0.29	9.04	109	3	40	1.4	355	7.4
Oct. 5	653	10		--	--	--		68	9.8	5.0	--	--		--	--	--	56	0	--	--	151	7.0
Oct. 6-10	117	13		32	2.6	19		116	14	13	.5	2.5		154	.21	48.6	91	0	31	.9	253	7.4
Oct. 11-19	5.76	12		46	4.0	27		161	24	22	.5	.8		215	.29	3.34	131	0	31	1.0	370	7.7
Oct. 20-26	2.81	10		53	4.7	95		252	68	56	.6	1.5		a432	.59	3.28	152	0	58	3.4	690	7.5
Oct. 27	6.70	--		--	--	--		167	--	415	--	--		1,040	1.41	18.8	233	96	--	--	1,690	7.5
Oct. 28-31	2,185	9.8		23	1.9	13		82	13	6.5	.4	1.8		109	.15	643	65	0	29	.7	179	7.2
Nov. 1-15	23.0	10		42	4.8	26		148	32	17	.3	.8		206	.28	12.8	125	3	31	1.0	352	7.4
Nov. 16-30	3.01	11		48	6.0	35		176	36	26	.3	.8		a272	.37	2.21	144	0	34	1.3	428	7.1
Dec. 1-4, 17-21	21.4	12		57	6.2	39		187	43	38	.3	.5		a302	.41	17.4	168	14	34	1.3	497	7.3
Dec. 5-7, 15-16, 30-31	1,837	9.2		28	3.1	12		90	19	9.0	.4	1.2		126	.17	625	83	9	24	.6	225	7.0
Dec. 8-14	6,225	8.8		18	2.3	6.9	2.9	64	9.2	4.0	.4	1.0		84	.11	1,410	54	2	21	.4	141	7.0
Dec. 22-29	30.1	12		87	8.8	45		284	56	41	.3	.5		a408	.55	33.2	253	20	28	1.2	663	7.5
Jan. 1-14, 1961	1,879	9.6		33	3.0	17		115	22	9.5	.3	1.0		152	.21	771	95	0	28	.8	263	7.3
Jan. 15-20	52.8	12		66	7.1	35		222	52	23	.3	.2		305	.41	43.5	194	12	28	1.1	515	7.6
Jan. 21-31	20.0	12		104	12	57		347	84	42	.3	.2		a498	.68	26.9	309	24	28	1.4	799	7.6
Feb. 1-5	18.2	12		113	14	75		361	112	61	.3	2.5		a592	.81	29.1	340	44	32	1.8	911	7.6
Feb. 6-11	1,145	11		32	2.8	16		98	28	9.5	.4	2.8		150	.20	464	91	11	28	.7	256	7.2
Feb. 12-20	55.3	12		72	8.1	39		227	59	34	.4	1.0		a348	.47	52.0	213	27	28	1.2	562	7.4
Feb. 21-28	222	11		55	6.1	29		174	46	23	.4	.8		a280	.38	168	162	20	28	1.0	433	7.2
Mar. 1-17	29.7	10		86	11	50		287	75	38	.4	.8		a442	.60	35.4	260	24	29	1.4	699	7.8
Mar. 18-21	600	10		36	3.7	19		113	32	12	.4	2.8		172	.23	279	105	12	28	.8	302	7.3
Mar. 22-26	57.2	12		54	6.5	29		180	44	21	.4	1.8		258	.35	39.8	162	14	28	1.0	440	7.5
Mar. 27-31	3,402	8.4		25	2.2	11		85	15	5.0	.4	1.8		111	.15	1,020	71	2	25	.6	195	7.1
Apr. 1-4, 9-11	646	8.8		42	5.2	21		140	34	14	.4	1.8		a212	.29	370	126	11	27	.8	339	7.8
Apr. 5-8, 12-16	31.4	14		64	7.1	33		218	47	22	.4	1.8		a310	.42	26.3	188	10	28	1.0	490	7.7
Apr. 17-30	6.69	12		80	11	50		282	67	36	.4	.0		a400	.54	7.23	244	14	31	1.4	667	7.7
May 1-3	19.0	10		70	13	70		270	86	48	.4	.8		431	.59	22.1	228	6	40	2.0	714	7.5
May 4-13	15.7	13		52	5.6	40		176	50	28	.4	3.0		a290	.39	12.3	153	9	36	1.4	466	7.6
May 14-23	7.42	11		86	10	56		302	67	42	.4	.8		a436	.59	8.73	256	8	32	1.5	703	7.5
May 24-31	32.2	11		40	4.0	36		140	41	22	.6	4.8		a240	.33	20.9	116	2	40	1.5	384	7.0
June 1-6	1.03	12		47	5.2	33		169	39	21	.6	.8		a254	.35	.71	139	0	34	1.2	399	7.3
June 7-8	436	18		33	2.6	20		109	22	13	.7	5.0		168	.23	198	93	4	32	.9	263	7.4
June 9-10	244	12		17	1.5	10		62	9.6	4.5	.4	3.8		89	.12	58.6	49	0	32	.6	143	6.8

a Residue on evaporation at 180°C.

3425. SOUTH SULPHUR RIVER NEAR COOPER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 11-20, 1961	7.60	11		38	4.2	24		138	26	15	0.5	1.8		a204	0.28	4.19	112	0	32	1.0	319	6.6
June 21-23	4.27	11		50	4.9	66		194	66	41	.5	2.5		a346	.47	3.99	145	0	50	2.4	557	7.5
June 24-25	1,140	8.1		--	--	6.1		52	6.0	2.0	.5	2.8		68	.09	209	42	0	24	.4	109	7.1
June 26-30	690	17		20	2.6	20		b78	21	12	.5	.0		a137	.19	255	61	0	42	1.1	273	8.9
July 1-23	5.57	14		53	5.9	27		190	30	18	.5	1.8		a261	.35	3.93	156	1	27	.9	405	7.1
July 24-25	806	12		21	1.8	13		72	14	8.5	.5	2.5		108	.15	235	60	1	33	.7	178	6.9
July 26-31	21.4	9.4		34	3.3	20		113	28	12	.5	1.8		165	.22	9.53	98	6	30	.9	281	6.5
Aug. 1-15	15.7	15		44	4.8	25		151	32	17	.5	1.2		a230	.31	9.75	130	6	29	1.0	351	7.0
Aug. 16-31	29.8	11		20	2.2	12		73	13	6.8	.5	1.8		103	.14	8.29	59	0	31	.7	174	6.6
Sept. 1-12	c .12	13		30	3.8	19		115	18	11	.5	1.2		154	.21	.05	90	0	31	.9	261	7.0
Sept. 13	356	--		--	--	--		55	155	404	--	--		--	--	--	128	83	--	--	1,410	6.6
Sept. 14-17	488	14		29	2.9	14		101	20	7.5	.5	.1		138	.19	182	84	2	27	.7	242	6.9
Sept. 18-30	3.38	14		40	4.1	21		141	29	10	.5	1.2		189	.26	1.72	117	1	28	.8	315	7.2
Weighted average	387	9.7		27	2.8	14		92	18	8.9	0.4	1.4		129	0.18	135	79	3	28	0.7	220	--

a Residue on evaporation at 180°C.
b Includes the equivalent of 20 parts per million of carbonate (CO_3).
c Includes days of less than 0.05 cubic foot per second discharge.

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.--3,493 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: February 1952 to September 1961.
Water temperatures: February 1952 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 334 ppm Oct. 21-31, Sept. 1-12; minimum, 88 ppm Dec. 8-25.
Hardness: Maximum, 76 ppm June 1-10; minimum, 26 ppm Dec. 8-25.
Specific conductance: Maximum daily, 764 micromhos June 6; minimum daily, 141 micromhos Dec. 12.
Water temperatures: Maximum, 89°F Aug. 10-12; minimum, 42°F Jan. 26, 28-29.
EXTREMES, 1952-61.--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, Mar. 1, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-6, 1960	1,308	13		16	5.0	67		48	22	101	--	1.8		250	0.34	883	60	21	71	3.8	468	7.0
Oct. 7-10	720	11		10	3.3	40		30	18	58	--	1.5		157	.21	305	38	14	70	2.8	287	6.9
Oct. 11-20	318	10		16	5.4	70		50	20	108	--	.5		a280	.38	240	62	21	71	3.9	489	6.7
Oct. 21-31	441	15		16	5.8	87		40	19	142	--	.8		a334	.45	398	64	31	75	4.7	585	6.6
Nov. 1-16	751	14		14	4.7	69		28	20	114	--	.8		250	.34	507	54	31	74	4.1	473	6.5
Nov. 17-20, 24-30	1,153	13		13	6.0	61		24	30	98	--	.8		234	.32	728	57	37	70	3.5	438	6.6
Nov. 21-23	1,323	15		10	4.3	45		22	20	71	--	.8		177	.24	632	43	25	69	3.0	327	6.6
Dec. 1-7	1,354	16		14	5.6	50		23	29	83	--	.8		209	.28	764	58	39	65	2.9	387	6.1
Dec. 8-25	14,200	7.4		6.5	2.5	20		12	13	32	--	.8		88	.12	3,370	26	17	62	1.7	163	5.6
Dec. 26-31	6,680	13		10	4.3	40		18	24	64	--	.2		164	.22	2,960	43	28	67	2.7	314	5.6
Jan. 1-5, 1961	4,436	15		11	4.3	37		14	28	60	--	.5		163	.22	1,950	45	34	64	2.4	302	6.3
Jan. 6-7	3,900	16		16	6.2	56		16	43	92	--	.8		238	.32	2,510	65	52	65	3.0	440	6.5
Jan. 8-20	6,859	11		9.2	3.4	31		16	24	46	--	.5		133	.18	2,460	37	24	64	2.2	242	6.3
Jan. 21-31	6,267	13		11	4.1	36		17	28	56	--	.2		156	.21	2,640	44	30	64	2.4	287	6.3
Feb. 1-13	3,842	15		13	6.2	43		13	38	72	--	.5		194	.26	2,010	58	47	62	2.5	354	6.0
Feb. 14-20	4,810	12		13	5.0	34		17	35	54	--	.5		162	.22	2,100	53	39	58	2.0	288	6.1
Feb. 21-28	7,850	12		9.8	4.3	27		15	25	44	--	.5		130	.18	2,760	42	30	58	1.8	234	6.0
Mar. 1-6	6,002	13		12	4.7	33		20	29	52	--	.5		154	.21	2,500	49	33	59	2.0	274	6.3
Mar. 7-13	2,471	17		14	6.0	45		22	34	74	--	.8		202	.27	1,350	60	42	62	2.5	367	6.2
Mar. 14-22	5,720	11		8.2	3.3	27		16	17	43	--	.8		118	.16	1,820	34	21	63	2.0	211	6.7
Mar. 23-31	5,892	13		12	5.0	36		22	29	56	--	.8		163	.22	2,590	50	32	60	2.2	283	6.2
Apr. 1-10	6,614	8.9		9.5	3.5	28		30	20	38	--	.2		123	.17	2,200	38	14	62	2.0	215	6.5
Apr. 11-20	4,151	13		13	5.4	34		26	29	54	--	.8		162	.22	1,820	55	33	57	2.0	305	6.0
Apr. 21-30	1,054	14		13	6.2	47		28	29	76	--	.2		a216	.29	615	58	35	64	2.7	375	6.2
May 1-10	1,011	19		13	6.2	50		24	27	84	--	1.2		212	.29	579	58	38	65	2.9	401	6.1
May 11-20	607	19		16	7.5	71		32	34	115	--	.8		279	.38	457	71	45	68	3.7	529	6.1
May 21-31	531	18		15	6.6	77		33	27	125	--	1.2		a310	.42	444	65	38	72	4.2	547	6.1
June 1-10	466	15		18	7.6	82		32	39	133	--	1.0		312	.42	393	76	50	70	4.1	600	6.2
June 11-18	419	16		15	6.4	77		35	26	124	--	1.2		283	.38	320	64	35	72	4.2	542	6.5
June 19-20	2,885	11		8.2	3.3	46		13	17	74	--	1.2		167	.23	1,300	34	23	75	3.4	327	6.1
June 21-23, 26-30	3,915	12		7.8	3.1	27		16	17	42	--	.5		117	.16	1,240	32	19	64	2.1	215	6.4
June 24-25	3,020	12		12	4.7	62		20	29	97	--	.8		228	.31	1,860	49	33	73	3.9	433	6.4
July 1-10	3,915	9.9		9.2	3.6	29		30	18	41	--	.2		126	.17	1,330	38	13	63	2.0	226	6.4
July 11-16	1,317	15		9.8	4.1	41		29	15	64	--	.8		164	.22	583	41	18	68	2.8	297	6.3
July 17-19	2,590	7.8		6.8	2.7	28		23	11	41	--	.2		108	.15	755	28	9	68	2.3	198	5.9
July 20-31	1,046	16		10	4.0	47		28	16	73	--	1.0		181	.25	511	41	18	71	3.2	330	5.8
Aug. 1-15	389	16		14	5.2	66		40	20	104	--	.2		a269	.37	283	56	24	72	3.8	461	6.3
Aug. 16-31	351	18		12	4.6	60		35	18	93	--	.8		a245	.33	232	49	20	73	3.7	414	6.2
Sept. 1-12	176	17		14	5.6	93		38	18	148	0.3	.8		a334	.45	159	58	27	78	5.3	599	6.2
Sept. 13	701	16		--	--	63		35	16	91	.3	1.8		--	--	--	38	9	78	4.4	404	6.9
Sept. 14-20	1,591	14		8.5	3.6	45		19	14	72	.2	1.2		168	.23	722	36	20	73	3.3	313	6.0
Sept. 21-30	397	18		14	5.9	86		26	25	140	.2	.8		a330	.45	354	59	38	76	4.9	574	6.3
Weighted average	3,104	11		10	4.0	34		19	23	53	--	0.6		146	0.20	1,220	41	26	64	2.3	266	--

a Residue on evaporation at 180°C.

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 The Kansas City Southern Railway Co. bridge, 4.5 miles downstream from Cypress Creek, and at mile 40.
DRAINAGE AREA.--9,329 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1961.
Water temperatures: October 1947 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 216 ppm Oct. 2-3, 5; minimum, 40 ppm Sept. 15-18.
Hardness: Maximum, 46 ppm June 1-15; minimum, 10 ppm Sept. 15-18.
Specific conductance: Maximum daily, 423 micromhos Oct. 3; minimum daily, 54 micromhos Sept. 17.
Water temperatures: Maximum, 86°F Aug. 22, Sept. 7-8; minimum, 41°F Jan. 26, Feb. 1.
EXTREMES, 1945-46, 1947-61.--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 (1947-61): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1, 4, 6-10, 1960-	2,671	8.8		7.0	2.9	36		24	12	54	--	0.8		134	0.18	966	30	10	73	2.9	244	6.8
Oct. 2-3, 5----------	2,540	12		10	3.9	63		35	16	94	--	.2		216	.29	1,480	41	12	77	4.3	402	6.8
Oct. 11-20----------	1,761	12		8.0	2.8	38		21	15	58	--	.5		144	.20	685	32	14	73	2.9	257	6.6
Oct. 21-29----------	1,640	12		7.8	2.5	36		23	12	54	--	.8		136	.18	602	30	11	72	2.9	244	6.5
Oct. 30-31----------	3,175	13		6.0	2.1	25		21	10	35	--	.8		102	.14	874	24	6	70	2.2	169	6.7
Nov. 1-6----------	3,803	7.4		5.2	2.1	22		17	8.8	32	--	.8		86	.12	883	22	8	69	2.0	158	6.2
Nov. 7-11----------	2,090	13		9.5	3.4	45		30	14	68	--	.8		169	.23	954	38	13	72	3.2	310	6.6
Nov. 12-19----------	3,709	10		6.8	2.9	33		17	14	50	--	.8		126	.17	1,260	29	15	71	2.7	230	6.4
Nov. 20-30----------	7,562	10		5.5	2.6	22		15	13	33	--	.8		94	.13	1,920	24	12	67	2.0	168	6.4
Dec. 1-10----------	5,435	14		8.5	4.0	29		18	20	46	--	.5		131	.18	1,920	38	22	63	2.0	233	6.3
Dec. 11----------	9,950	--		--	--	--		12	--	28	--	--		--	--	--	26	16	--	--	151	5.9
Dec. 12-20----------	19,860	9.1		4.5	2.5	11		9	12	18	--	.5		62	.08	3,320	22	14	53	1.0	102	5.8
Dec. 21-31----------	25,300	8.3		5.8	2.5	13		14	9.2	22	--	.5		68	.09	4,640	25	14	52	1.1	122	5.9
Jan. 1-8, 1961--------	33,590	12		6.0	2.3	--		15	--	--	0.2	.8		--	--	--	24	12	--	--	125	6.2
Jan. 9-11----------	47,070	54		9.5	2.4	21	1.9	53	9.2	18	.3	1.2		144	.20	18,300	34	0	56	1.6	168	7.4
Jan. 12-17----------	44,670	41		7.0	2.1	13	2.0	36	8.8	12	.2	.5		105	.14	12,660	26	0	50	1.1	118	6.9
Jan. 18-24----------	34,170	31		7.2	2.4	16	2.3	28	14	19	.3	.5		107	.15	9,870	28	5	53	1.3	145	6.7
Jan. 25-31----------	26,500	38		9.0	2.8	19	2.3	36	15	22	.3	.5		127	.17	9,090	34	4	53	1.4	172	6.8
Feb. 1-10----------	19,730	11		6.5	2.5	20		14	17	29	--	.2		93	.13	4,950	26	15	62	1.7	164	6.2
Feb. 11-17----------	15,310	12		7.8	2.9	25		15	22	35	--	.2		112	.15	4,630	32	19	63	1.9	194	6.2
Feb. 18----------	19,500	--		--	--	--		11	--	25	--	--		--	--	--	23	14	--	--	138	6.4
Feb. 19-28----------	29,170	8.7		4.2	1.6	12		12	11	15	--	.2		59	.08	4,650	17	7	60	1.3	99	6.0
Mar. 1-5----------	21,700	11		6.0	2.5	14		14	14	21	--	.5		76	.10	4,450	26	14	54	1.2	127	5.8
Mar. 6-18----------	15,990	14		8.2	3.6	20		20	19	30	--	.8		106	.14	4,580	36	19	55	1.4	184	6.4
Mar. 19-20, 27-31-----	21,230	9.7		5.8	2.3	13		15	12	19	--	.8		70	.10	4,010	24	12	54	1.2	122	6.5
Mar. 21-26----------	28,520	8.3		4.0	1.7	8.6	1.4	12	8.6	13	--	.8		52	.07	4,000	17	7	49	.9	85	5.8
Apr. 1-3----------	22,100	5.8		4.8	2.7	20		20	14	24	--	.5		82	.11	4,890	23	6	65	1.8	141	6.4
Apr. 4-9----------	24,080	9.2		4.2	2.3	14		18	11	17	--	.8		68	.09	4,420	20	5	61	1.4	116	5.8
Apr. 10-13----------	23,680	7.5		5.0	3.1	17		21	14	22	--	.2		79	.11	5,050	25	8	60	1.5	139	7.1
Apr. 14-19----------	20,330	11		5.5	2.7	20		22	14	24	--	.5		89	.12	4,890	24	6	63	1.8	148	5.8
Apr. 20-30----------	8,915	13		7.8	3.9	28		28	19	37	--	.5		123	.17	2,960	36	12	63	2.0	211	5.8
May 1-10----------	4,562	16		9.2	3.7	27		31	17	38	.2	.2		126	.17	1,550	38	12	61	1.9	215	6.5
May 11-20----------	3,350	17		10	4.5	32		34	17	48	.2	.2		146	.20	1,320	44	16	62	2.1	256	6.4
May 21-31----------	2,345	16		10	4.1	34		38	16	47	.2	.4		147	.20	931	42	11	63	2.3	252	6.6

325. NECHES RIVER NEAR ALTO, TEX.

LOCATION.--At gaging station at bridge on State Highway 21, 600 feet downstream from Bowles Creek, 7½ miles southwest of Alto, Cherokee County, and at mile 274.
DRAINAGE AREA.--1,945 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1961.
Water temperatures: October 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 304 ppm Oct. 2; minimum, 42 ppm June 19-20.
Hardness: Maximum, 61 ppm Oct. 2; minimum, 14 ppm June 19-20.
Specific conductance: Maximum daily, 508 micromhos Oct. 2; minimum daily, 56 micromhos June 20.
Water temperatures: Maximum, 85°F Aug. 3; minimum, 41°F Jan. 28-29.
EXTREMES, 1959-61.--Dissolved solids: Maximum, 304 ppm Oct. 2, 1960; minimum, 42 ppm June 19-20, 1961.
Hardness: Maximum, 61 ppm Oct. 2, 1960; minimum, 14 ppm June 19-20, 1961.
Specific conductance: Maximum daily, 508 micromhos Oct. 2, 1960; minimum daily, 56 micromhos June 20, 1961.
Water temperatures: Maximum, 87°F Aug. 5, 1960; minimum, 41°F Jan. 28-29, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1, 3-5, 1960------	274	23		10	4.4	34		26	25	49	0.1	1.0		160	0.22	118	43	22	63	2.3	266	7.1
Oct. 2----------	234	--		--	--	--		25	--	122	--	--		304	.41	192	61	40	--	--	508	7.0
Oct. 6-20----------	409	16		8.0	3.9	22		17	24	31	.1	.8		114	.16	126	36	22	57	1.6	191	6.5
Oct. 21-31----------	579	18		8.5	4.2	31		21	20	48	.1	1.0		141	.19	220	38	21	64	2.2	240	6.4
Nov. 1-6, 25-30--------	996	21		9.8	4.3	32		22	23	49	.2	.5		a164	.22	441	42	24	62	2.1	248	6.1
Nov. 7-20----------	572	20		9.0	4.3	24		23	20	37	.2	1.0		126	.17	195	40	21	57	1.6	210	6.4
Nov. 21-24----------	2,685	13		5.2	3.2	13		14	14	19	.2	.8		75	.10	544	26	15	52	1.1	120	6.1
Dec. 1-5----------	926	21		11	4.9	27		23	27	42	.1	.5		144	.20	360	48	29	55	1.7	242	6.4
Dec. 6-8----------	2,663	18		7.5	3.3	16		16	19	24	.2	.8		97	.13	697	32	19	53	1.2	148	6.4
Dec. 9-17----------	11,020	9.6		4.2	2.0	12		10	12	16	.1	.5		61	.08	1,810	19	10	57	1.2	102	6 2
Dec. 18-23----------	7,288	10		5.0	3.1	10		10	16	16	.1	.2		65	.09	1,280	25	17	47	.9	113	6.0
Dec. 24-31----------	3,094	17		7.8	3.5	17		15	22	25	.1	.2		100	.14	835	34	22	52	1.3	168	6 1
Jan. 1-7, 10, 1961-----	2,904	20		9.5	4.9	19		16	26	32	.3	.2		a132	.18	1,030	44	31	49	1.2	199	6.2
Jan. 8-9----------	6,450	12		4.3	3.2	12		13	16	15	.2	.2		69	.09	1,200	24	13	51	1.1	108	6.4
Jan. 11-20----------	8,507	12		6.5	2.9	14		12	18	20	.2	.2		80	.11	1,840	28	18	51	1.2	127	6.1
Jan. 21-31----------	5,075	13		7.0	3.8	14		14	20	22	.2	.2		87	.12	1,190	33	22	48	1.1	144	6.0
Feb. 1-10----------	3,564	15		8.2	3.9	18		17	25	25	.1	.8		104	.14	1,000	36	23	52	1.3	171	7.0
Feb. 11-21----------	3,527	13		10	4.1	20		18	29	28	.1	.5		114	.16	1,090	42	27	51	1.3	191	6.5
Feb. 22-28----------	6,387	8.4		8.0	3.5	18		18	21	26	.1	.2		94	.13	1,620	34	20	53	1.3	151	6.3
Mar. 1-10----------	4,237	13		9.0	3.9	18		22	22	25	.2	.8		103	.14	1,180	38	20	50	1.3	168	6.6
Mar. 11-20----------	2,724	14		10	4.6	18		26	22	27	.2	1.0		110	.15	809	44	23	48	1.2	181	6.7
Mar. 21-27----------	4,986	13		8.0	3.6	16		22	16	24	.2	.8		93	.13	1,250	35	17	50	1.2	156	6.6
Mar. 28-31----------	8,550	9.7		6.5	2.8	12		19	14	16	.2	.8		71	.10	1,640	28	12	49	1.0	118	6.5
Apr. 1-11----------	4,247	14		9.0	4.2	15		24	18	24	--	.5		97	.13	1,110	40	20	45	1.0	164	6.5
Apr. 12-13----------	3,045	18		8.0	5.0	13		26	18	20	--	.8		96	.13	789	40	19	41	.9	156	6.7
Apr. 14-24----------	1,834	16		9.2	5.0	19		28	19	29	--	.5		112	.15	555	44	21	48	1.2	193	6.1
Apr. 25-30----------	1,065	18		11	5.3	19		31	18	32	--	.8		119	.16	342	49	24	45	1.2	206	6.6
May 1-15----------	827	22		9.5	4.6	21		32	16	31	.2	1.2		122	.17	272	43	16	52	1.4	198	6.8
May 16-31----------	451	21		9.2	3.5	25		34	15	33	.2	1.2		125	.17	152	37	10	58	1.8	204	6.7
June 1-15----------	286	21		9.2	3.3	28		33	15	38	.2	1.2		a145	.20	112	36	9	63	2.0	208	6.4
June 16-18----------	1,055	16		6.8	2.7	19		19	15	27	.2	.8		96	.13	273	28	12	60	1.6	153	6.3
June 19-20----------	4,400	6.4		3.0	1.6	6.4	2.0	11	8.6	7.8	.2	.5		42	.06	499	14	5	45	.7	62	6.2
June 21-25----------	4,296	12		5.5	2.6	15		15	13	21	.2	.5		77	.10	893	24	12	57	1.3	117	5.9
June 26-30----------	2,298	19		9.2	3.9	22		20	22	33	.2	.8		120	.16	745	39	23	55	1.5	189	6.6
July 1-15----------	1,097	20		9.8	3.6	23		26	20	33	.2	1.0		124	.17	367	39	18	56	1.6	194	6.1
July 16-31----------	501	22		10	4.1	25		34	15	36	.2	2.2		132	.18	179	42	14	57	1.7	203	6.5
Aug. 1-10----------	254	24		10	4.0	29		38	12	42	.2	1.0		141	.19	96.7	41	10	60	2.0	234	6.8
Aug. 11-20----------	204	22		9.0	3.8	28		38	11	38	.2	1.5		132	.18	72.7	38	7	61	2.0	227	6.5
Aug. 21-31----------	200	21		9.2	3.9	32		38	14	43	.2	1.2		144	.20	77.6	39	8	64	2.2	242	6.8
Sept. 1-11----------	174	19		10	3.8	31		38	17	41	.2	1.0		a151	.21	70.9	41	9	62	2.1	231	6.5
Sept. 12-14----------	568	15		9.0	2.3	17		35	10	21	.2	.8		92	.13	141	32	3	54	1.3	136	6.2
Sept. 15-18----------	725	17		8.0	3.4	39		32	17	53	.2	.5		154	.21	301	34	8	72	2.9	249	6.6
Sept. 19-30----------	303	19		9.5	3.6	31		45	16	36	.2	.5		138	.19	113	38	2	63	2.2	214	6.6
Weighted average-----	2,327	14		7.5	3.5	17		18	19	24	0.2	0.5		94	0.13	591	33	18	53	1.3	153	--

a Residue on evaporation at 180°C.

Specific conductance (micromhos at 25° C)	pH
297	6.4
115	6.3
150	5.7
175	6.0
131	6.1
146	6.3
158	6.4
192	6.3
188	6.7
201	6.2
95	6.0
59	5.5
158	5.9
144	--

370. ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59, 200 feet upstream from Procella 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.--1,600 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1961.
Water temperatures: October 1954 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 267 ppm Oct. 2-3; minimum, 42 ppm Feb. 21-26, Mar. 18-21.
Hardness: Maximum, 55 ppm Oct. 2-3; minimum, 17 ppm Dec. 9-13, Feb. 21-26, Mar. 18-21, Sept. 14-17.
Specific conductance: Maximum daily, 532 micromhos Oct. 2; minimum daily, 45 micromhos Feb. 22.
Water temperatures: Maximum, 87°F June 11; minimum, 50°F Nov. 12.
EXTREMES, 1954-61.--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 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 water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1, 4-10, 1960-----	743	15		9.0	3.8	45		12	24	71	0.1	0.2		174	0.24	349	38	28	72	3.2	306	6.5
Oct. 2-3----------	915	14		12	6.2	75		9	20	135	.2	.2		267	.36	660	55	48	75	4.4	509	6.4
Oct. 11-17----------	196	16		11	5.1	60		18	21	101	.2	.2		224	.30	119	48	34	73	3.8	414	6.5
Oct. 18-23----------	366	16		6.5	2.8	27		24	18	34	.2	.5		117	.16	116	28	8	68	2.2	188	6.7
Oct. 24-31----------	578	14		7.0	3.4	37		16	21	54	.2	.5		a158	.21	247	31	18	72	2.9	250	6.5
Nov. 1-10----------	596	15		9.0	5.6	41		18	25	66	--	.5		171	.23	275	46	31	66	2.6	307	6.7
Nov. 11-21----------	457	16		8.0	5.1	29		20	22	46	--	.5		137	.19	169	41	24	61	2.0	237	6.6
Nov. 22-27----------	2,042	13		4.5	2.8	12		14	14	15	--	.8		69	.09	380	23	11	52	1.1	102	6.2
Nov. 28-30----------	1,847	15		5.4	5.0	21		14	23	32	--	.2		109	.15	544	34	23	58	1.6	181	6.1
Dec. 1-6----------	1,930	17		7.5	4.6	24		14	23	38	--	.0		121	.16	631	38	26	58	1.7	206	6.2
Dec. 7-8, 15-19--------	9,194	14		5.5	3.4	14		12	16	22	--	.2		81	.11	2,010	26	18	52	1.2	133	5.8
Dec. 9-13----------	7,698	12		3.5	2.0	4.4	2.5	12	7.6	8.8	--	.2		47	.06	977	17	7	32	.5	63	5.8
Dec. 14, 20-31---------	4,788	15		5.2	3.2	11		15	15	15	--	.5		72	.10	931	26	14	47	.9	112	5.9
Jan. 1-7, 1961---------	2,533	16		5.5	3.2	8.5	1.5	18	14	12	--	1.0		71	.10	486	27	12	39	.7	105	6.5
Jan. 8-17----------	7,793	13		3.5	2.3	5.0	1.6	14	8.8	7.0	--	.8		49	.07	1,030	18	7	35	.5	68	6.3
Jan. 18-31----------	4,731	14		4.5	3.0	6.3	1.4	16	11	9.5	--	.5		58	.08	741	24	10	35	.6	86	6.2
Feb. 1-13----------	4,101	14		4.5	3.1	10		18	13	12	--	.8		66	.09	731	24	9	48	.9	95	6.5
Feb. 14-17----------	3,078	12		7.0	4.2	12		19	19	17	--	.8		81	.11	673	35	19	42	.9	131	6.5
Feb. 18-20, 27-28------	4,086	12		4.5	2.8	6.2	1.2	20	7.4	9.8	--	.8		55	.07	607	23	6	36	.6	85	6.1
Feb. 21-26----------	4,695	11		3.2	2.1	4.2	1.2	14	5.8	6.5	--	.8		42	.06	532	17	5	33	.4	59	5.8
Mar. 1-10----------	4,317	14		5.8	3.2	7.9	1.2	21	11	12	--	1.0		66	.09	769	28	10	37	.6	103	6.3
Mar. 11-16----------	2,275	13		7.5	4.8	13		26	18	19	--	.8		89	.12	547	38	17	43	.9	147	6.6
Mar. 17----------	3,640	--		--	--	--		24	--	11	--	--		--	--	--	24	4	--	--	88	6.7
Mar. 18-21----------	4,178	11		3.8	1.8	4.1	1.4	15	5.2	6.5	--	1.0		42	.06	474	17	5	32	.4	59	6.0
Mar. 22-31----------	6,029	13		5.2	2.9	7.0	1.5	20	10	10	--	.8		60	.08	977	25	8	36	.6	92	6.2
Apr. 1-15----------	4,560	14		4.0	3.8	7.8	1.3	23	10	10	--	.8		63	.09	776	26	7	38	.7	97	6.1
Apr. 16-21----------	2,062	15		5.2	4.0	13		27	12	15	--	1.0		78	.11	434	29	7	48	1.0	121	6.1
Apr. 22-30----------	1,162	15		6.2	4.7	20		30	16	25	--	1.0		103	.14	323	35	10	55	1.5	170	5.9
May 1-2----------	925	17		8.0	4.1	20		b39	14	24	--	.0		106	.14	265	37	4	54	1.4	171	9.0
May 3-4----------	1,710	14		5.5	1.5	7.4		20	7.2	7.5	--	1.8		55	.07	254	20	3	45	.7	76	6.5
May 5-7----------	1,460	17		6.5	3.4	11	2.3	28	13	13	--	.8		81	.11	319	30	7	42	.9	119	7.1
May 8-18----------	1,350	17		8.5	5.1	20		27	18	31	--	.0		113	.15	412	42	20	50	1.3	193	8.2
May 19-25, 28-30-------	421	16		7.8	4.9	18		34	16	24	--	.2		104	.14	118	40	12	50	1.2	169	6.4
May 26-27, 31----------	329	20		9.5	4.0	25		33	16	36	--	.8		127	.17	113	40	13	58	1.7	219	7.2

a Residue on evaporation at 180°C.
b Includes the equivalent of 14 parts per million of carbonate (CO_3).

