

TEXAS WATER DEVELOPMENT BOARD

REPORT 7

CHEMICAL COMPOSITION OF TEXAS
SURFACE WATERS, 1963

By

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Prepared by the U.S. Geological Survey
in cooperation with the
Texas Water Development Board
and Others

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FOREWORD

On September 1, 1965 the Texas Water Commission (formerly, before February 1962, the State Board of Water Engineers) experienced a far-reaching realignment of functions and personnel, directed toward the increased emphasis needed for planning and developing Texas' water resources and for administering water rights.

Realigned and concentrated in the Texas Water Development Board were the investigative, planning, development, research, financing, and supporting functions, including the reports review and publication functions. The name Texas Water Commission was changed to Texas Water Rights Commission, and responsibility for functions relating to water-rights administration was vested therein.

For the reader's convenience, references in this report have been altered, where necessary, to reflect the current (post September 1, 1965) assignment of responsibility for the function mentioned. In other words credit for a function performed by the Texas Water Commission before the September 1, 1965 realignment generally will be given in this report either to the Water Development Board or to the Water Rights Commission, depending on which agency now has responsibility for that function.

Texas Water Development Board

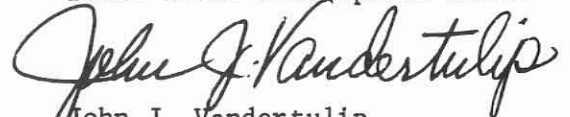

John J. Vandertulip
Chief Engineer

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CHEMICAL COMPOSITION OF TEXAS

SURFACE WATERS, 1963

INTRODUCTION

This report contains data on the chemical quality of the surface waters of Texas for the water year 1963 (October 1, 1962 to September 30, 1963). Results are presented for chemical analyses of water samples obtained daily or less frequently at selected sites throughout the State.

The material dissolved in the water of a stream is derived from many sources, and the amount carried is constantly changing. Water in contact with rocks and soils, even for short periods of time, will dissolve some of the mineral and organic substances. Industries and city sewer systems contribute waste water containing dissolved materials. Runoff from cultivated farmlands may contain phosphate, potassium, and nitrate from fertilizers. Forest areas yield runoff containing wastes from the decomposition of organic matter.

The concentration of dissolved solids in the water is usually at a minimum when streams are in flood. As streamflow decreases the concentration of dissolved solids generally increases so that where the base flow of a stream is maintained by ground water the dissolved-solids concentration is generally at a maximum.

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

COOPERATION

This is the eighteenth in a series of annual reports (water years 1946-63) on the chemical quality of surface waters of Texas prepared by the U.S. Geological Survey in cooperation with the Texas Water Development Board. In addition to the annual reports, two earlier reports contained data for the water years 1938-44 and 1938-45, respectively. Information as to the availability of these reports may be obtained by writing the Texas Water Development Board, 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 Corps of Engineers, U.S. Army, the Dow Chemical Company, 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 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, 1962 to September 30, 1963. 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 site for the sampling period are included in most tables of analyses.

Texas Water Development Board-U.S. Geological Survey Sampling Program

During the period covered by this report samples were collected daily at 57 stations on Texas streams and twice weekly at four sampling sites in Trinity Bay near the mouth of the Trinity River. Samples were collected periodically at three sites in a small area on Salt Croton and Haystack Creeks near Aspermont. In addition to the chemical-quality data included in this report, temperature data for streams at 47 of the sampling stations are available in the files of the U.S. Geological Survey in Austin. Records of chemical quality of streams at 56 additional sampling stations have been published in earlier reports of this series. The locations of the active and inactive stations are shown on the accompanying map (Plate 1). The periods of operation of all the stations are shown on the bar graph (Figure 4). The three sampling sites on Salt Croton and Haystack Creeks are indicated as a single location (46) on the map.

Water samples were usually collected 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 conductance. 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 concentration of daily samples, river stage, weather conditions, and other background information of the stream. At several sampling stations where chemical composition changes gradually, daily samples for an entire month were composited.

Reconnaissance Study

The collection of samples at miscellaneous sites was increased slightly during the 1963 water year. Sampling for the statewide reconnaissance study^{1/} was concentrated in the Neches and San Jacinto River Basins and reports summarizing water quality in those basins are in preparation. Similar reports are planned for the other major river basins of the State during the period 1965-68.

Low-Flow Investigations

A series of low-flow investigations was begun in 1962 to evaluate the quality of water and the interchange of ground and surface water in streams. These investigations are cooperative projects of the Geological Survey and the Texas Water Development Board.

Low-flow investigations were made during the 1963 water year on the Sabine River, on the Lampasas River in the Brazos River Basin, on Cibolo Creek in the San Antonio River Basin, and on the Nueces River. Chemical analyses of samples collected during these investigations are included with the miscellaneous analyses for the respective basins.

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

Included in this report are 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 two of the stations samples were collected daily; at the others, from 1 to 31 samples were collected each month. A single monthly composite was made by taking from each individual sample an amount of water proportional to the volume of riverflow represented by the sample. Results of these analyses are also published in equivalents per million in Water Bulletins Number 32 and 33 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.

^{1/} Texas Water Commission, 1962, The present reconnaissance study program of the chemical quality of streams in Texas: Texas Water Commission Circ. 6201, 15 p.

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.

Sodium-adsorption ratio (SAR) is used to express the relative activity of sodium ions in exchange reactions with the soil, and is an index of the sodium or alkali hazard to the soil.

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

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. It varies with the amount of dissolved solids and is used to approximate the dissolved-solids content.

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

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

Hardness due to calcium and magnesium, and noncarbonate hardness are reported as calcium carbonate (CaCO₃).

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.^{2/}

SURFACE-WATER RUNOFF AND CHEMICAL-QUALITY CONDITIONS

Runoff was generally deficient throughout Texas during the 1963 water year, with near-drouth conditions developing over most of the State. Locally,

^{2/} Rainwater, F. H., and Thatcher, L. L., 1960, Methods for collection and analysis of water samples: U.S. Geol. Survey Water-Supply Paper 1454, 301 p., 17 figs., 3 tables.

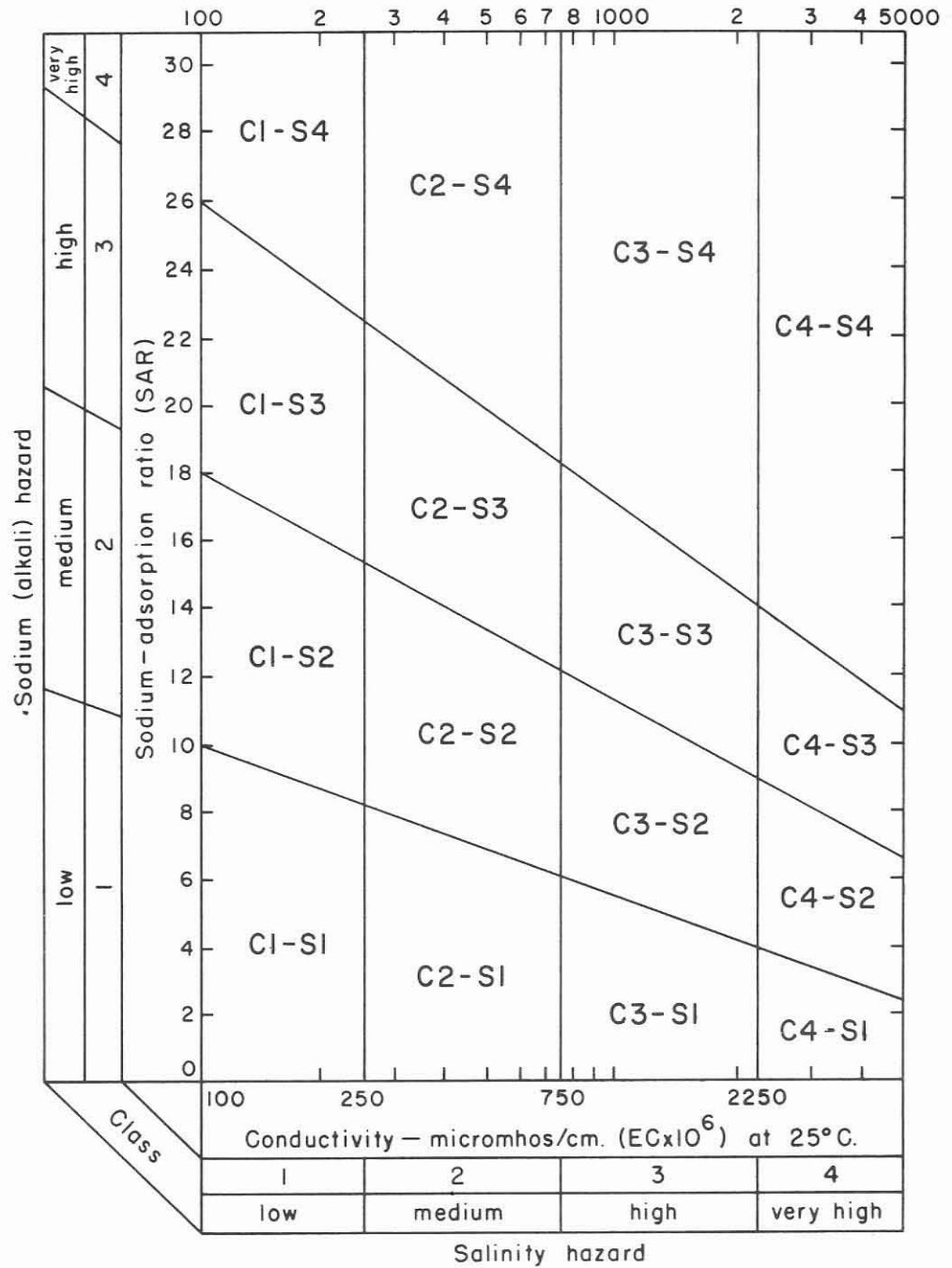


Figure 1
 Diagram for the Classification of Irrigation Waters
 (After United States Salinity Laboratory Staff, 1954, p. 80)

excessive rains caused flooding in the Dallas area in October; in the upper Trinity, Sabine, and Sulphur Rivers in April; and in the lower Nueces River in June. Rainfall associated with Hurricane Cindy approached 24 inches on September 17 in the Beaumont-Port Arthur area.

Mean discharges for selected stations for the 1962 and 1963 water years, and for the period of record, are shown in Figure 2. On many streams, changes in dissolved solids are closely related to the rate of discharge. Low flows are likely to be considerably more mineralized than are floodflows in the same stream. 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 large increases in dissolved solids when moderate storm runoff flushes oil-field wastes or salt residues 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 Development Board-U.S. Geological Survey cooperative program during the 1963 water year.

Canadian River Basin

Streamflow at the station Canadian River near Amarillo for the 1963 water year was about 80 percent of the previous year and less than 30 percent of the 26-year average. Almost 80 percent of the runoff for the year occurred during the summer. Although runoff during 1963 was less than in 1962 the weighted-average concentration of dissolved solids was 779 ppm, which is 41 ppm less than in 1962.

Low flow is maintained by drainage of sewage effluent down East Amarillo Creek from the Amarillo sewage disposal plant, and nitrates during much of the time exceed 30 ppm. The weighted-average nitrate concentration for 1963 was 11 ppm.

Red River Basin

Streamflow in the Red River Basin in 1963 was less than half the 27-year average and only about half of that recorded in 1962.

At the station Little Wichita River near Henrietta, streamflow was about 80 percent of the 10-year average and about the same as in 1962. The water was of good quality except during periods of low flow. The weighted-average concentration of dissolved solids was 158 ppm, which is 76 ppm less than in 1962.

The chemical-quality station Little Wichita River near Ringgold was discontinued on October 31, 1962.

At Denison Dam, the chemical quality of the outflow from Lake Texoma was uniform and improved slightly over 1962. The weighted-average concentration of dissolved solids was 989 ppm.

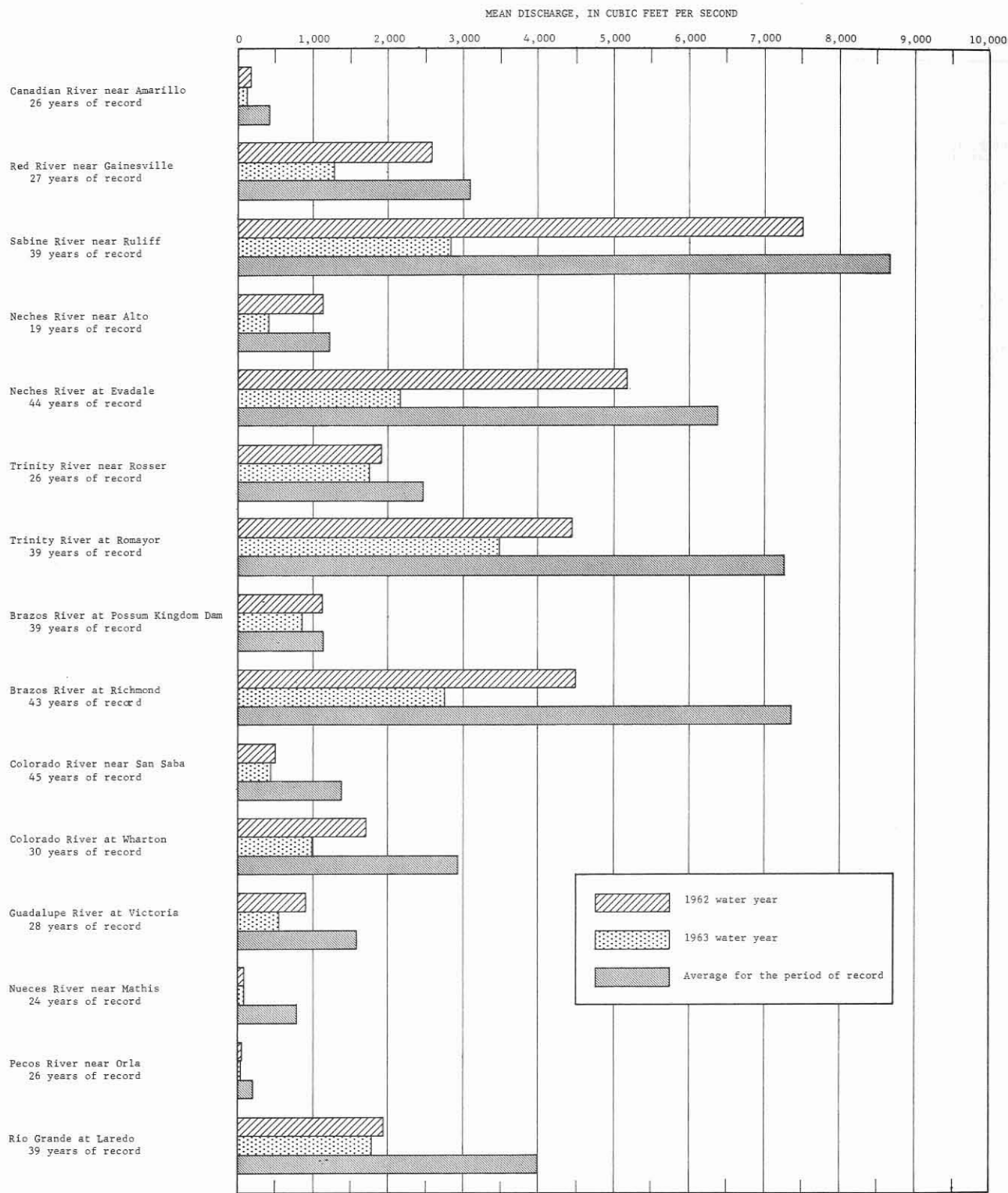


Figure 2.—Mean Discharge at Selected Stations for the 1962 and 1963 Water Years
and for the Period of Record

Table 1.--Mean discharge and maximum, minimum, and weighted-average concentrations of dissolved solids for the 1963 water year for stations operated under the Texas Water Development Board-U.S. Geological Survey cooperative program