370. ANGELINA RIVER NEAR LUFKIN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-10, 1961	224	16		7.2	4.2	21		34	15	27	--	0.2		108	0.15	65.3	35	7	57	1.5	176	7.8
June 11-20	404	19		6.5	3.9	18		28	15	22	--	1.0		99	.13	108	32	9	54	1.4	149	6.2
June 21-30	2,907	13		6.2	3.5	15		12	21	22	--	.0		87	.12	683	30	20	52	1.2	142	6.0
July 1-10	2,189	16		8.0	4.3	22		24	16	34	--	.2		112	.15	662	38	18	55	1.6	185	6.4
July 11-25	850	18		8.2	4.4	23		29	17	33	--	.8		118	.16	271	39	15	57	1.6	191	6.2
July 26-31	571	17		7.0	3.5	18		28	15	23	--	.2		98	.13	151	32	9	55	1.4	155	6.4
Aug. 1-14	276	21		8.5	4.8	26		33	15	38	0.3	.5		130	.18	96.9	41	14	58	1.8	222	6.3
Aug. 15-31	139	20		7.2	3.9	20		35	13	24	.3	.8		106	.14	39.8	34	5	56	1.5	166	6.3
Sept. 1-12	136	18		7.0	3.7	23		32	12	31	.2	.8		112	.15	41.1	33	6	61	1.7	184	6.9
Sept. 13	656	13		--	--	20		23	14	24	.2	.8		--	--	--	24	5	65	1.8	145	6.9
Sept. 14-17	1,490	13		3.5	2.0	11		10	15	11	.2	.5		61	.08	245	17	9	58	1.2	90	6.1
Sept. 18-30	1,143	16		7.5	3.9	28		12	20	46	.2	.2		128	.17	395	35	25	64	2.1	223	6.2
Weighted average	2,353	14		5.2	3.3	12		18	13	17	--	0.6		74	0.10	470	26	12	50	1.0	116	--

410. NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado & Santa Fe Railway Co. bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek and at mile 55.
DRAINAGE AREA.-- 7,952 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1961.
Water temperatures: October 1947 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 128 ppm Oct. 1-10; minimum, 46 ppm Jan. 11-20.
Hardness: Maximum, 42 ppm June 1-15; minimum, 14 ppm Jan. 11-20.
Specific conductance: Maximum daily, 264 micromhos Nov. 13; minimum daily, 68 micromhos Jan. 15.
Water temperatures: Minimum, 44°F Jan. 28-31.
EXTREMES, 1947-61.--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, Oct. 27-31, 1957, Sept. 21-22, 24, 1958, Jan. 11-20, 1961.
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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-10, 1960	1,966	15		8.8	3.8	28		35	18	36	0.2	0.8		128	0.17	679	38	9	62	2.0	223	6.8
Oct. 11-18	2,921	14		7.8	3.4	27		32	17	34	.2	.8		120	.16	946	34	8	64	2.0	204	6.6
Oct. 19-30	2,131	9.6		7.0	3.0	25		24	15	34	.1	.8		106	.14	610	30	10	64	2.0	193	6.3
Oct. 31, Nov. 1-10	3,674	11		7.2	3.0	16		20	14	23	.1	.8		85	.12	843	30	14	53	1.3	145	6.4
Nov. 11-18	2,599	13		8.0	3.7	22		23	18	32	.1	.5		108	.15	758	35	16	58	1.6	189	6.2
Nov. 19-30	6,556	12		7.0	3.2	15		18	16	22	.1	.5		85	.12	1,500	30	16	52	1.2	141	6.0
Dec. 1-14	8,866	13		6.5	2.4	16		17	18	20	.3	.2		84	.11	2,010	26	12	58	1.4	135	6.3
Dec. 15-24	22,990	12		4.5	1.7	12		10	15	14	.2	.2		65	.09	4,030	18	10	59	1.2	100	5.8
Dec. 25-31	32,140	10		5.0	1.8	14		9	15	20	.2	.2		70	.10	6,070	20	12	61	1.4	122	5.7
Jan. 1-10, 1961	23,520	9.8		4.0	1.6	11		9	13	14	.1	.2		58	.08	3,680	16	9	60	1.2	96	5.9
Jan. 11-20	35,650	8.7		3.5	1.5	6.7	1.7	9	11	8.5	.1	.2		46	.06	4,430	14	7	47	.8	75	5.9
Jan. 21-31	33,740	10		4.5	2.0	8.4	2.2	10	15	12	.1	.2		59	.08	5,370	19	11	46	.8	96	5.9
Feb. 1-10	17,470	12		6.5	2.4	19		12	20	25	.2	.5		92	.13	4,340	26	16	61	1.6	154	6.2
Feb. 11-16	14,380	12		7.2	2.7	17		16	21	21	.2	.2		89	.12	3,460	29	16	55	1.4	148	6.6
Feb. 17-28	20,830	9.6		5.2	1.7	13		14	16	14	.2	.2		67	.09	3,770	20	8	58	1.3	110	6.1
Mar. 1-9	19,690	11		6.0	2.5	14		18	18	16	.2	.5		77	.10	4,090	28	12	52	1.2	125	6.2
Mar. 10-16, 18-22	14,980	12		8.2	3.3	17		22	19	22	.2	.5		93	.13	3,760	34	16	51	1.3	155	6.1
Mar. 17	13,400	--		--	--	--		50	--	24	--	--		--	--	--	36	0	--	--	220	7.0
Mar. 23-31	21,970	7.5		5.8	2.4	12		18	14	14	.2	.5		65	.09	3,860	24	10	51	1.1	114	6.0
Apr. 1-10	17,320	9.0		6.0	3.1	19		24	17	21	.1	.8		90	.12	4,210	28	8	60	1.6	143	5.9
Apr. 11-20	17,680	11		5.2	2.8	17		22	15	18	.1	.8		81	.11	3,870	24	6	60	1.5	130	5.9
Apr. 21-30	7,155	12		7.2	3.5	21		28	18	24	.1	.5		100	.14	1,930	32	10	59	1.6	163	6.0
May 1-10	5,314	16		8.8	4.1	24		34	19	28	.1	1.0		118	.16	1,690	39	11	57	1.7	187	6.4
May 11-20	4,023	15		8.2	4.0	23		32	18	27	.1	1.0		112	.15	1,220	37	11	57	1.6	185	6.8
May 21-31	2,176	15		8.8	4.1	25		34	19	30	.1	1.0		120	.16	705	39	11	59	1.7	195	6.5
June 1-15	1,427	16		10	4.0	25		36	18	33	.2	.8		125	.17	482	42	12	57	1.7	207	6.7
June 16-23	2,691	13		9.2	3.4	22		30	16	30	.2	.8		110	.15	799	37	12	56	1.6	182	6.6
June 24-30	3,986	14		9.0	3.5	24		32	16	32	.2	.8		116	.16	1,250	37	11	58	1.7	191	6.5
July 1-15	7,825	13		8.0	2.9	19		19	20	26	.2	.8		99	.13	2,090	32	16	57	1.5	160	5.8
July 16-31	4,072	13		8.2	2.7	17		22	15	24	.2	.8		92	.13	1,010	32	14	54	1.3	150	5.9
Aug. 1-15	1,781	17		9.0	3.2	19		32	14	24	.3	1.0		104	.14	500	36	10	54	1.4	163	6.8
Aug. 16-31	1,566	18		9.0	3.4	21		37	14	26	.3	.8		110	.15	465	36	6	56	1.5	180	6.1
Sept. 1-13	1,103	19		9.5	3.4	23		40	13	28	.3	.5		117	.16	348	38	4	57	1.6	189	6.3
Sept. 14-15	5,565	15		6.5	2.5	19		24	11	25	.3	.8		92	.13	1,380	26	7	61	1.6	148	6.5
Sept. 16-19	12,850	13		5.5	2.1	17		20	10	22	.3	.8		81	.11	2,810	22	6	63	1.6	133	6.1
Sept. 20-30	4,456	15		6.0	2.2	14		21	12	16	.3	.8		76	.10	914	24	7	55	1.2	112	6.2
Weighted average	10,410	11		5.8	2.4	15		17	16	18	0.2	0.4		77	0.10	2,160	24	10	57	1.3	126	--

MISCELLANEOUS ANALYSES OF STREAMS IN NECHES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
BIG TURKEY CREEK AT WOODVILLE																						
Sept. 15, 1961---------		13		5.2	1.0	5.2	1.8	15	5.4	9.0	0.1	0.0		48	0.07		17	5	37	0.5	66	5.9
LITTLE CYPRESS CREEK AT U. S. HIGHWAY 190 NEAR WOODVILLE																						
Sept. 15, 1961---------		11		5.1	1.3	4.5	1.7	16	4.4	8.2	0.1	0.0		44	0.06		18	5	33	0.5	65	5.9
415. VILLAGE CREEK NEAR KOUNTZE																						
Sept. 14, 1961---------	2,920	6.2		2.8	1.0	9.4	1.0	3	2.8	19	0.1	0.0		43	0.06		11	9	62	1.2	81	5.2

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 1961.
Water temperatures: October 1954 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 701 ppm Nov. 1-10; minimum, 233 ppm June 27-30.
Hardness: Maximum, 202 ppm Apr. 19-30; minimum, 112 ppm May 26.
Specific conductance: Maximum daily, 1,240 micromhos Nov. 9, Aug. 25; minimum daily, 298 micromhos June 27.
Water temperatures: Maximum, 86°F on several days during August; minimum, 34°F Jan. 28-29.
EXTREMES, 1954-61.--Dissolved solids: Maximum, 1,800 ppm Aug. 21-31, 1956; minimum, 133 ppm Oct. 5, 1959.
Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 86 ppm Oct. 5, 1959.
Specific conductance: Maximum daily, 2,990 micromhos Oct. 13, 1956; minimum daily, 220 micromhos Oct. 5, 1959.
Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956, Dec. 23, 1958, Jan. 3, 1959, Jan. 28-29, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-13, 1960-------	261	14		52	5.1	150		176	146	108		36		625	0.85	440	150	6	68	5.3	994	6.9
Oct. 14-15----------	1,605	--		54	2.7	41		153	53	33		10		--	--	--	146	20	38	1.5	480	6.9
Oct. 16-31----------	344	13		52	4.7	138		174	136	94		40		584	.79	542	149	6	67	4.9	930	6.7
Nov. 1-10----------	231	17		52	6.5	178		202	167	120		44		701	.95	437	156	0	71	6.2	1,120	7.2
Nov. 11-20----------	254	16		50	6.5	155		186	130	113		51		643	.87	441	152	0	69	5.5	1,020	7.0
Nov. 21-30----------	314	16		46	6.5	155		214	125	107		26		609	.83	516	142	0	70	5.7	991	7.0
Dec. 1-5----------	265	15		52	6.5	163		165	181	108		42		698	.95	499	156	21	69	5.7	1,110	6.5
Dec. 6, 8-17----------	4,246	10		45	3.0	32		127	51	22		7.6		243	.33	2,790	125	21	36	1.2	392	7.2
Dec. 7, 18-31----------	1,893	10		57	3.6	36		156	59	28		8.3		292	.40	1,490	157	29	33	1.2	480	7.0
Jan. 1-7, 1961---------	1,814	10		57	4.5	47		161	69	34		14		a314	.43	1,540	160	28	39	1.6	535	7.1
Jan. 8-12----------	9,746	9.5		48	4.0	25		128	56	16		6.5		239	.33	6,290	136	31	29	.9	388	7.3
Jan. 13-21----------	2,411	10		62	4.0	35		173	61	25		8.4		315	.43	2,100	171	29	31	1.2	496	7.2
Jan. 22-31----------	2,518	7.7		57	4.2	36		177	55	24		1.0		290	.39	1,970	159	14	33	1.2	468	7.4
Feb. 1-4, 6-7---------	2,732	9.9		62	4.5	46		166	74	36		11		347	.47	2,560	173	37	37	1.5	547	7.3
Feb. 5, 8-11, 19-20---	3,927	8.8		58	4.0	30		150	61	24		8.1		287	.39	3,040	161	38	29	1.0	452	7.1
Feb. 12-18----------	2,896	7.6		62	5.1	42		160	64	44		8.0		321	.44	2,510	176	44	34	1.4	526	7.4
Feb. 21-28----------	2,342	7.1		66	4.6	42		174	71	36		9.6		342	.47	2,160	184	41	33	1.3	547	6.8
Mar. 1-3----------	1,690	7.3		64	4.8	43		178	66	36		7.5		a317	.43	1,450	179	33	34	1.4	544	7.6
Mar. 4-12----------	1,007	9.2		71	5.2	68		202	97	54		4.4		440	.60	1,200	198	33	43	2.1	715	7.4
Mar. 13-18----------	2,423	7.9		62	4.6	43		172	72	35		2.8		340	.46	2,220	174	33	35	5.6	562	8.0
Mar. 19-31----------	4,858	8.3		57	3.9	37		158	56	34		4.0		286	.39	3,750	158	29	34	1.3	484	7.2
Apr. 1-18----------	2,417	9.0		64	4.6	39		180	60	34		7.4		320	.44	2,090	178	31	32	1.3	514	7.4
Apr. 19-30----------	770	12		72	5.6	78		204	94	65		18		462	.63	960	202	36	45	2.4	743	7.5
May 1-15----------	1,029	7.2		60	5.8	59		177	80	50		2.3		a351	.48	975	174	28	42	1.9	624	7.8
May 16-25, 27-31------	746	6.4		57	6.1	70		176	90	56	0.7	.2		a373	.51	751	167	23	48	2.4	681	7.5
May 26----------	1,470	--		42	--	--		124	--	24		--		--	--	--	112	10	--	--	393	7.7
June 1-7----------	453	13		59	6.0	113		181	115	93		23		a511	.69	625	172	23	59	3.8	857	7.6
June 8-15----------	561	12		55	5.3	98		165	99	83		20		492	.67	745	159	24	57	3.4	773	6.9
June 16-26----------	2,320	13		54	4.0	56		150	75	44		13		355	.48	2,220	151	28	45	2.0	550	7.2
June 27-30----------	7,958	11		46	3.4	27		135	42	20		4.9		233	.32	5,010	129	18	31	1.0	362	7.2
July 1-9----------	1,509	11		54	5.1	50		164	66	39		8.1		320	.44	1,300	156	21	41	1.7	527	7.2
July 10-20----------	553	9.7		59	5.6	87		188	96	66		14		448	.61	669	170	16	53	2.9	731	7.2
July 21-31----------	501	11		55	5.4	108		182	112	82		16		490	.67	663	159	10	60	3.7	820	6.6
Aug. 1-18----------	397	15		51	5.8	116		114	111	90		22		a497	.68	533	151	8	62	4.1	846	7.6
Aug. 19-25----------	431	14		54	6.3	171		186	196	110		25		a667	.91	776	160	8	70	5.9	1,100	7.6
Aug. 26-31----------	389	11		48	5.9	96		168	82	83		16		a425	.58	446	144	7	59	3.5	747	7.1
Sept. 1-13----------	470	14		49	6.0	130		170	124	100		25		572	.78	726	147	8	66	4.7	894	7.2
Sept. 14-20----------	704	10		49	5.0	84		145	96	64		20		427	.58	812	143	24	56	3.1	673	7.0
Sept. 21-30----------	344	14		55	6.1	135		185	124	109		27		607	.83	564	162	10	64	4.6	955	6.9
Weighted average----	1,582	9.7		56	4.3	49		159	69	38		9.0		328	0.45	1,400	157	26	40	1 7	534	--

a Calculated from determined constituents.

645. CHAMBERS CREEK NEAR CORSICANA, TEX.

LOCATION.--At gaging station at bridge on State Highway 31, 500 feet upstream from St. Louis Southwestern Railway Lines bridge, 6 miles east of Corsicana, Navarro County, and 17 miles upstream from Richland Creek.
DRAINAGE AREA.--971 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961.
Water temperatures: September 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 1-10, 1961	0.70	10		64	4.4	39		176	69	32	0.6	0.5		320	0.44	0.60	178	34	33	1.3	508	7.3
Sept. 11-18	88.7	11		62	4.3	39		164	75	29	.6	2.8		320	.44	76.6	172	38	33	1.3	502	7.2
Sept. 19-30	9.70	9.4		86	5.5	54		152	161	41	.6	2.8		458	.62	12.0	237	112	33	1.5	687	7.1

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 1961.
Water temperatures: April 1956 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 7,900 ppm Oct. 1; minimum, 102 ppm Jan. 19.
Hardness: Maximum, 355 ppm Aug. 24-29; minimum, 60 ppm Jan. 19.
Specific conductance: Maximum daily, 13,100 micromhos Oct. 1; minimum daily, 166 micromhos Jan. 9.
Water temperatures: Maximum, 99°F Aug. 14; minimum, 40°F Jan. 30.
EXTREMES, 1956-61.--Dissolved solids: Maximum, 13,500 ppm Aug. 11-31, 1956; minimum, 102 ppm Jan. 19, 1961.
Hardness: Maximum, 460 ppm Oct. 18, 1956; minimum, 60 ppm Jan. 19, 1961.
Specific conductance: Maximum daily, 22,000 micromhos Aug. 22, 1956; minimum daily, 157 micromhos Apr. 25, 1957.
Water temperatures: Maximum, 99°F Aug. 14, 1961; 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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1, 1960		--		--	--	--		404	--	4,460	--	--		7,900	10.8		254	0	--	--	13,100	7.6
Oct. 17-18		9.2		39	5.1	268		127	53	382	0.5	2.0		899	1.22		118	14	83	11	1,520	7.7
Oct. 19		--		--	--	--		249	--	1,340	--	--		--	--		231	27	--	--	4,560	7.6
Oct. 20-21		9.4		37	3.3	39		118	38	36	.5	1.8		236	.32		106	9	44	1.6	379	7.6
Oct. 22, 24-26, 29-31, Nov. 1-2		12		40	3.5	72		122	35	94	.4	1.8		344	.47		114	14	58	2.9	573	7.4
Nov. 3-4, 6		14		63	7.9	370		176	69	550	.4	2.0		1,160	1.58		190	46	81	12	2,140	7.6
Nov. 7, 10-16		13		64	12	981		248	46	1,480	.6	2.5		2,720	3.70		209	6	91	30	4,940	7.8
Nov. 8-9		--		--	--	--		237	--	1,030	--	--		--	--		223	29	--	--	3,630	7.6
Nov. 18-21		11		33	6.1	339		151	29	488	.5	1.0		a982	1.34		108	0	87	14	1,850	7.6
Nov. 23-27		13		38	4.6	80		120	40	104	.4	1.5		360	.49		114	16	60	3.3	613	7.5
Nov. 30		--		--	--	--		190	--	425	--	--		--	--		191	36	--	--	1,750	7.7
Dec. 1-4, 6		14		81	11	667		268	61	1,000	.6	3.2		1,970	2.68		247	28	85	18	3,530	7.8
Dec. 7-8		11		27	2.4	118		131	17	146	.5	2.5		407	.55		78	0	77	5.8	712	7.5
Dec. 9-15		11		28	2.2	17		91	21	12	.4	2.2		a139	.19		79	4	32	.8	239	7.5
Dec. 17-18		12		44	3.3	36		131	34	39	.4	3.2		a236	.32		123	16	39	1.4	400	7.6
Jan. 4-5, 7, 1961		11		65	4.4	52		170	59	62	.3	4.8		362	.49		180	40	39	1.7	596	7.6
Jan. 8, 9 at 5:30 p.m., 10		12		24	1.7	14		82	14	9.8	.3	1.0		a117	.16		67	0	31	.7	200	7.2
Jan. 9 at 5:20 p.m.		--		--	--	--		147	--	23	--	--		--	--		143	23	--	--	395	7.6
Jan. 12, 16		14		39	2.7	13		115	28	7.5	.3	2.2		177	.24		108	14	21	.5	276	7.5
Jan. 17-18, 25-27		14		50	3.7	28		144	41	26	.3	3.0		247	.34		140	22	30	1.0	400	7.4
Jan. 19		--		--	--	--		76	--	8.5	--	--		a102	.14		60	0	--	--	175	7.2
Jan. 20-23, 29-31		15		82	5.2	56		216	65	69	.3	6.3		417	.57		226	49	35	1.6	696	7.7
Feb. 1, 3, 5-6		13		68	5.5	66		162	81	79	--	8.2		430	.58		192	59	43	2.1	687	7.9
Feb. 7-10		10		42	2.8	23		134	27	18	--	2.8		a192	.26		116	6	30	.9	332	7.3
Feb. 12-14		12		63	3.8	31		173	51	29	--	5.6		300	.41		173	31	28	1.0	473	7.7
Feb. 28		--		--	--	--		230	--	78	--	--		--	--		248	60	--	--	768	7.8
Mar. 1-2		13		79	6.2	74		191	86	93	.4	7.0		473	.64		222	66	42	2.2	784	7.8
Mar. 6-16, 26		12		94	7.6	116		226	108	152	.3	6.7		634	.86		266	81	49	3.1	1,050	7.9
Mar. 17-21, 24		12		58	3.7	29	3.6	120	79	33	--	.2		a278	.38		160	62	28	1.0	457	6.0
Mar. 22-23, 27, 29 at 7 a.m.		8.1		54	4.6	47		149	49	57	.2	2.8		318	.43		154	32	40	1.6	528	7.5
Mar. 29 at 5:15 p.m.		--		--	--	--		106	20	9.8	--	--		--	--		92	5	--	--	251	7.5
Mar. 30-31		9.5		46	3.5	22		131	41	17	.3	1.5		222	.30		129	22	27	.8	351	7.5

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Apr. 1-3, 1961		11		60	5.3	35		164	52	42	0.5	0.2		312	0.42		172	37	31	1.2	500	7.7
Apr. 4-5, 7-10, 12		11		62	9.9	96		144	96	130	.4	1.8		513	.70		195	77	52	3.0	851	7.6
Apr. 16-22, 24-28		5.1		70	9.6	189		152	118	265	.5	2.8		791	1.08		214	90	66	5.6	1,350	7.6
May 1-6, 8-11, 14-16, 18-20		11		66	7.8	244		180	94	340	.5	1.2		878	1.19		196	49	73	7.6	1,540	7.6
May 22-25		9.2		74	12	495		184	135	720	.6	3.8		1,540	2.09		234	83	82	14	2,860	7.8
May 26		12		63	6.6	220		162	77	315	.5	3.8		a778	1.06		184	51	72	7.1	1,430	7.8
May 27-29		24		42	3.8	47		113	58	48	.6	.8		301	.41		120	28	46	1.9	472	7.5
May 31		14		51	3.9	119		142	56	158	.6	2.8		a475	.65		143	26	64	4.3	859	7.8
June 1-2		--		--	--	--		156	--	154	--	--		--	--		147	19	--	--	876	7.7
June 3-7, 9, 16-17		11		56	5.7	210		186	54	289	.7	3.0		751	1.02		163	10	74	7.2	1,350	7.5
June 18-21		11		35	3.1	20		106	29	16	.5	2.8		a169	.23		100	13	30	.9	292	7.3
June 23-24, 26-28, 30		13		51	4.0	29		134	55	25	.5	2.8		263	.36		144	34	30	1.0	413	7.5
July 2, 5-6		15		65	5.1	64		165	70	78	.4	2.8		394	.54		183	48	43	2.1	649	7.6
July 7-8		16		40	3.3	17		126	29	9.5	.5	1.5		188	.26		113	10	24	.7	291	7.5
July 9-12		16		52	4.3	53		140	54	63	.5	1.2		333	.45		147	32	44	1.9	538	7.6
July 15		--		68	5.4	--		186	65	134	--	--		--	--		192	39	--	--	851	7.5
July 17-19		10		88	9.1	444		238	103	652	.5	1.0		1,420	1.93		257	62	79	12	2,530	7.7
Aug. 13-15, 17		11		78	13	884		226	90	1,340	.6	1.0		2,530	3.44		248	63	89	24	4,570	8.0
Aug. 18-21		10		50	5.6	251		157	50	362	.5	1.5		831	1.13		148	20	79	9.0	1,500	7.8
Aug. 22-23		7.2		72	8.1	420		215	71	620	.6	1.8		1,310	1.78		213	37	81	13	2,430	7.8
Aug. 24-29		5.5		111	19	1,630		340	61	2,520	.7	--		4,510	6.13		355	76	91	38	7,960	7.7
Sept. 1-8		6.6		96	17	1,580		314	58	2,430	.8	--		4,340	5.90		310	52	92	39	7,690	7.8
Sept. 12-14, 16-21		14		58	5.8	165		162	77	220	.7	3.5		641	.87		168	36	68	5.5	1,090	7.9
Sept. 22		12		68	6.7	281		195	90	390	.8	3.5		a948	1.29		197	37	76	8.7	1,760	8.0
Sept. 23-30		8.1		78	12	837		254	72	1,260	.7	1.5		2,390	3.25		244	36	88	23	4,350	7.9

a Calculated from determined constituents.

665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado & Santa Fe Railway Co. 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 1961.
Water temperatures: February 1950 to September 1951, April 1953 to January 1959, March to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 665 ppm Sept. 1-11; minimum, 83 ppm Nov. 24-26.
Hardness: Maximum, 184 ppm Sept. 1-11; minimum, 38 ppm Nov. 24-26.
Specific conductance: Maximum daily, 1,410 micromhos Sept. 22; minimum daily, 134 micromhos Jan. 15.
Water temperatures: Maximum, 89°F Aug. 3, 12, 18-19.
EXTREMES, 1945-50, 1953-61.--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, 1961): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-2, 1960	725	10		52	7.0	129		182	57	162		1.8		508	0.69	994	158	10	64	4.5	912	8.0
Oct. 3-16	692	15		30	4.9	82		102	46	97		5.6		330	.45	617	95	12	65	3.7	595	7.3
Oct. 17-28	2,608	11		32	4.6	79		98	40	103		4.8		322	.44	2,270	99	18	63	3.5	599	7.3
Oct. 29-31	12,530	12		21	2.5	22		68	11	30		1.5		133	.18	4,500	63	8	43	1.2	238	7.1
Nov. 1-3	9,913	8.8		13	2.6	13		42	12	17		1.2		89	.12	2,380	43	8	40	.9	158	6.7
Nov. 4-12	2,241	16		30	4.2	54		94	28	73		1.8		253	.34	1,530	92	16	56	2.4	458	7.2
Nov. 13-20	3,405	11		22	2.6	33		61	23	44		1.8		167	.23	1,540	66	16	52	1.8	300	6.8
Nov. 21-23	20,330	12		16	2.2	21		48	16	27		.8		119	.16	6,530	49	10	48	1.3	206	6.7
Nov. 24-26	27,770	9.4		12	2.1	13		39	12	15		.8		83	.11	6,220	38	6	42	.9	143	6.7
Nov. 27-30	7,675	16		23	4.0	46		72	29	60		1.8		215	.29	4,460	74	15	58	2.3	391	6.9
Dec. 1-4	2,890	16		30	4.3	45		86	35	58		2.0		232	.32	1,810	92	22	51	2.0	410	6.9
Dec. 5-9	9,080	13		21	2.7	24		50	28	32		1.8		148	.20	3,630	64	22	45	1.3	253	6.8
Dec. 10-21	36,290	8.8		20	2.4	14		62	15	16		1.5		108	.15	10,580	60	9	33	.8	192	6.9
Dec. 22-31	21,730	12		32	3.3	25		88	30	31		1.8		178	.24	10,440	94	22	37	1.1	309	7.0
Jan. 1-7, 1961	12,930	13		30	3.2	28		80	31	35		1.8		181	.25	6,320	88	22	41	1.3	319	7.0
Jan. 8-16	40,720	8.6		16	1.6	12		46	15	13		.5		90	.12	9,890	46	9	35	.8	158	6.5
Jan. 17-23	41,600	11		31	2.6	16		93	25	14		.8		146	.20	16,400	88	12	28	.7	254	7.0
Jan. 24-31	22,520	12		36	3.6	30		99	38	35		1.5		205	.28	12,460	105	24	39	1.3	359	7.0
Feb. 1-9	9,678	14		46	5.0	37		118	51	46		3.0		a272	.37	7,110	136	39	38	1.4	456	7.5
Feb. 10-19	21,940	12		33	3.0	26		90	34	28		2.8		183	.25	10,840	95	21	37	1.2	315	7.1
Feb. 20-25	35,850	9.6		18	1.4	13		50	15	15		1.2		98	.13	9,490	51	10	35	.8	166	6.9
Feb. 26-28	29,170	--		--	--	--		98	--	26		--		--	--	--	98	18	--	--	301	7.1
Mar. 1-5	13,840	15		40	4.2	36		121	41	36		2.8		235	.32	8,780	118	18	40	1.4	374	6.8
Mar. 6-17	5,748	16		52	6.2	50		133	59	65		2.8		a331	.45	5,140	155	46	41	1.7	555	6.9
Mar. 18-31	14,700	12		39	4.4	33		97	45	42		2.8		226	.31	8,970	116	36	39	1.3	404	6.8
Apr. 1-13	12,850	17		44	4.6	40		138	41	41		2.5		258	.35	8,950	129	16	40	1.5	413	6.9
Apr. 14-23	4,429	17		53	6.0	52		142	53	68		2.8		a342	.47	4,090	156	40	42	1.8	560	7.1
Apr. 24-30	2,633	19		60	6.2	58		168	56	73		2.5		a380	.52	2,700	175	38	42	1.9	619	7.2
May 1-15	2,233	15		61	7.3	74		168	64	98		1.5		a428	.58	2,580	182	44	47	2.4	710	7.7
May 16-31	1,705	11		58	7.3	81		165	62	106		1.8		a426	.58	1,960	174	40	50	2.7	730	7.5
June 1-13	1,605	21		60	6.3	106		164	63	144		3.0		a501	.68	2,170	176	41	57	3.5	847	7.6
June 14-21	4,018	20		41	4.4	70		120	44	90		1.8		a346	.47	3,750	120	22	56	2.8	571	7.7
June 22-30	16,900	16		35	2.7	31		100	27	38		2.2		a219	.30	9,990	98	16	40	1.4	342	7.1

a Residue on evaporation at 180°C.

665. TRINITY RIVER AT ROMAYOR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-14, 1961	10,040	15		38	3.4	30		111	30	35		3.0		a223	0.30	6,050	109	18	37	1.2	347	7.2
July 15-26	3,369	14		40	4.2	43		110	38	56		2.8		a267	.36	2,430	118	28	44	1.7	431	6.9
July 27-31	2,038	7.5		52	5.6	74		145	53	98		1.0		a384	.52	2,110	152	34	51	2.6	645	7.3
Aug. 1-5	1,496	15		57	5.9	128		169	59	172		3.0		a541	.74	2,190	166	28	63	4.3	929	8.0
Aug. 6-12	1,223	13		40	4.3	60		130	37	72		1.5		a306	.42	1,010	118	11	53	2.4	513	7.7
Aug. 13-31	930	12		56	6.2	104		178	55	132		.5		a476	.65	1,200	165	19	58	3.5	809	7.8
Sept. 1-11	809	15		62	7.2	168		188	59	235		3.2		a665	.90	1,450	184	30	67	5.4	1,150	7.6
Sept. 12, 23-30	2,709	19		43	5.5	70		133	54	80		5.0		a363	.49	2,660	130	21	54	2.7	588	7.4
Sept. 13-17	21,840	11		16	1.2	23		52	15	25		1.0		118	.16	6,960	45	2	52	1.5	201	7.0
Sept. 18-20	5,917	13		23	3.0	58		64	27	80		2.2		237	.32	3,790	70	18	64	3.0	426	6.9
Sept. 21-22	3,580	18		42	6.4	186		111	48	276		6.1		a661	.90	6,390	132	40	75	7.0	1,160	7.6
Weighted average	10,440	12		30	3.2	29		87	29	34		1.8		185	0.25	5,210	88	16	42	1.3	315	--

a Residue on evaporation at 180°C.

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 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 528 ppm Sept. 3-9; minimum, 86 ppm Jan. 24.
Hardness: Maximum, 186 ppm Aug. 5-7; minimum, 44 ppm Sept. 18.
Specific conductance: Maximum daily, 1,280 micromhos Aug. 13; minimum daily, 146 micromhos Jan. 12.
EXTREMES, 1949-61.--Dissolved solids: Maximum, 3,930 ppm Aug. 26-31, 1956; minimum, 86 ppm Jan. 24, 1961.
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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-8, 1960		11		52	5.9	107		158	44	148	0.3	1.0		a467	0.64		154	24	60	3.7	814	7.5
Oct. 9-22		9.6		26	4.0	65		96	18	88	.3	.8		a281	.38		81	3	64	3.1	484	7.0
Oct. 23-31		9.8		35	3.7	82		94	29	121	.2	3.5		a336	.46		102	26	64	3.5	611	7.1
Nov. 1-2, 4-5, 7-10, 12-16		13		32	3.6	53		97	23	74	--	2.0		249	.34		95	15	55	2.4	453	7.3
Nov. 3, 6, 11, 17, 19-20, 30		11		21	2.1	36		67	19	43	--	3.8		169	.23		61	6	56	2.0	295	7.2
Nov. 21-29		9.4		17	1.8	26		50	17	32	--	2.2		130	.18		50	9	53	1.6	225	6.9
Dec. 1-10		11		16	2.6	16		41	19	22	--	1.0		108	.15		51	17	41	1.0	189	6.3
Dec. 11-20		10		20	2.4	16		59	16	21	--	1.0		115	.16		60	11	37	.9	211	6.5
Dec. 21-31		11		27	2.8	20		77	23	25	--	1.2		148	.20		79	16	36	1.0	258	6.5
Jan. 1-4, 1961		9.3		17	1.6	14		49	14	16	.3	1.0		97	.13		49	9	38	.9	171	6.6
Jan. 5-8		12		26	2.4	24		74	24	28	.4	1.0		154	.21		75	14	41	1.2	275	6.8
Jan. 9-16		8.6		16	1.6	12		47	13	14	.3	.5		89	.12		46	8	36	.8	158	7.0
Jan. 17-23, 25-30		10		32	2.4	20		92	27	20	.3	1.0		158	.21		90	14	33	.9	281	6.9
Jan. 24		--		--	--	--		47	--	13	--	--		86	.12		46	8	--	--	151	6.8
Feb. 1-11		11		40	4.8	34		92	47	48	--	2.8		233	.32		120	44	38	1.3	415	6.7
Feb. 12-20		8.1		26	2.5	19		70	22	24	--	1.8		137	.19		75	18	35	1.0	247	6.2
Feb. 21-28		8.7		25	2.1	19		68	22	23	--	1.8		135	.18		71	15	37	1.0	236	6.4
Mar. 2-9		14		41	4.6	32		110	38	42	--	3.0		229	.31		121	31	37	1.3	397	7.3
Mar. 10-16		17		53	6.1	47		140	54	60	--	4.2		a334	.45		157	42	39	1.6	545	7.5
Mar. 17, 19-25, 27-28, 30-31		11		38	4.2	30		96	42	38	--	2.8		213	.29		112	33	37	1.2	366	6.8
Apr. 1-13		13		43	4.5	31		124	38	36	--	1.2		a245	.33		126	24	35	1.2	399	6.9
Apr. 14-30		13		56	5.9	52		154	48	70	--	2.8		a342	.47		164	38	41	1.8	581	6.7
May 2-10		6.9		64	5.9	77		172	66	99	--	2.2		406	.55		184	43	48	2.5	736	7.2
May 11-13, 15-20		9.2		60	5.9	82		172	63	103	--	1.5		410	.56		174	33	51	2.7	744	7.1
May 21-31		2.5		62	6.3	85		178	60	110	--	1.5		415	.56		180	34	50	4.8	764	7.2
June 1-4, 6-16		7.9		60	7.0	99		176	58	134	--	1.0		a483	.66		178	34	55	3.2	813	7.2
June 17-30		12		31	2.9	36		90	25	46	--	3.2		200	.27		89	16	47	1.7	342	7.0
July 1-15		12		39	3.2	29		116	28	34	--	2.0		204	.28		110	15	36	1.2	351	7.4
July 16-31		11		41	3.9	42		117	30	57	--	2.8		a260	.35		118	22	44	1.7	432	6.8
Aug. 1-4		9.4		54	6.0	78		156	53	102	--	.8		a408	.55		159	31	51	2.7	682	6.9
Aug. 5-7		6.8		64	6.6	114		180	61	158	--	.8		500	.68		186	39	57	3.6	910	6.9
Aug. 8-15		7.9		45	5.0	52		142	28	70	--	1.8		a304	.41		133	16	46	2.0	519	6.9
Aug. 16-31		13		60	6.1	81		181	49	106	--	1.0		a420	.57		174	26	50	2.7	725	6.7
Sept. 1-2		12		40	4.4	58		132	29	75	--	.5		284	.39		118	10	52	2.3	509	7.3
Sept. 3-9		12		58	6.0	124		180	50	169	--	.8		a528	.72		169	22	61	4.1	924	7.5
Sept. 10-14		9.5		26	3.4	62		84	20	88	--	.5		a266	.36		79	10	63	3.0	467	7.3
Sept. 15-17, 19-22		10		16	1.8	25		54	14	29	--	3.2		126	.17		47	3	54	1.6	219	7.1
Sept. 18		11		--	--	24		54	15	24	--	2.2		--	--		44	0	54	1.6	196	7.2
Sept. 23-30		15		32	3.2	71		105	29	92	--	1.5		a318	.43		93	7	62	3.2	532	7.2

a Residue on evaporation at 180°C.

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 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 887 ppm June 8-13; minimum, 104 ppm Dec. 14-18.
Hardness: Maximum, 232 ppm May 23-24; minimum, 47 ppm Dec. 14-18.
Specific conductance: Maximum daily, 1,790 micromhos June 8; minimum daily, 156 micromhos Jan. 14.
EXTREMES, 1949-61.--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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-10, 1960		13		51	6.3	79		186	27	102		0.5		389	0.53		153	0	53	2.8	668	7.7
Oct. 11-14, 16-18		11		52	6.8	80		176	37	105		1.0		404	.55		158	14	52	2.8	686	7.7
Oct. 19		--		--	--	--		55	--	29		--		--	--		48	3	--	--	214	7.1
Oct. 20-21		7.8		26	2.9	34		88	18	42		.5		a174	.24		77	5	49	1.7	328	7.6
Oct. 22-31		13		22	3.1	27		75	19	32		.2		a153	.21		68	6	47	1.4	262	7.0
Nov. 1-15		16		26	3.5	26		85	14	36		.8		a164	.22		79	10	42	1.3	314	7.3
Nov. 16-30		18		27	3.7	30		90	18	38		.8		a180	.24		83	9	44	1.4	291	7.4
Dec. 1-13		18		27	3.6	29		95	13	38		.8		a176	.24		82	4	44	1.4	310	7.5
Dec. 14-18		11		16	1.8	17		51	9.0	23		.8		a104	.14		47	6	44	1.1	185	7.2
Dec. 19-31		12		20	2.2	25		71	11	30		.5		a136	.18		59	1	48	1.4	238	7.2
Jan. 1-7, 1961		15		20	2.6	25		80	10	28		.5		a140	.19		61	0	48	1.4	227	6.9
Jan. 8-17		15		17	2.0	18		65	7.2	20		.8		a112	.15		51	0	44	1.1	184	6.8
Jan. 18-31		15		22	2.5	23		84	8.2	27		.5		a139	.19		65	0	44	1.2	238	7.0
Feb. 1-14		14		25	2.9	26		84	12	34		.8		a156	.21		74	5	43	1.3	274	6.9
Feb. 15-28		14		21	2.4	23		77	8.4	28		.8		a136	.18		62	0	44	1.3	231	7.0
Mar. 1-13		14		27	3.3	25		102	7.6	31		.8		a159	.22		81	0	40	1.2	279	7.2
Mar. 14-31		14		35	4.5	34		123	12	46		.8		a206	.28		106	5	41	1.4	372	7.2
Apr. 1-15		13		38	5.0	41		121	21	58		.8		255	.35		115	16	43	1.7	423	7.3
Apr. 16-30		13		47	5.4	44		139	34	60		1.0		290	.39		139	26	41	1.6	486	7.6
May 1-6		13		54	6.4	50		163	43	64		1.8		326	.44		161	28	40	1.7	555	7.3
May 7-10		11		59	9.7	94		166	55	139		1.2		461	.63		187	51	52	3.0	825	7.3
May 11-13		6.1		60	7.1	67		172	58	87		1.0		372	.51		178	38	45	2.2	668	7.4
May 14-22		7.2		64	8.8	102		180	66	142		2.2		489	.67		196	48	53	3.2	871	7.5
May 23-24		11		70	14	157		179	74	248		1.0		a663	.90		232	86	60	4.5	1,220	7.9
May 25-31		6.6		56	7.6	82		153	59	115		1.5		421	.57		171	46	51	2.7	741	7.4
June 1-7		9.6		63	11	127		170	67	190		1.8		572	.78		202	62	58	3.9	1,010	7.7
June 8-13		5.8		63	18	220		142	88	355		1.0		887	1.21		231	114	67	6.3	1,510	7.2
June 14-19		14		58	8.6	108		156	60	159		1.2		504	.69		180	52	57	3.5	875	7.6
June 20-30		16		23	3.2	30		83	15	37		1.2		178	.24		71	3	48	1.5	286	6.9
July 1-7		18		25	3.3	25		84	15	32		1.0		175	.24		76	7	42	1.2	272	6.9
July 8-13		21		37	4.5	40		129	24	46		1.5		256	.35		111	5	44	1.7	409	7.2
July 14-19		25		28	3.8	28		107	15	30		1.0		202	.27		86	0	42	1.3	302	7.1
July 20-31		24		41	4.4	37		135	23	46		1.2		253	.34		120	10	40	1.5	408	7.5
Aug. 1-10		16		47	5.4	54		149	32	71		1.0		310	.42		140	18	46	2.0	528	7.4
Aug. 11-20		12		52	6.5	84		162	37	118		.8		392	.53		156	23	54	2.9	702	7.2
Aug. 21-31		12		52	7.3	87		158	37	127		1.0		407	.55		160	30	54	3.0	729	7.0
Sept. 1-9		13		65	12	166		158	59	270		1.5		723	.98		212	82	63	5.0	1,230	7.1
Sept. 10-17		10		34	8.3	100		84	32	165		1.0		415	.56		119	50	65	4.0	738	7.0
Sept. 18-19		--		--	--	--		84	19	96		--		--	--		88	19	--	--	480	7.2
Sept. 20-30		16		29	4.1	34		111	9.6	44		.8		204	.28		89	0	45	1.6	334	7.1

a Calculated from determined constituents.

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 1961.
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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 5, 1960		--		--	--	--		203	--	252		--		--	--		187	20	--	--	1,230	7.3
Oct. 12		--		--	--	--		136	--	228		--		--	--		164	52	--	--	1,070	7.6
Oct. 19		--		--	--	--		177	--	870		--		--	--		380	235	--	--	3,240	7.8
Nov. 2		--		--	--	--		69	--	34		--		--	--		65	8	--	--	284	7.4
Nov. 7		--		--	--	--		79	--	56		--		--	--		83	17	--	--	375	6.9
Nov. 9		--		--	--	--		69	--	68		--		--	--		72	15	--	--	381	7.2
Nov. 18		--		--	--	--		116	--	100		--		--	--		111	16	--	--	574	7.7
Nov. 23		--		--	--	--		48	--	46		--		--	--		53	14	--	--	271	7.0
Nov. 30		--		--	--	--		52	--	35		--		--	--		55	12	--	--	241	7.0
Dec. 15		--		--	--	--		50	--	28		--		--	--		52	11	--	--	209	6.8
Dec. 22		--		--	--	--		74	--	18		--		--	--		69	8	--	--	221	6.9
Dec. 28		--		--	--	--		78	--	22		--		--	--		79	15	--	--	260	6.8
Jan. 4, 1961		--		--	--	--		64	--	35		--		--	--		76	24	--	--	287	7.1
Jan. 11		--		--	--	--		58	--	28		--		--	--		64	16	--	--	235	7.0
Jan. 18		--		--	--	--		48	--	17		--		--	--		49	10	--	--	165	7.0
Jan. 26		--		--	--	--		30	--	38		--		--	--		36	11	--	--	195	6.7
Feb. 1		--		--	--	--		103	--	36		--		--	--		104	20	--	--	351	7.0
Feb. 8		--		--	--	--		111	--	46		--		--	--		123	32	--	--	425	7.6
Feb. 22		--		--	--	--		71	--	26		--		--	--		76	18	--	--	255	7.5
Mar. 1		--		--	--	--		68	--	23		--		--	--		70	14	--	--	233	7.0
Mar. 4		--		--	--	--		112	--	44		--		--	--		122	30	--	--	431	7.4
Mar. 8		--		--	--	--		102	--	39		--		--	--		106	22	--	--	360	7.7
Mar. 15		--		--	--	--		130	--	64		--		--	--		148	42	--	--	536	7.7
Mar. 22		--		--	--	--		69	--	41		--		--	--		89	32	--	--	347	6.7
Apr. 3		--		--	--	--		124	--	50		--		--	--		131	29	--	--	443	7.6
Apr. 5		--		--	--	--		109	--	38		--		--	--		109	20	--	--	362	7.5
Apr. 7		--		--	--	--		115	--	26		--		--	--		111	17	--	--	342	7.6
Apr. 10		--		--	--	--		128	--	36		--		--	--		127	22	--	--	402	7.6
Apr. 12		--		--	--	--		119	--	44		--		--	--		126	28	--	--	430	7.6
Apr. 14		--		--	--	--		123	--	54		--		--	--		132	31	--	--	458	7.6
Apr. 17		--		--	--	--		116	--	68		--		--	--		132	37	--	--	498	7.6
Apr. 19		--		--	--	--		127	--	67		--		--	--		139	35	--	--	515	7.6
Apr. 24		--		--	--	--		148	--	77		--		--	--		159	38	--	--	605	7.7
Apr. 26		--		--	--	--		165	--	90		--		--	--		171	36	--	--	659	7.8
Apr. 28		--		--	--	--		170	--	97		--		--	--		177	38	--	--	696	7.8

673. TRINITY RIVER AT ANAHUAC, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1, 3, 1961		30		65	5.8	93		200	55	117		1.5		a465	0.63		186	22	52	3.0	767	8.1
May 5		--		--	--	--		172	--	600		--		--	--		320	179	--	--	2,430	7.9
May 8		--		--	--	--		132	--	39		--		--	--		94	0	--	--	346	8.0
May 10, 12		38		56	6.4	100		184	50	127		.8		a468	.64		166	15	57	3.4	791	8.0
May 15, 17, 19, 22, 24, 26, 29, 31		8.7		64	6.7	132		175	71	180		2.2		589	.80		187	44	61	4.2	997	7.5
June 2, 5, 7, 9, 12, 14, 16		10		65	9.7	158		178	76	225		3.0		658	.89		202	56	63	4.8	1,130	7.7
June 19, 21, 23, 26, 28, 30		13		28	3.7	45		81	24	65		1.0		237	.32		85	19	54	2.1	396	7.2
July 3, 7, 10, 12, 14		18		38	3.1	37		110	30	45		4.4		238	.32		108	17	43	1.5	388	7.0
July 17, 19, 21, 28, 31		17		38	3.5	49		109	28	68		2.2		263	.36		109	20	49	2.0	446	7.1
Aug. 2, 4, 7		19		53	6.2	84		152	47	118		.8		a403	.55		158	33	54	2.9	714	7.8
Aug. 9		12		66	3.8	139		173	62	195		.5		a563	.77		180	38	63	4.5	1,020	7.6
Aug. 11		--		--	--	--		86	19	74		--		--	--		74	--	--	--	404	7.4
Aug. 14, 17, 19, 21, 23		11		49	8.8	121		138	44	185		.5		492	.67		158	46	62	4.2	911	7.5
Aug. 25, 28, 30		16		62	17	228		163	76	360		1.2		881	1.20		224	91	69	6.6	1,540	7.8
Sept. 1		--		--	--	--		184	--	355		--		--	--		229	78	--	--	1,540	8.1
Sept. 8		--		--	--	--		b146	--	1,300		--		--	--		495	375	--	--	4,370	8.5
Sept. 11		--		--	--	--		163	--	211		--		--	--		169	36	--	--	1,020	8.2
Sept. 15		--		--	--	--		69	--	590		--		--	--		232	176	--	--	2,070	7.6
Sept. 18, 20		17		23	14	143		64	40	235		.5		a504	.69		115	62	73	5.8	938	7.9
Sept. 25, 27, 29		13		41	19	244		102	63	398		1.1		a829	1.13		180	97	75	7.9	1,320	8.0

a Calculated from determined constituents.
b Includes the equivalent of 14 parts per million of carbonate (CO_3).

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

LOCATION.--At four sampling stations in Trinity Bay opposite mouth of Trinity River near Anahuac, Chambers County. Station 2- In Anahuac Channel immediately below delta. Station 3- In Anahuac Channel about 1½ miles southwest of Station 2. Station 6- In Anahuac Channel at south end. Station 7- In Trinity Bay about 1½ miles west of Station 6.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1961.

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1960 to September 1961

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 5, 1960	1,310	272	1,320	272	1,330	278	1,740	408
Oct. 12	2,760	750	3,680	1,030	4,190	1,200	4,740	1,370
Oct. 19	4,750	1,360	4,670	1,330	5,920	1,780	10,900	3,450
Oct. 26	856	185	855	182	856	182	855	182
Nov. 2	260	35	263	36	263	34	263	34
Nov. 7	377	56	398	58	375	57	374	57
Nov. 9	383	67	381	68	382	67	410	75
Nov. 18	574	100	576	101	582	102	575	101
Nov. 23	271	45	276	46	276	47	269	44
Nov. 30	241	38	240	36	240	37	241	37
Dec. 15	208	28	206	28	208	28	208	29
Dec. 22	222	18	220	19	218	19	221	19
Dec. 28	259	24	260	24	257	22	259	23
Jan. 4, 1961	292	36	288	35	288	35	287	34
Jan. 11	235	26	242	27	234	26	235	26
Jan. 18	165	16	166	17	165	17	165	17
Jan. 26	195	38	194	38	194	38	195	39
Feb. 2	350	34	350	34	353	34	352	34
Feb. 8	427	44	426	44	423	44	425	44
Feb. 15	336	32	345	32	336	33	334	33
Feb. 22	252	24	255	24	253	24	250	24
Mar. 1	231	22	234	22	234	22	233	22
Mar. 8	359	36	359	36	360	36	359	36
Mar. 15	543	62	534	62	538	62	529	62
Mar. 22	345	37	345	37	346	37	344	37
Apr. 3	457	52	439	54	432	51	430	53
Apr. 5	363	37	375	37	358	38	389	44
Apr. 7	340	26	342	26	344	26	338	26
Apr. 10	539	65	406	37	406	38	409	38
Apr. 12	437	46	434	47	441	47	433	47
Apr. 14	463	54	467	55	463	54	462	55
Apr. 17	489	69	490	68	484	69	493	68
Apr. 19	521	72	525	72	521	71	519	69
Apr. 24	608	80	600	80	605	80	603	80
Apr. 26	655	91	663	91	661	92	663	91
Apr. 28	705	99	701	100	701	98	699	98
May 1	765	112	763	115	786	116	767	116
May 3	829	132	848	132	1,650	390	1,110	218
May 5	432	43	431	44	428	44	432	44
May 7	1,170	210	--	--	--	--	--	--
May 8	350	40	520	84	378	52	567	85
May 10	756	116	764	118	735	109	735	110
May 12	429	51	868	138	900	150	991	178
May 15	1,030	180	1,020	182	1,050	188	1,070	198
May 17	--	--	--	--	1,180	212	1,140	200
May 19	832	130	853	132	894	142	928	155
May 22	1,030	192	1,040	192	--	--	1,210	248
May 24	1,030	195	1,100	212	1,110	218	1,170	235
May 26	954	178	968	180	1,080	210	1,170	238
May 29	848	135	846	138	1,120	218	1,240	255
May 31	974	165	954	162	949	138	1,170	228
June 2	1,070	205	1,030	192	1,040	195	1,040	195
June 5	840	139	823	131	805	126	766	116
June 7	809	120	851	135	2,310	580	3,010	800
June 9	1,580	352	1,630	370	1,590	355	4,490	1,290
June 12	1,100	215	1,110	218	1,100	215	2,040	500
June 14	1,240	258	1,240	252	1,280	268	1,700	398
June 16	1,270	260	1,280	262	1,270	260	1,290	270
June 19	483	85	478	86	478	85	480	86
June 21	396	67	382	66	382	65	388	65
June 23	443	72	442	73	446	72	445	73
June 26	374	59	374	58	374	58	381	61
June 28	377	53	383	54	382	54	379	54
June 30	321	56	318	55	318	56	321	57
July 3	356	42	354	43	355	44	354	43
July 7	350	34	358	35	351	34	352	33
July 10	405	45	402	47	400	45	400	45
July 12	458	58	461	58	459	58	459	58
July 14	331	38	335	38	334	38	340	38
July 17	347	49	351	50	348	50	348	49
July 19	437	65	437	65	442	64	443	64
July 21	400	56	404	57	401	57	403	57
July 24	522	83	518	84	514	83	520	84
July 28	480	76	479	76	478	74	481	72
July 31	550	86	550	86	549	86	550	87

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 1960 to September 1961--Continued

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Aug. 2, 1961	602	97	590	97	602	96	797	158
Aug. 4	717	118	720	120	704	119	686	121
Aug. 7	797	141	802	140	802	140	805	140
Aug. 9	1,020	205	1,060	208	1,020	208	1,080	210
Aug. 11	402	72	387	72	387	71	392	73
Aug. 14	804	157	845	164	820	163	980	223
Aug. 17	657	116	658	117	652	116	698	159
Aug. 19	1,200	275	903	278	1,160	302	1,310	310
Aug. 21	1,980	500	1,880	460	--	--	--	--
Aug. 23	1,150	245	1,150	250	--	--	1,530	362
Aug. 25	1,050	210	1,750	430	2,400	620	2,200	590
Aug. 28	1,550	368	1,580	390	1,800	442	2,350	600
Aug. 30	1,680	405	1,680	405	4,100	1,170	4,980	1,440
Sept. 1	3,730	1,030	2,970	780	4,960	1,450	5,430	1,600
Sept. 4	1,050	208	1,960	480	2,920	790	3,690	1,020
Sept. 8	5,180	1,500	5,250	1,550	6,980	2,120	7,410	2,280
Sept. 15	2,890	810	2,040	550	2,010	540	1,920	520
Sept. 18	1,290	330	1,130	290	953	235	1,550	410
Sept. 20	1,580	395	814	195	1,610	405	1,600	400
Sept. 25	1,450	365	1,440	365	1,510	382	1,270	312
Sept. 27	1,710	440	1,710	440	1,100	262	1,670	430

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
502. ELM FORK TRINITY RIVER SUBWATERSHED 6-0 NEAR MUENSTER																						
Mar. 2, 1961		3.9		77	4.9	52		160	49	100	0.3	2.5		369	0.50		212	81	35	1.6	674	7.3
June 14		9.1		76	5.4	58		167	47	104	.4	4.0		386	.52		212	74	37	1.7	697	7.7
Aug. 30		12		71	6.5	75		176	38	128	.5	1.0		a455	.62		204	60	44	2.3	759	6.9
503. ELM FORK TRINITY RIVER NEAR MUENSTER																						
Mar. 2, 1961	8.90	4.0		100	6.5	42		231	32	102	0.3	0.0		a430	0.58		276	86	25	1.1	726	7.5
Aug. 30	0	8.7		402	37	507		130	33	1,500	.3	.5		2,550	3.47		1,160	1,050	49	6.5	4,720	7.0

a Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
680. WEST FORK SAN JACINTO RIVER NEAR CONROE																						
Sept. 14, 1961	9,460	8.6		14	1.6	4.3	3.1	50	0.4	6.8	0.2	0.0		64	0.09		42	1	17	0.3	110	6.3
Sept. 21-30	127	20		31	3.3	23		97	6.8	38	.2	.0		170	.23	58.3	91	11	35	1.0	282	7.2
685. SPRING CREEK NEAR SPRING																						
Sept. 14, 1961	8,750	15		1.9	1.3	3.7	2.2	15	0.0	6.0	0.1	0.0		37	0.05		10	0	38	0.5	46	5.8
690. CYPRESS CREEK NEAR WESTFIELD																						
Sept. 14, 1961	4,980	5.8		3.5	1.3	5.7	2.9	17	3.6	8.5	0.2	0.0		40	0.05		14	0	41	0.7	64	5.9
700. EAST FORK SAN JACINTO RIVER NEAR CLEVELAND																						
Sept. 14, 1961	8,340	5.1		8.7	1.3	4.1	2.3	30	0.0	6.5	0.2	0.0		43	0.06		27	2	23	0.3	77	6.1
720. LAKE HOUSTON NEAR SHELDON																						
July 24, 1961		6.6	0.09	9.5	1.5	11	2.0	29	2.4	21	0.3	0.0		68	0.09		30	6	42	0.9	127	6.2

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 1961.
Water temperatures: November 1949 to November 1951, October 1956 to September 1961.
Sediment records: November 1949 to September 1951.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 6,450 ppm May 1-16; minimum, 761 ppm June 16-19.
Hardness: Maximum, 2,700 ppm May 1-16; minimum, 307 ppm June 16-19.
Specific conductance: Maximum daily, 9,250 micromhos May 6; minimum daily, 916 micromhos Oct. 19.
Water temperatures: Maximum, 97°F Aug. 14; minimum, 36°F Dec. 7.
EXTREMES, 1948-51, 1956-61.--Dissolved solids: Maximum, 6,450 ppm May 1-16, 1961; minimum, 636 ppm Oct. 22-28, 1957.
Hardness: Maximum, 2,700 ppm May 1-16, 1961; 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 (1949-51, 1956-61): Maximum, 97°F Aug. 14, 1961; minimum, freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957, Nov. 13, 1959, Feb. 24, 1960.
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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-14, 1960	a0.04	23		700	105	566		69	1,920	960	--	1.5		4,310	5.86	0.47	2,180	2,120	36	5.3	5,490	7.2
Oct. 15-17, 22-26	1,060	14		248	24	180		93	677	230	--	2.8		1,420	1.93	4,060	718	642	35	2.9	2,010	7.5
Oct. 18-21	14,820	12		117	16	109		92	350	108	--	2.8		799	1.09	31,970	358	282	40	2.5	1,150	7.4
Oct. 27-31	273	15		330	39	460		107	922	662	--	3.0		2,480	3.37	1,830	984	896	50	6.4	3,630	7.4
Nov. 1-10	116	18		410	72	768		107	1,160	1,200	--	2.0		3,680	5.00	1,150	1,320	1,230	56	9.2	5,480	7.3
Nov. 11-20	56.7	19		480	84	1,010		115	1,350	1,590	--	2.0		4,590	6.24	703	1,540	1,450	59	11	6,740	7.4
Nov. 21-30	37.8	15		530	92	1,160		126	1,480	1,830	--	2.0		5,170	7.03	528	1,700	1,600	60	12	7,550	7.4
Dec. 1-15	39.7	18		540	94	1,190		78	1,510	1,900	--	2.0		5,290	7.19	567	1,730	1,670	60	12	7,770	7.2
Dec. 16-31	36.2	14		520	90	1,100		126	1,480	1,710	--	2.5		4,980	6.77	487	1,670	1,560	59	12	7,230	7.4
Jan. 1-18	35.1	14		510	100	1,210		103	1,520	1,880	--	.5		5,290	7.19	501	1,680	1,600	61	13	7,490	6.8
Jan. 19-26	45.9	17		420	85	866		86	1,310	1,310	--	.0		4,050	5.51	502	1,400	1,330	57	10	5,830	7.6
Jan. 27-31	63.2	19		400	83	1,110		98	1,150	1,750	--	.0		4,560	6.20	778	1,340	1,260	64	13	6,810	7.5
Feb. 1-15	64.6	11		340	68	789		135	999	1,200	--	.0		3,470	4.72	605	1,130	1,020	60	10	5,250	7.4
Feb. 16-28	31.4	9.7		435	86	1,090		127	1,280	1,680	--	.0		4,640	6.31	393	1,440	1,340	62	13	6,860	7.5
Mar. 1-20	20.0	15		515	95	1,170		108	1,510	1,820	--	1.0		5,180	7.04	280	1,680	1,590	60	12	7,600	7.0
Mar. 21-25	13.8	13		555	98	1,250		122	1,580	1,950	--	2.0		5,510	7.49	205	1,790	1,690	60	13	8,010	7.1
Mar. 26-31	77.2	8.0		435	66	905		94	1,220	1,400	--	3.0		4,080	5.55	850	1,360	1,280	59	11	6,090	7.3
Apr. 1-12	12.5	12		585	78	995		93	1,560	1,590	--	.5		4,870	6.62	164	1,780	1,700	55	10	6,940	7.5
Apr. 13-30	3.02	17		730	115	1,280		77	2,040	2,050	--	--		6,270	8.53	51.1	2,290	2,230	55	12	8,650	7.3
May 1-16	.88	15		870	128	1,160		90	2,210	2,020	0.6	--		6,450	8.77	15.3	2,700	2,620	48	9.7	8,700	6.9
May 17-31	2.52	14		800	128	1,100		93	2,060	1,900	.5	1.0		6,050	8.23	41.2	2,520	2,450	49	9.5	8,230	6.8
June 1-2	.20	--		--	--	--		75	--	1,820	--	--		--	--	--	2,560	2,500	--	--	8,110	7.2
June 3, 5	524	18		411	31	293		74	1,020	470	.4	3.8		2,280	3.10	3,230	1,150	1,090	36	3.8	3,110	7.4
June 4, 6-12	1,736	19		236	19	109		100	582	152	.5	1.2		1,170	1.59	5,480	667	585	26	1.8	1,680	7.2
June 13-15	236	16		235	31	335		111	638	485	1.0	1.8		1,800	2.45	1,150	714	623	51	5.5	2,730	7.4
June 16-19	3,058	18		100	14	126		122	291	124	.8	1.8		761	1.03	6,280	307	207	47	3.1	1,150	6.9
June 20-22	374	20		150	20	257		115	434	330	.8	1.5		1,270	1.73	1,280	456	362	55	5.2	2,000	7.2
June 23-30	182	21		285	39	416		104	814	595	.8	1.8		2,220	3.02	1,090	872	786	51	6.1	3,270	6.7
July 1-3	62.3	20		370	65	739		97	1,080	1,130	--	.5		3,450	4.69	580	1,190	1,110	57	9.3	5,170	7.1
July 4-10	863	17		172	20	212		107	488	265	--	2.5		1,230	1.67	2,870	511	424	47	4.1	1,880	7.3
July 11-18	2,513	16		118	14	107		104	324	114	--	2.8		797	1.08	5,410	352	267	40	2.5	1,150	7.2
July 19-21	350	19		188	26	275		110	540	370	--	1.2		1,470	2.00	1,390	576	486	51	5.0	2,230	7.4
July 22-25	1,808	19		151	15	123		96	410	140	--	2.8		b908	1.23	4,430	438	360	38	2.6	1,360	7.2
July 26-31	186	18		268	40	467		115	776	670	--	1.2		2,300	3.13	1,160	833	739	55	7.1	3,420	7.3
Aug. 1-19	33.1	20		540	101	1,100		86	1,550	1,750	--	1.0		5,100	6.94	456	1,760	1,690	58	11	7,320	7.3
Aug. 20-23	288	13		187	18	165		84	514	208	--	2.0		1,150	1.56	894	540	472	40	3.1	1,710	7.5
Aug. 24-25	66.0	15		250	29	310		180	656	415	--	.5		1,760	2.39	314	743	596	48	5.0	2,540	8.0
Aug. 26-31	22.0	14		445	69	747		101	1,220	1,180	--	.2		3,730	5.07	222	1,390	1,310	54	8.7	5,420	7.4
Sept. 1-5	10.0	21		580	99	994		87	1,620	1,600	--	1.5		4,960	6.75	134	1,850	1,780	54	10	7,150	7.6
Sept. 6-13	61.5	16		248	41	421		130	746	580	--	1.5		2,120	2.88	352	788	681	54	6.5	3,630	7.5
Sept. 14-20	6.83	16		520	80	995		101	1,460	1,550	--	.5		4,670	6.35	86.1	1,630	1,540	57	11	6,740	7.3
Sept. 21-30	9.73	12		580	103	846		86	1,600	1,400	--	.5		4,580	6.23	120	1,870	1,800	50	8.5	6,500	7.5
Weighted average	398	15		168	21	185		100	472	237	--	2.4		1,180	1.60	1,270	506	424	44	3.6	1,720	--

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

812. CROTON CREEK NEAR JAYTON, TEX.

LOCATION.--At gaging station in Stonewall County, 300 feet upstream from county road ford, 1½ miles upstream from mouth and about 8 miles northeast of Jayton, Kent County.
DRAINAGE AREA.--310 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May 1959 to September 1961.
REMARKS.--Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
Oct. 17, 1960	54.2					454	6.8	62	1,440	680						1,480	1,430	40		4,600	7.3	--
Oct. 18	b4,980					130	4.1	58	1,380	182						1,430	1,380	16		2,700	7.6	--
Oct. 19	149					531	4.7	62	1,620	790						1,660	1,610	41		4,660	7.4	--
Oct. 26	12.7					4,180	--	--	2,620	6,840						3,110	--	75		20,600	--	1.009
Nov. 15	3.17					7,230	--	--	3,130	11,800						4,250	--	79		32,600	--	1.017
Jan. 4, 1961	2.69					8,640	--	--	3,300	13,900						4,420	--	81		36,900	--	1.019
Feb. 8	3.92					9,010	--	--	3,200	14,300						4,180	--	82		35,600	--	1.019
Mar. 8	.44					9,740	--	--	3,580	15,500						4,730	--	82		37,700	--	1.020
Apr. 5	.54					10,900	--	--	3,720	17,200						4,840	--	83		43,700	--	1.022
May 4	b782					721	9.0	87	1,770	1,090						1,820	1,750	46		5,760	7.4	--
May 8	5.81					2,140	--	--	2,340	3,260						2,510	--	65		12,300	--	1.004
May 13	.49					4,400	--	--	2,910	6,940						3,450	--	74		21,500	--	1.009
May 26	.49					6,440	--	--	3,300	10,400						4,240	--	77		29,400	--	1.014
May 27	.07					6,610	--	--	3,320	10,500						4,240	--	77		29,900	--	1.014
June 3	b17					6,120	--	--	2,890	9,780						3,560	--	79		27,800	--	1.012
June 4	b99					1,790	10	100	1,790	2,880						2,040	1,960	65		10,700	7.5	--
June 6	619					373	7.0	80	1,580	530						1,600	1,530	34		4,040	7.6	--
June 15	b398					1,330	8.8	73	1,790	2,060						1,940	1,880	60		8,570	7.2	--
June 16	179					613	7.0	83	1,790	890						1,800	1,730	42		5,260	7.1	--
June 17	b51					1,630	8.8	66	1,910	2,550						2,060	2,010	63		9,790	7.7	--
June 19	b12					2,130	--	--	2,220	3,380						2,430	--	66		12,400	--	1.005
June 23	3.09					3,930	--	--	2,770	6,340						3,250	--	72		20,100	--	1.009
July 5	.14					5,240		--	3,100	8,500						3,820	--	75		25,200	--	1.012
July 9, 11-12	b203					717		82	1,740	1,100						1,870	1,800	45		5,690	7.4	--
July 13	223					2,410		--	2,280	3,860						2,570	--	67		13,400	--	1.005
Sept. 7	.92					2,830		--	2,460	4,520						2,780	--	69		15,500	--	1.007

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.
b Mean daily discharge.

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

LOCATION.--About 500 feet upstream from Haystack Creek and 1,000 feet upstream from gaging station, about 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1961.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 13, 1960----------	0.98					99,700			2,710	158,000						9,140		96		144,000		1.203
Nov. 15----------	1.46					90,000			3,230	141,000						9,080		96		159,000		1.179
Dec. 7----------	1.63					87,600			3,300	137,000						8,800		96		159,000		1.171
Jan. 4, 1961----------	.97					78,700			3,580	123,000						8,220		95		157,000		1.156
Feb. 8----------	1.58					65,700			3,340	103,000						7,530		95		127,000		1.129
Mar. 8----------	.29					98,300			2,750	154,000						9,010		96		143,000		1.199
Apr. 6----------	.81					83,400			3,730	132,000						8,980		95		152,000		1.169
Apr. 19----------	.96					99,600			2,720	157,000						9,480		96		160,000		1.203
Apr. 25----------	.07					99,500			2,540	157,000						10,100		96		160,000		1.203
May 2----------	.85					99,100			2,800	156,000						9,640		96		159,000		1.203
May 9----------	.43					99,300			2,810	156,000						9,310		96		160,000		1.203
May 23----------	.45					99,500			2,910	156,000						9,800		96		158,000		1.204
June 1----------	.62					91,600			3,130	145,000						8,490		96		152,000		1.190
June 12----------	.65					48,400			3,570	77,500						7,840		93		119,000		1.097
June 30----------	.73					81,200			3,880	129,000						9,430		95		147,000		1.166
July 17----------	1.10					89,400			3,090	142,000						9,050		96		152,000		1.182
Aug. 8----------	.6					97,900			2,740	156,000						9,890		96		153,000		1.203
Aug. 25----------	.75					93,900			2,860	149,000						8,900		96		146,000		1.191
Aug. 31----------	.89					98,700			2,660	157,000						9,560		96		143,000		1.203
Sept. 22----------	.64					98,800			2,710	157,000						9,390		96		158,000		1.203

a Values expressed in parts per million should be multiplied by the density when computing loads.

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 1961.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
Oct. 13, 1960	0.13					40,000			4,480	63,800						6,650		93		102,000		1.082
Nov. 15	.19					30,900			4,200	48,100						5,850		92		92,400		1.060
Dec. 7	.62					26,300			3,970	41,400						5,330		91		82,700		1.051
Jan. 4, 1961	.23					25,400			3,970	40,000						5,330		91		81,500		1.050
Feb. 8	.48					20,100			3,570	31,300						4,810		90		63,400		1.039
Mar. 8	.30					33,200			4,470	51,600						6,200		92		88,300		1.065
Apr. 6	.29					31,700			4,250	48,900						5,830		92		92,100		1.063
Apr. 25	.24					37,000			4,760	57,700						6,610		92		103,000		1.074
May 2	.20					40,000			4,590	62,000						6,480		93		108,000		1.080
May 9	.19					44,500			4,730	68,900						6,890		93		115,000		1.089
May 23	.15					43,900			4,620	68,800						6,790		93		115,000		1.090
June 1	.15					40,500			4,740	63,800						6,750		93		107,000		1.082
June 12	.10					40,600			4,750	63,800						6,750		93		106,000		1.081
June 30	.15					38,400			4,520	60,400						6,410		93		103,000		1.077
July 27	.14					34,200			4,290	53,800						6,060		92		96,800		1.069
Aug. 8	.12					40,300			4,640	63,400						6,660		93		106,000		1.081
Aug. 25	.13					39,700			4,420	62,600						6,490		93		101,000		1.079
Aug. 31	.13					40,000			4,470	62,900						6,480		93		103,000		1.081
Sept. 22	.10					38,300			4,720	60,300						6,680		93		101,000		1.078

a Values expressed in parts per million should be multiplied by the density when computing loads.

815. SALT CROTON CREEK NEAR ASPERMONT, TEX.

LOCATION.--At gaging station just below the mouth of Haystack Creek and about 20 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--69 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1961.
REMARKS.--Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
Oct. 13, 1960	1.05					96,700			2,900	152,000						9,110		96		143,000		1.197
Oct. 15	8.0					69,300			2,680	110,000						7,220		95		147,000		1.135
Oct. 17	--					2,630			1,250	4,050						1,370		81		13,000		1.005
Oct. 17	8,400					1,110		100	1,390	1,680						1,450	1,370	62		7,000	7.1	--
Nov. 15	1.98					41,700			4,070	65,200						6,750		93		112,000		1.081
Dec. 7	1.88					65,500			3,430	102,000						7,540		95		144,000		1.128
Jan. 4, 1961	1.08					68,800			3,670	107,000						7,750		95		148,000		1.135
Feb. 8	1.89					63,200			3,270	98,000						7,030		95		125,000		1.123
Mar. 8	.41					87,600			3,770	138,000						9,090		95		139,000		1.177
Apr. 19	.96					98,000			2,750	154,000						9,500		96		157,000		1.200
Apr. 25	.34					91,900			3,190	145,000						9,500		95		156,000		1.189
May 2	.77					95,200			2,930	149,000						9,780		95		156,000		1.196
May 9	.32					93,400			3,270	146,000						8,910		96		156,000		1.190
May 23	.37					91,100			3,380	143,000						9,210		96		155,000		1.183
June 1	.54					99,600			2,630	158,000						8,890		96		154,000		1.203
June 12	.48					38,300			3,520	61,300						6,870		92		103,000		1.077
June 15	1,970					6,880			1,860	10,900						2,350		86		29,000		1.013
June 15	4,700					--			--	4,630						--		--		15,000		1.005
June 30	.48					66,700			4,060	106,000						8,630		94		139,000		1.135
July 27	.63					70,700			4,180	112,000						8,570		95		141,000		1.143
Aug. 8	.68					83,000			3,540	132,000						9,320		95		148,000		1.170
Aug. 25	.62					78,900			3,950	125,000						8,870		95		134,000		1.161
Aug. 31	.71					87,000			3,380	138,000						8,990		95		138,000		1.179
Sept. 22	.85					90,000			3,350	143,000						9,360		95		140,000		1.186

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.