Sampling station	Mean discharge (cfs)	Dissolved solids (ppm)		
		Maximum	Minimum	Weighted average
CANADIAN RIVER BASIN				
Canadian River near Amarillo	129	1,540	253	779
RED RIVER BASIN				
Little Wichita River near Henrietta	101	2,470	30	158
Red River near Gainesville	1,289	5,580	292	1,590
Red River at Denison Dam near Denison	3,029	1,050	941	989
SULPHUR RIVER BASIN				
South Sulphur River near Cooper	156	1,150	87	159
SABINE RIVER BASIN				
Sabine River near Tatum	845	621	106	234
Sabine River near Ruliff	2,831	284	25	134
NECHES RIVER BASIN				
Neches River near Alto	418	281	96	147
Angelina River near Lufkin	365	452	70	158
Neches River at Evadale	2,153	159	14	122
TRINITY RIVER BASIN				
Trinity River near Rosser	1,752	604	225	297
Chambers Creek near Corsicana	114	578	174	299
Richland Creek near Fairfield	--	10,100	173	--
Long King Creek near Livingston (a)	28.9	316	52	142
Trinity River at Romayor	3,495	612	134	287
Trinity River near Moss Bluff	--	612	120	--
Old River near Cove	--	1,350	115	--
Trinity River at Anahuac	--	--	--	--
Trinity Bay at mouth of Trinity River near Anahuac	--	--	--	--
SAN JACINTO RIVER BASIN				
West Fork San Jacinto River near Conroe	249	286	57	146
BRAZOS RIVER BASIN				
Double Mountain Fork Brazos River near Aspermont	164	6,200	599	1,120
Croton Creek near Jayton	25.4	36,600	3,030	5,490
Salt Croton Creek near Aspermont	--	--	--	--
Salt Fork Brazos River near Aspermont	80.8	87,400	1,380	6,070
Brazos River at Seymour	299	12,800	852	2,850
California Creek near Stamford (b)	32.9	7,580	252	974
Deep Creek at Moran (c)	13.2	4,150	179	267
Hubbard Creek near Albany	17.7	1,180	177	248
North Fork Hubbard Creek near Albany (d)	.7	5,060	1,240	3,120
Salt Prong Hubbard Creek near Albany	1.2	4,250	766	2,110
Big Sandy Creek near Breckenridge	28.5	2,450	86	162
Hubbard Creek near Breckenridge	46.2	1,740	209	307
Clear Fork Brazos River near Eliasville	194	2,540	218	661
Brazos River at Possum Kingdom Dam near Grafrod	867	1,520	966	1,320
Brazos River at Whitney Dam near Whitney	1,215	1,060	810	896
Lampasas River at Youngsport	57.4	687	194	373
Little River at Cameron	475	539	176	301
Brazos River at Highway 21 near Bryan	1,896	1,200	186	703
Yegua Creek near Somerville	234	858	82	194
Navasota River near Bryan	48.7	1,410	64	288
Brazos River at Richmond	2,759	903	159	513
Brazos River at Harris Reservoir near Angleton	--	--	--	--
Brazos River at Brazoria River near Brazoria	--	--	--	--
COLORADO RIVER BASIN				
Colorado River near Ira	4.1	44,300	954	3,400
Colorado River at Colorado City	16.8	19,400	380	3,550
Beals Creek near Westbrook	10.6	6,100	253	1,100
Colorado River near Silver	32.2	8,060	203	1,780
Colorado River at Ballinger	58.7	6,900	144	1,230
San Saba River near San Saba	52.7	316	204	281
Colorado River near San Saba	446	1,360	155	384
Colorado River at Austin	1,056	348	313	338
Colorado River at Wharton	997	360	206	323
LAVACA RIVER BASIN				
Navidad River near Ganado	122	486	87	228
GUADALUPE RIVER BASIN				
Guadalupe River at Victoria	565	372	225	316
SAN ANTONIO RIVER BASIN				
San Antonio River at Goliad	196	761	158	524
SAN ANTONIO-NEECES COASTAL AREA				
Mission River at Refugio	10.6	66,900	324	9,650
NEECES RIVER BASIN				
Nueces River near Mathis	109	428	344	382
RIO GRANDE BASIN				
Pecos River below Red Bluff Dam near Orla	53.6	10,400	8,270	9,790
Pecos River near Girvin	36.8	20,000	11,200	13,900

a Station operation began Jan. 1, 1963.
b Station operation began Oct. 12, 1962.
c Station operation began Oct. 31, 1962.
d Station operation began Nov. 1, 1962.

Sulphur River Basin

Flow in the South Sulphur River at the Cooper station was only 47 percent of the flow in 1962 and 42 percent of the 21-year average. The water was almost always of good quality with a weighted-average dissolved-solids concentration of 159 ppm.

Sabine River Basin

The Sabine River drains an area of high rainfall in East Texas and western Louisiana, but runoff during the 1963 water year was unusually low. As measured at the lowermost gaging station, Sabine River near Ruliff, streamflow was only 33 percent of the 39-year average.

The water of the basin is almost always low in dissolved solids, but as a result of continued decreased flow the weighted-average concentration of dissolved solids for the Tatum station was 234 ppm, up 57 ppm from 1962 and at the Ruliff station the weighted average was 134 ppm, up 31 ppm from 1962. Duration curves for the Sabine River near Ruliff (Figure 3) show the percentage of time specific concentrations of dissolved solids were equaled or exceeded during the 1963 water year and during water years 1954-63.

Neches River Basin

Runoff in the Neches River Basin during 1963 was less than half as much as during 1962 and only about one-third as much as the long-term average.

Although often high in organic color and turbidity, the water of the basin is usually of good quality. The decrease in flow during 1963 caused an increase in the discharge-weighted average concentration of dissolved solids at every station. The weighted average increased to 147 ppm at the station on the Neches River near Alto, up 26 ppm from 1962, increased to 158 ppm at the station Angelina River near Lufkin, up 71 ppm from 1962, and increased to 122 ppm at the Evadale station, up 20 ppm from 1962. Duration curves for the Neches River at Evadale (Figure 3) show the percentage of time specific concentrations of dissolved solids were equaled or exceeded during the 1963 water year and during water years 1948-63.

Trinity River Basin

During the 1963 water year, streamflow in most of the streams in the upper Trinity River Basin was less than in 1962. Runoff for the basin as measured at the gaging station at Romayor was less than half the 39-year average.

Flow of the Trinity River at Rosser is largely controlled by reservoirs above Dallas and by Lavon Reservoir on the East Fork Trinity River. During low-flow periods much of the flow is sewage effluent from Fort Worth and Dallas. High concentrations of nitrate, phosphate and ABS (alkyl benzene sulfonate) are usually present in sewage effluent, and during 1963, nitrate concentrations were as high as 48 ppm, phosphate as high as 11 ppm, and ABS as high as 1.8 ppm. The weighted-average nitrate concentration was 9.4 ppm. The weighted-average concentration of dissolved solids was 297 ppm, almost the same as in 1962.

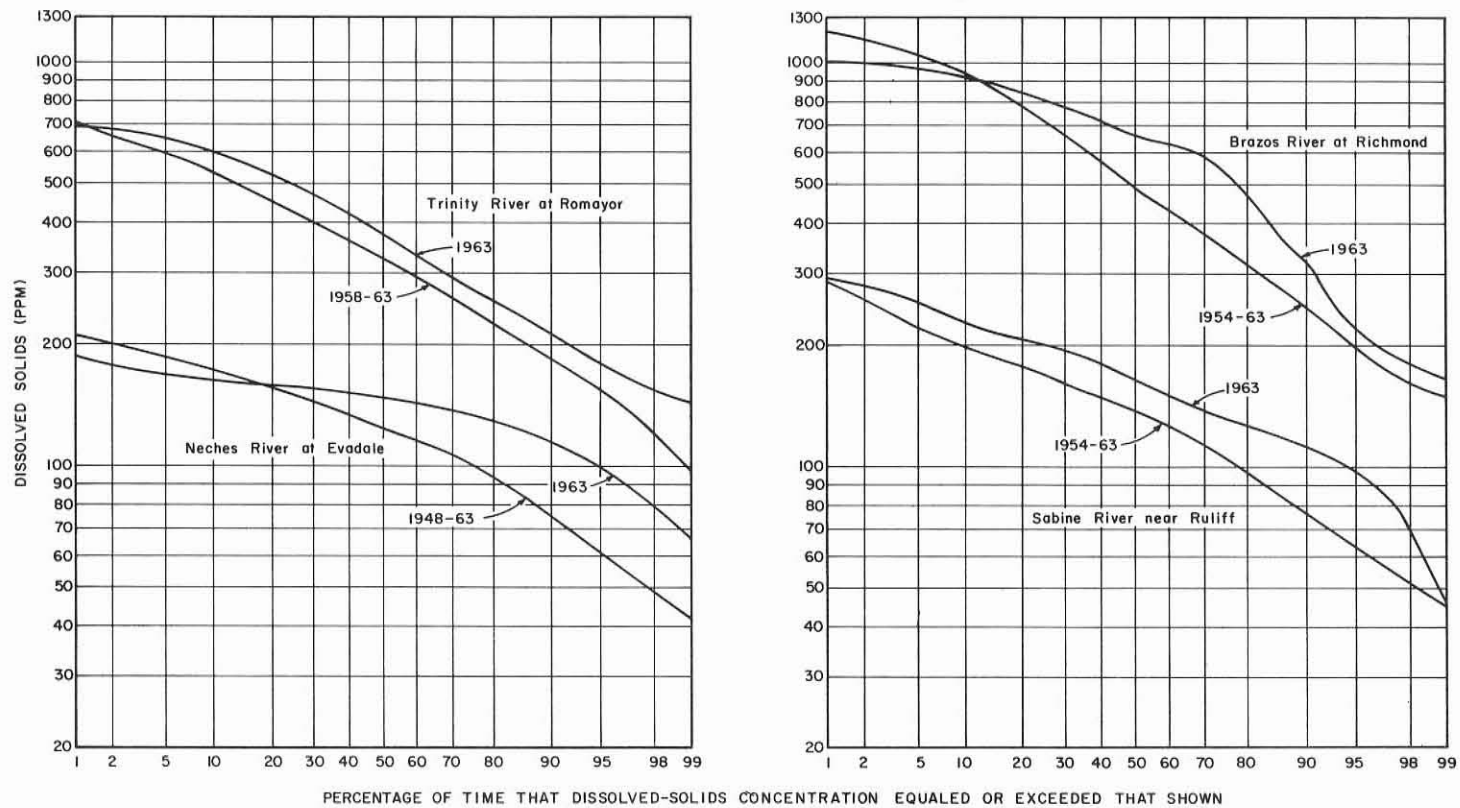


Figure 3
Duration Curves for Dissolved Solids at Four Selected Stations

A new chemical-quality station, Long King Creek near Livingston, was established in the Trinity River Basin in January 1963. For the period January to September, the weighted-average concentration of dissolved solids was 142 ppm.

Although runoff at the Romayor station was only about 80 percent of that in 1962, the weighted-average concentration of dissolved solids was slightly less, 287 ppm in 1963 as compared to 295 ppm in 1962. Duration curves for the Romayor station (Figure 3) show the percentage of time specific concentrations of dissolved solids were equaled or exceeded during the 1963 water year and during water years 1958-63.

San Jacinto River Basin

At the chemical-quality station, West Fork San Jacinto River near Conroe, runoff in 1963 was only about half the 27-year average but the average discharge in 1963 was 249 cfs as compared to 157 cfs in 1962. The water of the West Fork San Jacinto River is of good quality; in 1963 the weighted-average concentration of dissolved solids was 146 ppm.

Brazos River Basin

Runoff in the Brazos River Basin was below average in 1963 but at stations in the upper part of the basin it was about the same as in 1962. However, the water generally was of slightly better quality than in 1962.

The 1963 average discharge of the Double Mountain Fork Brazos River near Aspermont was slightly lower than both the 34-year and 1962 averages. The weighted-average concentration of dissolved solids was 1,120 ppm, nearly the same as in 1962. The average discharge of the Salt Fork Brazos River near Aspermont was only 55 percent of the 24-year average, but was 28 percent more than in 1962. The weighted-average concentration of dissolved solids decreased to 6,070 ppm, only two-thirds as high as in 1962.

Flow of the Brazos River at Seymour, downstream from the junction of the Double Mountain and Salt Forks of the Brazos River, was 69 percent of the 39-year average and about the same as in 1962. The weighted-average concentration of dissolved solids was 2,850 ppm, a slight increase over 1962.

Three chemical-quality stations were established in the Brazos River Basin during 1963. A station on California Creek near Stamford measures the salt load from an area having many oil fields. The other two stations, Deep Creek near Moran and North Fork Hubbard Creek near Albany, were established to measure the quality of inflow to Hubbard Creek Reservoir.

Storage in Possum Kingdom Reservoir decreased during 1963 from 692,600 acre-feet on October 1, 1962 to 560,800 acre-feet on September 30, 1963. The weighted-average concentration of dissolved solids in water released from the reservoir was about the same as in 1962.

Runoff from the area below Possum Kingdom Reservoir during the last quarter of the 1962 water year had improved the quality of the water stored in Whitney Reservoir so that the weighted-average concentration of dissolved solids in the water released from the reservoir decreased to 896 ppm in 1963, 134 ppm less than in 1962.

The average discharge of the Brazos River at Richmond was 2,759 cfs for 1963. Although the average discharge was only about 60 percent of that in 1962, the weighted-average concentration of dissolved solids was 513 ppm, compared with 551 ppm in 1962. The decrease in concentration was due principally to the improved quality of the water released from Whitney Reservoir. Duration curves for dissolved solids for the Richmond station for 1963 and 1954-63 are given on Figure 3.

Colorado River Basin

Streamflow in the Colorado River Basin was considerably below average during 1963, particularly at stations in the upstream part of the basin. As a result of the decrease in flow there was a manifold increase in the weighted-average concentration of dissolved solids at some of the stations.

Discharge of the Colorado River at the Ira and Colorado City stations was less than 20 percent of the 1962 average. The weighted-average concentration of dissolved solids at the Ira station was 3,400 ppm as compared to 725 ppm in 1962 and at the Colorado City station was 3,550 ppm as compared to 662 ppm in 1962.

The average discharge of Beals Creek near Westbrook was 10.6 cfs in 1963 as compared to 35.0 cfs in 1962 and the weighted-average concentration of dissolved solids was 1,100 ppm as compared to 569 ppm in 1962.

Discharge of the Colorado River near Silver in 1963 was only 17 percent of the 1962 average, and the weighted-average concentration of dissolved solids increased to 1,780 ppm, almost four times the 1962 value.

At the chemical-quality station on the Colorado River at Ballinger the discharge for 1963 was only 33 percent of the 1962 discharge and only 17 percent of the 56-year average. The weighted-average concentration of dissolved solids was 1,230 ppm, more than twice the 1962 value.

The 1963 water year was the first full year of record for the station on the San Saba River at San Saba. The weighted-average concentration of dissolved solids was 281 ppm.

The station on the Colorado River near San Saba measures inflow to Buchanan Reservoir. The mean discharge at the San Saba station in 1963 was 446 cfs, slightly less than in 1962, and only 32 percent of the 45-year average. However, the quality improved slightly, and the weighted-average concentration of dissolved solids was 384 ppm, compared to 440 ppm in 1962.

Flow of the Colorado River at Austin and Wharton is maintained by releases from the Highland Lakes, and the quality of the water is generally uniform throughout the year. In 1963 streamflow was well below the long-term average, and the weighted-average concentration of dissolved solids at both stations increased slightly over 1962.

Lavaca River Basin

The daily chemical-quality station on the Navidad River near Ganado is the only station in the Lavaca River Basin. Flow of the Navidad River during 1963

was 25 percent of the 24-year average and less than half the 1962 flow. The weighted-average concentration of dissolved solids was 228 ppm.