815.5. SALT CROTON CREEK AT FALLS NEAR ASPERMONT, TEX.

LOCATION.--At falls about 1.5 miles upstream from mouth and 17 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: January 1958 to September 1961.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
Oct. 13, 1960	0.38					74,600			3,290	117,000						8,610		95		136,000		1.150
Nov. 15	1.43					39,600			3,490	62,700						7,340		92		109,000		1.077
Jan. 4, 1961	1.25					48,300			3,050	75,500						6,410		94		124,000		1.092
Mar. 8	.32					63,100			4,140	98,800						8,360		94		126,000		1.125
Apr. 6	.43					41,300			3,150	66,100						6,100		94		110,000		1.082
Apr. 19	.11					68,000			4,110	108,000						8,790		94		142,000		1.138
Apr. 25	.09					62,000			4,270	98,800						8,440		94		137,000		1.126
May 2	.31					77,700			3,660	123,000						9,070		95		150,000		1.158
May 9	.001					99,500			2,580	156,000						9,980		96		157,000		1.203
May 23	.02					98,500			2,570	156,000						10,300		95		158,000		1.203
June 1	.09					90,600			3,340	143,000						8,110		96		151,000		1.183
June 12	.06					10,300			2,170	16,700						3,330		87		41,600		1.021
June 30	.03					32,100			3,800	52,000						7,460		90		94,100		1.067
July 27	.05					37,400			3,690	59,900						6,970		92		105,000		1.076
Aug. 8	0					--			--	95,500						--		--		132,000		1.121
Aug. 25	.004					49,300			3,830	78,400						7,270		94		113,000		1.100
Aug. 31	0					--			--	99,800						--		--		126,000		1.127
Sept. 8	.2					74,400			3,860	118,000						8,590		95		134,000		1.152

a Values expressed in parts per million should be multiplied by the density when computing loads.

820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 83, 5½ miles downstream from Salt Croton Creek and 13.2 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--4,830 square miles, approximately, of which 2,770 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1951, October 1956 to September 1961.
Water temperatures: October 1948 to September 1951, October 1956 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 114,000 ppm Aug. 18; minimum, 1,230 ppm Oct. 19-20.
Hardness: Maximum, 5,940 ppm Aug. 18; minimum, 344 ppm June 9-11.
Specific conductance: Maximum daily, 115,000 micromhos Aug. 18; minimum daily, 2,270 micromhos Oct. 19.
Water temperatures: Maximum, 95°F Aug. 16; minimum, freezing point Dec. 17, Jan. 31.
EXTREMES, 1948-51, 1956-61.--Dissolved solids: Maximum, 114,000 ppm Aug. 18, 1961; minimum, 1,230 ppm Oct. 19-20, 1960.
Hardness: Maximum, 6,200 ppm Mar. 30-31, 1959; minimum, 334 ppm July 7-9, 1960.
Specific conductance: Maximum daily, 125,000 micromhos Apr. 28, 1960; minimum daily, 1,690 micromhos July 8, 1960.
Water temperatures: Maximum, 95°F July 5, 1959, Aug. 16, 1961; 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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[a] at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-14, 1960	0.26	14		1,520	334	17,700		141	3,640	28,200		--	51,500	72.6	36.2	5,170	5,050	88	107	63,000	7.0	1.037
Oct. 15-16, 18	7,635	10		542	45	1,120		119	1,400	1,720		3.0	4,900	6.66	101,000	1,540	1,440	61	12	7,310	7.5	--
Oct. 17	847	--		--	--	--		80	798	630		--	--	--	--	935	870	--	--	3,460	7.6	--
Oct. 19-20	6,115	13		112	16	313		107	226	498		.5	1,230	1.67	20,310	346	258	66	7.3	2,320	7.8	--
Oct. 21	1,010	--		--	--	--		117	356	900		--	--	--	--	460	364	--	--	3,560	7.6	--
Oct. 22-23	510	16		220	38	1,110		132	536	1,740		4.0	3,730	5.07	5,140	706	598	77	18	6,220	7.9	--
Oct. 24-26	218	16		369	69	2,180		142	930	3,440		--	7,070	9.65	4,160	1,200	1,090	80	27	11,400	7.9	1.004
Oct. 27-31	118	--		--	--	--		188	1,480	6,750		--	--	--	--	1,980	1,830	--	--	20,400	7.3	1.008
Nov. 1-15	49.6	18		776	210	6,210		140	2,030	9,980		--	19,300	26.6	2,580	2,800	2,680	83	51	27,900	7.3	1.012
Nov. 16-30	26.7	17		897	236	7,660		170	2,290	12,300		--	23,500	32.4	1,690	3,210	3,070	84	59	33,100	7.4	1.015
Dec. 1-17	29.6	12		874	239	9,170		95	2,340	14,600		--	27,300	37.8	2,180	3,160	3,090	86	71	37,700	7.3	1.018
Dec. 18-31	23.3	13		812	225	8,230		183	2,140	13,100		--	24,600	34.0	1,550	2,950	2,800	86	66	34,500	7.4	1.016
Jan. 1-18, 1961	18.2	15		881	260	10,200		167	2,350	16,200		--	30,000	41.7	1,470	3,270	3,130	87	78	39,600	7.1	1.021
Jan. 19-31	21.3	13		928	293	12,000		150	2,490	19,000		--	34,800	48.5	2,000	3,520	3,400	88	88	45,100	7.0	1.024
Feb. 1-14	30.8	12		852	264	10,500		160	2,310	16,700		--	30,700	42.6	2,550	3,210	3,080	88	81	40,100	7.4	1.021
Feb. 15-28	27.4	8.7		843	254	10,000		150	2,320	15,900		--	29,400	40.8	2,180	3,150	3,020	87	78	38,900	7.5	1.020
Mar. 1-16	13.2	9.5		885	235	8,860		133	2,490	14,000		--	26,500	36.7	944	3,170	3,070	86	68	36,800	7.3	1.017
Mar. 17, 19-29	13.8	8.9		985	300	12,900		136	2,640	20,500		--	37,400	52.1	1,390	3,690	3,580	88	92	49,900	7.1	1.025
Mar. 18	20.0	--		--	--	--		98	--	37,800		--	--	--	--	4,470	4,390	--	--	77,300	7.6	1.046
Mar. 30-31	25.0	17		1,160	425	27,800		105	2,650	44,200		--	76,300	109	5,150	4,640	4,560	93	177	86,700	7.5	1.053
Apr. 1-15	7.57	9.7		999	284	11,000		111	2,790	17,400		--	32,500	45.1	664	3,660	3,570	87	79	43,400	7.5	1.021
Apr. 16-30	1.57	7.8		1,220	314	13,000		126	3,260	20,700		--	38,600	53.9	164	4,340	4,230	87	86	49,700	7.4	1.026
May 1-3	.77	13		1,230	340	13,700		214	3,100	21,900		--	40,400	56.5	84.0	4,470	4,290	87	89	51,800	6.9	1.029
May 4-7	136	15		717	80	1,850		127	1,820	2,940		--	7,480	10.2	2,750	2,120	2,010	66	17	11,200	7.0	1.004
May 8-10	8.80	15		908	119	3,770		168	2,370	5,920		--	13,200	18.1	314	2,760	2,620	75	31	19,100	7.6	1.009
May 11-20	1.72	11		1,260	288	11,000		158	3,210	17,600		--	33,400	46.5	155	4,330	4,200	85	73	44,100	7.2	1.023
May 21-31	7.75	10		1,440	392	19,600		167	3,500	31,200		--	56,200	79.6	1,180	5,200	5,070	89	118	67,800	6.9	1.041
June 1-3, 5	106	--		--	--	--		149	--	4,730		--	--	--	--	1,490	1,370	--	--	14,800	7.0	1.005
June 4	222	--		--	--	--		100	--	16,600		--	--	--	--	2,980	2,900	--	--	41,100	7.2	1.021
June 6-8, 12-13	1,019	16		255	40	980		136	696	1,480		8.4	3,540	4.81	9,740	800	689	73	15	5,730	7.5	--
June 9-11	443	24		105	20	470		166	286	660		1.8	1,650	2.24	1,970	344	208	45	11	2,810	8.2	--
June 14-15	3,452	--		--	--	--		124	--	3,590		--	--	--	--	1,160	1,060	--	--	11,500	7.9	1.003
June 16-17	5,395	24		110	20	442		142	294	635		.2	1,600	2.18	23,310	356	240	73	10	2,720	8.2	--
June 18-22	457	17		158	30	899		134	424	1,360		2.5	2,960	4.03	3,650	518	408	79	17	4,980	7.9	--
June 23-30	180	--		--	--	--		143	--	3,250		--	--	--	--	1,070	953	--	--	10,600	7.7	--

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
July 1-6, 1961	66.0	21		506	134	3,710		134	1,380	5,910		--	11,700	16.0	2,080	1,810	1,700	82	38	18,100	7.2	1.007
July 7-9, 15	1,012	17		275	48	1,590		129	700	2,480		--	5,170	7.03	14,130	884	778	80	23	8,550	7.4	--
July 10-11	2,995	16		150	24	415		288	280	600		1.0	1,630	2.22	13,180	472	236	66	8.3	2,760	7.0	--
July 12-14, 16-18	1,062	19		140	22	615		118	364	920		4.2	2,140	2.91	6,140	440	344	75	13	3,660	7.4	--
July 19-31	197	19		330	64	1,960		128	860	3,080		--	6,380	8.68	3,390	1,090	982	80	26	10,300	6.9	--
Aug. 1-13	23.8	18		644	168	5,000		110	1,820	7,930		--	15,600	21.4	1,000	2,300	2,210	83	45	22,600	7.4	1.009
Aug. 14-17	9.72	9.3		957	237	12,300		117	2,330	19,600		--	35,500	49.4	932	3,360	3,270	89	92	47,900	7.3	1.024
Aug. 18	28.0	13		1,520	523	41,900		103	3,060	66,500		--	114,000	168	8,620	5,940	5,860	94	236	115,000	7.4	1.082
Aug. 19	31.0	14		417	83	3,990		101	956	6,360		--	11,900	16.3	996	1,380	1,300	86	47	19,100	8.1	1.007
Aug. 20-31	5.35	12		1,020	248	9,410		112	2,660	15,000		--	28,400	39.4	410	3,560	3,470	85	69	39,100	7.5	1.019
Sept. 1-7	5.16	22		1,230	280	12,800		93	3,050	20,400		--	37,800	52.8	527	4,220	4,140	87	86	48,900	7.6	1.028
Sept. 8-11	19.0	19		565	129	3,950		127	1,550	6,250		--	12,500	17.1	641	1,940	1,840	82	39	19,200	7.4	1.008
Sept. 12-24, 27-30	3.00	12		1,160	274	13,500		116	2,930	21,500		--	39,400	55.1	319	4,020	3,930	88	93	50,100	7.5	1.028
Sept. 25	10.0	18		1,430	503	33,000		92	2,990	52,600		--	90,600	132	2,450	5,640	5,560	93	191	102,000	7.4	1.074
Sept. 26	4.60	9.0		618	148	5,970		109	1,730	9,390		--	18,000	24.8	224	2,110	2,060	86	56	27,000	7.8	1.012
Weighted average	253	16		322	49	1,470		136	817	2,290		--	5,030	6.84	3,440	1,000	894	76	20	7,630	--	--

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.

825. BRAZOS RIVER AT SEYMOUR, TEX.

LOCATION.--At gaging station at bridge on U. S. Highways 277 and 283, three-quarters of a mile upstream from Wichita Valley Railway bridge, and 1 mile southwest of courthouse in Seymour, Baylor County.
DRAINAGE AREA.--14,490 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1961.
Water temperatures: August 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 17,200 ppm Feb. 27-28; minimum, 723 ppm Oct. 14, 16.
Hardness: Maximum, 2,480 ppm May 1-3; minimum, 230 ppm Mar. 17.
Specific conductance: Maximum daily, 25,000 micromhos Feb. 28; minimum daily, 1,080 micromhos Oct. 16.
Water temperatures: Maximum, 95°F Aug. 3; minimum, 37°F Jan. 8, Feb. 8.
EXTREMES, 1959-61.--Dissolved solids: Maximum, 17,200 ppm Feb. 27-28, 1961; minimum, 723 ppm Oct. 14, 16, 1960.
Hardness: Maximum, 2,580 ppm May 1-4, 1960; minimum, 230 ppm Mar. 17, 1961.
Specific conductance: Maximum daily, 26,200 micromhos Feb. 9, 1960; minimum daily, 1,080 micromhos Oct. 16, 1960.
Water temperatures: Maximum, 99°F Aug. 6, 1959; minimum, 33°F Mar. 4, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-13, 1960	a2.62	9.6		545	108	1,840		97	1,550	2,920		--		7,020	9.55	49.7	1,800	1,720	69	19	10,400	7.4
Oct. 14, 16	1,686	11		77	15	154		72	210	218		2.8		723	.98	3,290	254	194	57	4.2	1,250	7.7
Oct. 15	560	--		--	--	--		68	--	1,120		--		--	--	--	600	544	--	--	4,300	7.4
Oct. 17	2,750	--		--	--	--		100	--	1,980		--		--	--	--	1,020	938	--	--	7,120	7.5
Oct. 18-19	26,350	11		144	15	175		72	380	245		1.8		1,010	1.37	71,860	421	362	47	3.7	1,600	7.8
Oct. 20	40,900	11		108	15	172		92	338	195		1.8		886	1.20	97,840	331	256	53	4.1	1,390	7.7
Oct. 21-29	3,149	12		190	28	398		104	514	590		2.0		1,780	2.42	15,130	589	504	59	7.1	2,870	7.5
Oct. 30-31	781	--		--	--	--		144	--	1,850		--		--	--	--	1,200	1,080	--	--	7,000	7.9
Nov. 1-3	496	20		440	78	1,590		139	1,180	2,500		--		5,880	8.00	7,870	1,420	1,300	71	18	9,060	7.6
Nov. 4-14	278	20		518	100	2,100		136	1,420	3,320		--		7,540	10.3	5,660	1,700	1,590	73	22	11,500	7.5
Nov. 15-30	150	18		603	142	2,460		149	1,670	3,960		--		8,930	12.2	3,620	2,090	1,970	72	23	13,400	7.5
Dec. 1-20	176	18		586	139	3,210		107	1,650	5,110		--		10,800	14.8	5,130	2,030	1,950	77	31	16,300	7.2
Dec. 21-31	124	14		607	148	2,840		159	1,710	4,530		--		9,930	13.6	3,320	2,120	1,990	74	27	14,900	7.4
Jan. 1-28, 1961	103	12		607	152	2,890		195	1,730	4,580		--		10,100	13.8	2,810	2,140	1,980	75	27	15,100	7.5
Jan. 29-31	147	13		558	135	2,370		179	1,610	3,740		--		8,510	11.6	3,380	1,950	1,800	73	23	12,800	7.6
Feb. 1-15	154	15		497	123	2,740		89	1,510	4,300		--		9,230	12.6	3,840	1,750	1,670	77	28	14,300	6.9
Feb. 16-26	114	10		527	134	2,920		115	1,610	4,570		--		9,830	13.4	3,030	1,870	1,770	77	29	14,900	7.1
Feb. 27-28	110	--		--	--	--		95	--	8,700		--		17,200	23.6	5,110	2,370	2,290	--	--	25,000	7.2
Mar. 1-16	81.1	15		626	164	3,610		83	1,950	5,660		--		12,100	16.6	2,650	2,240	2,170	78	33	17,700	7.3
Mar. 17	675	--		--	--	--		93	--	358		--		--	--	--	230	154	--	--	1,750	7.8
Mar. 18-20	132	14		300	75	1,330		149	950	2,010		--		4,750	6.46	1,690	1,060	935	73	18	7,460	7.7
Mar. 21-31	104	13		567	153	3,170		90	1,780	4,970		--		10,700	14.6	3,000	2,040	1,970	77	31	16,000	7.3
Apr. 1-2	151	15		240	49	678		100	710	1,030		2.5		2,770	3.77	1,130	800	718	65	10	4,400	7.6
Apr. 3-6	81.2	15		547	130	2,570		86	1,630	4,050		--		8,980	12.3	1,970	1,900	1,830	75	26	13,500	7.2
Apr. 7-13	52.6	17		650	168	4,100		93	1,980	6,450		--		13,400	18.4	1,900	2,310	2,240	79	37	19,100	7.1
Apr. 14-30	29.5	16		680	187	3,620		86	2,190	5,660		--		12,400	17.0	988	2,470	2,400	76	32	17,600	7.1
May 1-3	30.3	--		675	194	--		84	--	5,160		--		--	--	--	2,480	2,410	--	--	16,800	7.5
May 4-6	2,061	19		190	26	255		100	510	370		2.0		1,420	1.93	7,900	581	499	49	4.6	2,260	7.9
May 7-16	114	16		520	75	1,530		126	1,650	2,200		--		6,050	8.23	1,860	1,610	1,500	67	17	8,570	7.7
May 17-31	5.82	12		627	162	2,180		100	1,980	3,430		--		8,440	11.5	133	2,230	2,150	68	20	12,200	7.4
June 1-4	31.6	--		--	--	--		80	--	3,230		--		--	--	--	2,070	2,000	--	--	11,700	7.6
June 5-8	3,762	18		328	43	995		97	896	1,520		5.6		3,850	5.24	39,110	996	916	68	14	5,990	7.4
June 9-21	3,231	19		175	20	304		104	500	405		4.3		1,480	2.01	12,910	518	434	56	5.8	2,310	7.3
June 22-30	591	17		240	45	877		127	668	1,340		1.6		3,250	4.42	5,190	784	680	71	14	5,230	7.8

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

825. BRAZOS RIVER AT SEYMOUR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-8, 1961	320	20		305	50	1,100		115	872	1,670		1.5		4,080	5.55	3,530	966	872	71	15	6,410	7.3
July 9-10	4,032	22		235	34	478		94	656	710		5.7		2,190	2.98	23,840	726	650	59	7.7	3,390	7.5
July 11-12	5,415	21		188	21	377		94	524	530		6.6		1,710	2.33	25,000	556	478	60	6.9	2,680	7.6
July 13-14	6,185	20		237	17	149		95	624	180		4.2		1,280	1.74	21,380	662	584	33	2.5	1,800	7.6
July 15-21	2,129	18		148	18	300		96	408	418		4.8		1,360	1.85	7,820	444	365	60	6.2	2,180	7.4
July 22-24	3,463	17		127	15	145		86	322	202		2.8		b910	1.24	8,510	378	308	45	3.2	1,380	7.6
July 25-30	940	17		200	23	365		97	522	540		3.2		1,720	2.34	4,370	594	514	57	6.5	2,700	7.1
July 31	332	20		242	40	746		110	690	1,120		4.5		2,920	3.97	2,620	768	678	68	12	4,650	7.7
Aug. 1-24	106	22		420	96	1,430		90	1,320	2,200		--		5,530	7.52	1,580	1,440	1,370	68	16	8,420	7.4
Aug. 25-31	94.4	17		330	56	849		89	968	1,290		1.0		3,560	4.84	907	1,050	981	64	11	5,470	7.2
Sept. 1-3	36.3	23		400	84	1,170		99	1,220	1,800		.5		4,750	6.46	466	1,340	1,260	65	14	7,200	7.5
Sept. 4-5	247	18		170	30	342		89	510	485		3.2		1,600	2.18	1,070	548	474	58	6.4	2,550	7.6
Sept. 6-8	61.3	19		308	59	654		93	896	1,010		.5		2,990	4.07	495	1,010	935	58	9.0	4,580	7.6
Sept. 9-27	50.1	14		440	104	1,510		104	1,360	2,350		--		5,830	7.93	789	1,530	1,440	68	17	8,830	7.2
Sept. 28-30	87.3	13		300	57	705		95	878	1,080		1.5		3,080	4.19	726	983	905	61	9.8	4,770	7.5
Weighted average	807	15		211	32	548		96	592	817		--		2,270	3.09	4,950	658	580	64	9.3	3,500	--

b Residue on evaporation at 180°C.

865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 183, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.
DRAINAGE AREA.--1,087 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1955 to September 1961.
Water temperatures: April 1955 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 2,220 ppm May 16-31; minimum, 112 ppm June 15.
Hardness: Maximum, 1,030 ppm June 1-4; minimum, 78 ppm June 15.
Specific conductance: Maximum daily, 3,730 micromhos May 27, June 2; minimum daily, 189 micromhos June 15.
EXTREMES, 1955-61.--Dissolved solids: Maximum, 5,350 ppm July 1-5, 1960; minimum, 112 ppm June 15, 1961.
Hardness: Maximum, 1,820 ppm July 1-5, 1960; minimum, 72 ppm Feb. 6-8, 1957.
Specific conductance: Maximum daily, 9,270 micromhos July 4, 1960; 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-4, 7-15, 1960---	a16.2	5.2		76	15	118		106	32	272	0.4	1.8		572	0.78	25.0	251	164	50	3.2	1,150	7.1
Oct. 5-6---	3.00	--		--	--	--		74	--	105	--	--		--	--	--	126	66	--	--	529	7.2
Oct. 16-19---	776	7.0		40	6.9	39		94	15	83	.2	3.5		241	.33	505	128	51	40	1.5	462	7.2
Oct. 20-31---	22.8	8.6		49	9.1	55		104	24	118	.2	2.2		317	.43	19.5	160	75	43	1.9	605	7.3
Nov. 1-15---	a .09	9.0		88	17	76		166	96	155	.2	.8		b568	.77	.14	290	154	36	1.9	935	7.5
Nov. 16-30---	a .03	7.0		127	30	118		206	210	218	.2	1.2		b874	1.19	.07	440	272	37	2.4	1,380	7.4
Dec. 1-10---	a .12	5.2		156	33	169		220	314	272	.3	.8		1,060	1.44	.34	524	344	41	3.2	1,690	7.8
Dec. 11-20---	.46	8.7		134	27	127		196	210	242	.3	1.8		b905	1.23	1.12	446	285	38	2.6	1,440	7.5
Dec. 21-31---	.11	6.0		150	30	138		233	214	270	.3	1.5		b985	1.34	.29	498	306	38	2.7	1,580	7.6
Jan. 1-6, 1961---	.13	3.1		104	27	127		115	206	240	--	.8		b816	1.11	.29	370	276	43	2.9	1,370	7.8
Jan. 7, 8 (12 p.m.-12 m.), 9-17---	387	9.9		39	7.1	35		98	19	72	--	2.5		232	.32	242	126	46	38	1.4	448	7.3
Jan. 8 (12 m.-12 p.m.)-	3,700	--		--	--	--		110	22	98	--	--		--	--	--	148	58	--	--	562	7.7
Jan. 18-31---	5.57	9.8		54	10	56		118	30	118	--	2.8		339	.46	5.10	176	79	41	1.8	645	7.4
Feb. 1-4, 7-8---	38.6	8.4		62	13	73		112	31	170	.2	2.0		415	.56	43.3	208	116	43	2.2	798	7.6
Feb. 5-6---	166	11		38	6.2	38		85	18	79	.3	3.0		236	.32	106	120	51	41	1.5	451	7.5
Feb. 9-28---	32.5	6.8		157	43	301		121	60	750	.3	2.5		1,380	1.88	121	568	470	53	5.5	2,690	7.6
Mar. 1-15---	a .38	5.9		220	53	386		140	163	935	.3	3.5		1,840	2.50	1.89	767	652	52	6.1	3,370	7.2
Mar. 16-31---	4.16	6.7		215	52	332		164	184	810	.3	3.8		1,680	2.28	18.9	750	616	49	5.3	3,080	7.4
Apr. 1-15---	a .15	5.1		205	43	400		127	149	920	.3	2.0		1,790	2.43	.72	688	584	56	6.6	3,250	7.5
Apr. 16-30---	.10	4.6		230	49	402		144	251	900	.3	1.2		1,910	2.60	.52	776	658	53	6.3	3,390	7.5
May 1-15---	a .01	5.5		245	54	416		152	303	920	.3	.8		2,020	2.75	.05	834	709	52	6.3	3,510	7.3
May 16-31---	a .06	5.1		275	61	439		163	440	920	.3	1.2		2,220	3.02	.36	937	804	50	6.2	3,680	7.4
June 1-4---	0	--		--	--	--		153	--	870	--	--		--	--	--	1,030	904	--	--	3,710	6.9
June 5---	969	9.5		84	17	159		101	45	350	.3	1.5		716	.97	1,870	280	196	55	4.1	1,380	7.1
June 6---	10,400	9.6		32	4.3	19		105	11	28	.3	1.8		158	.21	4,440	98	12	30	.8	280	7.5
June 7-9---	845	11		40	6.0	35		102	19	68	.3	1.0		230	.31	525	124	41	38	1.4	424	7.3
June 10-14---	52.3	12		52	8.6	46		117	35	92	.3	1.0		305	.41	43.1	165	69	38	1.6	561	7.1
June 15---	265	--		--	--	--		65	25	10	--	--		112	.15	80.1	78	25	--	--	189	7.1
June 16---	4,080	8.1		39	6.5	42		85	12	93	.2	1.2		244	.33	2,690	124	54	42	1.6	477	7.1
June 17---	1,930	14		44	7.2	45		100	14	97	.3	2.8		273	.37	1,420	139	57	41	1.7	501	7.1
June 18-20---	1,313	17		54	9.5	55		125	18	119	.3	2.2		336	.46	1,190	174	71	41	1.8	615	7.0
June 21-23---	95.7	17		66	12	72		147	26	157	.3	1.8		424	.58	110	214	94	42	2.1	774	7.3
June 24-30---	.17	16		104	19	95		194	93	202	.3	1.2		626	.85	.29	338	178	38	2.2	1,090	7.5

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

865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-8, 1961	0.38	18		130	32	148		155	208	305	0.3	2.8		b989	1.35	1.01	456	329	41	3.0	1,570	7.3
July 9-10	2,415	13		52	8.2	54		114	19	115	.4	3.8		321	.44	2,090	163	70	42	1.8	606	7.6
July 11-20	134	14		71	14	89		120	45	198	.3	2.8		493	.67	178	234	136	45	2.5	915	7.4
July 21-31	a2.81	14		90	19	104		140	96	220	.3	2.8		615	.84	4.67	302	188	43	2.6	1,100	7.6
Aug. 1-14	.41	16		166	42	174		141	333	355	.3	2.5		1,160	1.58	1.28	586	471	39	3.1	1,880	7.5
Aug. 15-18	a2.32	8.1		56	8.7	32		81	94	54	.4	3.2		296	.40	1.85	175	109	28	1.1	510	7.4
Aug. 19-22	0	11		88	16	67		136	146	116	.5	2.5		514	.70	--	286	174	34	1.7	865	7.8
Aug. 23-31	0	13		131	28	108		168	233	208	.4	1.8		806	1.10	--	442	304	35	2.2	1,340	7.6
Sept. 1-3	0	14		143	31	139		164	290	245	.4	3.8		947	1.29	--	484	350	38	2.8	1,530	7.8
Sept. 4 (12 p.m.-12 m.)	1,080	7.9		50	5.3	15		86	74	20	.4	2.8		217	.30	633	147	76	18	.5	363	7.2
Sept. 4 (12 m.-12 p.m.)	1,080	9.6		73	14	122		90	20	288	.3	4.5		575	.78	1,680	240	166	53	3.4	1,110	7.4
Sept. 5-12	408	12		51	8.8	63		104	18	137	.3	2.2		343	.47	378	163	78	46	2.1	646	7.6
Sept. 13	2,010	12		59	11	83		110	19	184	.3	2.8		425	.58	2,310	192	102	49	2.6	803	7.6
Sept. 14-30	49.7	14		62	13	78		126	28	172	.3	1.8		431	.59	57.8	208	104	45	2.3	799	7.6
Weighted average	134	11		47	8.2	51		105	20	109	0.3	2.3		300	0.41	109	151	65	42	1.8	563	--

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

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 Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.
DRAINAGE AREA.--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1961.
Water temperatures: October 1949 to September 1955.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 3,770 ppm Feb. 18-20; minimum, 1,220 ppm Oct. 28-31.
Hardness: Maximum, 928 ppm Feb. 18-20; minimum, 408 ppm Oct. 28-31, Sept. 1-30.
Specific conductance: Maximum daily, 6,110 micromhos Feb. 20; minimum daily, 1,960 micromhos Nov. 5.
EXTREMES, 1942-61.--Dissolved solids: Maximum, 3,770 ppm Feb. 18-20, 1961; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.
Hardness: Maximum, 928 ppm Feb. 18-20, 1961; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.
Specific conductance: Maximum daily, 6,110 micromhos Feb. 20, 1961; 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-27, 1960	2,756	11		136	25	360		122	295	580	--	0.8		1,470	2.00	10,940	442	342	64	7.5	2,510	7.5
Oct. 28-31	4,515	12		134	18	275		98	296	438	--	.8		1,220	1.66	14,870	408	328	59	5.9	2,110	7.3
Nov. 1-20	1,444	13		133	20	287		99	322	440	--	1.0		1,260	1.71	4,910	414	333	60	6.1	2,110	7.5
Nov. 21-30	276	11		187	26	435		117	460	670	--	.5		1,850	2.52	1,380	574	478	62	7.9	3,070	7.5
Dec. 1-16	794	12		193	30	487		119	474	760	0.4	.8		2,020	2.75	4,330	605	508	64	8.6	3,350	7.8
Dec. 17-31	821	12		218	37	625		125	574	960	.4	.5		2,490	3.39	5,520	696	594	66	10	4,000	7.7
Jan. 1-31, 1961	609	15		230	42	707		127	590	1,110	--	.2		2,760	3.75	4,540	746	642	67	11	4,500	7.4
Feb. 1-17, 21-28	464	11		220	40	686		132	564	1,070	--	1.0		2,660	3.62	3,330	714	606	68	11	4,350	7.4
Feb. 18-20	108	14		278	57	1,020		137	736	1,600	--	1.0		3,770	5.13	1,100	928	816	70	15	6,030	7.8
Mar. 1-31	718	8.8		208	40	675		128	528	1,060	--	2.0		2,580	3.51	5,000	684	578	68	11	4,330	7.3
Apr. 1-30	717	9.6		190	41	631		123	484	1,000	--	.2		2,420	3.29	4,680	642	542	68	11	4,040	7.3
May 1-31	205	11		188	35	594		126	456	940	--	.2		2,290	3.11	1,270	613	510	68	10	3,800	7.6
June 1-30	2,899	9.8		169	30	454		114	404	720	.5	1.0		1,840	2.50	14,400	545	452	64	8.4	3,080	7.1
July 1-31	3,971	12		163	26	424		112	396	660	--	.5		1,740	2.37	18,660	514	422	64	8.1	2,880	6.8
Aug. 1-31	1,421	11		151	24	373		110	360	580	.5	.8		1,550	2.11	5,950	475	385	63	7.4	2,610	7.1
Sept. 1-30	1,011	11		148	27	366		108	366	570	.5	3.0		1,540	2.09	4,200	408	392	62	7.2	2,570	7.0
Weighted average	1,409	11		165	28	444		115	398	697	--	0.9		1,800	2.45	6,850	526	432	65	8.4	3,010	--

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 1961.
Water temperatures: October 1947 to May 1948, October 1948 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,430 ppm Sept. 1-30; minimum, 783 ppm Apr. 1-18.
Hardness: Maximum, 442 ppm Sept. 1-30; minimum, 283 ppm Mar. 1-31, Apr. 1-18.
Specific conductance: Maximum daily, 2,440 micromhos Sept. 4-7; minimum daily, 1,280 micromhos Apr. 1-2.
Water temperatures: Maximum, 83°F Aug. 19-20, 22-23; minimum, 46°F on several days during January and February.
EXTREMES, 1947-61.--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.--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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-31, 1960	1,993	10		94	19	211		132	173	342	--	2.0		980	1.33	5,270	312	204	59	5.2	1,630	7.8
Nov. 1-30	1,593	11		111	21	257		125	218	420	--	1.5		1,100	1.50	4,730	364	261	61	5.9	1,940	7.6
Dec. 1-31	1,211	11		112	20	263		126	240	410	--	1.0		1,120	1.52	3,660	362	258	61	6.0	1,950	7.5
Jan. 1-31, 1961	3,568	9.8		105	17	242		123	228	368	--	.8		1,030	1.40	9,920	332	231	61	5.8	1,770	7.5
Feb. 1-28	2,928	9.0		101	16	206		132	196	322	--	.8		974	1.32	7,700	318	210	59	5.0	1,610	7.6
Mar. 1-31	1,758	11		92	13	161		144	154	250	--	1.5		821	1.12	3,900	283	165	55	4.2	1,350	7.0
Apr. 1-18	893	10		92	13	162		152	149	250	--	2.8		783	1.06	1,890	283	158	55	4.2	1,330	7.4
Apr. 19-30	852	9.5		108	14	206		164	180	320	--	3.0		974	1.32	2,240	327	192	58	4.9	1,620	7.5
May 1-31	559	11		100	17	210		139	188	330	--	1.8		a926	1.26	1,400	320	206	59	5.1	1,630	7.3
June 1-30	3,667	10		104	17	216		139	179	352	--	1.8		a948	1.29	9,390	330	216	59	5.2	1,680	7.1
July 1-31	4,106	10		111	19	266		120	240	415	--	.8		1,120	1.52	12,420	355	256	62	6.1	1,920	7.5
Aug. 1-31	1,681	11		126	23	318		117	288	498	0.4	.8		1,320	1.80	5,990	409	313	63	6.8	2,260	7.6
Sept. 1-30	749	12		136	25	341		111	316	540	.5	.8		1,430	1.94	2,890	442	352	63	7.1	2,410	7.4
Weighted average	2,054	10		106	18	237		129	213	373	--	1.2		1,040	1.41	5,770	338	233	60	5.6	1,780	--

a Calculated from determined constituents.

1040. LAMPASAS RIVER AT YOUNGSPORT, TEX.

LOCATION.--At county road bridge, half a mile west of Youngsport, Bell County, one mile upstream from gaging station, and 3.0 miles downstream from Rock Creek.
DRAINAGE AREA.--1,242 square miles, at gaging station.
RECORDS AVAILABLE.--Chemical analyses: September 1961.
Water temperatures: September 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 1-15, 1961	85.3	19		42	31	92		200	25	169	0.4	2.2		513	0.70	118	232	68	46	2.6	894	7.8
Sept. 16-23	80.5	16		38	26	62		195	23	106	.4	2.5		389	.53	84.5	202	42	40	1.9	677	7.7
Sept. 24-30	54.1	14		52	27	80		230	24	140	.5	2.2		479	.65	70.0	240	52	42	2.2	836	7.8

1065. LITTLE RIVER AT CAMERON, TEX.

LOCATION.--At bridge on U. S. Highway 77, 2,020 feet downstream from gaging station, half a mile upstream from Gulf, Colorado & Santa Fe Railway Co. bridge, and 2 miles southeast of Cameron, Milam County.
DRAINAGE AREA.--7,000 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1961.
Water temperatures: October 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 391 ppm May 16-31; minimum, 168 ppm June 17-19.
Hardness: Maximum, 272 ppm Apr. 21-30; minimum, 112 ppm June 17-19.
Specific conductance: Maximum daily, 741 micromhos June 1; minimum daily, 234 micromhos Oct. 30.
Water temperatures: Maximum, 85°F Sept. 6-7; minimum, 41°F Dec. 12, 16.
EXTREMES, 1959-61.--Dissolved solids: Maximum, 607 ppm Sept. 29, 1960; minimum, 130 ppm June 25-26, 1960.
Hardness: Maximum, 273 ppm June 1-24, 1960; minimum, 92 ppm June 25-26, 1960.
Specific conductance: Maximum daily, 1,000 micromhos Sept. 29, 1960; minimum daily, 191 micromhos June 26, 1960.
Water temperatures: Maximum, 89°F on several days during July and August, 1960; minimum, 40°F Jan. 19, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-5, 24-28, 1960-	1,719	12		54	15	47		204	37	62	0.3	4.2		338	0.46	1,570	196	29	34	1.5	584	7.6
Oct. 6-7, 11-14, 22-23	921	13		48	9.8	25		178	24	28	.3	3.8		241	.33	599	160	14	25	.9	405	7.9
Oct. 8-10, 15-21, 29-31	9,736	12		39	5.5	17		135	22	14	.3	3.8		186	.25	4,890	120	9	24	.7	300	7.7
Nov. 1-10	2,383	14		62	15	26		206	36	43	.3	4.8		315	.43	2,030	216	47	21	.8	533	7.6
Nov. 11-19	783	12		79	18	26		276	38	38	.4	8.9		366	.50	774	271	45	17	.7	622	7.7
Nov. 20-23	7,228	13		40	5.0	13		126	23	14	--	3.2		a173	.24	3,380	120	17	20	.5	290	7.5
Nov. 24-30	1,459	14		80	13	23		260	37	32	.3	7.9		343	.47	1,350	253	40	17	.6	575	7.6
Dec. 1-7	1,274	15		73	14	30		251	39	37	.3	6.3		346	.47	1,190	240	34	21	.8	587	7.8
Dec. 8-12	19,000	15		50	6.1	20		160	29	16	.3	9.5		a225	.31	11,540	150	19	22	.7	351	8.0
Dec. 13-20	5,552	15		63	13	29		216	43	33	.3	5.4		a308	.42	4,620	210	34	23	.9	502	7.9
Dec. 21-31	5,983	11		60	13	31		205	38	40	.3	7.6		302	.41	4,880	203	35	25	.9	515	8.0
Jan. 1-10, 1961	8,620	12		60	11	23		202	34	27	.3	7.7		282	.38	6,560	195	29	21	.7	462	7.9
Jan. 11-20	7,322	13		65	12	20		217	33	25	.3	9.1		295	.40	5,830	212	34	17	.6	484	7.9
Jan. 21-31	7,831	11		60	12	22		204	32	29	.2	7.0		287	.39	6,070	199	32	20	.7	478	7.9
Feb. 1-9	13,340	9.5		66	11	18		219	29	23	.2	7.7		287	.39	10,340	210	30	16	.5	476	7.7
Feb. 10-16	6,597	12		72	13	20		248	30	24	.3	9.8		316	.43	5,630	233	30	16	.6	520	7.6
Feb. 17-18	16,350	15		50	6.6	14		158	26	14	.3	5.3		a209	.28	9,230	152	22	16	.5	357	7.3
Feb. 19-28	6,844	12		74	12	20		245	32	24	.3	10		318	.43	5,880	234	33	16	.6	527	7.7
Mar. 1-10	8,079	10		62	12	18		207	28	25	.4	9.9		290	.39	6,330	204	34	16	.5	468	7.7
Mar. 11-18	7,146	12		63	11	21		208	30	26	.4	9.6		298	.41	5,750	202	32	18	.6	479	7.5
Mar. 19-31	3,222	11		72	16	23		247	33	34	.4	11		352	.48	3,060	246	43	17	.6	563	7.5
Apr. 1-10	2,970	18		68	15	22		232	34	33	.4	5.9		333	.45	2,670	231	41	17	.6	535	7.7
Apr. 11-20	1,447	11		77	18	28		270	38	42	.4	7.8		378	.51	1,480	266	44	19	.7	624	7.8
Apr. 21-30	1,360	11		76	20	31		278	39	46	.4	5.5		a366	.50	1,340	272	44	20	.8	650	7.7
May 1-15	1,147	14		74	17	34		263	36	47	.3	9.7		368	.50	1,140	254	39	23	.9	614	7.6
May 16-31	665	14		73	19	39		262	40	56	.3	11		391	.53	702	260	46	25	1.1	652	7.3
June 1-15	672	13		66	18	43		243	40	58	.5	8.6		377	.51	684	238	40	28	1.2	637	7.5
June 16, 20-30	3,615	14		58	12	31		202	38	36	.5	5.6		304	.41	2,970	194	28	26	1.0	495	7.1
June 17-19	11,780	13		38	4.1	14		108	26	15	.5	4.8		a168	.23	3,340	112	23	21	.6	281	7.1
July 1-15	4,039	14		52	9.7	22		170	30	30	.4	4.5		260	.35	2,840	170	30	22	.7	423	6.9
July 16-31	3,002	14		56	12	20		190	29	29	.4	4.5		274	.37	2,220	189	33	18	.6	449	7.2
Aug. 1-15	2,586	13		56	13	25		194	31	36	.5	4.2		300	.41	2,090	193	34	22	.8	479	7.3
Aug. 16-31	546	13		70	17	35		251	38	48	.5	7.9		374	.51	551	244	39	24	1.0	609	7.5
Sept. 1-12	564	12		67	18	42		254	39	54	.4	7.6		380	.52	579	241	33	27	1.2	631	7.5
Sept. 13-15	12,670	14		42	3.8	16		120	30	14	.5	4.4		a184	.25	6,290	120	22	22	.6	300	7.6
Sept. 16-30	864	11		66	13	31		222	34	44	.4	5.9		326	.44	760	218	36	24	.9	541	7.4
Weighted average	4,154	12		59	11	22		198	31	27	0.3	7.1		279	0.38	3,130	192	30	20	0.7	458	--

a Calculated from determined constituents.

1087. BRAZOS RIVER AT STATE HIGHWAY 21 NEAR BRYAN, TEX.

LOCATION.--At bridge on State Highway 21, two miles upstream from Little Brazos River, about eight miles upstream from gaging station and 11 miles southwest of Bryan, Brazos County.
DRAINAGE AREA.--38,400 square miles, approximately, at gaging station, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August to September 1961.
Water temperatures: August to September 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Bryan for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, August to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 31, Sept. 1-10, 1961	1,359	13		91	22	191		158	182	292	0.4	1.2		924	1.26	3,390	318	188	57	4.7	1,510	7.3
Sept. 11-13, 17-21	4,541	15		66	11	87		150	93	125	.5	2.2		508	.69	6,230	210	86	48	2.6	830	7.6
Sept. 14-16	18,350	16		54	6.5	46		129	64	60	.6	3.0		a313	.43	15,510	161	56	38	1.6	540	7.3
Sept. 22-30	1,993	13		82	17	137		178	132	202	.4	2.8		712	.97	3,830	274	128	52	3.6	1,160	7.7

a Calculated from determined constituents.

1100. YEGUA CREEK NEAR SOMERVILLE, TEX.

LOCATION.--At gaging station at bridge on State Highway 36, 760 feet downstream from Gulf, Colorado & Santa Fe Railway Co. bridge, 2 miles south of Somerville, Burleson County, and 5 miles upstream from Davidson Creek.
DRAINAGE AREA.--990 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961.
Water temperatures: September 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 1-3, 11, 1961----	7.02	14		46	12	41	7.2	108	86	60	0.4	0.2		320	0.44	6.07	164	76	34	1.4	537	7.4
Sept. 4-10----------	10.1	15		84	22	84	7.9	114	205	134	.3	.0		a652	.89	17.8	300	206	37	2.1	1,000	7.2
Sept. 12, 15-19-------	4,822	12		12	1.5	6.6	5.3	40	13	6.8	.2	.5		78	.11	1,020	36	3	25	.5	122	6.2
Sept. 13-14----------	19,100	--		6.0	.7	--	--	33	--	4.8	--	--		--	--	--	18	0	--	--	67	6.4
Sept. 20-21----------	1,108	--		19	4.6	25		76	29	19	--	.5		--	--	--	66	4	70	1.3	216	6.9
Sept. 22-24----------	271	21		34	7.8	27	6.7	76	62	40	.4	.8		237	.32	173	117	55	32	1.1	388	7.0
Sept. 25-30----------	67.2	23		56	13	49	7.4	101	119	74	.4	.8		a414	.56	75.1	193	110	34	1.5	641	6.6

a Residue on evaporation at 180°C.

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 1961.
Water temperatures: October 1958 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 1,380 ppm Oct. 25-28; minimum, 52 ppm Nov. 22.
Hardness: Maximum, 262 ppm May 5-6; minimum, 22 ppm Nov. 22.
Specific conductance: Maximum daily, 2,760 micromhos Oct. 28; minimum daily, 89 micromhos Nov. 22.
Water temperatures: Maximum, 84°F Aug. 3-4; minimum, 38°F Jan. 29.
EXTREMES, 1958-61.--Dissolved solids: Maximum, 1,380 ppm Oct. 25-28, 1960; minimum, 52 ppm Nov. 22, 1960.
Hardness: Maximum, 355 ppm June 25, 1960; minimum, 22 ppm Nov. 22, 1960.
Specific conductance: Maximum daily, 2,760 micromhos Oct. 28, 1960; minimum daily, 89 micromhos Nov. 22, 1960.
Water temperatures: Maximum, 89°F Aug. 4, 1959; minimum, 38°F Jan. 4-5, 1959, Jan. 29, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-16, 1960	15.1	14		26	8.5	51		66	49	74	--	0.5		255	0.35	10.4	100	46	52	2.2	466	7.1
Oct. 17-19	151	13		45	14	184		46	50	340	--	1.2		670	.91	273	170	132	70	6.1	1,300	6.5
Oct. 20-22	681	7.0		8.7	3.0	24		24	17	34	--	1.0		107	.15	197	34	14	60	1.8	199	6.6
Oct. 23	755	--		--	--	--		37	20	74	--	--		--	--	--	54	24	--	--	360	6.8
Oct. 24	735	--		--	--	--		61	--	338	--	--		--	--	--	112	62	--	--	1,240	6.9
Oct. 25-28	318	12		56	13	458		69	24	785	--	1.0		1,380	1.88	1,180	193	136	84	14	2,610	7.0
Oct. 29	2,050	9.4		17	3.5	120		25	13	200	--	1.0		376	.51	2,080	57	36	82	6.9	744	6.6
Oct. 30-31	2,660	8.4		11	3.2	67		24	12	109	--	.8		223	.30	1,600	41	21	78	4.5	436	6.6
Nov. 1-5	1,322	9.0		10	3.0	42		33	15	60	--	.8		156	.21	557	37	10	71	3.0	292	6.7
Nov. 6-9	112	13		18	4.6	68		47	23	106	--	.8		256	.35	77.4	64	25	70	3.7	475	7.0
Nov. 10-18	98.4	12		28	8.4	150		58	36	245	--	.8		a559	.76	149	104	57	76	6.4	965	7.0
Nov. 19-20, 27	1,470	11		11	3.2	29		34	18	40	--	.8		130	.18	516	41	13	61	2.0	241	6.7
Nov. 21, 23-26	4,056	7.0		7.0	2.4	16		24	14	20	--	.8		79	.11	865	27	8	57	1.3	138	6.4
Nov. 22	5,330	--		--	--	--		21	11	9.0	--	--		52	.07	748	22	5	--	--	89	6.5
Nov. 28-30	1,444	12		20	5.2	93		49	20	151	--	.5		326	.44	1,270	72	32	74	4.8	640	6.7
Dec. 1-7	226	16		28	8.1	99		64	41	158	--	.5		a416	.57	254	104	51	68	4.2	703	6.9
Dec. 8, 20-22, 30-31	760	14		22	6.1	34		48	39	52	--	.5		192	.26	394	80	41	48	1.7	338	6.8
Dec. 9-19	10,980	9.1		10	2.0	18		33	12	23	--	.5		91	.12	2,700	33	6	54	1.4	158	6.4
Dec. 23-29	258	17		31	9.6	47		57	59	78	--	.5		270	.37	188	117	70	47	1.9	473	6.7
Jan. 1-6, 1961	1,014	13		26	6.9	36		53	46	57	--	.5		211	.29	578	93	50	46	1.6	382	6.7
Jan. 7-21	7,475	8.6		11	2.8	15		38	14	18	--	.5		89	.12	1,800	39	8	46	1.0	158	6.6
Jan. 22-31	669	14		27	7.7	36		56	50	56	--	.5		219	.30	396	99	53	44	1.6	391	6.8
Feb. 1-5	308	17		36	12	52		64	69	90	--	.5		308	.42	256	140	87	45	1.9	544	7.2
Feb. 6-12	4,820	9.2		16	3.6	23		35	26	34	--	.8		130	.18	1,690	55	26	48	1.3	230	6.6
Feb. 13-16, 18-20	1,794	12		23	5.4	41		50	32	67	--	.8		206	.28	998	80	39	53	2.0	376	6.7
Feb. 17	1,580	--		--	--	--		34	--	34	--	--		--	--	--	50	22	--	--	215	6.5
Feb. 21-28	3,720	13		16	3.5	22		46	20	31	--	.5		129	.18	1,300	54	17	47	1.3	222	6.7
Mar. 1-2	562	17		27	6.9	32		66	41	48	0.2	.2		204	.28	310	96	42	42	1.4	359	7.9
Mar. 3-9	357	18		38	11	45		74	63	77	.3	2.8		291	.40	280	140	79	41	1.7	517	7.2
Mar. 10-12	988	12		20	5.3	30		46	36	43	.3	.5		170	.23	453	72	34	48	1.5	305	7.1
Mar. 13-17	384	15		30	10	43		66	54	69	.3	.2		254	.35	263	116	62	44	1.7	461	7.2
Mar. 18-21	1,562	11		19	4.5	28		44	34	38	.3	.8		158	.21	666	66	30	48	1.5	284	6.8
Mar. 22-31	648	13		34	8.8	49		82	51	76	.3	.2		a278	.38	486	121	54	47	1.9	462	6.7
Apr. 1-10	307	15		40	11	66		94	61	104	--	.5		344	.47	285	145	68	50	2.4	625	6.8
Apr. 11-18	402	13		29	7.2	45		64	55	64	--	.8		a259	.35	281	102	50	49	1.9	446	6.8
Apr. 19-30	87.2	17		37	11	56		80	65	90	--	.2		315	.43	74.2	138	72	47	2.1	567	6.9
May 1-4	104	22		40	13	62		85	72	102	--	.8		a386	.52	108	154	84	47	2.2	625	7.1
May 5-6	138	26		74	19	156		150	80	280	--	1.5		710	.97	265	262	140	56	4.2	1,280	7.8
May 7-20	56.8	17		50	12	79		130	62	124	--	.8		a443	.60	67.9	174	68	50	2.6	744	7.5
May 21-31	46.9	21		46	13	76		111	68	122	--	.5		a439	.60	55.6	168	78	50	2.5	713	7.3

a Residue on evaporation at 180°C.

1110. NAVASOTA RIVER NEAR BRYAN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-2, 1961	53.0	--		--	--	--		106	83	208	--	--		--	--	--	218	131	--	--	985	7.5
June 3-16	31.3	13		64	16	182		99	59	338	--	1.8		723	0.98	61.1	226	144	64	5.3	1,340	6.9
June 17-19	284	15		42	10	104		79	61	172	--	1.0		444	.60	340	146	82	61	3.7	810	7.0
June 20-21	2,380	--		15	2.9	36		36	22	52	--	1.8		--	--	--	49	20	61	2.2	278	6.8
June 22	12,700	--		--	--	--		30	11	130	--	--		--	--	--	61	36	--	--	505	6.6
June 23-30	3,635	12		17	3.2	40		57	13	58	--	1.2		172	.23	1,690	56	9	61	2.3	305	6.4
July 1-12	332	17		26	6.2	41		77	26	62	--	1.2		217	.30	195	90	27	49	1.9	376	7.0
July 13-16, 19-23	1,280	12		12	2.8	15		39	13	20	--	1.0		95	.13	328	41	10	44	1.0	162	6.6
July 17-18	626	17		24	6.1	38		74	25	58	--	.0		204	.28	345	85	24	50	1.8	346	7.8
July 24-28	349	14		20	5.0	24		58	23	36	--	.8		152	.21	143	70	23	43	1.2	256	6.4
July 29-31	141	13		30	7.6	55		87	28	89	--	.8		266	.36	101	106	35	53	2.3	470	6.9
Aug. 1-10	45.5	18		33	8.9	44		106	34	65	--	.2		a276	.38	339	119	32	44	1.8	442	7.2
Aug. 11-18	64.4	19		39	11	50		100	49	84	--	.2		a327	.44	56.9	142	60	43	1.8	532	7.3
Aug. 19-31	18.7	17		26	8.2	35		64	39	58	--	.5		215	.29	10.9	99	46	44	1.5	382	6.7
Sept. 1-12	22.7	17		29	8.2	40		71	40	66	--	.8		236	.32	14.5	106	48	45	1.7	424	6.7
Sept. 13	969	9.5		--	--	12		23	18	8.0	--	10		--	--	--	31	12	46	.9	126	6.1
Sept. 14-18	1,602	12		12	2.9	19		32	18	27	--	1.2		108	.15	467	42	16	50	1.3	189	6.4
Sept. 19	2,200	15		--	--	95		55	12	166	--	.8		--	--	--	86	41	71	4.5	659	6.7
Sept. 20-30	273	14		36	8.4	161		79	21	275	--	1.0		555	.75	409	124	60	74	6.3	1,060	6.6
Weighted average	1,373	10		15	3.6	30		41	19	44	--	0.7		143	0.19	530	52	19	56	1.8	256	--

a Residue on evaporation at 180°C.

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 & New Orleans Railroad Co. 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 1961.
Water temperatures: November 1950 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 837 ppm Aug. 18-31; minimum, 159 ppm Nov. 24-30.
Hardness: Maximum, 304 ppm Aug. 18-31; minimum, 92 ppm Nov. 24-30.
Specific conductance: Maximum daily, 1,430 micromhos Aug. 20; minimum daily, 242 micromhos Nov. 25-26.
Water temperatures: Maximum, 85°F on many days during August and September; minimum, 46°F Dec. 21-22.
EXTREMES, 1945-61.--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 (1950-61): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-14, 1960	1,431	13		72	17	124		182	106	184	--	1.0		628	0.85	2,430	250	100	52	3.4	1,060	7.6
Oct. 15-19	4,880	12		50	10	63		141	54	92	--	2.0		368	.50	4,850	166	50	45	2.1	630	7.7
Oct. 20-27	13,990	13		36	5.4	23		111	29	28	--	1.8		198	.27	7,480	112	21	31	.9	324	7.5
Oct. 28-31	19,960	12		56	8.9	70		122	66	113	--	1.5		410	.56	22,100	176	76	47	2.3	687	7.6
Nov. 1-2, 5-8	24,850	12		44	7.0	49		102	46	81	--	1.0		a290	.39	19,460	139	56	44	1.8	521	7.2
Nov. 3-4	29,950	12		34	5.1	26		96	28	39	--	1.0		a192	.26	15,530	106	28	35	1.1	304	7.3
Nov. 9-19	7,433	11		62	12	91		132	82	147	--	1.0		a471	.64	9,450	204	96	49	2.8	847	7.3
Nov. 20-23	15,360	12		44	6.5	44		120	38	66	--	1.2		a271	.37	11,240	136	38	41	1.6	449	7.3
Nov. 24-30	25,910	12		30	4.0	20		93	22	24	--	1.2		a159	.22	11,120	92	16	32	.9	268	7.4
Dec. 1-10, 15	16,670	13		45	6.0	38		128	37	54	--	1.0		278	.38	12,510	137	32	38	1.4	460	7.1
Dec. 11-14, 16-18, 20-21	47,580	12		36	5.0	21		104	27	29	--	2.2		a183	.25	23,510	110	26	29	.9	330	7.2
Dec. 19, 22-31	17,870	13		45	7.3	32		133	36	45	--	2.5		260	.35	12,540	142	34	33	1.2	437	7.2
Jan. 1-9, 1961	19,540	13		50	8.2	35		142	44	49	--	2.8		297	.40	15,670	158	42	32	1.2	488	7.2
Jan. 10-17	69,180	11		42	6.1	25		124	33	32	--	2.8		a213	.29	39,790	130	28	29	1.0	376	7.3
Jan. 18-31	28,460	12		53	8.9	47		142	52	69	--	2.8		342	.47	26,280	168	52	38	1.6	569	7.4
Feb. 1-4	13,400	12		68	11	48		190	63	66	--	4.8		382	.52	13,820	214	59	33	1.4	637	7.7
Feb. 5-8, 14-17	28,100	11		55	8.9	40		154	52	55	--	4.2		324	.44	24,580	174	42	34	1.3	536	7.4
Feb. 9-13	48,020	10		42	6.4	24		123	36	30	--	3.0		223	.30	28,910	132	30	28	.9	371	7.2
Feb. 18-28	41,400	11		44	6.7	29		121	40	41	--	2.0		252	.34	28,170	138	38	31	1.1	418	7.2
Mar. 1-7	17,770	13		54	8.9	26		168	37	34	--	5.5		286	.39	13,720	171	34	25	.9	455	7.7
Mar. 8-17	13,500	13		68	11	43		193	56	62	--	6.2		388	.53	14,140	214	56	31	1.3	622	7.7
Mar. 18-24	15,630	11		58	9.4	37		165	53	49	--	5.3		332	.45	14,010	183	48	31	1.2	538	7.6
Mar. 25-31	9,790	12		68	11	56		178	68	82	--	3.8		426	.58	11,260	214	68	36	1.7	692	7.8
Apr. 1-10	7,992	13		70	13	53		197	64	78	0.4	4.8		426	.58	9,190	228	66	34	1.5	694	7.8
Apr. 11-20	5,782	12		72	13	52		212	64	72	.4	4.0		417	.57	6,510	233	60	33	1.5	681	7.8
Apr. 21-30	3,305	8.4		70	16	73		199	83	104	.4	2.2		498	.68	4,440	240	78	40	2.1	807	7.5
May 1-10	4,209	13		72	13	68		182	89	98	--	2.0		467	.64	5,310	233	84	39	1.9	763	7.4
May 11-20	2,369	11		68	15	84		180	90	122	--	1.8		490	.67	3,130	231	84	44	2.4	858	7.2
May 21-31	1,994	13		65	16	72		206	77	94	.4	1.2		447	.61	2,410	228	59	41	2.1	777	7.1
June 1-18	2,880	18		65	16	84		184	87	118	--	2.8		496	.67	3,860	228	77	44	2.4	828	7.6
June 19-25	42,760	17		37	5.6	28		110	32	36	--	3.2		225	.31	25,980	116	26	35	1.1	359	7.5
June 26-30	23,180	16		69	12	120		124	109	188	--	1.8		601	.82	37,610	220	120	54	3.5	1,020	7.5
July 1-9	14,840	21		58	11	82		131	78	126	.4	1.8		476	.65	19,070	190	82	49	2.6	775	7.3
July 10-13, 15	19,680	28		48	8.3	60		122	60	85	.4	1.8		376	.51	19,980	154	54	46	2.1	599	7.1
July 14, 16	24,100	21		38	6.1	32		115	33	42	.3	1.8		a231	.31	15,030	120	26	37	1.3	382	7.7
July 17-24	17,200	16		49	7.8	58		116	61	84	.3	1.8		356	.48	16,530	154	60	45	2.0	585	7.0
July 25-31	11,270	17		76	13	127		142	122	194	.3	1.8		658	.89	20,020	243	126	53	3.5	1,080	7.3
Aug. 1-17	7,486	20		84	15	145		161	134	222	.4	.5		755	1.03	15,260	271	139	54	3.8	1,200	7.8
Aug. 18-31	2,813	14		92	18	160		187	147	244	.4	1.5		837	1.14	6,360	304	150	53	4.0	1,340	7.7
Sept. 1-11	1,912	21		86	21	152		192	144	229	--	2.2		805	1.09	4,160	301	144	52	3.8	1,280	7.4
Sept. 12, 28-30	4,995	18		54	10	73		144	58	110	--	.0		426	.58	5,750	176	58	47	2.4	701	7.2
Sept. 13, 21-27	10,320	20		40	5.5	42		110	42	56	--	.5		278	.38	7,750	122	32	42	1.7	445	7.2
Sept. 14-20	36,610	16		34	4.7	24		103	28	31	--	.8		208	.28	20,560	104	20	34	1.0	323	7.4
Weighted average	16,130	13		49	8.0	44		132	49	64	--	2.4		312	0.42	13,590	156	48	38	1.5	519	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

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 (residue at 180°C): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
797. DOUBLE MOUNTAIN FORK BRAZOS RIVER TRIBUTARY AT MOUTH NEAR POST																						
Nov. 16, 1960	0									26										397		
Jan. 4, 1961	0									27										491		
June 22	0									505										2,000		
Aug. 9	0									48										1,230		
ROUGH CREEK ABOUT 5 MILES ABOVE MOUTH NEAR ROTAN																						
Aug. 9, 1961	0.49					73		108	1,010	119						1,150	1,060	12		2,080	7.6	
799. ROUGH CREEK AT MOUTH NEAR ROTAN																						
Nov. 16, 1960	0									74										2,060		
Jan. 5, 1961	0									66										2,110		
June 15	0									51										1,520		
Aug. 9	0									70										1,800		
SALT FORK BRAZOS RIVER TRIBUTARY #1 NEAR POST																						
June 20, 1961	0.01					6,170			782	10,800						2,510		84		28,700		1.011
June 20	.01					6,170			741	10,600						2,430		85		27,800		1.011
Aug. 10	0					--			--	29						--		--		858		--
Aug. 10	0					--			--	9,500						--		--		25,400		1.012
805.5. McDONALD CREEK AT MOUTH NEAR POST																						
Nov. 16, 1960	0					--			--	14,500						--		--		36,700		1.017
Mar. 9, 1961	0					--			--	14,600						--		--		35,600		1.018
Apr. 4	0					--			--	14,000						--		--		37,000		1.017
May 24	0					--			--	20,500						--		--		49,800		1.025
June 22	1.90					2,530			593	3,960						702		89		12,300		1.003
Aug. 10	0					7,120			1,540	10,900						7,120		91		29,200		1.013
809.2. RED MUD CREEK AT MOUTH NEAR CLAIREMONT																						
Oct. 12, 1960	0					--	--	--	--	415						--	--	--		2,470	--	--
Nov. 16	.04					99	6.9	142	1,400	158						1,540	1,420	12		2,670	7.3	--
Jan. 4, 1961	.12					152	4.8	173	1,640	220						1,800	1,660	15		3,220	7.7	--
Mar. 9	.10					7,210	--	--	2,990	11,600						4,060	--	79		30,200	--	1.015
Apr. 4	.09					6,590	--	--	3,830	10,400						4,380	--	77		29,100	--	1.014
May 8	0					--	--	--	--	20,500						--	--	--		50,200	--	1.025
July 7	.06					7,300		--	2,820	12,000						3,990	--	80		31,900	--	1.016
Aug. 23	0					--	--	--	--	21,600						--	--	--		50,100	--	1.029

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--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)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
809.6. BUTTE CREEK AT MOUTH NEAR JAYTON																						
Nov. 16, 1960	0									7,780										23,600		1.009
Jan. 4, 1961	.20					212	5.2	126	1,710	235						1,730	1,630	21		3,640	7.7	--
Mar. 9	0									4,580										15,400		1.005
Apr. 4	0									8,030										23,600		1.009
Aug. 23	0									3,270										13,200		1.003
810.5. SHORT CROTON CREEK AT MOUTH NEAR JAYTON																						
Oct. 6, 1960	0								--	19,500						--		--		45,900		1.024
Nov. 16	0					6,900			2,980	11,100						3,760		80		30,800		1.015
Jan. 4, 1961	0								--	28,000						--		--		63,900		1.035
Mar. 8	0								--	23,800						--		--		50,900		1.029
Apr. 5	0								--	33,100						--		--		71,200		1.041
May 10	0								--	30,800						--		--		67,900		1.038
June 23	.02					8,700			3,150	13,900						3,970		83		36,500		1.019
July 16	.02								--	15,900						--		--		41,000		1.021
July 25	.02								--	4,230						--		--		14,800		1.005
Aug. 23	0								--	16,300						--		--		42,100		1.022
Aug. 29	0								--	19,700						--		--		47,800		1.026
Sept. 7	0								--	18,500						--		--		44,400		1.023
811. CROTON CREEK BELOW MOUTH OF SHORT CROTON CREEK NEAR JAYTON																						
Oct. 6, 1960	0					--			--	7,930						--		--		23,700		1.009
Nov. 16	1.86					8,060			3,300	13,000						4,360		80		34,900		1.018
Jan. 4, 1961	1.90					9,170			3,420	14,500						4,420		82		39,000		1.019
Mar. 8	.19					10,200			3,970	16,000						4,770		82		40,900		1.022
Apr. 5	.36					11,800			4,100	18,500						4,980		84		46,700		1.025
Apr. 20	.02					15,200			4,730	23,500						5,710		85		55,600		1.033
May 10	1.78					2,700			2,540	4,220						2,840		67		15,200		1.006
June 23	1.96					4,640			2,970	7,430						3,490		74		22,700		1.010
July 5	.22					6,360			3,520	10,100						4,080		77		29,200		1.015
July 17	.12					329		63	1,680	478						1,760	1,710	29		3,990	7.3	--
July 25	3.59					3,250			2,690	5,210						3,080		70		17,000		1.008
Aug. 23	.06					3,500			2,780	5,610						3,190		70		18,100		1.008
Aug. 29	.01					5,720			3,490	9,080						4,010		76		26,500		1.013

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--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)	Dissolved solids (residue at 180°C) Parts per million	Dissolved solids (residue at 180°C) Tons per acre-foot	Dissolved solids (residue at 180°C) Tons per day	Hardness as $CaCO_3$ Calcium, magnesium	Hardness as $CaCO_3$ Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
SALT FLAT CREEK AT MOUTH NEAR ASPERMONT																						
May 11, 1961				1,880	1,400	82,200	370	16	3,060	133,000			b222,000	353		10,400	10,400	94	350		6.1	1.169
May 24						90,000			3,050	143,000						9,810		95				1.183
822. NORTH CROTON CREEK AT MOUTH NEAR KNOX CITY																						
Oct. 11, 1960	0					--		--	--	4,360						--	--	--		14,600	--	1.005
Nov. 14	5.36					1,700		--	1,870	2,990						2,490	--	60		11,000	--	1.004
Jan. 3, 1961	3.77					1,260		184	1,790	2,120						2,170	2,020	56		8,880	7.4	--
Mar. 7	1.00					2,800		--	2,340	4,650						3,060	--	67		15,400	--	1.006
Apr. 7	2.26					4,410		--	2,560	7,330						3,450	--	74		21,800	--	1.009
May 11	3.77					1,080	13	80	1,700	1,800						1,960	1,890	54		7,720	7.4	--
July 28	1.20					2,480		--	2,170	4,130						2,700	--	67		14,000	--	1.006
Sept. 11	0					--		--	--	4,550						--	--	--		15,600	--	1.005
824. MUSTANG CREEK AT MOUTH NEAR KNOX CITY																						
Oct. 11, 1960	0.01					1,990	--	--	2,860	2,990						2,950	--	59		11,900	--	1.004
Nov. 14	1.65					393	12	140	1,990	780						2,360	2,250	26		5,200	7.4	
Jan. 3, 1961	.51					421	13	160	1,990	740						2,260	2,130	29		4,960	7.3	
Mar. 7	.04					726	12	134	2,390	1,120						2,520	2,410	38		6,400	7.5	
Apr. 7	.03					621	13	72	2,190	880						2,140	2,080	38		5,790	7.3	
May 11	4.31					278	13	86	1,760	495						1,940	1,870	24		4,040	7.4	
July 28	.08					322		107	1,740	420						1,790	1,700	28		3,940	7.3	
Sept. 11	.005					577		82	2,270	740						2,220	2,150	36		5,330	7.5	
LAKE GRAHAM NEAR GRAHAM																						
Oct. 14, 1960		4.2		46	9.0	94		129	8.6	124	0.3	0.2	b319	0.43		152	46	48	2.3	619	7.2	
1025. LEON RIVER NEAR BELTON																						
Mar. 28, 1961	c2,130	8.4		65	9.5	18		206	28	27	0.3	5.4	272	0.37		201	32	17	0.6	463	7.5	

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.
b Calculated from determined constituents.
c Mean daily discharge.

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

Chemical analyses, in parts per million, water year October 1960 to September 1961--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)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density[a] at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
NORTH SAN GABRIEL RIVER AT GEORGETOWN																						
Feb. 24, 1961	d80	11		92	15	13		310	22	18		21	364	0.50		291	37	9	0.3	586	7.3	
Mar. 28	121							234	27	27						238	46			529	7.3	
SOUTH SAN GABRIEL RIVER AT GEORGETOWN																						
Feb. 24, 1961	d440	10		74	14	14		254	25	18		17	311	0.42		242	34	11	0.4	520	7.6	
Mar. 28	75							230	29	25						220	32			505	7.0	
1050. SAN GABRIEL RIVER AT GEORGETOWN																						
Feb. 24, 1961	c527	9.8		75	15	14		262	24	18	0.1	18	309	0.42		248	34	11	0.4	532	7.7	
Mar. 28	c201							248	28	26						246	43			538	7.5	
BRUSHY CREEK AT U. S. HIGHWAY 81 AT ROUND ROCK																						
Feb. 24, 1961		8.8		78	10	11		253	20	15	0.0	12	292	0.40		236	28	9	0.3	497	7.5	

a Values expressed in parts per million should be multiplied by the density, where given, when computing loads.
c Mean daily discharge.
d Field estimate.