Guadalupe River Basin

The Guadalupe River heads in the Edwards Plateau and flows southeastward across the Balcones fault zone. A relatively high base flow is maintained by springs in the drainage area. The water in the Guadalupe River is calcium carbonate type and almost always of good quality.

At the Victoria station the mean discharge for 1963 was less than for 1962 and only about one-third the 28-year average. The weighted-average concentration of dissolved solids was 316 ppm, almost the same as in 1962.

San Antonio River Basin

Streamflow in 1963 in the San Antonio River at Goliad was less than in 1962 and less than half the long-term average. The weighted-average concentration of dissolved solids was 524 ppm, compared to 488 ppm for 1962.

San Antonio-Nueces Coastal Area

Streamflow in the San Antonio-Nueces Coastal Area in the 1963 water year was far below the long-term average. The mean discharge of the Mission River at Refugio was only about 15 percent of the 29-year average and 25 percent of the 1962 average. Water quality in the Mission River is affected by the disposal of oil-field brines; dissolved-solid concentrations ranged from 325 to 66,900 ppm and the weighted average was 9,650 ppm, which is almost three times the 1962 value.

Nueces River Basin

Runoff in the Nueces River Basin in 1963 was far below the long-term average. Storage in Lake Corpus Christi decreased slightly and at the end of the water year the lake contained only 119,500 acre-feet.

At the Mathis station, just below Lake Corpus Christi, the weighted-average concentration of dissolved solids was 382 ppm as compared to 355 ppm for 1962.

Rio Grande Basin

During the 1962 water year streamflow in the Rio Grande Basin was below normal. Storage in Red Bluff Reservoir near Orla increased slightly from 30,300 acre-feet on September 30, 1962 to 31,100 acre-feet on September 30, 1963. The mean discharge of the Pecos River below Red Bluff Dam for 1963 was 60.8 cfs, less than 30 percent of the 26-year average. The weighted-average concentration of dissolved solids at the chemical-quality station near Orla was 9,790 ppm, compared to 9,190 ppm for 1962.

Downstream on the Pecos River near Girvin, the mean discharge was 36.8 cfs and the weighted average was 13,900 ppm.

Inflow to International Falcon Reservoir in the lower Rio Grande Basin was slightly more than in 1962. The quality of the outflow from the reservoir was about the same as in 1962; the dissolved-solids concentration ranged from 578 to 706 ppm in the 1963 water year.

No. on Map	Stream and Location	Calendar Year																											
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	
	<u>Brazos River Basin--Continued</u>																												
64	Brazos River near Whitney																												
65	Leon River near Eastland																												
66	Lampasas River at Youngsfort																												
67	Lampasas River near Belton																												
68	Little River at Camerton																												
69	Brazos River at State Highway 21 near Bryan																												
70	Yegua Creek near Somerville																												
71	Navasota River near Easterly																												
72	Navasota River near Bryan																												
73	Brazos River at Richmond																												
74	Brazos River at Harris Reservoir																												
75	Brazos River at Brazoria Reservoir																												
	<u>Colorado River Basin</u>																												
76	Colorado River above Bull Creek near Knapp																												
77	Bull Creek near Ira																												
78	Bluff Creek near Ira																												
79	Colorado River near Ira																												
80	Deep Creek near Dunn																												
81	Colorado River at Colorado City																												
82	Morgan Creek near Colorado City																												
83	Beals Creek near Westbrook																												
84	Colorado River near Silver																												
85	Colorado River at Robert Lee																												
86	Oak Creek near Blackwell																												
87	Colorado River at Ballinger																												
88	San Saba River at San Saba																												
89	Colorado River near San Saba																												
90	Colorado River at Austin																												
91	Colorado River at Wharton																												
	<u>Lavaca River Basin</u>																												
92	Navidad River near Ganado																												
	<u>Guadalupe River Basin</u>																												
93	Guadalupe River near Spring Branch																												
94	Guadalupe River at Victoria																												

Figure 4. — Periods of Operation of Quality-of-Water Sampling Stations in Texas — Continued

No. on Map	Stream and Location	Calendar Year																											
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	
	<u>San Antonio River Basin</u>																												
95	San Antonio River at Coliad																												
	<u>San Antonio-Nueces Coastal Area</u>																												
96	Mission River at Refugio																												
	<u>Nueces River Basin</u>																												
97	Nueces River at Cotulla																												
98	Nueces River at Tilden																												
99	Nueces River near Three Rivers																												
100	Nueces River near Mathis																												
	<u>Rio Grande Basin</u>																												
101	*Rio Grande near El Paso																												
102	*Rio Grande below Old Fort Quitman																												
103	*Rio Grande at Upper Presidio																												
104	*Rio Grande near Johnson Ranch																												
105	*Rio Grande at Langtry																												
106	Salt (Screobean) Draw near OrLa																												
107	Pecos River near OrLa																												
108	Pecos River at Pecos																												
109	Toyah Creek near Pecos																												
110	Salt Draw near Pecos																												
111	Toyah Creek below Toyah Lake near Pecos																												
112	Pecos River near Barstow																												
113	Pecos River below Granifalls																												
114	Pecos River near Girvin																												
115	Pecos River near Sheffield																												
116	*Pecos River near Shumla																												
117	*Rio Grande at Laredo																												
118	*Rio Grande below Falcon Dam																												
119	Rio Grande at Roma																												
120	*Rio Grande at Fort Ringgold, Rio Grande City																												
121	Rio Grande at Mission Pumping Plant near Mission																												
122	*Rio Grande at Anzalduas Dam																												
123	Rio Grande near San Benito																												
124	Rio Grande at Los Fresnos Pumping Plant near Brownsville																												
125	Rio Grande near Brownsville																												

* 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 — Continued

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 1962 to September 1963" has been generally used throughout the following tables.

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

Stream

Location

Month

Number of samples

Mean discharge (cfs)

Dissolved solids - Tons per acre-foot

Dissolved solids - Tons per day

Sodium-adsorption ratio

Specific conductance (micromhos at 25°C)

pH

Density at 20°C

CANADIAN RIVER BASIN

7-2275. 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, 1.4 miles downstream from East Amarillo Creek, 1.7 miles downstream from Panhandle and 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 1963. Water temperatures: August 1949 to September 1963. Sediment records: August 1949 to September 1952.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,540 ppm Mar. 1-13; minimum, 253 ppm Sept. 10. Hardness: Maximum, 494 ppm Jan. 16-31; minimum, 75 ppm Sept. 10. Specific conductance: Maximum daily, 3,070 micromhos Dec. 26; minimum daily, 438 micromhos Sept. 10. Water temperatures: Maximum, 92°F Aug. 24, 28; minimum, freezing point on many days during winter months. EXTREMES, 1948-63.--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 (1949-63): Maximum, 95°F June 29, 1951; minimum, freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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)	Phosphate (PO ₄)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Alkylbenzenesulfonate (ABS)	Nitrite (NO ₂)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate							
Oct. 1-15, 1962	45.0	35		76	33	212		258	244	202	1.6	38		1020	1.39	124	325	114	5.1	1580	7.2				
Oct. 16-25	16.3	49		65	32	138		317	110	110	2.3	72		755	1.03	33.2	294	34	3.5	1210	6.8				
Oct. 26-31	27.8	37		98	40	299		295	342	310	1.7	23		1300	1.77	97.6	409	167	6.4	2080	6.7				
Nov. 1-6	24.8	41		104	39	272		265	312	295	1.9	60		1250	1.70	83.7	420	203	5.8	2000	6.8				
Nov. 7-17	17.0	52		80	30	140		284	125	130	2.6	92		8859	1.17	39.4	323	90	3.4	1330	7.5				
Nov. 18-30	30.5	34		116	40	357		242	384	415	1.5	52		1520	2.07	125	454	256	7.3	2420	6.9				
Dec. 1-23, 25-27	34.8	34		114	43	360		333	356	420	1.6	5.0		1500	2.04	141	462	188	7.3	2450	7.0				
Dec. 24, 28-31	25.6	45		100	38	252		386	252	265				1140	1.55	78.8	406	90	5.4	1930	6.8				
Jan. 1-15, 1963	20.9	43		113	44	314		320	310	355	1.9	70		1410	1.92	79.6	463	201	6.3	2260	6.6				
Jan. 16-31	9.3	44		127	43	288		321	326	352	2.1	20		1360	1.85	34.1	494	231	5.6	2280	6.5				
Feb. 1-28	23.6	31		110	40	347		258	354	410	1.3	39		1460	1.99	93.0	439	228	7.2	2370	6.6				
Mar. 1-13	23.7	40		110	45	363		253	372	428	1.7	56		1540	2.09	98.5	460	252	7.4	2430	7.1				
Mar. 14-31	13.6	53		67	35	169		378	102	135	2.5	80		830	1.13	30.5	311	1	4.2	1330	6.7				
Apr. 1, 3-14																									
Apr. 16-30	11.3	50		58	34	181		399	83	128	2.5	96		828	1.13	25.3	284	0	4.7	1290	6.6	3.5			
Apr. 2	23.0			101	44	233		258	285	258	5.0	69		1120	1.52	69.6	433	222	4.9	1850	7.0				
Apr. 15	5.9	49		68	49	306		530	226	255	2.3			1220	1.66	19.4	371	0	6.9	1930	7.0				
May 1-23	28.8	62		52	37	164		358	77	128	2.3	95		796	1.08	61.9	282	0	4.2	1230	6.7			2.5	
May 24-29	113	22		72	33	320		230	362	308	.9	10		1240	1.69	378	315	126	7.8	1930	7.1			.02	
May 30-31	750	22		42	16	173		200	164	150	.6	.5		666	.91	1350	171	7	5.7	1060	7.6			.04	
June 1-16	705	28		66	28	210		240	202	230	1.0	3.8		887	1.21	1690	280	83	5.4	1470	6.9				
June 17	848	21		43	15	95		202	78	61	.7	7.4		548	.75	1100	169	18	4.4	932	6.6				
June 18-22	745	20		64	32	191		264	174	185	1.4	37		861	1.17	80.0	291	74	4.9	1430	6.3				
June 23-30	34.4	37		55	20	69	9.2	272	41	58	1.5	36		467	.64	19.8	220	0	2.0	760	7.0				
July 1-7	15.7	43		37	13	249		252	182	252		20		586	.80	1100	384	20	5.5	1840	7.5				
July 8-10	105			69	26	155		195	139	124		3.2		894	.86	164	274	44	5.6	989	7.3				
July 11-18	68.1	35		56	18	208		281	207	180	.6	2.2		405	.55	14.7	214	6	2.0	1470	6.7				
July 19-31	13.4	24		68	26	66		254	37	76															
Aug. 1-10																									
Aug. 11-12																									
Aug. 13-15																									
Aug. 15-24, 27-31	129	23		68	26	243		209	266	245		14		988	1.34	344	276	105	6.4	1650	6.8				

a Residue at 180°C.

CANADIAN RIVER BASIN--Continued
 7-2275. CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--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)	Phosphate (PO ₄)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Alkylbenzene sulfonate (ABS)	Nitrite (NO ₂)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 13-14, 25-26, 1963..	1875	20		30	10	125	5.3	172	110	92	--	3.6	--	476	0.65	2410	116	0	5.0	792	7.4	--	--
Sept. 1-9.....	504	18		53	26	207	5.7	195	209	210	0.8	4.7	1.6	832	1.13	1130	239	79	5.8	1380	7.3	0.17	0.00
Sept. 10.....	125	16		--	--	62	8.2	211	29	7.6	.5	4.8	.4	253	.34	85.4	75	0	3.1	438	7.6	--	--
Sept. 11-16....	57.8	24		79	30	262	8.6	206	282	302	1.0	14	3.8	1110	1.51	173	320	151	6.4	1850	7.1	.78	.00
Sept. 17-21....	176	24		57	24	182	8.6	194	181	205	1.0	12	4.7	795	1.08	378	240	82	5.1	1340	7.3	.69	.00
Sept. 22-23....	337	20		35	13	145	4.6	184	130	125	.7	5.1	2.2	571	.78	520	141	0	5.3	966	7.9	--	.00
Sept. 24-25....	47.5	22		--	--	216	6.1	172	208	248	.8	12	3.2	--	--	--	252	110	5.9	1510	7.3	--	--
Sept. 26-29....	19.0	32		111	41	310	9.0	230	372	385	1.2	20	2.5	1400	1.90	71.8	446	257	6.4	2250	7.3	.82	.00
Sept. 30.....	46.0	37		--	--	172	12	221	186	198	1.7	24	2.5	--	--	--	298	117	4.3	1400	7.6	--	--
Weighted average....	129	25		55	22	189	--	220	180	185	1.0	11	--	779	1.06	272	230	57	5.4	1280	7.0	--	--
Time-weighted average....	--	37		80	34	235	--	287	223	245	2.0	41	--	1040	--	--	338	107	5.5	1690	6.8	--	--
Tons per day.	--	8.7		19	7.8	66	--	77	63	65	0.4	3.8	--	--	--	--	--	--	--	--	--	--	--

CANADIAN RIVER BASIN--Continued

MISCELLANEOUS ANALYSIS OF STREAM IN CANADIAN RIVER BASIN IN TEXAS

Chemical analysis, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
Mar. 13, 1963-----	5.36	30		61	30	182		282		59	265	1.7	0.0	768	1.04	276	44	4.8	1,330	7.4

7-2350. WOLF CREEK AT LIPSCOMB

RED RIVER BASIN

7-3150. LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.

LOCATION.--At gaging station at bridge on State Highway 148, 1.5 miles northwest of Henrietta, Clay County, 4 miles upstream from Turkey Creek, and 5 miles upstream from Dry Fork Little Wichita River.

DRAINAGE AREA.--1,037 square miles

RECORDS AVAILABLE.--Chemical analyses: December 1952 to January 1956, March 1959 to September 1963.

Water temperatures: December 1952 to January 1956, March 1959 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 2,470 ppm Feb. 1-4, 8-14, 16-19; minimum, 30 ppm Nov. 24-25.

Hardness: Maximum, 836 ppm Feb. 1-4, 8-14, 16-19; minimum, 8 ppm Nov. 24-25.

Specific conductance: Maximum daily, 5,140 microhos Jan. 27; minimum daily, 44 microhos Nov. 24.

EXTREMES, 1952-56, 1959-63.--Dissolved solids: Maximum, 4,120 ppm June 2, 1960; minimum, 30 ppm Nov. 24-25, 1962.

Hardness: Maximum, 1,060 ppm June 2, 1960; minimum, 8 ppm Nov. 24-25, 1962.