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS-COLORADO COASTAL AREA

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
1175. SAN BERNARD RIVER NEAR BOLING																						
Sept. 14, 1961-------	11,500	8.0		11	2.0	6.1	4.5	40	9.8	6.0	0.3	0.2		68	0.09		36	3	24	0.4	93	6.2

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, and 4.5 miles southwest of Ira, Scurry County.
DRAINAGE AREA.--3,617 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1961.
Water temperatures: November 1958 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 57,900 ppm May 1-6; minimum, 234 ppm Oct. 19.
Hardness: Maximum, 5,990 ppm May 1-6; minimum, 69 ppm Oct. 19.
Specific conductance: Maximum daily, 71,600 micromhos May 6; minimum daily, 411 micromhos Oct. 19.
Water temperatures: Maximum, 91°F June 13; minimum, freezing point Jan 25, 27, 29.
EXTREMES, 1958-61--Dissolved solids: Maximum, 67,600 ppm May 1-8, 1960; minimum, 234 ppm Oct. 19, 1960.
Hardness: Maximum, 6,420 ppm May 1-8, 1960; minimum, 69 ppm Oct. 19, 1960.
Specific conductance: Maximum daily, 87,800 micromhos May 8, 1960; minimum daily, 411 micromhos Oct. 19, 1960.
Water temperatures: Maximum, 95°F July 10, 1960; minimum, freezing point 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 water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 15-17, 1960	20.2	6.4		234	64	2,350		65	640	3,710		--		7,040	9.60	384	847	794	86	35	11,600	6.7
Oct. 18, 20-30	471	7.6		26	6.9	129		152	70	125		0.8		a456	.62	580	94	0	75	5.8	770	7.9
Oct. 19	2,910	8.2		23	2.8	60		99	23	65		2.5		234	.32	1,840	69	0	65	3.1	411	7.5
Oct. 31	100	--		--	--	--		142	--	225		--		--	--	--	112	0	--	--	1,080	7.7
Nov. 1-2	65.0	7.8		38	13	237		155	82	318		2.2		a782	1.06	137	148	22	78	8.5	1,420	8.1
Nov. 3-6, 9	26.2	5.4		56	19	458		159	132	670		2.0		1,420	1.93	100	218	87	82	13	2,600	7.9
Nov. 7-8	17.5	6.4		87	28	833		165	206	1,270		2.5		2,510	3.41	119	332	197	85	20	4,520	7.8
Nov. 10-12, 16-18	2.83	3.7		138	48	1,530		168	360	2,380		--		4,540	6.17	34.7	542	404	86	29	7,810	7.7
Nov. 13-15, 19-23	2.09	3.9		217	79	2,630		166	558	4,160		--		7,730	10.6	43.6	866	730	87	39	12,700	7.6
Nov. 24-30	.61	3.2		337	158	4,280		162	901	6,890		--		12,600	17.3	20.8	1,490	1,360	86	48	19,800	7.5
Dec. 1-8	.56	5.0		406	160	5,370		155	1,180	8,510		--		15,700	21.6	23.7	1,670	1,540	87	57	23,900	7.6
Dec. 9	3.70	11		32	6.1	143		101	50	198		2.5		493	.67	4.93	105	22	75	6.1	908	8.1
Dec. 10-18	1.32	5.7		352	136	4,480		180	1,050	7,040		--		13,200	18.1	47.0	1,440	1,290	87	52	20,300	7.7
Dec. 19-31	.61	5.5		514	194	6,570		191	1,480	10,400		--		19,300	26.6	31.8	2,080	1,920	87	63	28,100	7.4
Jan. 1-15, 1961	.91	5.4		543	205	6,910		188	1,630	10,900		--		20,300	27.9	49.9	2,200	2,040	87	64	29,100	7.4
Jan. 16-31	1.86	4.3		597	224	7,760		178	1,850	12,200		--		22,700	31.3	114	2,410	2,260	87	69	31,700	7.3
Feb. 1-12	.80	3.3		553	205	7,240		164	1,810	11,300		--		21,200	29.2	45.8	2,220	2,090	88	67	30,200	7.4
Feb. 13-28	.57	2.8		605	236	8,160		129	1,990	12,800		--		23,900	33.0	36.8	2,480	2,370	88	71	33,900	7.1
Mar. 1-15	.23	3.7		744	278	10,600		92	2,520	16,500		--		30,700	42.6	19.1	3,000	2,920	88	84	42,600	7.0
Mar. 16-31	.39	3.1		696	267	9,930		101	2,390	15,500		--		28,800	40.0	30.3	2,830	2,750	88	81	40,400	6.6
Apr. 1-13	.17	3.7		822	344	11,500		122	2,790	18,000		--		33,500	46.6	15.4	3,470	3,370	88	85	43,400	7.2
Apr. 14-30	b .05	3.5		1,220	493	16,700		157	4,030	26,300		--		48,800	68.7	6.59	5,070	4,940	88	102	57,900	7.1
May 1-6	b .07	4.9		1,440	583	19,800		172	4,750	31,200		--		57,900	82.1	10.9	5,990	5,850	88	111	69,100	7.0
May 18-24	1.90	4.2		586	195	7,730		106	1,840	12,100		--		22,500	31.1	115	2,260	2,180	88	71	32,400	6.6
May 25-31	b .04	1.8		755	306	10,200		82	2,450	16,100		--		29,900	41.5	3.23	3,140	3,080	88	79	41,200	7.0
June 4-5	60.0	--		--	--	--		100	--	700		--		--	--	--	320	238	--	--	2,790	7.4
June 6	3.90	--		--	--	--		85	--	1,560		--		--	--	--	400	330	--	--	5,250	7.3
June 7	32.0	--		--	--	--		84	--	3,050		--		--	--	--	655	586	--	--	9,540	7.2
June 8	313	14		52	4.5	86		150	33	124		3.2		391	.53	330	148	25	56	3.1	720	7.8
June 9	13.0	--		--	--	--		83	--	610		--		--	--	--	190	122	--	--	2,250	7.5
June 10	3.40	--		--	--	--		94	--	1,460		--		--	--	--	360	283	--	--	4,980	7.5

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

1195. COLORADO RIVER NEAR IRA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 11-14, 1961	0.55	--		--	--		--	86	--	3,930		--		--	--	--	807	736	--	--	12,000	7.0
June 15-17	220	15		44	6.8		156	111	52	235		2.0		566	0.77	336	138	47	71	5.8	1,080	7.9
June 18	11.0	--		--	--		--	93	--	820		--		--	--	--	238	162	--	--	2,960	7.7
June 19-20	3.15	--		--	--		--	108	--	1,650		--		--	--	--	415	326	--	--	3,360	7.6
June 21-24	.50	--		--	--		--	104	--	3,480		--		--	--	--	755	670	--	--	10,700	7.4
June 25-30	b .13	--		--	--		--	100	--	6,210		--		--	--	--	1,320	1,240	--	--	17,900	6.7
July 1-12	b2.27	4.0		362	124		4,170	71	929	6,700		--		12,300	16.8	75.4	1,410	1,360	87	48	19,700	6.7
July 13	2,100	11		36	2.4		79	104	31	108		2.8		321	.44	1,820	100	15	63	3.4	615	7.7
July 14, 16-22	78.0	6.4		44	11		240	157	89	322		1.5		a792	1.08	167	155	26	77	8.4	1,480	7.4
July 15	37.0	10		91	20		610	103	160	980		2.8		1,920	2.61	192	309	224	81	15	3,490	7.6
July 23-31	276	5.3		28	7.0		83	165	56	61		.5		a324	.44	241	99	0	65	3.6	569	7.5
Aug. 1-3	53.3	6.0		34	8.8		160	171	71	180		.5		a550	.75	79.2	121	0	74	6.3	985	7.8
Aug. 4-6	20.7	6.0		47	12		325	175	107	438		.8		1,020	1.39	57.0	167	24	81	11	1,850	7.6
Aug. 7-10	5.60	5.8		82	24		830	172	222	1,230		1.0		2,480	3.37	37.5	303	162	86	21	4,360	7.8
Aug. 11-20	.44	4.3		197	68		2,370	145	572	3,690		--		6,970	9.51	8.28	771	652	87	37	11,600	7.5
Aug. 21-25	b .14	2.9		384	139		4,720	113	1,020	7,540		--		13,900	19.1	5.25	1,530	1,440	87	52	21,300	7.3
Weighted average	c 43.5	8.1		37	8.4		198	136	74	260		--		660	0.90	77.5	127	16	77	7.6	1,100	--

a Residue on evaporation at 180°C.
b Includes days of less than 0.05 cubic foot per second discharge.
c Represents 100 percent of streamflow for water year October 1960 to September 1961.

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 Co. 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 1961.
Water temperatures: November 1952 to September 1954, November 1956 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 48,600 ppm May 1-17; minimum, 302 ppm June 15-17.
Hardness: Maximum, 6,040 ppm May 1-17; minimum, 92 ppm July 14.
Specific conductance: Maximum daily, 67,400 micromhos May 14, 17; minimum daily, 514 micromhos June 15.
Water temperatures: Maximum, 96°F Aug. 4; minimum, freezing point Jan. 28, Feb. 7.
EXTREMES, 1946-54, 1956-61.--Dissolved solids: Maximum, 48,600 ppm May 1-17, 1961; minimum, 176 ppm Oct. 26, 1947.
Hardness: Maximum, 6,040 ppm May 1-17, 1961; minimum, 65 ppm Sept. 15-20, 1949.
Specific conductance: Maximum daily, 67,400 micromhos May 14, 17, 1961; minimum daily, 245 micromhos May 14, 1957.
Water temperatures (1956-61): Maximum, 98°F July 29, 1960; minimum, freezing point on several days during December, January, and March.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-15, 1960	0	9.3		475	192	5,530		82	1,330	8,900		--		16,500	22.7	--	1,970	1,910	86	54	24,600	6.8
Oct. 16	185	--		--	--	--		95	--	490		--		--	--	--	208	130	--	--	1,900	7.6
Oct. 17	90.0	--		--	--	--		86	--	1,720		--		--	--	--	464	394	--	--	5,690	7.4
Oct. 18, 20	946	11		40	8.1	186		112	61	270		3.0		634	.86	1,620	134	42	75	7.0	1,220	7.7
Oct. 19	2,380	9.2		37	5.6	104		125	43	135		3.2		398	.54	2,560	116	13	66	4.2	723	7.7
Oct. 21-28	542	7.4		28	8.2	148		158	80	150		1.0		a514	.70	752	104	0	76	6.3	900	7.9
Oct. 29-31	185	7.8		40	13	245		163	94	322		.8		803	1.09	401	154	20	78	8.6	1,460	8.0
Nov. 1-3	90.7	8.6		60	19	406		166	123	600		1.8		1,300	1.77	318	228	92	80	12	2,400	8.1
Nov. 4-7	42.0	8.8		92	32	716		175	184	1,120		3.0		2,240	3.05	254	361	218	81	16	4,010	8.1
Nov. 8-16	13.2	5.6		161	59	1,460		175	356	2,350		--		4,480	6.09	160	644	500	83	25	7,570	7.9
Nov. 17-30	4.61	4.4		259	118	2,520		145	594	4,160		--		7,730	10.5	96.2	1,130	1,010	83	33	12,400	7.8
Dec. 1-12	6.68	6.4		333	136	3,210		148	778	5,270		--		9,810	13.4	177	1,390	1,270	83	38	15,900	7.8
Dec. 13-31	3.57	4.6		417	171	3,990		168	1,000	6,550		--		12,200	16.7	118	1,740	1,610	83	41	19,100	7.3
Jan. 1-15, 1961	4.73	3.7		402	163	3,950		157	993	6,450		--		12,000	16.4	153	1,670	1,540	84	42	18,300	7.4
Jan. 16-31	5.97	4.3		407	155	3,980		172	1,020	6,450		--		12,100	16.6	195	1,650	1,510	84	43	18,300	7.5
Feb. 1-15	4.61	3.7		363	155	3,440		193	962	5,570		--		10,600	14.5	132	1,540	1,380	83	38	16,600	7.2
Feb. 16-28	3.27	3.3		446	189	4,560		175	1,250	7,340		--		13,900	19.1	123	1,890	1,750	84	46	20,900	6.9
Mar. 1-15	1.24	3.7		514	197	5,720		152	1,500	9,100		--		17,100	23.5	57.3	2,090	1,970	86	54	24,900	7.3
Mar. 16-31	2.36	3.4		558	227	6,170		109	1,660	9,880		--		18,600	25.6	119	2,330	2,240	85	56	26,900	7.1
Apr. 1-15	.84	5.0		656	290	7,310		100	1,920	11,800		--		22,000	30.3	49.9	2,830	2,750	85	60	32,200	7.1
Apr. 16-30	0	8.4		922	422	9,710		84	2,560	15,900		--		29,600	41.1	--	4,040	3,970	84	66	40,700	6.7
May 1-17	0	16		1,410	613	16,200		86	3,870	26,400		--		48,600	68.3	--	6,040	5,970	85	91	61,300	7.1
May 18, 21-22	154	13		127	36	907		108	237	1,490		.5		2,860	3.89	1,190	465	376	81	18	5,120	7.7
May 19-20	1,160	13		70	15	339		100	103	555		1.8		1,150	1.56	3,600	236	154	76	9.6	2,180	7.1
May 23-31	4.22	7.9		212	68	1,860		99	456	3,050		--		5,700	7.75	64.9	808	728	83	28	9,680	7.3
June 1-3	0	--		279	89	--		74	--	4,290		--		--	--	--	1,060	1,000	--	--	13,000	7.0
June 4-5, 8-9	483	11		50	6.8	148		144	58	210		1.5		556	.76	725	153	35	68	5.2	1,030	7.3
June 6-7	69.0	--		130	106	--		105	--	2,980		--		--	--	--	760	674	--	--	9,490	7.8
June 10-11	51.0	11		74	17	446		122	131	700		1.2		1,440	1.96	198	254	154	79	12	2,650	7.6
June 12-14	9.37	9.1		120	31	823		114	209	1,350		2.0		2,600	3.54	65.8	427	334	81	17	4,660	7.1
June 15-17	977	13		36	5.8	--		120	--	90		2.2		302	.41	797	114	16	--	--	552	7.8
June 18-19	114	12		67	15	376		112	101	600		2.8		1,230	1.67	379	228	136	78	11	2,180	7.3
June 20-24	15.8	9.4		138	43	--		126	--	1,720		3.0		--	--	--	522	418	--	--	5,800	7.2
June 25-30	4.08	--		220	85	1,990		116	534	3,250		--		6,140	8.35	67.6	898	804	83	29	10,200	7.1

a Residue on evaporation at 180°C.

1210. COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-3, 1961	2.87	17		259	101	2,360		119	631	3,860		--		7,290	9.95	56.5	1,060	964	83	32	12,100	7.9
July 4-12	8.07	12		200	77	1,860		102	550	2,980		--		5,730	7.79	125	816	732	83	28	9,650	7.4
July 13	533	--		82	15	448		104	134	720		2.0		1,450	1.97	2,090	266	181	79	12	2,670	7.9
July 14	1,400	--		28	5.4	87		108	36	110		1.5		--	--	--	92	4	67	3.9	630	7.8
July 15-21	78.0	14		70	20	479		132	194	700		.8		1,540	2.09	324	256	148	80	13	2,760	7.7
July 22-31	355	9.6		33	8.8	132		164	66	144		.8		a483	.66	463	118	0	71	5.3	843	7.8
Aug. 1-4	67.5	8.7		44	13	273		180	98	360		.8		a891	1.21	162	164	16	78	9.3	1,590	7.8
Aug. 5-10	16.1	7.0		74	22	667		160	188	990		2.5		2,030	2.76	88.2	275	144	84	17	3,570	7.6
Aug. 11-20	2.36	6.2		155	57	1,630		114	466	2,550		--		4,920	6.69	31.4	621	528	85	28	8,440	7.4
Aug. 21-31	0	7.0		357	196	3,860		94	1,000	6,360		--		11,800	16.2	--	1,700	1,620	83	41	18,500	6.4
Sept. 1-24	0	14		505	215	5,050		81	1,270	8,320		--		15,400	21.2	--	2,140	2,080	84	47	22,800	6.8
Sept. 25	755	--		--	--	--		152	86	95		--		--	--	--	138	14	--	--	716	8.0
Sept. 26	89.0	--		--	--	--		102	50	430		--		--	--	--	196	112	--	--	1,700	7.7
Sept. 27-30	14.6	7.3		126	37	886		100	308	1,410		1.0		2,820	3.84	111	466	384	80	18	5,050	7.5
Weighted average	71.9	10		54	14	305		135	102	453		--		1,010	1.37	196	192	82	78	9.6	1,760	--

a Residue on evaporation at 180°C.

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.--9,903 square miles (revised), of which 8,903 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1961.
Water temperatures: November 1958 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 6,780 ppm Mar. 11-20; minimum, 170 ppm Oct. 18-19.
Hardness: Maximum, 2,050 ppm Mar. 11-20, Aug. 1-18; minimum, 75 ppm Oct. 18-19.
Specific conductance: Maximum daily, 12,000 micromhos Apr. 16; minimum daily, 273 micromhos Oct. 19.
Water temperatures: Maximum, 95°F Aug. 14; minimum, 33°F Jan. 28.
EXTREMES, 1958-61.--Dissolved solids: Maximum, 14,900 ppm May 5-21, 1960; minimum, 155 ppm Nov. 4, 1959.
Hardness: Maximum, 5,010 ppm May 5-21, 1960; minimum, 75 ppm Oct. 18-19, 1960.
Specific conductance: Maximum daily, 21,600 micromhos May 16, 1960; minimum daily, 242 micromhos Oct. 3, 1959.
Water temperatures: Maximum, 98°F July 28, 1960; minimum, 33°F Dec. 30-31, 1958, Jan. 21, 1959, Jan. 28, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 18 (12 p.m.-12 m.), 1960	170	--		--	--	--		163	--	106	--	--		--	--	--	143	10	--	--	735	7.1
Oct. 18 (12 m.-12 p.m.), 19	86.7	9.2		19	6.7	33		91	21	34	--	2.2		170	0.23	39.8	75	0	49	1.7	303	7.3
Oct. 20-24, 28	3.70	7.6		30	11	88		112	57	110	--	4.8		a386	.52	3.86	120	28	61	3.5	671	7.0
Oct. 29	3.40	8.4		27	5.7	35		97	25	41	--	3.2		193	.26	1.77	91	11	45	1.6	348	7.3
Oct. 30	17.0	4.4		52	26	200		138	168	270	--	4.0		792	1.08	36.4	236	124	65	5.7	1,410	8.2
Oct. 31, Nov. 1-3	2.32	5.6		120	107	555		250	536	830	--	16		2,290	3.11	14.3	740	534	62	8.9	3,760	7.6
Dec. 8-9	3.50	5.8		52	43	242		108	230	355	0.5	2.0		a1,020	1.39	9.64	306	218	63	6.0	1,750	7.7
Dec. 10-11	15.5	6.2		98	130	579		257	540	880	1.2	27		2,390	3.25	100	779	568	62	9.0	3,990	7.2
Dec. 12	6.20	--		--	--	--		133	--	260	--	--		--	--	--	248	139	--	--	1,410	7.3
Dec. 13	4.00	5.6		28	17	88		97	75	118	1.1	6.3		387	.53	4.18	140	60	58	3.2	710	7.4
Dec. 14-17	.98	6.6		56	39	200		132	182	300	.7	14		a923	1.26	2.44	300	192	59	5.0	1,570	6.8
Dec. 18-31	.57	7.9		143	183	767		305	748	1,200	1.1	4.0		3,200	4.35	4.92	1,060	810	61	10	5,180	7.6
Jan. 1-10, 1961	2.57	6.1		135	176	891		149	874	1,390	--	8.0		3,550	4.83	24.6	1,060	938	65	12	5,630	7.4
Jan. 11-20	2.44	13		160	211	992		251	1,010	1,520	--	27		4,060	5.52	26.7	1,270	1,060	63	12	6,310	6.9
Jan. 21-31	2.67	9.6		156	196	958		228	952	1,480	--	15		3,880	5.28	28.0	1,200	1,010	64	12	6,100	7.0
Feb. 1-10	1.39	10		155	214	1,070		240	1,070	1,600	--	25		4,260	5.79	16.0	1,270	1,070	65	13	6,530	7.0
Feb. 11-20	1.18	8.1		142	202	962		186	989	1,480	--	8.9		3,880	5.28	12.4	1,180	1,030	64	12	6,090	6.9
Feb. 21-28	.96	5.7		185	286	1,340		197	1,390	2,080	--	--		5,380	7.32	13.9	1,640	1,480	64	14	8,150	7.3
Mar. 1-10	.38	8.6		200	339	1,550		187	1,600	2,450	--	--		6,240	8.49	6.40	1,890	1,740	64	16	9,300	7.2
Mar. 11-20	b .23	7.0		220	364	1,690		212	1,740	2,650	--	--		6,780	9.22	4.21	2,050	1,870	64	16	9,970	7.4
Mar. 21-31	.54	6.9		200	361	1,540		260	1,640	2,420	--	--		6,300	8.57	9.19	1,980	1,770	63	15	9,380	7.3
Apr. 1-17	b .21	7.7		222	343	1,680		342	1,670	2,550	--	--		6,640	9.03	3.76	1,960	1,680	65	16	9,970	7.4
May 18-19	2,448	11		34	6.8	28		125	16	38	.4	1.2		196	.27	1,300	113	10	35	1.1	373	6.8
May 20-21	86.5	11		40	10	54		132	51	67	--	2.2		a327	.44	76.4	141	33	45	2.0	546	7.0
May 22-31	5.02	10		46	16	98		128	100	131	--	1.2		a503	.68	6.82	181	76	54	3.2	842	6.8
June 1-4	b .40	--		--	--	--		140	--	154	--	--		--	--	--	200	86	--	--	923	7.4
June 5-7	8.93	18		35	11	61		88	62	88	.5	2.8		321	.44	7.74	132	60	50	2.3	568	7.2
June 8-10	32.1	12		43	13	116		104	84	168	.7	2.8		a537	.73	46.5	161	76	61	4.0	875	6.8
June 11-15	73.2	15		71	26	206		160	173	295	.8	2.2		868	1.18	172	284	153	61	5.3	1,500	7.0
June 16-17	550	13		41	12	59		128	52	82	.5	4.2		a346	.47	514	152	47	46	2.1	573	7.3
June 18-30	16.4	--		--	--	--		130	--	530	--	--		--	--	--	460	354	--	--	2,350	6.7

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

1238. BEALS CREEK NEAR WESTBROOK, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-3, 1961	21.4	8.3		102	73	403		105	384	670	--	1.8		1,690	2.30	97.6	554	468	61	7.5	2,940	7.1
July 4 (12 p.m.-12m.), 9-10	279	11		33	8.3	40		112	34	53	--	2.8		a250	.34	188	116	25	43	1.6	437	7.1
July 4 (12 m.-12 p.m.), 5-8, 11-12	66.1	13		72	36	204		119	198	328	--	5.8		a989	1.35	177	328	230	57	4.9	1,600	7.1
July 13-15	141	12		46	15	90		104	67	153	--	2.2		436	.59	166	176	92	53	3.0	810	7.2
July 16-20	5.36	11		83	51	280		132	256	460	--	2.8		1,210	1.65	17.5	416	308	59	6.0	2,110	7.5
July 21, 24	278	12		85	49	230		118	244	398	--	2.8		1,080	1.47	811	414	317	55	4.9	1,880	7.2
July 22-23	2,770	12		42	9.6	45		123	47	64	--	2.2		282	.38	2,110	144	44	40	1.6	516	7.5
July 25-31	38.8	12		155	246	952		150	976	1,650	--	2.5		4,070	5.54	426	1,400	1,280	60	11	6,520	7.1
Aug. 1-18	1.41	9.6		220	365	1,430		131	1,460	2,500	--	--		6,050	8.23	23.0	2,050	1,940	60	14	9,320	7.2
Aug. 19-20	6.00	8.3		140	146	629		97	644	1,110	--	2.5		2,730	3.71	44.2	950	870	59	8.9	4,510	7.6
Aug. 21-25	2.10	8.3		185	275	1,160		152	1,140	1,980	--	3.5		4,830	6.57	27.4	1,590	1,470	61	13	7,570	7.2
Sept. 4-14	b .07	7.7		150	175	806		141	780	1,360	--	1.5		3,350	4.56	.63	1,090	978	62	11	5,380	7.3
Sept. 26-30	31.2	11		78	58	335		124	384	465	--	5.6		1,400	1.90	118	433	332	63	7.0	2,200	7.6
Weighted average	c 42.7	12		47	20	96		125	90	148	--	2.4		481	0.65	55.5	200	97	51	2.9	830	--

a Residue on evaporation at 180°C.
b Includes days of less than 0.05 cubic foot per second discharge.
c Represents 100 percent of runoff for water year October 1960 to September 1961.

1239. COLORADO RIVER NEAR SILVER, TEX.

LOCATION.--At gaging station at bridge on FM Road 2059, 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.--15,480 square miles, approximately, of which 11,600 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1961.
Water temperatures: October 1956 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 15,000 ppm May 1-18; minimum, 204 ppm Oct. 17-18.
Hardness: Maximum, 2,840 ppm May 1-18; minimum, 94 ppm Oct. 21.
Specific conductance: Maximum daily, 24,200 micromhos May 17-18; minimum daily, 265 micromhos Oct. 16.
Water temperatures: Maximum, 90°F June 3; minimum, freezing point Jan. 24.
EXTREMES, 1956-61.--Dissolved solids: Maximum, 15,000 ppm May 1-18, 1961; minimum, 180 ppm June 1-4, 1957.
Hardness: Maximum, 2,870 ppm June 1-8, 1960; minimum, 93 ppm Apr. 29-30, 1957.
Specific conductance: Maximum daily, 24,200 micromhos May 17-18, 1961; minimum daily, 202 micromhos June 2, 1957.
Water temperatures: Maximum, 93°F July 23, 29, 1960; minimum, freezing point on several 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-14, 1960	0	5.2		145	44	699		72	460	1,080	--	2.0		2,470	3.36	--	543	484	74	13	4,130	6.8
Oct. 15-16	214	10		41	7.1	27		129	29	37	--	3.0		a217	.30	125	132	26	31	1.0	392	7.5
Oct. 17, 18 (12 p.m.-9 a.m.)	118	9.6		37	6.2	25		98	42	32	--	3.8		a204	.28	65.0	118	38	32	1.0	348	7.8
Oct. 18 (9 a.m.-12 m.)	1,200	--		--	--	--		111	--	2,200	--	--		--	--	--	775	684	--	--	7,200	6.9
Oct. 18 (12 m.-12 p.m.)	180	--		--	--	--		124	--	555	--	--		--	--	--	262	160	--	--	2,150	7.4
Oct. 19 (12 p.m.-12 m.)	1,408	--		--	--	--		119	--	262	--	--		--	--	--	183	86	--	--	1,190	7.3
Oct. 19 (12 m.-12 p.m.)	468	9.8		83	19	480		143	146	750	--	3.5		1,560	2.12	1,970	285	168	79	12	2,830	7.8
Oct. 20	2,230	8.8		40	6.7	153		144	58	198	--	3.8		540	.73	3,250	128	10	72	5.9	991	7.6
Oct. 21	1,000	7.6		29	5.4	102		113	41	126	--	3.8		379	.52	1,020	94	2	70	4.6	687	7.4
Oct. 22-23	952	9.0		29	6.8	176		156	95	180	--	1.8		576	.78	1,480	100	0	79	7.7	1,020	7.4
Oct. 24-27	533	7.8		27	7.6	131		155	79	123	--	1.5		454	.62	653	99	0	74	5.7	806	7.4
Oct. 28	321	14		32	9.1	150		157	80	164	--	1.0		a527	.72	457	118	0	74	6.0	953	7.9
Oct. 29-31	223	14		38	11	184		157	88	225	--	3.0		671	.91	404	140	12	74	6.8	1,180	7.8
Nov. 1-4	108	11		50	15	274		164	112	375	--	3.2		951	1.29	277	186	52	76	8.7	1,680	8.0
Nov. 5-10	41.7	6.0		78	24	487		164	178	730	--	2.0		1,590	2.16	179	293	158	78	12	2,860	7.9
Nov. 11-18	16.2	5.4		109	33	727		152	272	1,120	--	3.0		2,340	3.18	102	408	283	80	16	4,140	7.8
Nov. 19-30	8.32	5.3		150	45	906		144	390	1,420	--	3.0		2,990	4.07	67.2	559	441	78	17	5,140	7.8
Dec. 1-7	5.79	6.8		190	54	1,010		154	482	1,600	--	2.0		3,420	4.65	53.5	696	570	76	17	5,830	7.6
Dec. 8-11	26.5	7.3		139	39	649		107	322	1,060	--	2.0		2,270	3.09	162	508	420	74	13	3,940	7.4
Dec. 12-20	14.2	5.4		188	66	1,190		144	480	1,920	--	2.0		3,920	5.33	150	740	622	78	19	6,690	7.4
Dec. 21-31	6.62	4.7		212	79	1,320		107	604	2,130	--	--		4,400	5.98	78.6	854	766	77	20	7,350	6.9
Jan. 1-16, 1961	10.4	4.5		258	83	1,510		138	636	2,480	--	--		5,040	6.85	142	985	872	77	21	8,320	7.5
Jan. 17-31	9.95	4.0		278	107	1,700		144	732	2,800	--	--		5,690	7.74	153	1,130	1,020	77	22	9,340	7.5
Feb. 1-14	7.91	4.9		300	120	2,020		153	843	3,280	--	--		6,640	9.03	142	1,240	1,120	78	25	10,500	7.9
Feb. 15-28	3.95	4.0		349	129	2,100		123	945	3,460	--	--		7,050	9.62	75.2	1,400	1,300	76	24	11,100	7.7
Mar. 1-15	1.55	6.9		388	138	2,390		124	1,120	3,880	--	--		7,980	10.9	33.4	1,540	1,430	77	27	12,500	7.2
Mar. 16-18, 20-31	1.21	6.1		448	142	2,560		112	1,300	4,130	--	--		8,640	11.8	28.2	1,700	1,610	77	27	13,300	7.0
Mar. 19	1.00	--		--	--	--		118	--	2,350	--	--		--	--	--	1,460	1,360	--	--	9,820	7.4
Apr. 1-15	.53	4.7		527	144	2,770		105	1,530	4,430	--	--		9,460	12.9	13.5	1,910	1,820	76	28	14,300	7.2
Apr. 16-30	b .09	4.3		675	156	3,760		79	1,950	5,960	--	--		12,500	17.1	3.04	2,330	2,260	78	34	18,100	6.9
May 1-18	b .02	4.5		693	269	4,510		59	2,360	7,180	0.5	--		15,000	20.6	.81	2,840	2,790	78	36	22,200	6.4
May 19	10,500	11		51	9.1	116		126	61	175	.2	2.8		530	.72	15,030	164	61	61	3.9	892	7.6
May 20	4,550	12		42	7.7	60		120	44	84	.2	3.2		332	.45	4,080	136	38	49	2.2	558	7.6
May 21	322	11		52	8.9	129		104	74	201	.2	1.2		a528	.72	459	166	81	63	4.3	974	7.3
May 22-25	74.2	12		80	17	260		107	147	420	.3	1.2		a990	1.35	198	270	182	68	6.9	1,780	6.8
May 26-31	17.5	9.7		134	28	558		140	293	880	.3	.2		1,970	2.68	93.1	450	335	73	11	3,400	7.4

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

1239. COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-4, 5 (12 p.m.-6 a.m.), 1961	28.4	--		--	--	--		137	--	1,500	--	--		--	--	--	690	578	--	--	5,440	7.7
June 5 (6 a.m.-10 a.m.)	600	--		--	--	--		166	--	395	--	--		--	--	--	332	196	--	--	1,860	8.0
June 5 (10 a.m.-6 p.m.)	840	9.2		53	10	40		160	40	60	--	2.8		a294	0.40	667	173	42	33	1.3	531	7.5
June 5 (6 p.m.-12 p.m.), 6	534	9.8		95	21	435		118	151	720	--	1.8		1,490	2.03	2,150	324	228	75	11	2,740	7.0
June 7-8	177	11		72	16	336		104	124	540	--	1.8		1,150	1.56	550	246	160	75	9.3	2,100	7.4
June 9-16	355	11		69	15	296		124	122	460	--	.0		1,030	1.40	987	234	132	73	8.4	1,850	7.5
June 17-18	1,219	10		42	7.6	85		126	47	118	--	2.8		a374	.51	1,230	136	33	58	3.2	680	7.2
June 19	276	13		45	10	88		110	68	130	--	1.2		a409	.56	305	154	64	56	3.1	741	7.5
June 20-21	106	12		54	13	156		108	98	238	--	1.2		687	.93	197	188	100	64	4.9	1,140	7.3
June 22-25	35.2	9.6		88	23	423		114	316	575	--	.8		1,490	2.03	142	314	220	75	10	2,310	7.2
June 26-30	12.3	7.2		136	35	518		130	196	920	--	1.8		1,880	2.56	62.4	484	377	70	10	3,570	6.9
July 1-3	6.23	8.4		170	43	731		126	378	1,200	--	1.5		2,590	3.52	43.6	601	498	73	13	4,540	6.8
July 4	448	10		62	15	185		113	110	290	--	1.8		799	1.09	966	216	124	65	5.5	1,330	6.9
July 5-13	115	10		52	16	153		98	110	235	--	3.0		675	.92	210	196	115	63	4.8	1,130	7.3
July 14-15	1,240	8.3		52	12	214		119	90	320	--	2.8		776	1.06	2,600	179	82	72	7.0	1,380	6.8
July 16	299	16		41	7.7	121		114	52	176	--	1.5		a471	.64	380	134	40	66	4.5	857	7.5
July 17-19	103	7.2		58	14	209		116	104	320	--	1.8		a771	1.05	214	202	107	69	6.4	1,440	7.0
July 20-21	57.5	14		96	23	484		130	172	780	--	2.0		1,640	2.23	255	334	228	76	12	2,980	7.4
July 22-23	5,935	11		32	5.6	31		103	25	41	--	3.8		214	.29	3,430	103	18	40	1.3	362	7.3
July 24	1,340	11		41	8.6	69		112	57	95	--	2.8		358	.49	1,300	138	46	52	2.6	614	6.8
July 25-31	430	9.2		52	24	185		146	154	248	--	1.2		772	1.05	896	228	108	64	5.3	1,310	7.2
Aug. 1-5	94.6	9.3		62	24	274		176	168	375	--	1.5		1,000	1.36	255	253	109	70	7.5	1,770	7.7
Aug. 6-10	36.2	13		87	32	419		171	234	620	--	2.8		1,490	2.03	146	348	208	72	9.8	2,600	7.6
Aug. 11-15	14.4	13		117	34	623		130	338	940	--	4.0		2,130	2.90	82.8	432	326	76	13	3,670	7.5
Aug. 16-31	4.90	9.9		195	57	989		142	558	1,540	--	1.0		3,420	4.65	45.2	721	604	75	16	5,650	7.6
Sept. 1-3	1.00	--		--	--	--		125	832	2,500	--	--		--	--	--	1,030	928	--	--	8,730	7.6
Sept. 4 (12 p.m.-10 a.m.)	144	--		--	--	--		114	512	1,640	--	--		--	--	--	665	572	--	--	5,930	7.6
Sept. 4 (10 a.m.-12 p.m.)	85.7	--		--	--	--		97	209	485	--	--		--	--	--	310	230	--	--	2,090	7.5
Sept. 5-6	46.5	8.8		38	8.2	74		85	58	111	--	3.5		a344	.47	43.2	128	59	56	2.8	618	7.6
Sept. 7-24	1.73	13		210	53	1,170		117	548	1,850	--	1.5		3,900	5.30	18.2	742	646	77	19	6,520	7.1
Sept. 25, 26 (12 p.m.-12 m.)	187	9.9		162	45	596		123	426	950	--	1.8		2,250	3.06	1,140	589	488	69	11	3,800	7.1
Sept. 26 (12 m.-12 p.m.), 27-28	190	10		60	13	229		136	103	340	--	4.0		836	1.14	429	203	92	71	7.0	1,500	7.3
Sept. 29-30	41.0	7.9		138	118	651		150	600	1,060	--	3.5		2,650	3.60	293	830	706	63	9.8	4,380	7.8
Weighted average	159	10		51	12	166		124	87	245	--	2.7		653	0.89	280	176	75	67	5.4	1,130	--

a Calculated from determined constituents.

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 1961.
Water temperatures: September 1947 to September 1961.
Sediment records: December 1950 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 817 ppm Sept. 6; minimum, 156 ppm Oct. 17.
Hardness: Maximum, 366 ppm Apr. 30; minimum, 129 ppm Oct. 17.
Specific conductance: Maximum daily, 1,440 micromhos Oct. 27; minimum daily, 275 micromhos Oct. 17.
Water temperatures: Maximum, 90°F Aug. 13; minimum, 35°F Jan. 28, Feb. 2.
Sediment concentrations: Maximum daily, 7,700 ppm July 26; minimum daily, 19 ppm Sept. 24.
Sediment loads: Maximum daily, 168,000 tons Oct. 18; minimum daily, 8.7 tons Sept. 24.
EXTREMES, 1947-61.--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.
Sediment concentrations (1950-61): Maximum daily, 10,500 ppm Oct. 20, 1956; minimum daily, no flow Aug. 27-31, 1954.
Sediment loads (1950-61): Maximum daily, 535,000 tons May 19, 1955; minimum daily, 0 tons Aug. 27-31, 1954.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-16, 1960--------	130	15		57	26	63		228	48	104	--	2.0		438	0.60	154	249	62	35	1.7	762	7.8
Oct. 17----------	5,700	14		37	9.0	6.2		147	6.0	11	--	.8		a156	.21	2,400	129	9	9	.2	275	7.3
Oct. 18-26----------	2,750	8.8		49	11	38		124	54	64	--	4.0		296	.40	2,200	168	66	33	1.3	515	7.6
Oct. 27-28----------	1,064	9.6		56	14	171		119	74	278	--	4.0		677	.92	1,940	197	100	65	5.3	1,230	7.7
Oct. 29-31----------	1,245	11		46	10	66		158	35	93	--	3.2		a342	.47	1,150	156	26	48	2.3	619	7.5
Nov. 1-15----------	338	14		46	14	99		192	61	117	--	2.8		455	.62	415	172	15	56	3.3	793	7.8
Nov. 16-30----------	189	13		62	23	67		269	55	82	--	2.0		444	.60	227	249	28	37	1.8	761	7.8
Dec. 1-7----------	158	14		60	26	66		263	54	90	--	2.2		446	.61	190	256	41	36	1.8	775	7.7
Dec. 8----------	2,480	--		--	--	--		215	--	170	--	--		--	--	--	252	76	--	--	1,060	7.8
Dec. 9-14----------	1,074	12		43	12	32		165	26	44	--	3.2		262	.36	760	157	21	31	1.1	456	7.6
Dec. 15-31----------	290	12		65	19	46		257	39	61	--	3.5		376	.51	294	240	30	29	1.3	652	7.7
Jan. 1-7, 1961---------	488	12		64	26	60		245	64	90	--	2.8		454	.62	598	266	66	33	1.6	778	7.7
Jan. 8-9----------	4,640	12		38	10	26		130	29	38	--	3.5		a220	.30	2,760	136	29	30	1.0	393	7.6
Jan. 10-12----------	2,057	15		59	18	51		165	70	85	--	3.8		408	.55	2,270	221	86	33	1.5	675	7.9
Jan. 13-20----------	885	12		74	22	75		221	77	123	--	4.5		529	.72	1,260	275	94	37	2.0	879	7.9
Jan. 21-31----------	421	11		72	26	48		262	52	83	--	6.2		440	.60	500	286	72	27	1.2	754	7.9
Feb. 1-10----------	1,485	10		62	21	42		216	48	72	--	4.5		384	.52	1,540	241	64	27	1.2	654	7.7
Feb. 11-18----------	1,634	11		67	18	43		220	45	72	--	6.5		390	.53	1,720	241	60	28	1.2	657	7.9
Feb. 19-20----------	1,115	--		--	--	--		195	--	105	--	--		--	--	--	262	102	--	--	784	7.7
Feb. 21-23----------	1,240	12		51	14	29		179	32	45	--	4.8		284	.39	951	185	38	25	.9	492	7.6
Feb. 24-28----------	905	12		64	18	40		220	43	64	--	4.8		378	.51	924	234	53	27	1.1	631	7.8
Mar. 1-17----------	592	9.5		56	23	36		217	38	65	0.3	2.5		366	.50	585	234	56	25	1.0	621	7.6
Mar. 18-31----------	335	8.4		64	28	53		253	55	86	.3	3.0		456	.62	412	274	67	30	1.4	772	7.6
Apr. 1-15----------	256	11		56	34	69		236	70	113	--	4.2		491	.67	339	280	86	35	1.8	852	7.4
Apr. 16-29----------	173	12		54	34	58		250	58	94	--	2.5		442	.60	206	274	70	31	1.5	784	7.4
Apr. 30----------	1,040	--		--	--	--		226	--	235	--	--		--	--	--	366	181	--	--	1,350	7.7
May 1-6----------	200	14		47	25	24		236	22	38	--	3.5		a290	.39	157	220	27	19	.7	514	7.7
May 7-9----------	1,268	--		--	--	--		158	--	175	--	--		--	--	--	280	150	--	--	1,020	7.4
May 10-22----------	565	14		55	25	43		224	44	72	--	2.8		375	.51	572	240	56	28	1.2	652	7.7
May 23-24----------	3,785	11		69	15	123		164	93	188	--	4.2		616	.84	6,300	234	99	53	3.5	1,040	7.3
May 25-31----------	449	12		53	17	79		176	54	121	--	3.8		433	.59	525	202	58	46	2.4	769	7.5

a Calculated from determined constituents.

1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-7, 1961	2,581	7.0		52	17	52		177	44	87	--	0.2		380	0.52	2,650	200	54	36	1.6	642	7.3
June 8	7,060	5.8		68	19	89		129	63	192	--	.2		a500	.68	9,530	248	142	44	2.5	968	7.2
June 9-20	6,399	6.4		42	10	30		130	25	55	--	.4		a233	.32	4,030	146	39	31	1.0	441	7.3
June 21	11,800	9.1		65	15	72		161	61	131	--	.0		a432	.59	13,760	224	92	41	2.1	814	7.0
June 22-30	1,867	8.6		54	14	40		178	33	70	--	.5		332	.45	1,670	192	46	31	1.1	576	7.6
July 1-9	1,199	14		53	15	43		190	32	69	--	1.8		337	.46	1,090	194	38	33	1.3	562	7.6
July 10-12, 18	2,955	13		39	9.7	26		129	25	42	--	2.2		232	.32	1,850	137	32	29	1.0	386	7.3
July 13-17, 19-25	1,496	13		59	17	69		169	63	114	--	1.8		428	.58	1,730	217	78	41	2.0	738	7.6
July 26	6,720	13		62	15	143		147	90	220	--	3.8		a619	.84	11,230	216	96	59	4.2	1,120	7.2
July 27-31	1,694	12		41	9.4	41		137	30	60	--	3.8		280	.38	1,280	141	29	39	1.5	465	7.4
Aug. 1-15	439	10		48	16	45		190	34	65	--	1.2		336	.46	398	186	30	34	1.4	556	7.6
Aug. 16-31	143	19		45	25	44		224	36	64	--	.5		360	.49	139	216	32	31	1.3	607	7.7
Sept. 1-5, 8-14	599	14		45	23	49		175	45	84	0.3	3.5		376	.51	608	207	64	34	1.5	631	7.7
Sept. 6	2,630	13		78	25	180		163	178	260	.6	2.2		a817	1.11	5,850	298	164	57	4.5	1,410	7.6
Sept. 7	7,490	9.9		42	13	48		102	54	85	.3	3.8		a306	.42	6,190	158	75	40	1.7	561	7.7
Sept. 15-30	230	15		57	26	55		228	47	91	.3	3.0		424	.58	263	249	62	32	1.5	715	7.8
Weighted average	1,073	10		53	16	51		170	46	84	--	2.4		357	0.49	1,030	198	58	36	1.6	625	--

a Calculated from determined constituents.

1580. COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from Lamar Boulevard 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 1961.
Water temperatures: October 1947 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 297 ppm Jan. 1-31; minimum, 258 ppm May 1-31.
Hardness: Maximum, 238 ppm Jan. 1-31; minimum, 174 ppm Oct. 1-31.
Specific conductance: Maximum daily, 603 micromhos Dec. 2; minimum daily, 387 micromhos Feb. 2.
Water temperatures: Maximum, 81°F Sept. 8-9; minimum, 44°F Dec. 17.
EXTREMES, 1947-61.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.
Hardness: Maximum, 238 ppm Jan. 1-31, 1961, minimum, 120 ppm Oct. 8-31, 1959.
Specific conductance: Maximum daily, 603 micromhos Dec. 2, 1960; 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. 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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1960	1,609	9.2		43	16	33		181	28	47	--	0.5		279	0.38	1,210	174	25	29	1.1	472	7.6
Nov. 1-30	598	11		54	18	23		220	23	36	0.1	3.0		279	.38	450	208	28	19	.7	481	7.7
Dec. 1-31	645	13		56	18	17		231	22	24	.3	4.8		269	.37	468	214	24	15	.5	479	7.6
Jan. 1-31, 1961	875	11		64	19	19		260	24	25	.2	5.6		297	.40	702	238	24	15	.5	517	7.6
Feb. 1-28	4,461	11		48	17	29		199	27	41	.3	2.5		277	.38	3,340	190	27	25	.9	487	7.7
Mar. 1-31	3,683	11		46	17	27		185	27	44	.3	2.0		282	.38	2,800	185	34	24	.9	474	7.7
Apr. 1-30	3,451	10		44	17	29		186	27	43	.3	1.2		274	.37	2,550	180	28	26	.9	473	7.6
May 1-31	2,440	9.2		45	18	25		190	25	41	.3	1.0		a258	.35	1,700	186	31	23	.8	473	7.2
June 1-30	2,389	12		46	17	25		191	25	38	.3	1.8		265	.36	1,710	185	28	22	.8	460	7.7
July 1-31	4,016	9.1		46	19	25		199	25	40	.3	1.5		268	.36	2,910	193	30	22	.8	468	7.5
Aug. 1-31	3,635	11		45	19	26		187	28	45	.3	1.0		293	.40	2,880	190	38	23	.8	475	7.4
Sept. 1-30	2,379	9.9		42	17	28		180	26	42	.3	1.0		280	.38	1,800	175	28	26	.9	465	7.8
Weighted average	2,502	10		46	18	27		193	26	41	0.3	1.7		276	0.38	1,860	189	31	24	0.9	474	--

a Calculated from determined constituents.

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 Co. 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 1961.
Water temperatures: October 1945 to September 1948, March 1950 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 337 ppm Jan. 16-31; minimum, 128 ppm Nov. 1-3.
Hardness: Maximum, 232 ppm Jan. 16-31; minimum, 85 ppm Nov. 24-25.
Specific conductance: Maximum daily, 626 micromhos Jan. 31; minimum daily, 163 micromhos Sept. 14.
Water temperatures: Maximum, 87°F May 8; minimum, 41°F Jan. 31.
EXTREMES, 1944-61.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.
Hardness: Maximum, 232 ppm Jan. 16-31, 1961; 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, 1950-61): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-18, 1960	1,498	12		44	17	30		183	31	43	0.2	1.2		286	0.39	1,160	180	30	26	1.0	482	7.6
Oct. 19-24, 31	13,820	9.6		30	4.6	10		95	21	10	.3	1.2		a134	.18	5,000	94	16	19	.4	234	7.2
Oct. 25-30	4,580	13		45	8.9	18		152	29	23	.3	1.5		232	.32	2,870	149	24	21	.6	377	7.4
Nov. 1-3	27,620	14		30	3.2	6.0	3.9	94	17	6.0	--	1.5		a128	.17	9,550	88	11	12	.3	216	7.3
Nov. 4-23, 26-30	3,435	15		52	11	16		173	32	23	--	2.5		250	.34	2,320	174	32	17	.5	408	7.4
Nov. 24-25	8,385	15		28	3.6	8.0	4.0	90	15	12	--	.8		a130	.18	2,940	85	11	16	.4	216	7.3
Dec. 1-11	2,906	18		67	14	24		225	41	32	.3	4.0		329	.45	2,580	224	40	19	.7	526	7.8
Dec. 12-15	5,272	16		42	6.8	15		123	32	19	.3	3.5		a195	.27	2,780	133	32	20	.6	324	7.7
Dec. 16-31	2,112	15		68	14	20		230	37	28	.3	4.5		308	.42	1,760	227	38	16	.6	512	7.7
Jan. 1-15, 1961	6,302	13		42	6.6	16		131	31	17	.3	2.5		211	.29	3,590	132	24	21	.6	332	7.6
Jan. 16-31	2,030	14		70	14	32		253	40	34	.3	3.8		337	.46	1,850	232	24	23	.9	563	7.7
Feb. 1-6, 12-16	3,335	13		57	15	26		203	40	34	--	3.8		296	.40	2,670	204	37	21	.8	496	7.7
Feb. 7-11	8,280	11		40	7.4	17		118	38	21	--	3.2		209	.28	4,670	130	34	22	.6	337	7.4
Feb. 17-18	25,050	15		28	5.6	13		103	13	16	--	1.8		a143	.19	9,670	93	8	24	.6	241	7.5
Feb. 19-28	10,290	12		48	11	20		171	27	28	--	2.5		246	.33	6,830	165	25	21	.7	415	7.3
Mar. 1-31	4,346	11		54	14	32		205	32	41	--	2.8		a288	.39	3,380	192	24	27	1.0	503	7.4
Apr. 1-30	3,711	13		48	15	29		186	30	42	--	2.2		286	.39	2,870	182	29	26	.9	478	7.2
May 1-15	2,650	12		44	17	30		186	30	42	--	2.2		282	.38	2,020	180	28	26	1.0	474	7.5
May 16-31	1,997	11		42	16	29		175	29	42	--	1.0		262	.36	1,410	171	28	27	1.0	462	7.1
June 1-17, 24-30	2,868	13		46	14	24		178	27	34	.3	2.2		254	.35	1,970	172	26	23	.8	430	7.6
June 18-23	29,920	13		33	5.8	12		112	18	14	.3	2.2		160	.22	12,930	106	14	20	.5	260	7.1
July 1-11, 15-31	5,381	16		51	15	23		192	29	34	.3	3.0		a265	.36	3,850	188	31	21	.7	452	7.4
July 12-14	29,300	14		29	4.2	12		96	17	12	.3	1.8		a137	.19	10,840	90	12	22	.5	229	6.8
Aug. 1-31	3,197	14		45	18	29		189	30	44	.3	1.8		302	.41	2,610	186	32	26	.9	477	7.8
Sept. 1-11	3,205	14		47	17	31		191	30	46	.3	2.0		288	.39	2,490	188	31	26	1.0	488	7.6
Sept. 12-18	29,910	14		33	4.5	10		109	17	10	.3	2.0		a145	.20	11,710	101	12	18	.4	245	6.9
Sept. 19-30	3,100	15		56	14	22		205	28	32	.3	1.8		282	.38	2,360	197	29	19	.7	472	7.5
Weighted average	5,390	13		43	10	19		154	26	25	--	2.3		223	0.30	3,250	148	22	22	0.7	372	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
1265. COLORADO RIVER NEAR BALLINGER																						
Sept. 26-28, 1961	97.3	9.9		127	41	173		153	302	295	0.5	6.1		1,030	1.40	271	486	360	44	3.4	1,690	7.3
Sept. 29-30	136	9.7		179	48	508		115	476	820	.5	2.0		2,100	2.86	771	644	550	63	8.7	3,440	7.5
1345. SAN ANGELO RESERVOIR AT SAN ANGELO																						
Sept. 23, 1961								151	12	13							122	0			304	7.1
1350. NORTH CONCHO RIVER AT SAN ANGELO																						
Sept. 23, 1961	2.80							348	98	190							355	70			1,280	7.4
CONCHO RIVER AT BELL STREET DAM AT SAN ANGELO																						
Sept. 23, 1961								177	55	119							214	69			760	7.0
1515. LLANO RIVER AT LLANO																						
Jan. 18, 1961	532	12		44	19	18		207	17	26	0.3	3.0		241	0.33		188	18	17	0.6	417	7.6
CUMMINS CREEK NEAR COLUMBUS																						
Dec. 1, 1960	a250	16		57	3.9	19		185	11	25	0.2	0.2		b238	0.32		158	7	20	0.7	382	7.3
1610. COLORADO RIVER AT COLUMBUS																						
Oct. 31, 1960	54,600	9.0	0.00	42	3.9	4.8	4.8	128	19	4.0	0.2	0.0		b160	0.22		121	16	8	0.2	267	7.6

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

1645. NAVIDAD RIVER NEAR GANADO, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59, 170 feet upstream from Texas & New Orleans Railroad Co. bridge, a quarter of a mile downstream from Sandy Creek, and 2½ miles northwest of Ganado, Jackson County.
DRAINAGE AREA.--1,116 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1961.
Water temperatures: October 1959 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 490 ppm Apr. 11-20; minimum, 44 ppm Feb. 5-8.
Hardness: Maximum, 275 ppm Mar. 21-31; minimum, 18 ppm Feb. 5-8.
Specific conductance: Maximum daily, 962 micromhos Apr. 6; minimum daily, 63 micromhos Sept. 12.
Water temperatures: Maximum, 88°F Oct. 6, May 22, Aug. 1, 25-26; minimum, 41°F Jan. 27.
EXTREMES, 1959-61.--Dissolved solids: Maximum, 490 ppm Apr. 11-20, 1961; minimum, 44 ppm Feb. 5-8, 1961.
Hardness: Maximum, 313 ppm Nov. 16-30, 1959; minimum, 18 ppm Feb. 5-8, 1961.
Specific conductance: Maximum daily, 962 micromhos Apr. 6, 1961; minimum daily, 63 micromhos Sept. 12, 1961.
Water temperatures: Maximum, 90°F June 15, July 12, 27, 1960; minimum, 41°F Feb. 12, 1960, Jan. 27, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-14, 1960	53.4	23		66	8.7	50		241	13	68	0.3	0.5		a362	0.49	52.2	200	3	35	1.5	606	7.7
Oct. 15-17	175	18		42	5.3	37		149	11	51	.2	.8		238	.32	112	127	4	39	1.4	426	7.5
Oct. 18-20	7,717	9.2		8.6	1.6	5.2	3.8	36	2.8	7.0	.2	.8		57	.08	1,190	28	0	26	.4	96	6.5
Oct. 21-23, 25-31	5,633	13		17	2.0	10		64	3.6	11	.2	.8		89	.12	1,350	51	0	31	.6	153	6.8
Oct. 24	2,330	--		--	--	--		114	5.6	20	--	--		--	--	--	92	0	--	--	261	7.4
Nov. 1-3	2,503	19		30	3.5	13		104	5.4	19	.1	.5		142	.19	960	89	4	25	.6	239	7.4
Nov. 4-13	393	22		72	5.4	30		236	12	42	.1	.5		a321	.44	341	202	8	24	.9	520	7.6
Nov. 14, 17-19	2,068	13		17	2.4	11		60	4.4	15	.1	.5		93	.13	519	52	3	31	.7	156	6.9
Nov. 15-16, 20-21	1,238	17		32	3.3	21		110	7.8	28	.2	.5		164	.22	548	94	3	33	.9	282	7.1
Nov. 22-25	4,582	13		16	2.1	6.7	4.0	58	3.2	11	.1	.5		86	.12	1,060	49	1	21	.4	138	6.9
Nov. 26-27	1,370	15		21	2.7	13		76	4.6	17	.1	.5		111	.15	411	64	1	31	.7	189	7.1
Nov. 28-30	667	18		43	3.8	23		146	8.4	31	.2	.5		200	.27	360	123	3	29	.9	338	7.4
Dec. 1-8, 25-26	241	22		67	5.3	33		220	15	45	.3	.8		a318	.43	207	189	8	28	1.0	510	7.4
Dec. 9-16, 29-31	2,467	14		22	2.1	16		73	7.2	21	.3	.5		119	.16	793	64	4	35	.9	200	7.0
Dec. 17-20, 28	488	18		51	3.7	30		170	12	39	.3	.8		239	.33	315	142	3	32	1.1	416	7.0
Dec. 21-24, 27	177	24		86	5.5	42		275	17	60	.3	.8		a390	.53	186	237	12	28	1.2	637	7.5
Jan. 1, 1961	6,450	--		--	--	--		31	4.4	8.0	--	--		--	--	--	30	5	--	--	95	6.4
Jan. 2-3	3,985	14		19	1.7	12		63	6.8	14	.2	.8		100	.14	1,080	54	3	32	.7	167	6.8
Jan. 4-5	835	14		31	2.1	21		108	7.8	24	.2	.8		154	.21	347	86	0	35	1.0	271	7.5
Jan. 6-9	3,715	9.1		13	1.7	10		48	5.2	11	.2	.8		75	.10	752	39	0	36	.7	131	6.8
Jan. 10	2,210	--		--	--	--		75	--	16	--	--		--	--	--	64	3	--	--	196	6.8
Jan. 11-16	1,584	14		34	2.1	19		115	8.8	22	.2	.8		158	.21	676	94	0	31	.9	279	7.2
Jan. 17-31	308	19		73	4.6	40		235	16	56	.2	.8		a343	.47	285	201	8	30	1.2	573	7.6
Feb. 1-4	162	22		88	5.4	49		273	20	72	.4	1.5		a407	.55	178	242	18	31	1.4	684	7.5
Feb. 5-8	4,257	5.3		5.8	.9	5.6	2.8	19	4.8	8.5	.3	.8		44	.06	506	18	3	36	.6	76	6.6
Feb. 9-11	1,543	7.8		24	1.2	16		77	7.4	20	.4	.2		115	.16	479	65	2	35	.9	206	7.0
Feb. 12-16	561	15		52	3.5	29		166	12	40	.3	.8		a248	.34	376	144	8	30	1.0	415	7.0
Feb. 17-20, 22-23	7,947	6.2		8.0	1.1	5.3	2.8	30	3.0	7.2	.3	.5		49	.07	1,050	24	0	29	.5	86	6.3
Feb. 21	3,400	--		--	--	--		65	--	14	--	--		--	--	--	56	3	--	--	157	6.6
Feb. 24-25	2,350	15		25	1.6	17		90	5.8	18	.4	.8		128	.17	812	69	0	35	.9	212	7.5
Feb. 26-28	719	17		48	3.1	26		155	10	35	.4	1.0		216	.29	419	132	6	30	1.0	380	7.1
Mar. 1-10	285	23		74	5.6	43		246	17	57	.4	.8		a364	.50	280	208	6	31	1.3	597	7.7
Mar. 11-20	185	24		84	5.6	50		271	19	69	.4	1.0		a402	.55	201	232	10	32	1.4	670	7.8
Mar. 21-31	132	25		100	6.2	52		316	20	76	.4	1.2		a462	.63	165	275	16	29	1.4	760	7.5
Apr. 1-10	148	27		88	7.0	69		285	21	99	.4	1.8		a479	.65	191	248	15	37	1.9	791	7.5
Apr. 11-20	106	27		96	7.3	65		310	22	93	.5	1.0		a490	.67	140	270	16	34	1.7	808	7.7
Apr. 21-29	91.6	26		94	7.6	67		310	22	94	.5	1.0		a488	.66	121	266	12	35	1.8	804	7.7
Apr. 30	487	--		--	--	--		122	--	74	--	--		--	--	--	118	58	--	--	483	6.8

a Residue on evaporation at 180°C.

1645. NAVIDAD RIVER NEAR GANADO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1-3, 1961	221	11		36	5.4	41	3.8	125	14	63	0.2	0.2		236	0.32	141	112	10	43	1.7	387	8.2
May 4-16	59.2	29		86	6.7	60		286	20	82	.4	1.8		a444	.60	71.0	242	8	35	1.7	734	7.4
May 17-24	41.5	27		85	7.1	62		285	19	86	.4	.8		a435	.59	48.7	241	8	36	1.7	747	7.1
May 25	135	--		--	--	--		92	8.4	32	--	--		--	--	--	72	0	--	--	287	8.2
May 26-31	111	18		60	7.9	58		205	22	81	.4	1.8		a362	.49	108	182	14	41	1.9	631	7.5
June 1-9	46.3	24		68	7.6	73		244	21	97	.5	.2		a419	.57	52.4	201	1	44	2.2	712	7.5
June 10-17	654	16		35	6.2	41		130	15	54	.5	1.8		a247	.34	436	113	6	44	1.7	397	6.9
June 18-20	8,640	6.5		8.2	1.7	8.1	2.6	34	3.4	11	.2	.2		59	.08	1,380	27	0	36	.7	99	6.5
June 21-23	12,050	12		14	3.1	13		52	6.0	17	.2	4.2		96	.13	3,120	48	5	38	.8	159	6.1
June 24-30	762	19		37	3.7	27		135	9.8	31	.3	1.0		a212	.29	436	108	0	35	1.1	331	6.8
July 1-2	323	30		56	5.9	37		206	12	44	.4	.2		286	.39	249	164	0	33	1.3	476	8.0
July 3-8	402	22		44	5.0	28		151	11	38	.4	2.5		225	.31	244	130	7	32	1.1	380	7.2
July 9	261	31		51	6.7	30		185	13	38	.4	1.0		262	.36	185	155	3	30	1.0	424	7.9
July 10-14	4,491	17		18	2.8	15		70	6.2	17	.3	1.8		112	.15	1,360	56	0	37	.9	187	6.9
July 15-17	1,227	23		26	4.4	23		101	7.8	28	.3	3.2		166	.23	550	83	0	38	1.1	275	7.1
July 18-31	248	31		60	6.4	41		215	14	51	.4	1.8		a334	.45	224	176	0	34	1.3	511	7.7
Aug. 1-10	177	31		63	8.6	47		227	16	65	.4	.8		a376	.51	180	192	6	35	1.5	570	7.8
Aug. 11-20	210	32		52	10	53		210	14	69	.4	.8		a358	.49	203	170	0	40	1.8	559	7.8
Aug. 21-30	109	29		51	13	51		213	16	70	.4	1.8		a341	.46	100	180	6	38	1.7	576	7.7
Aug. 31	232	--		--	--	--		141	12	47	--	--		--	--	--	115	0	--	--	390	7.7
Sept. 1-8	190	26		45	13	47		190	15	68	.4	1.0		a336	.46	172	166	10	38	1.6	534	7.4
Sept. 9-11	596	20		--	--	17		114	5.8	20	.4	2.5		--	--	--	93	0	29	.8	265	7.0
Sept. 12-17	19,500	8.7		8.2	1.9	6.2	3.2	34	.2	8.2	.2	1.0		55	.07	2,900	28	18	29	.5	95	6.5
Sept. 18-20	2,860	18		22	3.3	13		84	3.8	16	.2	1.0		118	.16	911	68	0	29	.7	201	7.1
Sept. 21-22	644	25		40	4.7	21		146	7.2	25	.3	.8		196	.27	341	119	0	27	.8	321	7.5
Sept. 23-30	301	27		85	5.7	18		233	13	48	.4	1.2		313	.43	254	236	44	14	.5	595	7.5
Weighted average	1,508	12		19	2.5	14		69	4.9	17	0.2	1.1		107	0.15	436	58	1	35	0.8	180	--

a Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN LAVACA RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
1640. LAVACA RIVER NEAR EDNA																						
Oct. 27, 1960	21,000	6.5		14	1.2	2.8	2.4	49	0.2	4.0	0.2	0.5		56	0.08		40	0	12	0.2	97	6.5
Apr. 4, 1961	113	25		118	8.0	66		362	32	97	.5	2.5		a544	.74		328	31	30	1.6	909	7.6
Sept. 14	19,900	7.6		24	1.7	4.2	3.4	82	3.6	7.5	.2	.0		92	.13		67	0	11	.2	152	6.6

a Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN LAVACA-GUADALUPE COASTAL AREA

Chemical analyses, in parts per million, October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
ARENOSA CREEK NEAR EDNA																						
Oct. 27, 1960		5.3		3.2	1.3	2.3	1.7	16	0.2	4.0	0.1	0.2		26	0.04		13	0	24	0.3	40	6.2
Sept. 13, 1961		7.9		6.1	1.4	6.7	3.4	30	2.4	8.2	.1	.0		51	.07		21	0	37	.6	78	6.1
Sept. 14		11		6.3	2.5	9.0	3.6	35	3.0	12	.2	.5		65	.09		26	0	39	.8	107	6.0

1765. GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas & New Orleans Railroad Co. bridge, 10 miles upstream from Coleto Creek, and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1961.
Water temperatures: November 1950 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 416 ppm Dec. 1-12; minimum, 100 ppm Oct. 30-31.
Hardness: Maximum, 282 ppm Nov. 11-22; minimum, 69 ppm Oct. 30-31.
Specific conductance: Maximum daily, 889 micromhos Dec. 1; minimum daily, 160 micromhos Oct. 31.
Water temperatures: Maximum, 84°F Aug. 8, Sept. 3; minimum, 47°F Jan. 29.
EXTREMES, 1945-46, 1948-61.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 100 ppm Oct. 30-31, 1960.
Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 69 ppm Oct. 30-31, 1960.
Specific conductance: Maximum daily, 1,950 micromhos Jan. 11-17, 1946; minimum daily, 160 micromhos Oct. 31, 1960.
Water temperatures (1950-61): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-16, 1960	824	18		64	17	30		254	29	38	0.3	3.0		328	0.45	730	230	22	22	0.9	551	7.6
Oct. 17-18	4,570	14		46	11	21		176	18	28	.3	2.8		a228	.31	2,810	160	16	22	.7	386	7.4
Oct. 19-29	20,650	12		32	4.4	12		110	12	14	.2	1.5		a142	.19	7,920	98	8	21	.5	235	7.3
Oct. 30-31	18,150	--		24	2.2	8.3		82	6.6	9.0	--	.5		100	.14	4,900	69	2	21	.4	160	7.4
Nov. 1-5	23,780	13		39	5.4	12		130	15	15	--	1.8		a165	.22	10,590	120	13	17	.5	280	7.2
Nov. 6-10	4,454	18		74	15	19		257	24	34	--	3.5		332	.45	3,990	246	36	14	.5	540	7.4
Nov. 11-22	3,345	18		85	17	29		300	31	44	--	4.8		394	.54	3,560	282	36	18	.8	643	7.4
Nov. 23-30	6,439	14		56	11	21		188	28	32	--	3.2		282	.38	4,900	184	30	20	.7	446	7.3
Dec. 1-12	2,895	21		83	17	40		292	38	56	.3	4.9		416	.57	3,250	277	38	24	1.0	694	7.6
Dec. 13-20, 30-31	4,217	15		68	14	29		242	32	37	.3	4.8		329	.45	3,750	227	28	21	.8	547	7.6
Dec. 21-29	2,782	16		83	16	30		300	31	38	.3	5.7		374	.51	2,810	273	27	19	.8	628	7.7
Jan. 1-10, 1961	5,397	15		57	12	23		196	30	34	--	3.0		277	.38	4,040	192	31	21	.7	474	7.3
Jan. 11-16	4,523	15		59	12	23		197	33	34	--	3.5		294	.40	3,590	196	35	20	.7	485	7.3
Jan. 17-31	2,513	15		81	19	28		287	35	45	--	6.0		398	.54	2,700	280	45	18	.7	647	7.5
Feb. 1-6	2,603	13		72	19	32		264	37	47	--	6.7		357	.49	2,510	258	41	21	.9	624	7.8
Feb. 7-12	7,042	12		52	10	26		171	33	34	--	5.0		264	.36	5,020	170	30	25	.9	450	7.4
Feb. 13-20	4,311	11		67	15	25		239	31	35	--	6.1		316	.43	3,680	228	32	19	.7	536	7.7
Feb. 21-28	4,695	14		64	14	20		228	26	30	--	5.4		292	.40	3,700	217	30	17	.6	498	7.7
Mar. 1-10	2,933	17		72	19	25		265	32	39	.3	7.5		368	.50	2,910	258	40	18	.7	599	7.6
Mar. 11-20	2,412	18		71	21	24		260	36	42	.4	7.5		381	.52	2,480	264	50	17	.6	619	7.4
Mar. 21-31	2,071	17		69	21	29		259	35	46	.4	7.3		384	.52	2,150	258	46	19	.8	618	7.5
Apr. 1-10	1,864	18		67	20	28		258	33	42	.3	4.2		361	.49	1,820	249	38	20	.8	602	7.4
Apr. 11-20	1,574	16		72	20	33		268	38	50	.4	4.0		396	.54	1,680	262	42	22	.9	640	7.5
Apr. 21-30	1,418	15		62	19	37		260	35	43	.4	2.8		351	.48	1,340	232	20	26	1.1	600	7.4
May 1-10	1,352	17		66	17	34		258	36	40	.3	2.8		362	.49	1,320	234	23	24	1.0	594	7.3
May 11-20	1,118	18		66	19	34		260	36	44	.3	2.5		365	.50	1,100	242	30	23	.9	601	7.4
May 21-31	999	16		63	19	30		250	33	42	.4	1.8		333	.45	898	235	30	22	.9	575	7.3
June 1-10	877	19		55	19	32		228	31	44	--	4.0		320	.44	758	215	28	24	1.0	550	7.5
June 11-19	2,002	19		57	15	31		214	29	44	--	4.2		318	.43	1,720	204	28	25	.9	516	7.4
June 20-25	27,250	14		33	4.3	8.7	4.1	112	13	12	--	1.8		a146	.20	10,740	100	8	15	.4	247	7.0
June 26-30	3,074	22		71	14	29		247	31	42	--	4.0		358	.49	2,970	234	32	21	.8	559	7.0
July 1-10	1,967	21		80	17	40		292	37	53	.3	3.2		407	.55	2,160	270	30	24	1.1	668	7.6
July 11-13	5,497	18		63	14	31		232	28	42	.3	3.8		a314	.43	4,660	214	24	24	.9	539	7.3
July 14-17	5,302	15		37	6.4	18		130	18	22	.3	2.2		a183	.25	2,620	119	12	25	.7	316	7.1
July 18-31	1,741	18		70	14	36		249	37	45	.4	3.2		361	.49	1,700	232	28	25	1.0	596	7.4
Aug. 1-10	1,326	22		54	18	34		216	36	46	--	4.2		340	.46	1,220	208	32	26	1.0	542	7.6
Aug. 11-20	1,154	21		58	18	39		234	33	52	--	3.8		356	.48	1,110	218	26	28	1.1	581	7.6
Aug. 21-31	1,056	19		52	17	35		214	32	45	--	3.8		328	.45	935	200	24	28	1.4	531	7.5
Sept. 1-10	950	22		55	19	36		232	34	45	.3	3.5		332	.45	852	215	25	27	1.1	546	7.7
Sept. 11-13	2,327	18		42	11	27		175	18	31	.3	3.0		a236	.32	1,480	150	6	28	1.0	396	7.8
Sept. 14	4,180	20		--	--	33		231	27	38	.3	3.8		--	--	--	204	14	26	1.0	510	8.2
Sept. 15-20	4,362	19		36	6.6	19		133	20	18	.3	2.5		204	.28	2,400	117	8	26	.8	305	7.7
Sept. 21-30	1,020	20		64	16	37		248	34	45	.3	3.8		349	.47	961	226	22	26	1.1	570	7.7
Weighted average	3,865	15		53	11	22		188	24	29	--	3.3		258	0.35	2,690	177	23	21	0.7	428	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
1675. GUADALUPE RIVER NEAR SPRING BRANCH																						
Feb. 22, 1961	1,380	12		76	21	13		302	21	18	0.1	10		330	0.45		276	28	9	0.3	557	7.7
BLANCO RIVER 6 MILES WEST OF BLANCO																						
Feb. 22, 1961								290		16							260	22			531	7.7
BLANCO RIVER AT BLANCO																						
Feb. 22, 1961		11		69	20	14		286	18	16	0.1	12		303	0.41		254	20	11	0.4	525	7.5
LITTLE BLANCO RIVER AT TWIN SISTERS																						
Feb. 22, 1961		10		73	13	6.8	0.8	264	13	14	0.0	9.1		278	0.38		236	19	6	0.2	483	7.4
1720. SAN MARCOS RIVER AT LULING																						
Sept. 12, 1961	335	9.9		100	30	149		231	88	292	0.3	3.5		846	1.15		373	184	46	3.4	1,410	7.2
1730. PLUM CREEK NEAR LULING																						
Apr. 4, 1961	18.0	13		172	24	249		366	190	395	0.7	14		a1,240	1.69		528	228	51	4.7	2,120	7.3
Sept. 12	390	9.6		115	16	231		198	94	418	.5	3.8		1,080	1.47		353	190	59	5.3	1,780	7.0

a Calculated from determined constituents.