Specific conductance: Maximum daily, 7,520 microhos June 2, 1960; minimum daily, 44 microhos Nov. 24, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 20-27, Feb. 5-7, 15, 20-28, Mar. 1-29, Apr. 19-26, May 26-29, June 21 to July 13, July 25 to Aug. 31, Sept. 6-11.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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		Specific conductance (microhos at 25°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Sodium carbonate	
Oct. 1-19, 1962...	1.7	--	--	--	--	--	--	102	--	145	--	--	--	--	--	117	34	651	
Oct. 28.....	90.0	--	--	--	--	--	--	57	--	26	--	--	--	--	43	0	204		
Oct. 29.....	542	11	--	29	8.2	64	--	96	9.6	108	0.4	4.0	2.8	281	38	106	27		
Oct. 30-31.....	1115	8.4	--	20	5.8	49	--	70	7.2	81	--	--	--	208	28	106	27		
Nov. 1-7.....	41.9	11	--	29	8.2	66	--	91	12	114	3.0	1.0	3.2	286	39	106	27		
Nov. 8-23.....	4.0	11	--	40	12	95	--	103	13	182	--	--	--	a434	59	150	65		
Nov. 24-25.....	5.9	--	--	--	--	--	--	8	--	8.0	--	--	--	30	.04	8	1		
Nov. 26.....	195	--	--	--	--	--	--	60	9.2	64	--	--	--	--	--	68	19		
Nov. 27-29.....	1970	8.1	--	11	3.0	13	--	45	4.0	19	--	1.2	1.1	81	11	40	3		
Nov. 30-Dec. 2.....	3337	6.6	--	6.5	2.0	8.8	2.9	28	5.8	10	--	2.5	57	08	2	24	2		
Dec. 3-4.....	3295	8.3	--	20	5.8	29	--	92	11	35	--	2.8	155	21	74	0	1.5		
Dec. 5.....	2650	--	--	--	--	--	--	17	--	7.5	--	--	--	--	--	14	0		
Dec. 6-12.....	364	10	--	25	7.1	46	--	108	11	65	--	--	--	--	--	92	3		
Dec. 13-19.....	17.1	13	--	48	14	101	--	156	13	181	--	2.5	218	.30	214	178	50		
Dec. 20-24.....	76.4	14	--	27	7.9	48	--	93	13	81	--	1.0	a252	.34	52.0	100	24		
Dec. 25-29.....	14.7	13	--	76	23	170	--	133	18	372	--	2.8	738	1.00	29.3	284	175		
Dec. 30-31.....	8.9	8.2	--	133	42	358	--	137	26	810	--	2.2	1440	1.96	34.6	504	392		
Jan. 1-11, 1963.....	6.8	8.4	--	191	28	222	--	153	21	480	3.2	2.0	926	1.26	17.0	342	216		
Jan. 12-29.....	3.5	7.5	--	191	70	538	--	183	33	1240	--	0	2170	2.95	20.5	764	614		
Jan. 30-31.....	1.0	5.2	--	106	39	305	--	102	17	700	--	0	1220	1.66	3.29	425	342		
Feb. 1-4, 8-14, 16-19.....	1	5.3	--	210	76	628	--	170	29	1440	--	1.0	2470	3.36	111	836	697		
Mar. 30-31.....	327	8.8	--	16	4.5	23	--	67	13	30	3.2	2.8	126	.17	111	58	4		
Apr. 1-2.....	316	12	--	26	7.3	46	--	84	13	77	2.2	3.0	226	.31	193	95	26		
Apr. 3-4.....	40.5	9.7	--	44	14	93	--	88	14	200	--	2.0	420	.57	168	96	3.1		
Apr. 5-18.....	10.2	8.5	--	112	40	381	6.6	109	30	800	--	1.5	1440	1.96	39.7	445	354		
Apr. 27-30.....	240	8.8	--	32	7.8	70	--	107	7.6	119	--	1.8	300	.41	194	112	24		
May 1-6.....	24.4	10	--	40	11	119	--	88	9.4	225	4.4	4.8	463	.63	30.5	145	73		
May 7.....	87.0	--	--	--	--	--	--	96	--	62	--	--	--	--	--	77	0		
May 8-9.....	136	13	--	54	14	170	--	94	12	332	--	4.8	646	.88	237	192	115		
May 10-20.....	10.3	--	--	--	--	--	--	101	--	185	--	--	--	--	--	137	54		
May 21-25, 30-31.....	6.5	9.6	--	22	5.1	53	--	82	9.6	79	--	2.0	220	.30	3.86	76	9		
June 1.....	97.0	16	--	15	4.5	37	--	75	8.4	46	3.1	1.8	166	.23	43.5	56	0		
June 2.....	258	16	--	82	22	301	--	96	22	600	--	1.5	1090	1.48	759	295	216		

a Residue at 180°C.

RED RIVER BASIN--Continued

7-3150, LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
June 3, 1963.....	472	17		48	10	128		119		11	230	--	6.1		509	0.69	649	161	64	4.4	964	7.5
June 4-20.....	21.3	14		33	8.1	67		118		8.6	110	--	2.0		301	.41	17.3	116	20	2.7	551	6.9
July 14-16.....	44.3	13		15	4.5	27		78		6.4	30	--	2.0		136	.18	16.3	56	0	1.6	244	6.3
July 17-24.....	5.5	13		37	11	93	5.3	122		8.8	164	0.4	1.8		394	.54	5.85	138	38	3.4	759	6.6
Sept. 1-5.....	18.8	9.0		14	3.4	21		76		7.0	16	.6	1.8		110	.15	5.58	49	0	1.3	199	7.0
Sept. 12-14.....	7.0	12		16	4.4	23		87		7.0	19	.3	1.8		126	.17	2.38	58	0	7.3	232	6.7
Sept. 15.....	97.0	16		--	--	111		176		15	121	.7	2.2		--	--	--	93	0	5.0	702	7.1
Sept. 16-30.....	5.9	11		30	12	66		173		13	79	.4	1.0		297	.40	4.73	124	0	2.6	563	7.2
Weighted average	b101	8.6		17	4.9	33		63		7.8	53	--	1.2		158	0.21	66.0	63	12	1.6	290	6.8
Time-weighted average.....	--	10		64	21	175		118		16	364	--	1.8		712	--	--	248	154	4.4	1340	7.0
Tons per day....	--	3.6		7.2	2.1	14		26		3.3	22	--	0.5		--	--	--	--	--	--	--	--

b Mean discharge based on 365 days; mean discharge for 236 days of actual flow, 156 cfs.

RED RIVER BASIN--Continued

7-3154. LITTLE WICHITA RIVER NEAR RINGGOLD, TEX.

LOCATION--At gaging station at bridge on abandoned county road, 2 miles downstream from East Fork Little Wichita River, 8 miles northwest of Ringgold, Montague County, 11.5 miles upstream from mouth, and 13 miles downstream from gaging station near Henrietta.

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

RECORDS AVAILABLE.--Chemical analyses: March 1959 to October 1962 (discontinued).

EXTREMES, March 1959 to October 1962.--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. No flow Oct. 18-27.

Chemical analyses, in parts per million, October 1962

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-15, 1962...	4.1	12		34	9.8	75		110		8.4	134	0.3	1.0		356	0.48	3.94	126	36	2.9	617	7.3
Oct. 16-17.....	.2	14		42	11	82		141		8.0	145	--	.8		402	.55	.22	150	34	2.9	698	7.2
Oct. 28.....	20.0	--		--	--	--		116		7.6	102	--	--		--	--	--	121	26	--	526	7.6
Oct. 29.....	400	--		--	--	--		56		7.8	54	--	--		--	--	--	54	8	--	292	7.2
Oct. 30-31.....	1200	--		--	--	--		73		7.0	93	--	--		--	--	--	79	19	--	433	7.0

RED RIVER BASIN--Continued

7-3160. RED RIVER NEAR GAINESVILLE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 0.2 mile downstream from Gulf, Colorado, and Santa Fe Railway Co. bridge, 5 miles downstream from Fish Creek, and 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 1963 (discontinued).

Water temperatures: October 1952 to September 1963 (discontinued).

EXTREMES, 1962-63.--Dissolved solids: Maximum, 5,580 ppm June 26 to July 1; minimum, 292 ppm Nov. 26.

Hardness: Maximum, 1,300 ppm Sept. 12-17; minimum, 116 ppm Dec. 30.

Specific conductance: Maximum daily, 9,920 microhmhos Sept. 12; minimum, freezing point on several days during January.

Water temperatures: Maximum, 90°F July 10, 22, Aug. 14, 15; minimum, freezing point on several days during January.

EXTREMES, 1944-46, 1952-63.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 115 ppm Nov. 4, 1958.

Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 83 ppm Nov. 4, 1958.

Specific conductance: Maximum daily, 9,920 microhmhos Sept. 12, 1963; minimum daily, 176 microhmhos Nov. 4, 1958.

Water temperatures (1952-63): Maximum, 95°F July 13, 1954; minimum, freezing point on many 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 1963 available in district office at Oklahoma City, Okla.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₂)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium-sulfate ratio	Specific conductance (microhmhos at 25°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium			Non-carbonate
Oct. 1, 1962.....	3960	--	--	138	23	279	--	120	0	300	450	--	0.15	1250	1.70	13360	440	342	5.8	2100
Oct. 2-10.....	1428	--	--	176	29	436	--	180	0	372	690	--	.36	1790	2.43	6900	560	412	8.0	3070
Oct. 11-12.....	1640	--	--	216	46	576	--	160	0	505	940	--	.30	2360	3.21	10450	730	599	9.3	4020
Oct. 13-14.....	1107	--	--	176	42	456	--	174	0	385	750	--	.34	1900	2.58	5680	610	467	8.0	3240
Oct. 15.....	824	--	--	26	17	223	--	192	8	132	220	--	.11	a 785	1.07	1750	134	0	8.4	1320
Oct. 16-18.....	630	--	--	216	46	536	--	192	0	450	900	--	.30	2240	3.05	3810	730	573	8.6	3810
Oct. 19.....	522	--	--	33	19	238	--	228	4	155	228	--	.21	a 820	1.12	1160	160	0	8.2	1390
Oct. 20-27.....	464	--	--	208	56	609	--	214	0	510	970	--	.33	2460	3.34	3080	750	575	9.7	4040
Oct. 28-29.....	818	--	--	248	63	736	--	156	2	630	1200	--	.38	2960	4.02	6540	880	749	11	4870
Oct. 30.....	1120	--	--	152	39	392	--	166	4	300	665	--	.35	1630	2.22	4930	540	397	7.3	2836
Oct. 31.....	2000	--	--	70	14	152	--	128	0	119	238	--	.22	a 735	1.00	3970	234	129	4.3	1200
Nov. 1.....	6100	--	--	69	15	138	--	120	4	111	222	--	.15	a 726	.99	11960	234	129	3.9	1200
Nov. 2.....	5420	--	--	108	24	280	--	128	4	222	450	--	.24	1150	1.56	16830	368	256	6.7	2030
Nov. 3-4.....	2800	--	--	155	40	383	--	158	0	365	620	--	.23	1640	2.23	12400	550	420	7.1	2780
Nov. 5-10.....	1024	--	--	136	15	307	--	180	0	240	475	--	.16	1260	1.71	3480	400	252	6.7	2160
Nov. 11-25.....	625	15	--	155	43	441	--	224	0	350	680	0.4	1.8	1800	2.45	3040	565	381	8.1	3030
Nov. 26.....	4220	--	--	58	8.6	23	--	148	4	72	19	--	.06	a 292	.40	3330	180	52	7	460
Nov. 27-29.....	8393	--	--	64	12	115	--	116	4	91	188	--	.11	a 582	.79	13190	210	108	3.5	978
Nov. 30.....	7680	--	--	80	22	206	--	104	2	174	330	--	.11	a 987	1.34	20470	288	199	5.2	1610
Dec. 1-6.....	6903	--	--	74	15	170	--	130	0	119	275	--	.17	a 791	1.08	14740	248	141	4.7	1290
Dec. 7-9.....	5650	--	--	66	16	160	--	138	0	109	250	--	.32	a 729	.99	11120	232	119	4.6	1200
Dec. 10-12.....	1847	--	--	122	32	333	--	178	4	248	530	--	.29	1360	1.85	6780	435	282	6.9	2350
Dec. 13-20.....	990	--	--	200	44	578	--	230	8	420	920	--	.57	2280	3.10	6090	680	478	9.6	3840
Dec. 21-22.....	2275	--	--	142	37	365	--	242	0	272	580	--	.24	1520	2.07	9340	505	307	7.1	2570
Dec. 23-26.....	2158	--	--	96	28	232	--	182	2	192	358	--	.30	997	1.36	5810	354	201	5.3	1760

a Residue at 180°C.

RED RIVER BASIN--Continued

7-3160. RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium		Non-carbonate
Dec. 27, 1962	993	--	--	174	39	487	--	226	2	365	770	--	--	0.26	1950	2.65	5230	595	406	3300
Dec. 28-29	834	--	--	160	38	338	--	290	0	292	530	--	--	.21	1500	2.04	3380	555	317	2570
Dec. 30	768	--	--	24	14	87	--	136	4	119	45	--	--	.11	a 382	.52	792	116	0	614
Dec. 31-Jan. 7, 1963	644	15	--	232	68	613	--	248	8	490	1040	--	--	.31	2570	3.50	4470	860	644	4270
Jan. 8-18	465	--	--	268	64	724	7.2	260	8	585	1200	0.2	--	.42	3000	4.08	3770	930	704	4930
Jan. 19-20	495	--	--	122	31	182	--	264	0	230	262	--	--	.24	957	1.30	1280	430	214	1620
Jan. 21-26	318	--	--	228	59	583	--	318	0	445	960	--	--	.28	2430	3.30	2090	810	549	4040
Jan. 27-28	330	--	--	119	37	304	--	276	0	248	445	--	--	.15	1290	1.75	1150	450	224	2230
Jan. 29-31	376	--	--	164	59	544	--	144	0	415	910	--	--	.38	2160	2.94	2190	650	532	3660
Feb. 1-11	622	--	--	196	90	710	--	154	0	590	1180	--	--	.43	2840	3.86	4770	860	734	4710
Feb. 12-19	558	--	--	224	83	722	--	196	2	630	1170	--	--	.50	2930	3.98	4410	900	736	4820
Feb. 20-21	534	--	--	188	73	589	--	204	4	475	980	--	--	.54	2410	3.28	3470	770	596	4050
Feb. 22-Mar. 2	644	--	--	228	112	794	--	116	2	725	1350	--	--	.53	3270	4.45	5680	1030	932	5370
Mar. 3-4	356	--	--	240	76	691	--	224	0	650	1100	--	--	.33	2870	3.90	4320	910	726	4810
Mar. 5	534	--	--	102	48	472	--	96	0	408	690	--	--	--	1770	2.41	2550	450	371	3010
Mar. 6-13	486	--	--	274	53	623	--	206	8	580	1040	--	--	.50	2680	3.64	3520	900	718	4400
Mar. 14-16	712	--	--	288	66	786	--	176	0	720	1280	--	--	.50	3230	4.29	6210	990	845	5180
Mar. 17-31	583	9.6	--	204	76	618	7.6	182	2	500	1060	.3	--	.50	2570	3.50	4040	820	667	4370
Apr. 1-2	2434	--	--	146	52	420	--	168	4	340	705	--	--	.02	1750	2.38	11500	580	436	3010
Apr. 3-5	6073	--	--	76	17	151	--	144	4	121	240	--	--	.21	a 738	1.00	12100	260	135	1230
Apr. 6-7	1825	--	--	96	29	228	--	144	0	178	392	--	--	.21	994	1.35	4900	360	242	1790
Apr. 8-15	741	--	--	148	49	380	--	176	0	335	640	--	--	.16	1640	2.23	3280	570	426	2830
Apr. 16-25	474	--	--	202	82	649	--	216	0	515	1090	--	--	.38	2640	3.99	3380	840	663	4440
Apr. 26	400	--	--	118	72	516	--	120	2	395	850	--	--	--	2010	2.73	2170	590	488	3520
Apr. 27	768	--	--	95	20	143	--	160	6	169	222	--	--	--	a 789	1.07	1640	320	179	1270
Apr. 28	720	--	--	136	51	437	--	156	2	340	720	--	--	--	1760	2.39	3420	550	419	3140
Apr. 29	736	--	--	104	34	236	--	172	10	185	400	--	--	--	1050	1.43	2090	400	243	1860
Apr. 30	2190	--	--	136	51	393	--	168	4	290	680	--	--	--	1640	2.23	9700	550	406	2890
May 1	5540	--	--	78	17	161	--	150	8	128	245	--	--	--	a 771	1.05	11530	264	128	1240
May 2-6	1977	--	--	83	20	173	--	154	4	145	270	--	--	.11	a 850	1.16	4540	288	155	1370
May 7-9	1062	--	--	102	34	286	--	140	0	230	470	--	--	.15	1190	1.62	3410	395	280	2080
May 10	3370	--	--	152	49	505	--	92	0	455	800	--	--	--	2010	2.73	18290	580	505	3370
May 11-20	933	--	--	132	26	292	--	140	4	275	470	--	--	.23	1270	1.73	3200	435	314	2160
May 21-31	488	--	--	158	48	442	--	152	8	340	750	--	--	.30	1820	2.48	2400	590	452	3130
June 1-3	10970	--	--	116	31	314	--	134	0	230	550	--	--	.19	1290	1.75	38210	415	305	2300
June 4-7	9388	--	--	102	17	229	--	126	0	228	342	--	--	.12	980	1.33	24840	325	222	1680
June 8	4780	--	--	182	31	387	--	120	2	455	600	--	--	.19	1720	2.34	22200	580	478	2900

a Residue at 180°C.