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 1961.
Water temperatures: September 1958 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 725 ppm June 1-10; minimum, 85 ppm Oct. 27.
Hardness: Maximum, 370 ppm May 1-15; minimum, 57 ppm Oct. 27.
Specific conductance: Maximum daily, 1,180 micromhos June 6; minimum daily, 138 micromhos Oct. 27.
Water temperatures: Maximum, 89°F Sept. 5; minimum, 47°F Jan. 27, 30.
EXTREMES, 1945-46, 1958-61.--Dissolved solids: Maximum, 808 ppm Sept. 18, 1959; minimum, 85 ppm Oct. 27, 1960.
Hardness: Maximum, 370 ppm May 1-15, 1961; minimum, 57 ppm Oct. 27, 1960.
Specific conductance: Maximum daily, 1,390 micromhos Apr. 3, 1959; minimum daily, 138 micromhos Oct. 27, 1960.
Water temperatures (1958-61): Maximum, 89°F Sept. 5, 1961; 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-15, 1960--------	200	15		92	21	92		287	106	115	0.6	10		611	0.83	330	316	81	39	2.3	997	7.8
Oct. 16, 18------------	1,328	20		65	14	63		221	51	80	.5	9.0		a412	.56	1,480	220	39	38	1.8	741	7.8
Oct. 17----------------	2,440	--		--	--	--		80	--	4.0	--	--		--	--	--	62	0	--	--	150	7.3
Oct. 19-20-------------	4,860	13		30	4.8	21		108	20	19	.3	3.5		a165	.22	2,170	95	6	32	.9	281	7.4
Oct. 21-25-------------	1,346	14		47	8.5	33		154	42	34	.4	5.6		274	.37	996	152	26	32	1.2	449	7.5
Oct. 26, 28-31---------	8,870	10		27	3.4	12		95	14	9.0	.3	1.8		a124	.17	2,970	81	4	24	.6	217	7.4
Oct. 27----------------	9,230	--		--	--	--		75	--	3.0	--	--		85	.12	2,120	57	0	--	--	138	7.4
Nov. 1-3---------------	6,470	13		34	4.7	18		115	22	16	.2	3.2		a168	.23	2,930	104	10	27	.8	290	7.5
Nov. 4-10--------------	1,009	20		73	12	49		228	59	59	.3	5.7		414	.56	1,130	232	44	31	1.4	666	7.7
Nov. 11-22-------------	836	16		78	14	60		243	72	72	.3	6.5		462	.63	1,040	252	53	34	1.6	751	7.7
Nov. 23-25-------------	4,183	16		29	3.9	19		104	19	16	.1	2.5		a156	.21	1,760	88	3	32	.9	261	7.4
Nov. 26-30-------------	806	18		71	13	52		227	59	64	.3	4.9		412	.56	897	230	44	33	1.5	680	7.5
Dec. 1-9---------------	677	15		100	19	83		305	94	107	.5	9.1		600	.82	1,100	328	78	36	2.0	973	7.8
Dec. 10----------------	2,960	24		33	4.6	21		105	26	20	.4	4.4		a185	.25	1,480	101	15	31	.9	301	7.6
Dec. 11-12-------------	2,340	16		44	7.5	29		140	38	32	.3	4.9		a241	.33	1,520	141	26	31	1.1	412	7.7
Dec. 13-15-------------	1,004	22		62	12	56		201	58	64	.4	11		408	.55	1,110	204	40	37	1.7	660	7.3
Dec. 16-28-------------	645	20		88	18	69		280	82	84	.5	9.0		531	.72	925	294	64	34	1.8	860	7.6
Dec. 29-31-------------	1,375	18		68	12	53		210	59	68	.4	5.6		388	.53	1,440	219	47	35	1.6	657	7.8
Jan. 1-3, 1961---------	1,917	15		46	8.2	36		144	40	45	.3	4.8		275	.37	1,420	148	30	35	1.3	455	7.8
Jan. 4-15--------------	857	17		79	16	55		239	70	75	.4	8.1		441	.60	1,020	263	67	31	1.5	740	8.0
Jan. 16-31-------------	680	17		89	18	60		265	84	79	.4	11		506	.69	929	296	79	31	1.5	825	7.8
Feb. 1-5---------------	661	15		88	19	61		268	86	80	--	11		505	.69	901	298	78	31	1.5	828	8.0
Feb. 6, 11-17----------	1,194	15		70	15	43		212	64	59	--	8.2		396	.54	1,280	236	62	28	1.2	654	7.8
Feb. 7-10--------------	3,418	14		42	7.1	28		132	37	31	--	6.7		a231	.31	2,130	134	26	32	1.1	399	7.7
Feb. 18-22-------------	1,032	15		76	17	44		238	72	56	--	7.1		407	.55	1,130	260	64	27	1.2	686	7.9
Feb. 23-28-------------	1,057	13		74	18	36		231	69	50	--	6.4		396	.54	1,130	258	69	23	1.0	650	7.8
Mar. 1-12--------------	822	16		81	21	43		250	75	64	.4	8.7		454	.62	1,010	288	84	24	1.1	723	8.1
Mar. 13-20-------------	660	17		90	21	55		267	87	79	.3	9.5		510	.69	909	311	92	28	1.4	815	8.1
Mar. 21-31-------------	553	18		93	22	62		282	91	87	.4	10		547	.74	817	322	92	29	1.5	869	8.1
Apr. 1-10--------------	556	19		89	18	75		271	91	94	.5	9.4		548	.75	823	296	74	35	1.9	877	7.8
Apr. 11-20-------------	378	21		104	21	86		310	108	112	.5	10		633	.86	646	346	92	35	2.0	1,010	7.9
Apr. 21-30-------------	334	21		106	21	106		320	127	126	.5	9.5		676	.92	610	351	89	40	2.5	1,090	7.7
May 1-15---------------	292	22		107	25	100		322	121	133	.6	9.0		716	.97	564	370	106	37	2.3	1,110	7.9
May 16-31--------------	243	22		102	23	102		314	117	131	.5	7.0		702	.95	461	349	92	39	2.4	1,100	7.9
June 1-10--------------	226	23		104	23	109		310	127	141	.6	6.9		725	.99	442	354	100	40	2.5	1,140	7.9
June 11-16, 18-19------	566	22		84	18	99		264	101	119	.6	10		616	.84	941	284	67	43	2.6	991	7.8
June 17----------------	425	--		--	--	--		183	--	85	--	--		--	--	--	190	40	--	--	699	7.9
June 20-23-------------	6,518	12		30	4.3	16		101	22	13	.4	3.8		a152	.21	2,670	93	10	28	.7	262	7.5
June 24----------------	3,010	--		--	--	--		152	--	32	--	--		--	--	--	151	26	--	--	433	7.9
June 25-30-------------	791	19		70	13	50		218	68	58	.4	6.0		422	.57	901	228	50	32	1.4	665	7.5

a Calculated from determined constituents.

1885. SAN ANTONIO RIVER AT GOLIAD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1960 to September 1961--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 1-12, 1961	553	26		87	19	73		256	102	93	0.4	6.3		560	0.76	836	295	85	35	1.8	859	8.0
July 13-15	2,817	18		42	7.2	25		127	40	26	.4	6.3		a227	.31	1,730	134	30	29	.9	379	7.5
July 16-19	728	22		67	13	48		205	71	54	.4	6.5		407	.55	800	220	52	32	1.4	632	7.8
July 20-25	525	25		94	20	77		289	106	92	.5	6.3		595	.81	843	316	80	35	1.9	898	8.0
July 26	2,220	18		70	11	52		216	68	55	.6	8.2		a389	.53	2,330	220	42	34	1.5	642	7.9
July 27-28	2,710	20		43	7.2	27		141	36	26	.4	6.3		a235	.32	1,720	137	21	30	1.0	375	7.8
July 29-31	867	20		56	13	50		206	69	54	.4	10		a383	.52	897	218	49	33	1.5	643	7.7
Aug. 1-15	459	22		96	17	73		289	96	86	.5	9.0		563	.77	698	310	72	34	1.8	865	8.1
Aug. 16-31	311	21		103	19	92		314	112	108	.5	9.4		652	.89	547	335	78	37	2.2	1,000	7.8
Sept. 1-14	267	24		104	23	99		316	118	127	.6	7.5		687	.93	495	354	95	38	2.3	1,070	7.9
Sept. 15-30	447	22		86	18	83		276	90	98	.5	11		569	.77	687	288	62	38	2.1	901	7.5
Weighted average	994	16		60	11	43		188	55	52	0.4	6.1		347	0.47	931	194	40	32	1.3	564	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
1870. ESCONDIDO CREEK SUBWATERSHED #1 NEAR KENEDY																						
Mar. 9, 1961----------		1.0		42	3.0	15		134	6.8	22	0.2	0.8		157	0.21		117	7	21	0.6	303	7.0

1895. MISSION RIVER AT REFUGIO, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 77, 560 feet upstream from Missouri-Pacific Railroad Co. bridge, and a quarter of a mile southwest of Refugio, Refugio County.
DRAINAGE AREA.--643 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961.
Water temperatures: September 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, September 1961

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,		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 14, 1961---------	32.0	9.8		64	8.4	529		83	5.0	900	0.2	1.8		1,560	2.12	135	194	126	86	17	2,960	6.5
Sept. 15-17----------	16.7	18		152	23	1,290	18	113	4.7	2,300	.3			3,860	5.25	174	474	381	85	26	6,900	7.4
Sept. 18-20----------	11.2	24		337	47	2,890	28	173	16	5,180	.4			8,610	11.9	260	1,030	892	85	39	14,800	7.3
Sept. 21-25, 29-30-----	7.93	29		496	69	4,500	39	230	25	7,840	.5			13,100	18.0	280	1,520	1,330	86	50	21,000	7.2
Sept. 26-28----------	14.0	27		248	37	2,010	22	204	19	3,500	.5			5,960	8.11	225	771	604	85	32	10,300	7.9

MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO-NUECES COASTAL AREA

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
MEDIO CREEK NEAR REFUGIO																						
Sept. 14, 1961---------		9.7		22	2.6	10	81	0.6	14	0.2	0.5			100	0.14		66	0	25	0.5	184	6.4
ARANSAS RIVER AT U. S. HIGHWAY 77 NEAR SINTON																						
Sept. 14, 1961---------		15		18	2.6	13	77	4.6	10	0.4	2.0			104	0.14		56	0	34	0.8	173	6.4
CHILTIPIN CREEK AT U. S. HIGHWAY 77 NEAR SINTON																						
Sept. 14, 1961---------		25		56	12	469	74	8.8	805	0.3	2.5			1,410	1.92		189	128	84	15	2,660	6.3

2110. NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Wesley E. 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 1961.
Water temperatures: October 1947 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 332 ppm June 1-30; minimum, 200 ppm Dec. 11-20.
Hardness: Maximum, 162 ppm June 1-30; minimum, 108 ppm Nov. 1-30.
Specific conductance: Maximum daily, 592 micromhos June 12; minimum daily, 325 micromhos Nov. 27.
Water temperatures: Maximum, 91°F June 24; minimum, 50°F Jan. 27-28.
EXTREMES, 1947-61.--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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1960--------	2,534	15		42	6.3	43		168	27	41	--	0.5		270	0.37	1,850	131	0	42	1.6	454	7.5
Nov. 1-11, 13-30-------	1,606	12		36	4.2	31		138	23	26	--	1.2		220	.30	954	108	0	38	1.3	341	7.8
Nov. 12----------------	947	--		--	--	--		136	--	64	--	--		--	--	--	108	0	--	--	478	7.6
Dec. 1-10--------------	1,029	21		38	4.5	27		140	23	23	--	1.2		a207	.28	575	114	0	34	1.1	345	7.8
Dec. 11-20-------------	1,407	17		38	4.1	26		135	25	22	--	1.8		a200	.27	760	112	2	34	1.1	350	7.1
Dec. 21-31-------------	603	17		38	4.0	29		137	26	24	--	1.8		a207	.28	337	112	0	36	1.2	353	7.3
Jan. 1-31, 1961--------	837	16		40	3.8	32		143	27	27	0.2	1.2		231	.31	522	116	0	37	1.3	367	7.9
Feb. 1-28--------------	1,163	15		42	4.5	39		142	33	40	--	1.8		256	.35	804	124	7	41	1.5	418	7.5
Mar. 1-31--------------	182	15		46	4.8	42		144	34	50	.3	.2		281	.38	138	134	16	40	1.6	463	7.4
Apr. 1-30--------------	290	14		48	5.3	44		160	38	46	.3	.5		300	.41	235	142	11	40	1.6	496	7.3
May 1-31---------------	122	15		52	6.2	52		170	39	62	.3	.5		322	.44	106	155	16	42	1.8	534	7.7
June 1-30--------------	1,369	12		54	6.6	55		174	40	68	--	1.2		332	.45	1,230	162	19	43	1.9	561	7.6
July 1-31--------------	457	14		49	5.8	51		163	38	59	--	1.0		316	.43	390	146	13	43	1.8	513	7.2
Aug. 1-31--------------	457	19		52	6.2	50		187	34	52	--	.8		318	.43	392	155	2	41	1.7	507	8.2
Sept. 1-30-------------	200	21		54	6.5	50		196	32	52	.3	.8		328	.45	177	161	0	40	1.7	517	8.0
Weighted average------	847	15		43	5.3	41		157	30	41	--	1.0		266	0.36	608	130	1	41	1.6	438	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES-RIO GRANDE COASTAL AREA

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
AGUA DULCE CREEK AT U. S. HIGHWAY 77 NEAR DRISCOLL																						
Sept. 14, 1961--------		17		49	4.2	66		181	9.2	88	0.3	0.2		323	0.44		140	0	51	2.4	580	6.7
2120. SAN FERNANDO CREEK AT STATE HIGHWAY 359 NEAR ALICE																						
Sept. 13, 1961--------		25		38	16	454		488	162	408	0.7	1.8		1,350	1.84		161	0	86	16	2,330	7.2
SAN FERNANDO CREEK NEAR KINGSVILLE																						
Sept. 14, 1961--------		18		36	7.6	399		256	274	348	0.9	1.0		1,210	1.65		122	0	88	16	2,130	6.9

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 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960--	31	179	--		138	31	310	--	305	517	267	--	0.6	0.40	1,504	2.05		469	219	59	6.2	2,210	7.9
November------	30	124	--		139	31	323	--	290	541	273	--	(b)	.36	1,566	2.13		474	236	60	6.4	2,280	8.4
December------	31	117	--		133	31	331	--	284	539	280	--	.6	.37	1,552	2.11		457	224	61	6.7	2,280	7.8
January 1961--	31	94.5	28		133	32	339	9.4	302	537	289	1.0	(b)	.37	1,547	2.10		466	218	61	6.8	2,290	8.2
February------	28	71.5	--		103	32	361	--	220	552	307	--	.6	.43	1,520	2.07		388	208	67	8.0	2,390	8.1
March---------	31	615	--		83	19	126	--	204	236	112	--	(b)	.15	727	.99		284	116	49	3.2	1,120	8.2
April---------	30	402	--		90	19	140	--	223	269	103	--	(b)	.19	806	1.10		303	120	50	3.5	1,210	8.0
May-----------	31	485	--		94	20	155	--	229	288	124	--	(b)	.22	850	1.16		318	130	51	3.8	1,300	8.1
June----------	30	682	--		88	19	133	--	220	262	106	--	.6	.23	773	1.05		298	118	49	3.3	1,180	8.0
July----------	29	878	24		80	20	130	8.2	204	248	105	.8	.6	.20	710	.97		283	116	49	3.3	1,130	8.0
August--------	31	784	--		84	17	163	--	210	295	113	--	(b)	.15	770	1.05		278	106	56	4.2	1,170	8.0
September-----	30	452	--		100	22	184	--	235	323	160	--	.6	.28	960	1.31		338	146	54	4.3	1,440	8.1

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

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 30).
RECORDS AVAILABLE.--Chemical analyses: 1933 to 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960--	5	187	--		138	24	237	--	181	381	298	--	3.1	0.25	1,253	1.70		442	294	54	4.9	1,900	8.0
November------	5	81.0	--		287	71	778	--	332	913	1,060	--	.6	.55	3,487	4.74		1,010	738	63	11	5,110	8.2
December------	4	101	--		247	56	635	--	341	781	812	--	2.5	.54	2,885	3.92		848	568	62	9.5	4,280	8.2
January 1961--	4	60.3	27		258	61	683	7.8	326	797	913	1.0	.6	.49	2,998	4.08		892	624	62	10	4,500	8.0
February------	3	27.4	--		287	75	824	--	305	927	1,140	--	.6	.56	3,572	4.86		1,020	774	64	11	5,350	8.3
March---------	5	9.19	--		407	124	1,350	--	293	1,350	2,010	--	.6	.69	5,755	7.83		1,530	1,290	66	15	8,420	8.1
April---------	4	8.34	--		537	163	1,580	--	317	1,450	2,660	--	1.2	.84	6,878	9.35		2,010	1,750	63	15	10,000	8.0
May-----------	5	13.5	--		406	169	1,500	--	299	1,400	2,330	--	.6	.82	6,308	8.58		1,710	1,460	66	16	9,250	8.0
June----------	4	5.60	--		502	168	1,760	--	275	1,590	2,770	--	(b)	.92	7,370	10.0		1,940	1,720	66	17	10,600	7.7
July----------	2	1.64	30		541	191	2,020	12	241	1,750	3,220	1.0	1.2	1.06	8,308	11.3		2,140	1,940	67	19	12,000	7.8
August--------	1	.27	--		73	9.2	65	--	177	93	87	--	.6	.14	499	.68		220	75	39	1.9	747	7.8
September-----	3	13.8	--		454	141	1,570	--	259	1,450	2,450	--	.6	.84	6,484	8.82		1,710	1,500	67	17	9,450	7.9

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

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 30).
RECORDS AVAILABLE.--Chemical analyses: 1935 to 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960--	4	97.4	--		--	--	98	--	165	--	106	--	--	--	625	0.85		257	122	45	2.7	968	--
November------	8	57.0	--		--	--	699	--	232	--	996	--	--	--	3,192	4.34		934	744	62	9.9	4,760	--
December------	9	68.0	--		--	--	698	--	252	--	922	--	--	--	3,094	4.21		864	657	64	10	4,590	--
January 1961--	9	55.3	21		253	63	743	9.0	262	865	993	1.1	0.6	0.57	3,169	4.31		892	676	64	11	4,780	8.2
February------	7	20.5	--		--	--	808	--	212	--	1,130	--	--	--	3,509	4.77		960	787	65	11	5,210	--
March---------	0	--	--		--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
April---------	0	--	--		--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
May-----------	3	47.7	--		--	--	60	--	131	--	41	--	--	--	462	.63		216	108	38	1.8	711	--
June----------	8	65.0	--		--	--	69	--	128	--	53	--	--	--	601	.82		265	160	36	1.9	844	--
July----------	4	12.1	16		81	5.6	64	5.5	122	222	28	.6	1.9	.08	482	.66		224	124	38	1.9	740	7.7
August--------	6	50.7	--		--	--	59	--	143	--	35	--	--	--	467	.64		214	96	38	1.8	642	--
September-----	1	6.22	--		--	--	36	--	90	--	12	--	--	--	546	.74		307	234	20	.9	764	--

(a) Includes the equivalent of any carbonate (CO_3) present.

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 30).
RECORDS AVAILABLE.--Chemical analyses: 1948 to 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Month	Number of samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1960--	10	884	--		--	--	150	--	165	--	80	--	--	--	913	1.24		332	196	50	3.6	1,280	--
November------	8	973	--		--	--	155	--	171	--	113	--	--	--	949	1.29		350	209	49	3.6	1,350	--
December------	8	1,151	--		--	--	135	--	196	--	140	--	--	--	812	1.10		313	152	48	3.3	1,200	--
January 1961--	9	1,060	26		97	16	129	5.1	198	291	90	1.5	0.6	0.26	770	1.05		310	148	47	3.2	1,140	8.1
February------	8	812	--		--	--	142	--	174	--	96	--	--	--	786	1.07		289	146	52	3.6	1,200	--
March---------	8	559	--		--	--	131	--	192	--	74	--	--	--	807	1.10		316	159	47	3.2	1,170	--
April---------	7	198	--		--	--	206	--	153	--	126	--	--	--	1,159	1.58		391	266	53	4.5	1,640	--
May-----------	10	581	--		--	--	150	--	336	--	87	--	--	--	965	1.31		376	101	47	3.4	1,360	--
June----------	8	1,143	--		--	--	88	--	149	--	44	--	--	--	627	.85		276	154	41	2.3	929	--
July----------	9	1,249	26		95	11	104	6.3	159	290	60	1.1	1.9	.18	676	.92		280	150	44	2.7	1,010	7.8
August--------	9	1,386	--		--	--	89	--	157	--	46	--	--	--	655	.89		283	154	41	2.3	930	--
September-----	9	867	--		--	--	134	--	165	--	71	--	--	--	782	1.06		277	142	51	3.5	1,130	--

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 30).
RECORDS AVAILABLE.--Chemical analyses: 1944 to 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Month	Number of samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) (a)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1960--	6	1,984	--		75	11	72	--	177	183	43	--	2.5	0.23	525	0.71		234	90	40	2.1	779	7.7
November------	5	1,348	--		99	18	131	--	183	310	99	--	3.1	.26	829	1.13		322	172	47	3.2	1,190	8.1
December------	3	1,514	--		98	17	116	--	198	274	87	--	3.1	.23	749	1.02		312	149	45	2.9	1,110	7.9
January 1961--	4	1,408	26		89	18	118	5.1	192	263	87	1.3	.6	.22	720	.98		296	138	46	3.0	1,090	8.0
February------	4	1,223	--		70	18	117	--	145	265	85	--	(b)	.26	665	.90		249	130	51	3.2	1,030	8.0
March---------	5	930	--		78	19	104	--	180	260	62	--	1.9	.22	667	.91		272	124	45	2.7	993	8.1
April---------	4	469	--		80	22	99	--	174	257	71	--	1.9	.14	672	.91		290	148	43	2.5	1,000	8.0
May-----------	6	1,217	--		99	16	93	--	183	287	50	--	1.2	.19	676	.92		310	160	40	2.3	1,000	8.1
June----------	4	2,571	--		77	9.1	50	--	174	151	30	--	1.2	.12	427	.58		228	86	32	1.4	671	7.8
July----------	6	2,098	22		91	11	75	5.5	168	239	39	1.0	1.2	.15	567	.77		272	134	37	2.0	849	7.9
August--------	5	1,903	--		96	13	85	--	184	274	35	--	(b)	.15	655	.89		294	144	38	2.1	924	7.9
September-----	3	1,410	--		99	15	119	--	204	300	69	--	1.2	.25	766	1.04		311	144	45	2.9	1,120	7.8

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

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 1961.
Water temperatures: March 1953 to September 1961.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 7,440 ppm Sept. 1-30; minimum, 5,120 ppm Nov. 17-30.
Hardness: Maximum, 2,270 ppm Sept. 1-30; minimum, 1,770 ppm Dec. 1-31.
Specific conductance: Maximum daily, 11,100 micromhos Sept. 24; minimum daily, 7,400 micromhos Jan. 17, Feb. 25.
Water temperatures: Maximum, 78°F Aug. 20-23; minimum, 45°F on many days during winter months.
EXTREMES, 1937-61.--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 (1953-61): 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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release. 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 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-15, 21-31, 1960-	15.9	18		515	191	1,770		130	1,850	2,750		--		7,160	9.74	307	2,070	1,960	65	17	10,400	7.3
Oct. 16-20----------	1.90	15		470	148	1,260		107	1,610	1,950		1.5		5,510	7.49	28.3	1,780	1,690	61	13	7,960	7.3
Nov. 1-16----------	4.05	18		490	179	1,420		132	1,630	2,300		--		6,100	8.30	66.7	1,960	1,850	61	14	9,040	7.1
Nov. 17-30----------	3.79	13		470	157	1,100		107	1,500	1,820		3.0		5,120	6.96	52.4	1,820	1,730	57	11	7,630	7.2
Dec. 1-31----------	5.92	14		475	142	1,200		117	1,620	1,840		2.0		5,350	7.28	85.5	1,770	1,670	60	12	7,740	6.9
Jan. 1-31, 1961--------	6.02	14		485	149	1,150		126	1,600	1,810		2.0		5,270	7.17	85.7	1,820	1,720	58	12	7,670	7.6
Feb. 1-28----------	5.16	20		515	163	1,270		144	1,760	1,960		4.5		5,760	7.83	80.2	1,960	1,840	59	12	8,100	7.1
Mar. 1-31----------	129	12		480	157	1,180		124	1,620	1,860		3.5		5,370	7.30	1,870	1,840	1,740	58	12	7,840	7.3
Apr. 1-30----------	157	11		485	155	1,290		127	1,690	1,980		1.5		5,670	7.71	2,400	1,850	1,740	60	13	8,140	7.5
May 1-31----------	201	9.4		505	159	1,230		128	1,700	1,990		1.5		5,660	7.70	3,070	1,910	1,810	57	12	8,200	7.4
June 1-30----------	173	12		520	168	1,340		130	1,780	2,080		--		5,960	8.11	2,780	1,990	1,880	59	13	8,540	7.1
July 1-31----------	258	15		550	179	1,410		118	1,900	2,200		--		6,310	8.58	4,400	2,110	2,010	59	13	9,030	7.3
Aug. 1-31----------	340	16		560	185	1,540		118	1,970	2,380		--		6,710	9.13	6,160	2,160	2,060	61	14	9,520	7.4
Sept. 1-30----------	198	16		585	196	1,780		124	2,000	2,800		--		7,440	10.1	3,980	2,270	2,160	63	16	10,400	7.6
Weighted average-----	125	14		533	174	1,420		123	1,840	2,230		--		6,270	8.53	2,120	2,050	1,940	60	14	8,950	--

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 Co. 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 1961.
Water temperatures: October 1953 to January 1959.
EXTREMES, 1960-61.--Dissolved solids: Maximum, 18,300 ppm June 1-23; minimum, 1,410 ppm Mar. 28-29.
Hardness: Maximum, 4,860 ppm June 1-23; minimum, 456 ppm Mar. 28-29.
Specific conductance: Maximum daily, 25,800 micromhos June 14; minimum daily, 2,350 micromhos Mar. 28.
EXTREMES, 1939-41, 1946-47, 1953-61.--Dissolved solids (1960-61): Maximum, 18,300 ppm June 1-23, 1961; minimum, 1,410 ppm Mar. 28-29, 1961.
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 1960 to September 1961 given in Surface Water Records of Texas, Geological Survey Basic Data Release.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-23, 1960-------	33.9	3.2		670	371	3,170		88	3,080	4,960		--		12,300	16.9	1,130	3,200	3,120	68	24	17,100	6.4
Oct. 24-31------------	83.4	6.2		355	228	1,780		104	1,810	2,700		--		6,930	9.42	1,560	1,820	1,740	68	18	10,100	6.9
Nov. 1-30-------------	28.5	4.7		--	--	3,290		99	3,070	4,970		--		--	--	--	3,320	3,240	68	25	16,600	7.1
Dec. 1-31-------------	32.1	13		723	452	3,680		185	3,260	5,650		--		13,900	19.0	1,200	3,660	3,510	69	26	19,000	7.1
Jan. 1-31, 1961-------	35.5	12		733	467	3,760		189	3,390	5,740		--		14,200	19.5	1,360	3,750	3,590	69	27	18,600	7.6
Feb. 1-28-------------	35.8	2.9		753	414	3,940		195	3,490	5,950		--		14,600	20.1	1,410	3,580	3,420	71	29	19,800	7.5
Mar. 1-27-------------	38.8	6.3		776	502	4,390		164	3,700	6,630		--		16,100	22.1	1,690	4,000	3,870	70	30	21,400	7.0
Mar. 28-29------------	334	11		125	35	319		108	392	470		3.8		1,410	1.92	1,270	456	368	60	6.5	2,350	7.8
Mar. 30---------------	92.0	14		170	70	570		132	600	840		2.8		2,330	3.17	579	712	604	64	9.3	3,810	7.7
Mar. 31---------------	71.0	12		290	187	1,440		152	1,370	2,120		3.0		5,500	7.48	1,050	1,490	1,370	68	16	8,230	7.9
Apr. 1-6--------------	42.7	8.2		370	264	1,850		158	1,800	2,800		--		7,170	9.75	827	2,010	1,880	67	18	10,500	7.4
Apr. 7-30-------------	28.9	4.4		635	460	3,440		111	3,190	5,280		--		13,100	17.9	1,020	3,480	3,380	68	25	17,900	6.8
May 1-31--------------	13.8	12		800	574	4,780		62	4,090	7,410		--		17,700	24.4	660	4,360	4,310	70	31	23,500	7.3
June 1-23-------------	39.3	14		888	642	4,880		83	4,350	7,500		--		18,300	25.2	1,940	4,860	4,790	69	30	24,200	6.7
June 24-30------------	34.7	8.6		418	236	2,360		68	2,120	3,390		--		8,570	11.7	803	2,010	1,960	72	23	12,300	6.6
July 1-31-------------	36.7	13		517	298	2,390		74	2,330	3,630		--		9,210	12.6	913	2,520	2,460	67	21	13,100	6.7
Aug. 1-31-------------	19.6	9.1		807	465	4,070		62	3,760	6,140		--		15,300	21.0	810	3,920	3,870	69	28	21,100	6.8
Sept. 1-30------------	23.1	9.6		792	444	3,920		57	3,650	6,040		--		14,900	20.4	929	3,800	3,760	69	28	20,100	7.3
Weighted average----	33.5	8.8		651	402	3,350		120	3,050	5,110		--		12,600	17.1	1,140	3,280	3,180	69	25	17,200	--

4474. 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 (from International Boundary and Water Commission Water Bulletin Number 30).
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Month	Number of samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) (a)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1960--	4	200	--		112	50	301	--	143	290	512	--	2.5	0.24	1,442	1.96		483	366	58	5.9	2,350	7.7
November------	3	182	--		138	64	382	--	155	367	656	--	3.1	.23	1,803	2.45		606	478	58	6.7	2,900	8.2
December------	4	182	--		151	65	418	--	165	404	709	--	3.1	.19	1,969	2.68		646	510	58	7.2	3,150	8.1
January 1961--	4	198	14		161	75	466	4.3	163	457	789	1.0	(b)	.19	2,143	2.91		708	574	59	7.6	3,430	8.0
February------	4	185	--		150	83	532	--	86	519	906	--	(b)	.25	2,359	3.21		714	644	62	8.6	3,840	7.7
March---------	5	159	--		177	89	574	--	140	554	986	--	.6	.24	2,587	3.52		808	692	61	8.8	4,140	8.0
April---------	3	160	--		211	122	781	--	136	740	1,320	--	.6	.33	3,454	4.70		1,030	916	62	11	5,320	7.9
May-----------	5	129	--		159	81	556	--	114	513	940	--	(b)	.29	2,450	3.33		730	638	62	8.9	3,960	8.1
June----------	4	750	--		106	44	275	--	162	268	446	--	3.7	.18	1,301	1.77		444	312	57	5.7	2,140	7.9
July----------	4	268	16		113	53	341	3.9	146	328	559	.8	3.1	.15	1,568	2.13		501	381	59	6.6	2,540	7.7
August--------	5	267	--		116	57	353	--	137	335	598	--	1.2	.22	1,666	2.27		526	414	59	6.7	2,670	7.8
September-----	3	180	--		105	48	296	--	149	279	494	--	2.5	.25	1,393	1.89		459	336	58	6.0	2,310	8.1

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

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 30).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960---	31	6,123	--		--	--	45	--	145	--	48	--	--	--	372	0.51		189	70	34	1.4	586	--
November-------	30	3,260	--		--	--	75	--	171	--	81	--	--	--	534	.73		248	108	40	2.1	826	--
December-------	31	3,032	--		--	--	101	--	180	--	103	--	--	--	640	.87		282	134	44	2.6	999	--
January 1961---	31	2,872	20		80	20	104	3.5	179	191	115	1.0	0.6	0.18	632	.86		282	136	44	2.7	1,010	7.9
February-------	28	2,659	--		--	--	103	--	110	--	118	--	--	--	575	.78		237	146	48	2.9	939	--
March----------	31	1,721	--		--	--	114	--	143	--	128	--	--	--	653	.89		268	150	48	3.0	1,060	--
April----------	30	1,288	--		--	--	124	--	143	--	162	--	--	--	717	.98		287	170	49	3.2	1,150	--
May----------	31	1,716	--		--	--	100	--	143	--	126	--	--	--	601	.82		251	134	46	2.8	976	--
June----------	30	10,900	--		--	--	30	--	140	--	33	--	--	--	299	.41		167	52	28	1.0	474	--
July----------	31	5,286	21		68	12	58	4.3	151	125	67	.6	5.6	.09	441	.60		221	98	36	1.7	720	7.8
August---------	31	3,750	--		--	--	69	--	162	--	69	--	--	--	535	.73		244	112	38	1.9	804	--
September------	30	2,662	--		--	--	72	--	163	--	73	--	--	--	510	.69		241	108	39	2.0	811	--

(a) Includes the equivalent of any carbonate (CO_3) present.

4613. 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 30).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

Month	Number of samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) (a)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1960--	7	1,478	--		65	19	92	--	126	194	98	--	0.6	0.23	572	0.78		240	136	45	2.6	902	7.9
November------	10	701	--		67	16	87	--	131	188	90	--	.6	.22	575	.78		234	126	45	2.5	870	8.0
December------	11	603	--		69	17	89	--	135	183	94	--	.6	.20	551	.75		240	130	45	2.5	876	8.0
January 1961--	11	1,182	16		70	18	88	4.3	140	193	91	0.8	.6	.19	550	.75		248	134	43	2.4	896	7.9
February------	7	1,592	--		69	19	88	--	144	182	98	--	.6	.23	565	.77		249	131	44	2.4	896	8.0
March---------	13	5,432	--		71	17	87	--	143	188	89	--	(b)	.09	562	.76		248	130	43	2.4	897	8.0
April---------	7	4,269	--		72	17	88	--	144	194	89	--	(b)	.18	573	.78		249	130	43	2.4	903	7.9
May-----------	10	7,628	--		71	18	90	--	142	191	96	--	.6	.20	568	.77		252	136	44	2.5	911	7.9
June----------	10	3,563	--		67	18	90	--	135	190	98	--	(b)	.20	558	.76		241	130	45	2.5	902	8.0
July----------	27	2,228	11		64	16	81	6.7	128	167	90	.8	.6	.17	509	.69		225	120	43	2.4	839	7.8
August--------	13	3,074	--		63	18	80	--	130	166	89	--	.6	.12	524	.71		228	122	43	2.3	829	7.9
September-----	14	3,311	--		60	15	80	--	128	149	89	--	.6	.21	509	.69		212	107	45	2.4	815	7.8

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

4647 RIO GRANDE AT FORT RINGGOLD, RIO GRANDE CITY, TEX.

LOCATION.--At gaging station about one 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 30).
RECORDS AVAILABLE.--Chemical analyses: January 1959 to September 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960--	31	1,675	--		70	16	101	--	137	192	108	--	0.6	0.27	597	0.81		239	126	48	2.8	947	7.8
November------	30	750	--		77	18	128	--	153	224	138	--	.6	.30	721	.98		266	141	51	3.4	1,110	8.0
December------	31	587	--		71	22	137	--	163	225	142	--	.6	.26	725	.99		267	134	53	3.7	1,150	7.9
January 1961--	31	1,233	17		72	19	119	4.3	157	210	121	1.0	.6	.28	651	.89		256	128	50	3.2	1,050	7.9
February------	22	1,601	--		68	18	114	--	140	206	119	--	.6	.26	613	.83		243	128	51	3.2	1,010	8.2
March---------	7	5,416	--		72	17	86	--	145	187	89	--	(b)	.15	565	.77		248	130	43	2.4	891	7.9
April---------	30	4,302	--		73	17	89	--	146	190	96	--	(b)	.20	583	.79		252	132	44	2.5	920	7.9
May-----------	19	7,872	--		70	19	89	--	145	188	97	--	.6	.16	564	.77		254	135	43	2.4	912	8.0
June----------	13	3,798	--		67	18	92	--	134	189	100	--	.6	.19	567	.77		242	132	45	2.6	912	7.8
July----------	13	2,374	12		63	17	86	5.9	131	171	96	.6	(b)	.18	517	.70		228	120	44	2.5	860	7.8
August--------	14	3,285	--		61	20	83	--	135	168	92	--	.6	.28	536	.73		234	124	43	2.4	847	7.8
September-----	12	4,101	--		61	15	80	--	123	156	87	--	.6	.20	488	.66		211	110	45	2.4	796	7.8

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

4692. RIO GRANDE AT ANZALDUAS DAM, TEX.

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 30).
RECORDS AVAILABLE.--Chemical analyses: March 1959 to September 1961.
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 1960 to September 1961 given in International Boundary and Water Commission Water Bulletin Numbers 30 and 31.

Chemical analyses, in parts per million, water year October 1960 to September 1961

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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
October 1960--	13	1,187	--		69	19	131	--	124	203	161	--	0.6	0.36	690	0.94		249	148	53	3.6	1,120	7.9
November------	13	679	--		116	34	272	--	183	317	394	--	(b)	.67	1,306	1.78		430	280	58	5.7	2,080	8.0
December------	13	533	--		119	34	272	--	181	327	388	--	.6	.67	1,302	1.77		438	290	57	5.6	2,080	8.0
January 1961--	13	541	16		88	27	180	4.3	153	260	236	0.8	(b)	.44	911	1.24		330	204	54	4.3	1,480	8.0
February------	12	906	--		90	27	191	--	156	264	252	--	.6	.46	956	1.30		336	208	55	4.5	1,540	7.9
March---------	14	1,997	--		79	21	132	--	146	224	160	--	(b)	.30	731	.99		284	164	50	3.4	1,180	7.9
April---------	12	1,798	--		86	24	172	--	149	255	220	--	(b)	.40	892	1.21		314	192	54	4.2	1,420	7.9
May-----------	14	2,667	--		78	22	126	--	148	220	151	--	(b)	.28	702	.95		283	162	49	3.2	1,150	8.0
June----------	13	2,487	--		80	23	160	--	143	243	196	--	(b)	.35	807	1.10		294	177	54	4.0	1,320	7.9
July----------	13	1,351	12		75	23	161	3.5	131	225	207	.8	(b)	.27	790	1.07		281	174	55	4.2	1,300	7.8
August--------	13	1,740	--		70	21	128	--	135	200	161	--	(b)	.33	688	.94		261	150	52	3.4	1,120	8.0
September-----	13	2,986	--		67	20	120	--	128	180	153	--	(b)	.32	632	.86		249	144	51	3.3	1,040	8.0

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

MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1960 to September 1961

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 (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
CAPOTE CREEK NEAR CANDELARIA																						
Mar. 30, 1961---------	a0.17	29		19	0.6	183	350	117	27		0.0			549	0.75		50	0	89	11	867	7.9

a Field estimate.