RED RIVER BASIN--Continued

7-3160, RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium-sulfate ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
June 9-12, 1963...	2972	--	--	210	38	589	--	120	2	540	920	--	--	0.26	2360	3.21	18940	680	578	9.8	3930	8.3	
June 13.....	2910	--	--	294	50	781	--	116	2	800	1210	--	--	.22	3190	4.34	25060	940	842	11	5130	8.3	
June 14-24.....	1842	18	--	196	46	490	9.3	140	2	525	770	.4	2.8	.30	2130	2.90	10590	680	562	8.2	3450	8.4	
June 25.....	1250	--	--	288	59	830	--	140	6	775	1300	--	--	.33	3330	4.53	11240	960	835	12	5380	8.4	
June 26-July 1....	751	--	--	392	69	1550	--	146	0	1150	2350	--	--	.43	5580	7.59	11310	1260	1140	19	8800	8.2	
July 2-13.....	383	--	--	248	68	911	--	122	0	720	1440	--	--	.40	3450	4.69	3570	900	800	13	5680	7.9	
July 14-18.....	853	--	--	166	48	536	--	110	0	480	840	--	--	.41	2120	2.88	4880	610	520	9.4	3540	8.0	
July 19-25.....	652	--	--	120	31	337	--	136	0	260	550	--	--	.33	1370	1.86	2410	425	313	7.1	2370	8.0	
July 26-30.....	247	--	--	142	55	433	--	108	0	360	750	--	--	.65	1790	2.43	1190	580	491	7.8	3070	8.1	
July 31-Aug. 15...	200	--	--	180	61	626	--	80	0	520	1030	--	--	.76	2460	3.34	1330	700	634	10	4170	7.9	
Aug. 16-28.....	172	--	--	212	71	716	--	90	0	585	1200	--	--	1.1	2830	3.85	1310	820	746	11	4710	7.4	
Aug. 29-Sept. 10...	243	--	--	248	73	829	--	96	0	710	1350	--	--	.74	3260	4.43	2140	920	841	12	5240	7.9	
Sept. 11.....	318	--	--	304	93	974	--	116	0	870	1600	--	--	.97	3900	5.30	3350	1140	1040	13	6180	8.0	
Sept. 12-17.....	241	--	--	376	88	1450	--	92	0	1080	2300	--	--	.87	5340	7.26	3470	1300	1220	17	8420	7.8	
Sept. 18-20.....	301	--	--	284	76	1000	--	136	0	770	1620	--	--	.65	3820	5.20	3100	1020	908	14	6110	8.0	
Sept. 21-30.....	786	--	--	272	59	795	--	116	0	745	1190	--	--	.64	3120	4.24	6620	920	825	11	4940	7.9	
Weighted average	--	--	--	141	36	381	--	150	2	324	611	--	--	0.26	1590	2.16	5540	498	372	7.0	2660	8.2	
Time-weighted average.....	1289	--	--	190	54	569	--	162	2	475	922	--	--	0.37	2300	--	--	695	560	9.1	3820	8.1	
Tons per day.....	--	--	--	491	124	1330	--	520	7	1130	2130	--	--	0.90	--	--	--	--	--	--	--	--	--

RED RIVER BASIN--Continued

7-3316. RED RIVER AT DENISON DAM, NEAR DENISON, TEX.

LOCATION--at gaging station immediately below Denison Dam, 1.7 miles upstream from Sand Creek, and 4 miles northwest of Denison, Grayson County. RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1963. Water temperatures: October 1945 to September 1963. EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,050 ppm Sept. 1-30; minimum, 390 ppm Sept. 1-30; hardness: Maximum, 354 ppm Nov. 16, 17. Specific conductance: Maximum daily, 1,890 micromhos Sept. 30; minimum daily, 1,530 micromhos May 16, 17. EXTREMES, 1944-63.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946. 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.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)		Tons per acre-foot	Parts per million	Hardness as CaCO ₃	Sodium sulfate (Mg, Ca, SO ₄)	Non-carbonate hardness (Mg, Ca)	Sulfate hardness (Mg, Ca)	Specific conductivity (micro-mhos at 25°C)	pH	
											Tons per day	Tons per million									
Oct. 1-31, 1962..	4495	10	95	29	217	123	242	242	335	0.4	1.2	990	1.35	990	1.35	12020	356	256	5.0	1710	7.5
Nov. 1-30,	4080	10	99	26	218	126	248	330	338	.4	.5	994	1.35	994	1.35	10950	354	250	5.0	1710	7.5
Dec. 1-31,	5931	8.5	100	29	217	124	251	338	338	.4	.2	1010	1.37	1010	1.37	16170	369	268	4.9	1730	7.3
Jan. 1-31, 1963,	4401	9.9	98	28	215	129	248	328	328	.4	.2	990	1.35	990	1.35	11760	360	254	4.9	1650	7.6
Feb. 1-28,	1136	8.2	99	28	208	130	244	320	320	.3	1.0	972	1.32	972	1.32	2980	362	256	4.8	1640	7.3
Mar. 1-31,	1449	8.3	99	27	204	131	242	312	312	.3	1.0	958	1.30	958	1.30	3750	358	250	4.7	1610	7.4
Apr. 1-30,	2862	8.5	98	27	199	140	236	302	302	.3	1.0	941	1.28	941	1.28	7270	356	241	4.6	1570	7.7
May 1-30,	2596	8.9	100	28	201	144	236	310	310	.2	.5	956	1.30	956	1.30	6700	364	246	4.6	1550	7.8
June 1-30,	2539	9.7	101	30	202	146	240	312	312	.4	.5	972	1.32	972	1.32	6660	376	256	4.5	1580	7.5
July 1-31,	2889	9.7	100	31	210	140	242	325	325	.3	1.5	1010	1.37	1010	1.37	7880	377	262	4.5	1630	6.7
Aug. 1-31,	2251	10	103	31	211	150	239	332	332	.4	1.5	1000	1.36	1000	1.36	6080	384	262	4.7	1710	7.1
Sept. 1-30,	1501	9.2	105	31	225	150	249	350	350	.4	1.8	1050	1.43	1050	1.43	4260	390	266	5.0	1820	6.9
Weighted average	3029	9.3	99	29	211	133	244	326	326	0.4	1.2	989	1.35	8090	366	256	4.8	1670	7.3		
Time-weighted average,	9.2	9.2	100	29	210	136	243	325	325	0.4	1.4	987	1.35	987	1.35	367	256	4.8	1660	7.2	
Tons per day,	76	76	812	235	1730	1090	2000	2670	2670	3.0	9.5										

RED RIVER BASIN--Continued
7-3355. RED RIVER AT ARTHUR CITY, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 271 at Arthur City, Lamar County, 10.6 miles downstream from Muddy Boggy River and 26.0 miles upstream from Kiamichi River.
DRAINAGE AREA.--44,531 square miles, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1961 to September 1963 (discontinued).

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		Sodium adsorption ratio	
Oct. 10, 1962.....	4650			94	31	193		136	0	225	308		0.0		1010	1.37		360	248	4.4	1590	7.7
Nov. 6.....	4140					175		138	4	--	--				848	1.15		320	200	4.2	1350	8.4
Dec. 4.....	24200					143		120	0	125	215				566	.77		222	124	4.2	936	8.2
Jan. 29, 1963.....	4820					187		154	0	210	285				936	1.27		355	229	4.3	1510	8.0
Feb. 26.....	689					116		236	0	122	175				657	.89		315	121	2.8	1100	8.2
Mar. 26.....	5580					39		124	0	56	70				314	.43		174	72	1.3	513	8.2
Apr. 23.....	1640					125		118	2	140	182				682	.93		230	130	3.6	1040	8.3
May 21.....	1640					175		112	8	195	260				945	1.28		295	190	4.4	1390	8.4
June 18.....	1560					191		144	2	215	290				974	1.32		340	219	4.5	1500	8.3
July 16.....	1780					123		148	4	128	182				642	.87		250	122	3.4	1050	8.4
Aug. 12.....	2340					210		140	0	225	322				1050	1.43		345	230	4.9	1610	8.2
Sept. 9.....	2180					235		136	4	246	370				1130	1.54		386	268	5.2	1790	8.4

RED RIVER BASIN--Continued

7--3368.5. RED RIVER NEAR NEW BOSTON, TEX.

LOCATION.--At bridge on State Highway 8, 7 miles north of New Boston, Bowie County.
 DRAINAGE AREA.--47,555 square miles.
 RECORDS AVAILABLE.--Chemical analyses: November 1960 to August 1963 (discontinued).
 REMARKS.--No discharge records available.

Chemical analyses, in parts per million, October 1962 to August 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Oct. 10, 1962.....						172		124	0	192	275					907	1.23	213	315	4.2	1420	7.6
Nov. 8.....						142		126	2	155	220					742	1.01	163	270	3.8	1170	8.3
Dec. 5.....						96		126	0	111	146					543	.74	216	216	2.9	879	8.0
Jan. 3, 1963.....						103		148	0	116	158					593	.81	242	242	2.9	961	8.0
Jan. 30.....						164		144	0	191	260					868	1.18	326	326	4.0	1390	7.9
Feb. 27.....						113		208	0	124	174					687	.93	300	300	2.8	1090	8.1
Mar. 27.....						23		88	0	31	32					208	.28	100	100	1.0	306	8.0
Apr. 24.....						144		140	4	155	240					802	1.09	308	308	3.6	1280	8.3
May 22.....						171		144	2	205	270					922	1.25	344	344	4.0	1450	8.3
June 19.....						192		134	4	225	295					992	1.35	350	350	4.5	1540	8.4
July 18.....						64		92	0	40	120					380	.52	148	148	2.3	620	8.2
Aug. 12.....						204		148	2	228	320					1030	1.40	370	370	4.6	1640	8.3

RED RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
PRAIRIE DOG FORK RED RIVER NEAR WELLINGTON																						
Apr. 21, 1963-----	a15	9.4		1,670	377	19,800	92			4,770	31,000				57,700	81.8		5,720	5,640		61,300	6.9
SALT FORK RED RIVER NEAR QUAIL																						
Apr. 21, 1963-----	a1.5	20		640	84	402	166			1,800	570		2.0		3,600	4.90		1,940	1,810	4.0	4,320	7.2
7-3014.1. SWEETWATER CREEK NEAR KELTON																						
Aug. 13, 1963-----	224	12		74	8.6	18	241			44	11	0.2	0.5		287	0.39		220	22	0.5	488	6.6
SOUTH FORK WICHITA RIVER NEAR GUTHRIE																						
Apr. 20, 1963-----	a0.25	3.4		675	260	1,540	166			2,470	2,400				7,430	10.1		2,750	2,620	13	9,880	7.2
NORTH BUFFALO CREEK NEAR IOWA PARK																						
May 6, 1963-----	0.95	5.3		425	147	1,870	6.6	43		137	3,900				6,510	8.85		1,660	1,630	20	10,900	5.9
BIG PINE CREEK NEAR MANCHESTER																						
Mar. 27, 1963-----	500	5.8		10	2.5	8.1	2.8	20		25	10	0.1	0.5		75	0.10		35	19	0.6	122	6.1

a Field estimate.

SULPHUR RIVER BASIN

7-3425. 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, 3.5 miles downstream from Doctors Creek, and 5.7 miles southeast of Cooper, Delta County.

DRAINAGE AREA.--527 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1963.

Water temperatures: October 1958 to September 1963.
 EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,150 ppm Oct. 1.
 Hardness: Maximum, 347 ppm Feb. 1-28; minimum, 46 ppm May 20.

Specific conductance: Maximum daily, 2,130 microhmhos Nov. 9; minimum daily, 146 microhmhos Oct. 1, Nov. 27.

Water temperatures: Maximum, 94°F July 8, 24; minimum, 38°F Jan. 25, 28.

EXTREMES, 1958-63.--Dissolved solids: Maximum, 1,150 ppm Nov. 9, 1962; minimum, 68 ppm June 24-25, 1961.

Hardness: Maximum, 347 ppm Feb. 1-28, 1963; minimum, 42 ppm June 24-25, 1961.

Specific conductance: Maximum daily, 2,130 microhmhos Nov. 9, 1962; minimum daily, 92 microhmhos Dec. 11, 1960.

Water temperatures: Maximum, 97°F Aug. 6, 1960, Aug. 10, 1962; minimum, 38°F Jan. 23, 1962, Jan. 25, 28, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 16 to Sept. 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1, 1962	429	--	--	--	--	--	--	58	--	12	6.0	--	--	--	--	87	0.12	101	52	4	--	146
Oct. 2-27	4.6	11	--	49	5.5	32	--	167	--	31	31	0.5	0.5	--	--	242	3.33	3.01	145	8	--	407
Oct. 28-30	1359	13	--	25	2.8	15	--	82	--	23	11	--	2.5	--	--	129	1.18	473	74	7	--	205
Oct. 31	441	--	--	--	--	--	--	103	--	20	12	--	--	--	--	92	--	--	92	8	--	249
Nov. 1-7	18.8	11	--	40	4.6	20	--	134	--	29	15	4	1.2	--	--	187	2.25	9.49	119	9	--	329
Nov. 8	10.0	--	--	--	--	--	--	186	--	40	122	--	--	--	--	--	--	--	199	46	--	760
Nov. 9	7.3	12	--	100	10	326	--	168	--	41	580	--	8	--	--	1150	1.56	22.7	290	153	--	2130
Nov. 10-20	9.5	13	--	58	6.4	35	--	202	--	38	30	--	5	--	--	4306	4.2	7.85	171	5	--	477
Nov. 21-25	424	11	--	34	3.6	21	--	167	--	33	16	--	2.0	--	--	174	2.24	199	100	12	--	299
Nov. 26-30	3668	11	--	26	2.2	11	--	85	--	17	6.5	--	2.0	--	--	118	1.16	1170	74	4	--	204
Dec. 1-5	360	11	--	33	4.2	16	--	113	--	24	11	3	1.2	--	--	157	2.1	153	100	7	--	260
Dec. 6-15	36.9	13	--	67	7.1	32	--	216	--	49	26	--	1.0	--	--	4322	4.4	32.1	196	19	--	506
Dec. 16-31	14.2	12	--	102	11	59	--	343	--	70	51	--	1.0	--	--	4499	6.8	19.1	300	18	--	799
Jan. 1-3, 1963	15.0	8.6	--	112	12	87	--	372	--	94	80	3	1.2	--	--	4596	8.1	24.1	329	24	--	965
Jan. 4-12	700	11	--	40	4.4	19	--	124	--	33	16	--	2.0	--	--	4204	2.8	386	118	16	--	325
Jan. 13-31	8.9	12	--	93	10	50	--	308	--	65	43	--	1.5	--	--	4447	6.1	10.7	273	20	--	715
Feb. 1-28	4.2	3.7	--	116	14	95	--	403	--	106	78	5	1.2	--	--	4621	8.4	7.04	347	16	--	1010
Mar. 1	50.0	--	--	--	--	--	--	94	--	42	23	--	--	--	--	--	--	--	102	25	--	319
Mar. 2-10	8.4	9.5	--	66	12	57	--	212	--	108	34	5	2.5	--	--	4402	5.5	9.12	214	40	--	626
Mar. 11-18	336	11	--	43	4.5	32	--	124	--	49	27	--	4.5	--	--	4246	3.3	223	126	24	--	384
Mar. 19-31	16.5	12	--	77	7.9	42	--	232	--	70	37	--	1.2	--	--	4376	5.1	16.8	224	34	--	611
Apr. 1-6	4.4	13	--	61	11	63	--	225	--	70	52	5	5	--	--	4394	5.4	4.68	197	12	--	622
Apr. 7-24	12.2	11	--	96	11	111	--	329	--	111	99	--	1.5	--	--	4615	8.4	20.3	284	15	--	971
Apr. 25-26	14.6	9.2	--	73	7.0	80	--	207	--	90	86	--	1.8	--	--	449	6.1	17.7	211	42	--	747
Apr. 27-30	956	18	--	--	--	25	--	117	--	41	14	--	13	--	--	--	--	--	114	18	--	329
May 1-5	171	18	--	49	3.8	26	--	150	--	37	16	4	11	--	--	235	3.2	108	138	15	--	377
May 6	182	11	--	--	--	12	--	66	--	12	12	--	6.6	--	--	--	--	--	63	9	--	179
May 7	386	14	--	--	--	23	--	155	--	40	18	--	3.5	--	--	--	--	--	143	16	--	377
May 8	947	19	--	--	--	13	--	111	--	18	5.5	--	3.5	--	--	--	--	--	91	0	--	223
May 9-11	142	22	--	43	3.6	21	--	148	--	26	12	--	2.2	--	--	203	2.8	77.8	122	1	--	304

a Residue at 180°C.

SULPHUR RIVER BASIN--Continued

7-3425. SOUTH SULPHUR RIVER NEAR COOPER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonylate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
May 12-19, 1963...	6.0	17		62	6.9	28		218		35	20		1.0		277	0.38	4.49	183	4	0.9	439	
May 20.....	125	--		--	--	--		47		--	16		--		--	--	--	174	8	--	174	
May 21-25.....	152	9.8		36	3.0	34		120		36	25		5.3		208	.28	85.4	102	4	1.5	344	
May 26-28.....	185	15		36	3.7	26		126		34	14		2.8		194	.26	96.9	105	2	1.1	308	
May 29-30.....	916	13		--	--	11		83		16	5.5		2.5		--	--	--	70	2	.6	185	
May 31.....	57.0	14		--	--	16		123		25	8.5		3.0		--	--	--	106	5	.7	267	
June 1-3.....	62.7	19		40	3.9	22		131		33	13		3.2		199	.27	33.7	116	8	.9	312	
June 4-19.....	3.9	14		56	5.9	27		191		36	19		2.0		254	.35	2.67	164	7	.9	417	
June 20.....	134	16		62	5.2	91		236		103	51		.8		445	.61	161	176	0	3.0	712	
June 21-30.....	20.9	11		38	3.2	21		127		29	12		2.2		178	.24	10.0	108	4	.9	301	
July 1-2, 4-13.....	1.4	15		49	4.8	31		174		34	25		1.5		250	.34	.94	142	0	1.1	411	
July 3.....	2.0	14		56	6.0	190		136		25	310		1.0		669	.91	3.61	164	52	6.5	1220	
July 14-17.....	1880	13		20	1.5	9.0		68		14	3.0		3.2		102	.14	518.0	56	0	.5	155	
July 18-31.....	60.6	14		32	3.7	16		114		20	9.5		1.5		153	.21	25.0	95	2	.7	253	
Aug. 1-15.....	1.5	13		46	4.2	26		166		29	14		2.2		217	.30	.88	132	0	1.0	359	
Weighted average	b156	12		32	3.2	17		103		26	12		3.2		159	0.22	77.0	92	8	0.8	258	
Time-weighted average.....	--	12		63	7.0	44		210		52	38		1.9		329	--	--	185	13	1.4	533	
Tons per day.....	--	6.0		15	1.5	8.3		50		12	5.6		1.5		--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge based on 365 days; mean discharge for 319 days of actual flow, 179 cfs.

CYPRESS CREEK BASIN

MISCELLANEOUS ANALYSIS OF STREAM IN CYPRESS CREEK BASIN IN TEXAS

Chemical analysis, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH
															Parts per million	Tons per acre-foot				

CADDO LAKE NEAR MARSHALL

June 24, 1963-----		13	0.05	8.0	3.2	24	20	17	36	0.2	0.2	0.2			112	0.15	33	17	1.8	189	6.0
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SABINE RIVER BASIN

8-220. SABINE RIVER NEAR TATUM, TEX.

LOCATION.--At gaging station at bridge on State Highway 43, 5.2 miles upstream from Potter Creek, 5.1 miles northeast of Tatum, Rusk County, and 5.6 miles downstream from Cherokee Bayou.

DRAINAGE AREA.--3,493 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1952 to September 1963.

Water temperatures: February 1952 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 621 ppm Aug. 10-16; minimum, 106 ppm May 1-13.

Hardness: Maximum, 100 ppm Apr. 19-27; minimum, 28 ppm Apr. 30.

Specific conductance: Maximum daily, 1,420 microhmhos Aug. 12--minimum daily, 151 microhmhos May 4.

EXTREMES, 1952-63.--Dissolved solids: Maximum, 936 ppm Aug. 21-31, 1956; minimum, 65 ppm Nov. 23, 1961.

Hardness: Maximum, 121 ppm Oct. 20, 1958; minimum, 15 ppm Nov. 23, 1961.

Specific conductance: Maximum daily, 1,850 microhmhos Oct. 25, 1954; Aug. 31, 1956; minimum daily, 98 microhmhos Apr. 29, 1957.

Water temperatures(1952-62): Maximum, 98°F Aug. 13, 1956; minimum, 35°F Jan. 12, 13, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate			
Oct. 1-11, 1962...	437	15		12	4.9	63		28		21	100	0.3	1.5		a248	0.34	293	50	27	3.9	429	6.4
Oct. 12-13.....	504									37	282							84	60		1060	6.4
Oct. 14-31.....	399	15		12	4.9	70		27		25	108		1.2		249	.34	268	50	28	4.3	464	6.5
Nov. 1-14.....	310	17		14	5.3	82		29		26	128	.3	1.2		289	.39	242	57	31	4.7	544	6.3
Nov. 15-23.....	380	17		13	5.2	84		27		25	133		1.2		291	.40	299	54	32	5.0	544	6.4
Nov. 24-30.....	1334	16		12	4.8	66		20		22	109		.8		241	.33	868	50	33	4.1	449	6.5
Dec. 1-11.....	2225	12		11	4.4	37		18		27	58	.2	.8		159	.22	955	46	31	2.4	286	6.3
Dec. 12-20.....	649	18		16	6.1	56		26		34	92		1.0		a248	.34	435	65	44	3.0	440	6.6
Dec. 21-31.....	1089	17		16	6.3	67		20		36	111		.2		a274	.37	806	66	49	3.6	485	6.0
Jan. 1-13, 1963...	1362	18		20	8.1	74		20		53	122	.2	.3		a334	.45	1230	84	67	3.5	564	6.1
Jan. 14-21.....	1194	15		16	6.9	51		18		41	84		.8		a225	.31	725	68	52	2.7	409	6.2
Jan. 22-31.....	722	18		16	7.1	68		18		40	113		.5		a290	.39	565	69	54	3.6	505	6.1
Feb. 1-28.....	673	17		17	7.9	82		18		45	135	.3	.8		a338	.46	614	75	60	4.1	584	6.0
Mar. 1-8.....	1280	14		15	7.2	70		14		41	116	.2	.8		a294	.40	1020	67	56	3.7	506	6.1
Mar. 9-31.....	778	15		22	9.8	82		18		66	134		.5		a365	.50	767	96	80	3.6	630	6.0
Apr. 1-18.....	593	15		18	8.0	78		26		47	125	.2	.8		305	.41	488	78	56	3.8	535	6.3
Apr. 19-27.....	386	13		24	9.9	123		34		58	198		.8		444	.60	463	100	72	5.4	814	6.2
Apr. 28-29.....	2000	13		16	6.3	59		21		43	93		2.2		242	.33	1310	66	49	3.2	439	6.3
Apr. 30.....	4530	6.9		6.8	2.7	32		10		16	51		1.5		122	.17	1490	28	20	2.6	234	5.8
May 1-13.....	6173	7.0		9.0	2.6	24		20		17	36	.2	.5		106	.14	1770	33	17	1.8	192	6.0
May 14-18.....	4178	13		16	4.6	43		23		34	66		1.0		188	.26	2120	59	24	2.4	327	6.3
May 19-31.....	626	17		18	7.3	91		38		34	146		1.2		334	.45	565	75	44	4.6	601	6.4
June 1-6.....	624	16		20	7.1	98		38		42	154	.2	1.0		357	.49	601	79	48	4.8	660	6.7
June 7-8.....	992	13				55		30		36	86		2.0					66	41	2.9	420	6.7
June 9-11.....	521	14		12	4.1	36		35		20	52		2.0		157	.21	221	47	18	2.3	274	6.8
June 12-21.....	216	15		17	5.7	76		50		26	114		2.0		281	.38	164	66	25	4.1	314	6.6
June 22-23.....	202	18		23	9.4	103		46		30	315		.8		611	.83	333	96	58	8.5	1150	6.9
June 24-30.....	305	12		18	6.3	102		42		29	162		.8		353	.48	291	71	35	5.3	663	6.3
July 1-15.....	195	11		15	5.5	101		36		25	161	.3	1.2		342	.47	180	60	30	5.7	641	6.3
July 16-31.....	122	10		17	6.7	112		53		33	166		1.2		372	.51	123	70	26	5.8	699	6.4

a Residue at 180°C.

SABINE RIVER BASIN--Continued

8-220, SABINE RIVER NEAR TATUM, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids (calculated)			Tons per day	Calcium, magnesium, non-carbonate	Hardness as CaCO ₃	Sodium carbonate ratio (microhm at 25°C)	Specific conductance (microhm at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day							
Aug. 1, 1963.....	378	12	10	17	--	125	40	23	199	1.0	--	1.0	--	23	264	0.36	114	66	33	6.7	778	6.5	6.3
Aug. 2-9.....	160	10	17	6.2	70	47	33	33	103	0.2	1.8	1.0	--	33	264	0.36	114	68	29	3.7	498	6.0	6.3
Aug. 10-16.....	95.7	6.2	20	6.3	207	38	47	40	322	--	--	--	--	621	84	160	76	45	10	1210	6.0	6.0	
Aug. 17-31.....	58.4	6.6	18	5.8	164	56	56	36	242	--	--	--	--	501	.88	79.0	69	23	8.6	968	6.2	6.2	
Sept. 1-7.....	42.1	4.8	19	7.9	203	66	66	39	302	.3	.5	.3	.3	608	.83	69.1	80	26	9.9	1200	6.5	6.5	
Sept. 8-20.....	116	9.3	17	6.2	153	67	67	36	218	1.8	1.0	1.0	--	474	.64	148	68	13	8.1	932	6.7	6.7	
Sept. 21-30.....	65.0	8.6	14	4.6	108	46	46	30	155	--	--	--	--	344	.47	60.4	54	16	6.4	692	6.6	6.6	
Weighted average	845	13	14	5.5	58	24	24	32	92	0.8	--	0.8	--	234	0.32	533	58	38	3.2	417	6.1	6.1	
Time-weighted average.....	--	14	16	6.5	89	32	32	36	139	1.0	--	1.0	--	325	--	--	68	41	4.7	597	6.2	6.2	
Tons per day.....	--	29	--	--	--	132	55	73	210	1.8	--	1.8	--	--	--	--	--	--	--	--	--	--	--

SABINE RIVER BASIN--Continued

8-305. 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, and 4.5 miles downstream from Cypress Creek.

DRAINAGE AREA.--9,329 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1963.

Water temperatures: October 1947 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 284 ppm May 6-7; minimum, 25 ppm Sept. 18-20.

Hardness: Maximum, 70 ppm May 6-7; minimum, 8 ppm Sept. 21-22.

Specific conductance: Maximum daily, 575 micromhos May 7; minimum daily, 28 micromhos Sept. 19.

Water temperatures: Maximum, 91°F July 22, 23; minimum 49°F Dec. 27, Jan. 20.

EXTREMES, 1945-46, 1947-63.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 25 ppm Sept. 18-20, 1963.

Hardness: Maximum, 70 ppm May 6-7, 1963; minimum, 8 ppm May 20-24, 1953, Sept. 21-22, 1963.

Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 28 micromhos Sept. 19, 1963.

Water temperatures (1947-63): Maximum, 97°F Aug. 14, 1962; minimum, 34°F Jan. 28, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		Sodium-sorption ratio	pH
Oct. 1-15, 1962	1240	14	7.5	3.4	24	33	32	11	11	32	0.2	0.2	108	0.15	362	6	1.83	183
Oct. 16-31	1398	13	9.0	4.1	39	32	58	15	15	58	--	--	al63	.22	615	40	1.7	277
Nov. 1-10	1014	17	10	4.6	51	34	77	17	17	77	.2	.2	194	.26	531	44	3.3	349
Nov. 11-20	1017	17	9.2	4.0	50	34	73	16	16	73	--	--	187	.25	513	40	3.4	333
Nov. 20-30	2047	15	7.2	3.3	37	24	56	13	13	56	--	--	al51	.21	835	32	2.8	255
Dec. 1-10	2626	15	9.5	2.9	42	20	66	16	16	66	.2	.2	162	.22	1150	36	3.0	299
Dec. 11-20	2804	14	9.5	2.9	34	17	50	23	23	50	--	1.0	142	.19	1080	36	2.5	262
Dec. 21-31	4605	12	6.0	1.5	22	14	30	13	13	30	--	.8	92	.13	1140	21	2.1	159
Jan. 1-10, 1963	7573	14	9.0	3.9	30	14	49	22	22	49	.2	.5	136	.18	2780	38	2.1	243
Jan. 11-20	4321	16	11	4.8	37	16	61	28	28	61	--	.8	167	.23	1950	47	3.4	296
Jan. 21-31	4143	16	8.8	4.0	27	18	41	22	22	41	--	.5	128	.17	1430	38	1.9	221
Feb. 1-18	2691	19	10	4.7	37	22	58	24	24	58	.2	.2	al76	.24	1280	44	2.4	282
Feb. 19-28	8157	11	6.2	3.0	23	11	36	18	18	36	--	.5	103	.14	2270	28	1.9	180
Mar. 1-18	5234	14	8.0	3.6	29	15	43	23	23	43	.2	.8	129	.18	1820	35	2.1	216
Mar. 19-31	2875	15	13	5.4	43	27	66	31	31	66	--	.0	186	.25	1440	54	3.2	332
Apr. 1-11	2627	17	13	5.2	47	29	70	31	31	70	.4	.5	198	.27	1400	54	3.0	343
Apr. 12-22	3680	12	9.0	4.0	31	21	45	24	24	45	--	.8	136	.18	1350	39	2.2	236
Apr. 23-30	1535	16	12	5.0	40	33	61	23	23	61	--	.0	173	.24	717	50	2.5	302
May 1-5	1528	19	12	4.9	46	36	68	23	23	68	.2	.5	192	.26	792	50	2.8	323
May 6-7	3695	12	17	6.7	75	30	118	40	40	118	--	1.2	284	.39	2830	70	3.9	520
May 8-20	5965	9.3	7.5	3.0	27	16	39	17	17	39	--	1.2	112	.15	1800	31	1.8	194
May 21-31	3995	12	12	3.6	32	34	48	18	18	48	--	.8	143	.19	1540	45	1.7	258
June 1-7	1611	16	12	4.9	42	41	88	19	19	88	.3	.8	176	.24	766	50	2.6	304
June 8-22	1301	17	14	5.1	58	41	88	22	22	88	--	.5	225	.31	790	56	3.4	402
June 23-30	1335	13	9.5	3.5	43	30	63	18	18	63	--	.5	166	.23	598	38	1.4	296
July 1-17	1601	12	7.2	2.9	30	30	44	10	10	44	.1	.8	124	.17	536	30	2.4	220
July 18-26	1201	12	9.0	3.3	41	32	62	11	11	62	--	.2	154	.21	499	36	1.0	284
July 27-31	1580	10	5.0	1.8	23	20	32	6.8	6.8	32	--	.5	89	.12	380	20	4.2	155
Aug. 1-11	797	16	7.5	2.8	35	34	49	8.0	8.0	49	.2	1.0	136	.18	293	30	2.8	243
Aug. 12-26	740	15	8.8	3.4	55	40	79	10	10	79	--	1.0	192	.26	384	36	3	360

a Residue at 180°C.

SABINE RIVER BASIN--Continued

8-305. SABINE RIVER NEAR RULIFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Aug. 27, 1963.....	818	10		4.5	1.7	23		18		7.2	32	--	1.0		88	0.12	194	18	3	2.4	165	6.2	
Aug. 28-31.....	579	13		6.5	3.2	48		30		17	65	--	.5		168	.23	263	29	4	3.9	294	6.2	
Sept. 1-17.....	447	15		7.2	3.4	37		39		9.0	49	0.2	.5		140	.19	169	32	0	2.8	256	6.3	
Sept. 18-20.....	17130	.0		3.0	1.1	4.4	1.2	10		3.0	5.4	.5	1.0		25	.03	1160	12	4	.6	40	5.8	
Sept. 21-22.....	9430	3.0		--	--	7.5	.9	7		4.2	11	.0	1.0		--	--	--	8	2	1.2	62	6.0	
Sept. 23-25.....	2933	4.6		4.0	1.7	16		14		4.4	25	.0	.8		64	.09	507	17	6	1.7	126	6.0	
Sept. 26-30.....	1042	13		7.5	2.8	39		34		10	53	.1	.5		143	.19	402	30	2	3.1	262	6.5	
Weighted average	2831	13		8.6	3.5	31		21		19	47	--	0.6		134	0.18	1030	36	19	2.2	235	6.2	
Time-weighted average.....	--	14		9.1	3.7	37		27		18	54	--	0.6		151	--	--	38	16	2.6	265	6.3	
Tons per day....	--	98		65	27	240		159		143	361	--	4.9		--	--	--	--	--	--	--	--	--

SABINE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-0172. SABINE RIVER AT GREENVILLE																						
Feb. 27, 1963----	0.8							180			49							160	12	508	7.1	
SABINE RIVER NEAR LONE OAK																						
Feb. 26, 1963----	a5							186			43							171	18	575	6.4	
MILL CREEK NEAR EDGEWOOD																						
Feb. 26, 1963----	a3	22		45	21	65	48	133	115	0.2	0.2							199	160	2.0	737	6.5
GRAND SALINE CREEK AT STATE HIGHWAY 110 NEAR GRAND SALINE																						
Feb. 26, 1963----	a3						23				100							214	195		764	6.1
GRAND SALINE CREEK AT FM ROAD 857 NEAR GRAND SALINE																						
Feb. 26, 1963----		20		50	23	70	20	201	100	0.1	0.2							220	203	2.1	792	6.3
SALT FLAT AT GRAND SALINE																						
Feb. 26, 1963----	a0.1	9.2		315	51	25,500	99	1,100	39,200									996	915		71,100	7.0
GRAND SALINE CREEK AT HIGHWAY 80 NEAR GRAND SALINE																						
Feb. 27, 1963----	6.8	17		64	29	786	40	251	1,200	0.2	1.0							279	246	20	4,160	6.7
CARTER CREEK 4 MILES NORTH OF QUITMAN AT COUNTY ROAD																						
Feb. 26, 1963----	a0.6	0.3					c0				295							208	208		1,220	4.2

a Field estimate.
 b Residue at 180°C.
 c Contains 0.3 ppm total acidity as H⁺.

SABINE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate				
LAKE FORK CREEK NEAR POINT																					
Feb. 27, 1963	a0.2							316			42					284	25	779	7.1		
CANEY CREEK NEAR QUITMAN																					
Feb. 26, 1963	a5	17		39	19	92		52		102	160	0.2	0.0		b475	0.65	176	133	3.0	823	6.8
LAKE FORK CREEK NEAR ALBA																					
Feb. 27, 1963	a15							54			155						231	186		948	6.8
DRY CREEK AT FARM ROAD 69 NEAR QUITMAN																					
Feb. 26, 1963	a3	c27		25	8.8	96		c0		71	175	0.2	0.2		b413	0.56	98	98	4.2	766	3.8
UNNAMED CREEK AT MYRTLE SPRINGS																					
Feb. 26, 1963	a0.05	43		114	41	505		d0		172	1,020	0.7	1.0		1,900	2.58	453	453	10	3,470	3.8
DRY CREEK NEAR QUITMAN																					
Feb. 26, 1963	3.81	31		82	29	340		e0		158	650	0.4	0.5		1,290	1.75	324	324	8.2	2,350	4.3
8-0190. LAKE FORK CREEK NEAR QUITMAN																					
Jan. 20, 1963	69.4	20		43	19	109		36		130	182	0.2	0.2		b558	0.76	186	156	3.5	881	6.6
Feb. 24	32.6	19		58	27	148		42		183	248	0.2	1.5		b745	1.01	256	221	4.0	1,210	6.5
Feb. 26	a30	--		--	--	--		40		--	235	--	--		--	--	250	217	--	1,190	6.6
Mar. 31	29.7	13		58	26	143	3.6	51		171	252	0.2	0.2		692	0.94	252	210	3.9	1,220	6.7

a Field estimate.

b Residue at 180°C.

c Contains 0.3 ppm total acidity as H⁺.

d Contains 1.4 ppm total acidity as H⁺.

e Contains 0.4 ppm acidity as H⁺.

SABINE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-0195. BIG SANDY CREEK NEAR BIG SANDY																						
Jan. 19, 1963-----	83.5	17		8.5	3.9	26		5		24	46	0.1	0.2		128	0.17		37	33	1.9	227	5.8
Feb. 23-----	71.6	--		--	--	--		6		--	52	--	--		--	--		36	31	--	237	5.7
Mar. 31-----	65.3	14		8.8	4.1	27	2.4	11		23	48	.2	.2		133	.18		39	30	1.9	236	5.8
8-0224. SOCAGEE CREEK NEAR CARTHAGE																						
Nov. 20, 1962-----	0.23	15		14	5.2	49		38		6.0	88	0.3	0.2		197	0.27		56	25	2.8	370	5.7
Dec. 18-----	.14	19		25	8.6	131		18		12	252	.2	.2		457	.62		98	83	5.8	883	5.9
Jan. 29, 1963-----	3.23	19		21	8.6	95		26		18	180	.2	.0		355	.48		88	66	4.4	675	6.0
Feb. 20-----	85.8	12		18	8.1	89		26		21	162	.2	.8		324	.44		78	57	4.4	610	6.1
Mar. 5-----	21.6	9.9		16	6.8	64		28		23	113	.2	.8		248	.34		68	45	3.4	464	6.1
8-0300. CYPRESS CREEK NEAR BUNA																						
Sept. 18, 1963-----	7,040	1.0		0.5	0.2	0.3	0.4	2		0.0	0.9	0.0	0.0		4	0.01		2	0	0.09	10	5.6
8-0310. COW BAYOU NEAR MAURICEVILLE																						
Sept. 19, 1963-----	4,470	0.5		1.0	0.1	0.5	0.9	4		0.0	1.1	0.0	0.5		7	0.01		3	0	0.1	13	5.5

SABINE RIVER BASIN--Continued

SABINE RIVER LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on the Sabine River and its tributaries from near Carthage, Panola County, Texas, to the stream gaging station near Ruliff, Texas, a distance of 268 miles.

Chemical analyses, in parts per million, September 1963

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Calcium Magnesium sum	Non-carbonate			
Sept. 4	Sabine River	At bridge on U.S. Highway 79, 8.0 miles NE of Carthage, Tex.	43.4	3.6	19	6.4	135	66	30	200	0.4	0.5	0.58	427	74	20	6.8	831	6.2
Do.	Mill Creek	At bridge on Farm Road 123, 10.0 miles NE of Carthage, Tex.	.03	--	--	--	--	--	--	73	--	--	--	--	--	--	--	453	--
Sept. 5	Sabine River	At bridge on Farm Road 2517, 3.6 miles west of Deadwood, Tex.	45.2	--	--	--	--	76	--	178	--	--	b405	75	12	--	--	779	6.3
Do.	Murvaul Bayou	At bridge on Farm Road 1401, 7.0 miles SE of Carthage, Tex.	5.42	5.7	18	9.5	38	77	31	50	.2	.2	.26	84	21	1.8	357	6.9	
Sept. 4	Booker Branch	At bridge on Farm Road 31, 5.5 miles SE of Deadwood, Tex.	.03	--	--	--	--	--	--	8.4	--	--	--	--	--	--	--	96	--
Sept. 5	McFaddin Creek	At bridge on county road, 6.5 miles NW of Joaquin, Tex.	.39	--	--	--	--	--	--	37	--	--	--	--	--	--	--	453	--
Do.	Moorman Creek	At bridge on county road, 3.9 miles NW of Joaquin, Tex.	.64	--	--	--	--	--	--	8.9	--	--	--	--	--	--	--	101	--
Do.	Sabine River	At Hewitt Camp near Joaquin, Tex.	55.1	6.1	18	6.6	109	81	29	150	.4	.2	.49	72	6	5.6	688	6.4	
Do.	Morris Creek	At bridge on county road, 1.0 mile NW of Joaquin, Tex.	.07	--	--	--	--	--	--	9.5	--	--	--	--	--	--	--	114	--
Sept. 4	Sabine River	At gaging station (8-0225) at Logansport, La.	55.2	--	--	--	--	69	--	190	--	--	.56	70	14	--	--	807	6.3
Do.	do.	At mouth of Bayou Castor	59.1	--	--	--	--	63	--	212	--	--	.62	72	20	--	--	882	6.5
Do.	do.	6.0 miles SE of Logansport, La.	60.8	5.9	20	7.3	151	55	30	235	.3	.5	.65	80	35	7.3	940	6.6	
Do.	do.	1.9 miles above mouth of Tenaha Creek	63.6	--	--	--	--	52	--	192	--	--	.55	81	38	--	--	792	6.4
Do.	Spring	1.9 miles above mouth of Tenaha Creek	a .001	--	--	--	--	--	--	16	--	--	--	--	--	--	--	99	--
Do.	Sabine River	0.5 mile below mouth of Tenaha Creek	65.0	--	--	--	--	54	--	175	--	--	.51	80	36	--	--	731	6.5
Do.	do.	At road crossing, 2.6 miles ESE of Huxley, Tex.	63.6	--	--	--	--	60	--	134	--	--	.41	75	26	--	--	600	6.3
Do.	Bayou Step	At bridge on county road, 10.0 miles NE of Patroon, Tex.	.08	--	--	--	--	--	--	20	--	--	--	--	--	--	--	194	--
Do.	Half Branch Bayou	At bridge on county road, 2.0 miles SE of Huxley, Tex.	.17	--	--	--	--	--	--	5.5	--	--	--	--	--	--	--	107	--
Do.	Sabine River	6.7 miles SE of Huxley, Tex.	70.8	1.4	15	6.5	67	65	27	90	.3	.2	.33	64	11	3.6	462	7.0	
Do.	do.	At road crossing, 10.8 miles SSE of Huxley, Tex.	70.8	--	--	--	--	74	--	100	--	--	.36	70	9	--	--	511	6.4

a Estimated.

b Calculated from specific conductance.

SABINE RIVER BASIN--Continued

SABINE RIVER LOW-FLOW INVESTIGATION--Continued

Chemical analyses, in parts per million, September 1963--Continued

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro- mhos at 25°C)	pH
													Parts per million	Tons per acre- foot	Calcium, Magnesium	Non-carbonate			
Sept. 5	Sabine River	At mouth of Bayou San Miguel	72.6	2.8	17	7.7	112	82	28	156	0.4	0.2	364	0.50	74	7	5.7	704	6.7
Sept. 4	Bayou La Nana	At gaging station (8-0242) near Zwolle, La.	.06	--	--	--	--	--	--	62	--	--	--	--	--	--	--	397	--
Do.	Patroon Bayou	At bridge on Farm Road 276, 7.0 miles NE of Milam, Tex.	a .002	--	--	--	--	--	--	12	--	--	--	--	--	--	--	219	--
Do.	Corsey Creek	At county road crossing, 4.4 miles NE of Milam, Tex.	a .003	--	--	--	--	--	--	20	--	--	--	--	--	--	--	407	--
Sept. 5	Sabine River	At gaging station (8-0244) near Milam, Tex.	78.0	1.8	15	6.2	111	73	39	144	.4	.2	354	.48	63	3	6.1	643	6.4
Sept. 4	Palo Gaucho Bayou	At bridge on Farm Road 242, 2.0 miles NW of Sabinetown, Tex.	.63	--	--	--	--	--	--	4.0	--	--	--	--	--	--	--	98	--
Do.	Carrice Creek	At bridge on State Highway 21, 5.3 miles ENE of Milam, Tex.	.03	--	--	--	--	--	--	6.6	--	--	--	--	--	--	--	98	--
Do.	Coma Creek	At bridge on county road, 7.4 miles ENE of Hemphill, Tex.	.01	--	--	--	--	--	--	7.3	--	--	--	--	--	--	--	235	--
Do.	Mill Branch	At bridge on county road, 9.5 miles ENE of Hemphill, Tex.	.13	--	--	--	--	--	--	5.9	--	--	--	--	--	--	--	59	--
Do.	Sabine River	10.7 miles ENE of Hemphill, Tex.	78.1	3.6	14	6.8	131	64	22	192	.4	.2	401	.55	63	10	7.2	782	6.8
Do.	Bayou Negreet	At bridge, 5.0 miles SW of Negreet, La.	.87	--	--	--	--	--	--	74	--	--	--	--	--	--	--	265	--
Do.	Unnamed Tributary to Bayou Negreet	At bridge, 5.8 miles SW of Negreet, La.	.03	--	--	--	--	--	--	19	--	--	--	--	--	--	--	125	--
Do.	do.	At bridge, 6.7 miles SW of Negreet, La.	.01	--	--	--	--	--	--	7.2	--	--	--	--	--	--	--	58	--
Do.	Sabine River	10.8 miles ENE of Hemphill, Tex.	78.7	--	--	--	--	68	--	240	--	--	b480	.65	64	8	--	945	6.3
Do.	Caney Creek	At bridge, 1.0 mile SW of Esto, La.	.30	--	--	--	--	--	--	5.3	--	--	--	--	--	--	--	89	--
Do.	Sabine River	11.6 miles ESE of Hemphill, Tex.	78.7	--	--	--	--	66	--	255	--	--	b500	.69	74	20	--	992	6.4
Do.	do.	12.2 miles ESE of Hemphill, Tex.	90.7	4.8	18	7.5	165	66	22	252	.4	.5	502	.68	76	22	8.2	994	6.4
Do.	Arnold Creek	At bridge, 2.2 miles south of Esto, Tex.	.05	--	--	--	--	--	--	10	--	--	--	--	--	--	--	128	--
Do.	Sandy Creek	At bridge on Farm Road 944, 9.5 miles east of Yellowpine, Tex.	.41	--	--	--	--	--	--	3.8	--	--	--	--	--	--	--	48	--
Do.	Spring on unnamed tributary	At bridge, 3.9 miles SW of Toro, La.	--	--	--	--	--	--	--	4.7	--	--	--	--	--	--	--	34	--

a Estimated.

b Calculated from specific conductance.

SABINE RIVER BASIN--Continued

SABINE RIVER LOW-FLOW INVESTIGATION--Continued

Chemical analyses, in parts per million, September 1963--Continued

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
Sept. 4	Mill Creek	At bridge on county road, 2.4 miles SE of Fairdale, Tex.	2.94	19	1.8	0.6	4.9	12	2.4	3.4	0.1	0.2	38	0.05	7	0	0.8	35	6.1
Sept. 5	Sabine River	At Anthony's Ferry, 4.4 miles SE of Fairdale, Tex.	100	--	--	--	--	64	--	208	--	--	b425	.58	69	16	--	828	6.7
Sept. 4	Indian Creek	At bridge on county road, 5.6 miles SE of Fairdale, Tex.	2.06	30	2.8	.2	7.6	16	4.2	4.4	.2	.2	58	.08	8	0	1.2	49	6.6
Do.	Buck Creek	At bridge on county road, 5.3 miles SE of Fairdale, Tex.	2.89	22	1.0	.4	3.4	7	2.6	1.9	.1	.2	35	.05	4	0	.7	25	7.1
Do.	Sand Branch	At bridge on county road, 6.2 miles SE of Fairdale, Tex.	a .03	--	--	--	--	--	--	5.3	--	--	--	--	--	--	--	55	--
Do.	Bayou Toro	At bridge, 2.5 miles south of Toro, La.	5.12	23	5.8	1.8	9.3	22	1.4	6.2	.2	.2	72	.10	22	4	.9	92	5.9
Do.	Macciva Creek	At bridge, 4.2 miles south of Toro, La.	.28	--	--	--	--	--	--	4.9	--	--	--	--	--	--	--	68	--
Do.	Hunter Branch	At bridge, 5.7 miles south of Toro, La.	.08	--	--	--	--	--	--	2.7	--	--	--	--	--	--	--	29	--
Do.	Mill Creek	At bridge, 6.6 miles south of Toro, La.	2.86	36	2.0	.2	6.0	12	4.2	3.1	.1	.2	58	.08	6	0	1.1	40	6.3
Do.	Spring on Mill Creek	6.6 miles south of Toro, La.	--	--	--	--	--	--	--	3.3	--	--	--	--	--	--	--	85	--
Sept. 5	Sabine River	6.8 miles south of Toro, La.	112	8.5	12	4.9	88	57	1.9	123	.3	.2	284	.39	50	3	5.4	539	6.2
Do.	Sutton Creek	At Farm Road 692 crossing, 7.5 miles SE of Fairdale, Tex.	.01	--	--	--	--	--	--	8.7	--	--	--	--	--	--	--	85	--
Do.	Babel Creek	At bridge on Farm Road 692, 7.9 miles SE of Fairdale, Tex.	.04	--	--	--	--	--	--	3.5	--	--	--	--	--	--	--	68	--
Sept. 4	Sandy Creek	At bridge, 5.3 miles NW of Burr Ferry, La.	6.08	27	5.0	.6	12	33	3.2	7.2	.2	.0	71	.10	15	0	1.3	79	6.5
Do.	Cain Creek	At bridge, 3.7 miles north of Burr Ferry, La.	.12	--	--	--	--	--	--	3.2	--	--	--	--	--	--	--	29	--
Sept. 5	Unnamed tributary to Sabine River	At bridge on Farm Road 692, 8.6 miles SE of Fairdale, Tex.	.27	--	--	--	--	--	--	2.7	--	--	--	--	--	--	--	25	--
Do.	do.	At Farm Road 692 crossing, 8.7 miles SE of Fairdale, Tex.	.12	--	--	--	--	--	--	3.1	--	--	--	--	--	--	--	28	--
Do.	Hurger Branch	At Farm Road 692 crossing, 9.5 miles SE of Fairdale, Tex.	.05	--	--	--	--	--	--	2.9	--	--	--	--	--	--	--	31	--
Do.	Unnamed tributary to Hurger Branch	At Farm Road 692 crossing, 9.1 miles SE of Fairdale, Tex.	.02	--	--	--	--	--	--	3.7	--	--	--	--	--	--	--	40	--
Do.	Melton Branch	At bridge on Farm Road 692, 10.2 miles SSE of Fairdale, Tex.	.03	--	--	--	--	--	--	2.7	--	--	--	--	--	--	--	30	--

a Estimated.

b Calculated from specific conductance.

SABINE RIVER BASIN--Continued

SABINE RIVER LOW-FLOW INVESTIGATION--Continued

Chemical analyses, in parts per million, September 1963--Continued

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
Sept. 5	Hickman Creek	At bridge on Farm Road 692, 10.6 miles SSE of Fairdale, Tex.	2.73	22	1.5	0.3	4.2	10	1.6	2.8	0.1	0.2	38	0.05	5	0	0.8	29	6.0
Sept. 4	Yellow Branch	At bridge, 2.5 miles north of Burr Ferry, La.	.67	--	--	--	--	--	--	3.1	--	--	--	--	--	--	--	29	--
Do.	Pearl Creek	At bridge, 0.5 mile west of Burr Ferry, La.	1.62	--	--	--	--	--	--	3.7	--	--	--	--	--	--	--	46	--
Do.	Spring on Pearl Creek	0.6 mile east of Burr Ferry, La.	--	--	--	--	--	--	--	3.3	--	--	--	--	--	--	--	32	--
Sept. 5	Sabine River	At gaging station (8-0260) near Burkeville, Tex.	134	12	9.5	4.0	66	52	15	88	.3	.5	221	.30	40	0	4.5	413	6.4
Do.	Mill Creek	At bridge on State Highway 63, 7.1 miles NE of Burkeville, Tex.	.68	--	--	--	--	--	--	3.5	--	--	--	--	--	--	--	28	--
Do.	Black Branch	At bridge on State Highway 63, 6.2 miles NE of Burkeville, Tex.	.09	--	--	--	--	--	--	2.7	--	--	--	--	--	--	--	23	--
Do.	Unnamed tributary to Black Branch	At State Highway 63 crossing, 6.5 miles NE of Burkeville, Tex.	.02	--	--	--	--	--	--	3.7	--	--	--	--	--	--	--	26	--
Do.	Unnamed tributary to Mill Creek	At State Highway 63 crossing, 7.7 miles NE of Burkeville, Tex.	.09	--	--	--	--	--	--	3.1	--	--	--	--	--	--	--	29	--
Sept. 4	Clear Creek	At road crossing, 1.0 mile south of Burr Ferry, La.	.22	--	--	--	--	--	--	2.9	--	--	--	--	--	--	--	27	--
Do.	Red Bank Creek	At bridge, 0.5 mile south of Evans, La.	.29	--	--	--	--	--	--	5.7	--	--	--	--	--	--	--	55	--
Do.	Sabine River	3.8 miles east of Evans, La.	155	15	9.5	4.0	62	50	14	84	.2	.5	214	.29	40	0	4.3	395	6.4
Do.	Mill Creek	At bridge, 3.1 miles south of Evans, La.	1.25	--	--	--	--	--	--	3.5	--	--	--	--	--	--	--	29	--
Do.	Moore Branch	At bridge, 2.7 miles south of Evans, La.	.03	--	--	--	--	--	--	8.2	--	--	--	--	--	--	--	189	--
Sept. 4	Little Cow Creek	0.5 mile above mouth, 8.0 miles SE of Burkeville, Tex.	38.6	19	3.2	.7	3.9	14	2.4	3.7	.1	.0	40	.05	11	0	.5	45	6.1
Sept. 5	Sabine River	6.7 miles SW of Evans, La.	200	16	9.8	3.5	50	46	12	69	.2	.2	184	.25	39	1	3.5	336	6.4
Do.	Spring flow and seeps	6.7 miles SW of Evans, La.	.15	8.7	2.5	.4	2.7	5	4.2	3.8	.1	.0	25	.03	8	4	.4	36	5.6
Sept. 4	Bayou Anacoco	At bridge, 4.5 miles SW of Knight, La.	42.5	17	4.8	.7	5.5	22	2.2	4.5	.1	.0	46	.06	15	0	.6	57	6.4
Do.	Unnamed tributary to Bayou Anacoco	At bridge, 9.2 miles north of Merryville, La.	.02	--	--	--	--	--	--	4.1	--	--	--	--	--	--	--	39	--
Sept. 5	Sabine River	7.2 miles north of Merryville, La.	243	15	8.8	2.9	42	42	10	57	.2	.5	157	.21	34	0	3.1	278	6.4

a Estimated

SABINE RIVER BASIN--Continued

SABINE RIVER LOW-FLOW INVESTIGATION--Continued

Chemical analyses, in parts per million, September 1963--Continued

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂) (Ca)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
												Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
Sept. 4	Trout Creek	At bridge, 3.5 miles north of Merryville, La.	0.45	--	--	--	--	--	--	6.1	--	--	--	--	--	--	54	--
Sept. 5	Sabine River	4.2 miles NW of Merryville, La.	247	15	8.0	3.2	38	40	9.2	52	0.2	146	0.20	33	0	2.9	259	6.4
Sept. 4	Bridge Creek	At bridge, 2.5 miles north of Merryville, La.	.41	--	--	--	--	--	--	9.4	--	--	--	--	--	--	89	--
Sept. 5	Kinney Lake Slough	At county road crossing, 4.2 miles NE of Bon Wier, Tex.	.23	--	--	--	--	--	--	3.9	--	--	--	--	--	--	35	--
Sept. 4	Unnamed tributary to Sabine River	At Merryville, La.	2.13	--	--	--	--	--	--	8.0	--	--	--	--	--	--	76	--
Sept. 5	Quicksand Creek	At bridge on U. S. Highway 190, 1.2 miles east of Bon Wier, Tex.	14.5	13	1.8	.6	3.6	10	.2	4.0	.2	29	.04	7	0	.6	32	6.2
Do.	Caney Creek	At bridge on U. S. Highway 190, 0.6 mile east of Bon Wier, Tex.	4.59	16	4.5	.7	5.4	20	2.0	4.9	.1	44	.06	14	0	.6	56	6.2
Do.	David Creek	At bridge on Farm Road 1416, 3.5 miles SW of Bon Wier, Tex.	.13	--	--	--	--	--	--	4.3	--	--	--	--	--	--	52	--
Do.	Dempsey Creek	At bridge on Farm Road 1416, 5.0 miles SSE of Bon Wier, Tex.	.50	--	--	--	--	--	--	5.2	--	--	--	--	--	--	52	--
Do.	Church House Creek	At bridge on Farm Road 1416, 5.8 miles SSE of Bon Wier, Tex.	.13	--	--	--	--	--	--	7.4	--	--	--	--	--	--	58	--
Sept. 4	Bossier Creek	At gaging station (8-0287) near Merryville, La.	1.88	--	--	--	--	--	--	5.5	--	--	--	--	--	--	62	--
Do.	Cypress Creek	At bridge, 2.5 miles north of Bivens, La.	.05	--	--	--	--	--	--	80	--	--	--	--	--	--	317	--
Do.	Seep on Texas side	1.5 miles SE of Lower Belgrade, Tex.	a .20	11	7.8	2.3	7.9	39	.4	8.5	.1	58	.08	29	0	.6	111	6.2
Do.	Bugger Branch	At bridge, 0.7 mile NW of Bivens, La.	.09	--	--	--	--	--	--	242	--	--	--	--	--	--	948	--
Do.	Sabine River	1.5 miles north of Baucroft, La.	319	16	7.5	3.0	34	39	7.4	46	.2	133	.18	31	0	2.7	236	6.3
Sept. 5	Donahoe Creek	At bridge on Farm Road 1416, 9.2 miles SW of Bon Wier, Tex.	a .04	--	--	--	--	--	--	4.3	--	--	--	--	--	--	55	--
Do.	Big Cow Creek	8.5 miles SW of Belgrade, Tex.	69.5	15	3.2	.5	4.9	14	2.6	4.3	.1	38	.05	10	0	.7	44	6.0
Do.	Sabine River	5.1 miles SW of Lower Belgrade, Tex.	391	16	7.0	2.6	29	37	6.6	38	.1	118	.16	28	0	2.4	203	7.0
Sept. 4	Caney Creek	At bridge, 6.4 miles west of Fields, La.	.10	--	--	--	--	--	--	4.5	--	--	--	--	--	--	51	--
Sept. 5	Sabine River	4.0 miles SE of Salem, Tex.	390	16	7.0	2.6	30	36	6.4	41	.1	121	.16	28	0	2.5	216	6.4
Do.	Sabine River	11.2 miles north of Deweyville, Tex.	399	15	7.2	2.4	30	38	7.6	38	.2	119	.16	28	0	2.5	208	6.1
Sept. 4	Bess Branch	At bridge, 5.0 miles NW of Starks, La.	1.39	--	--	--	--	--	--	27	--	--	--	--	--	--	248	--

a Estimated.

NECHES RIVER BASIN

8-325. NECHES RIVER NEAR ALTO, TEX.

LOCATION.--At gaging station at bridge on State Highway 21, 600 feet downstream from Bowles Creek and 7.5 miles southwest of Alto, Cherokee County. DRAINAGE AREA.--1,945 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1963.

Water temperatures: October 1959 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 281 ppm Aug. 1-5; minimum, 96 ppm June 20-22.

Hardness: Maximum, 66 ppm Aug. 1-5; minimum, 28 ppm June 20-22.

Specific conductance: Maximum daily, 611 micromhos Aug. 2; minimum daily, 133 micromhos June 21.

Water temperatures: Maximum, 93°F July 23; minimum, freezing point Jan. 24.

EXTREMES, 1959-63.--Dissolved solids: Maximum, 304 ppm Oct. 2, 1960; minimum, 42 ppm June 19-20, 1961.

Hardness: Maximum, 66 ppm Aug. 1-5, 1963; minimum, 14 ppm June 19-20, 1961.

Specific conductance: Maximum daily, 611 micromhos Aug. 2, 1963; minimum daily, 56 micromhos June 20, 1961.

Water temperatures: Maximum, 93°F July 23, 1963; minimum, freezing point Jan. 24, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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)	Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	
													Calcium, Magnesium	Non-carbonate			
													Dissolved solids (calculated)				
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate
Oct. 1-15, 1962...	236	16		10	4.7	29		35	14	44	0.3	0.8	16	44	16	1.9	242
Oct. 16-31.....	239	16		10	4.9	26		37	13	40	--	.8	45	15	1.7	227	
Nov. 1-15.....	230	17		10	4.9	32		35	14	50	.2	1.0	45	16	2.1	251	
Nov. 16-30.....	353	18		9.0	4.6	29		28	16	45	--	.8	41	18	2.0	227	
Dec. 1-31.....	584	18		9.8	4.9	29		30	19	44	.2	.5	45	20	1.9	230	
Jan. 1-31, 1963...	665	16		9.5	4.4	27		22	22	42	.2	.2	42	24	7.8	229	
Feb. 1-17.....	503	17		10	4.6	31		21	24	48	.1	1.0	44	27	2.0	246	
Feb. 18-21.....	890	16		8.0	4.4	22		15	22	35	--	1.0	38	26	1.6	198	
Feb. 22-28.....	829	17		10	4.9	31		16	28	49	--	1.0	45	32	2.0	258	
Mar. 1-31.....	711	13		12	5.4	31		23	28	50	.2	.5	52	33	1.9	266	
Apr. 1-5.....	479	13		12	5.8	35		33	27	52	.2	.5	54	27	2.1	282	
Apr. 6-8.....	1430	16		22	22	22		22	23	29	--	.8	36	18	1.6	180	
Apr. 9-30.....	519	16		13	5.8	36		34	26	55	--	1.5	56	28	2.1	286	
May 1-12.....	583	17		13	5.7	39		34	28	59	.2	.8	56	28	2.3	306	
May 13-31.....	879	12		9.8	4.3	25		30	21	35	--	.8	42	18	1.7	211	
June 1-5.....	564	13		11	4.0	27		40	17	36	.2	1.2	44	11	1.8	215	
June 6-19.....	175	14		12	4.4	34		46	16	47	--	1.0	48	10	2.1	257	
June 20-22.....	596	14		6.5	2.9	20		22	11	29	--	1.8	28	10	1.6	158	
June 23-30.....	296	16		10	4.4	35		28	18	54	--	1.8	43	20	2.3	264	
July 1-8.....	283	14		10	4.6	31	3.6	32	15	50	.3	1.5	44	18	2.0	251	
July 9-31.....	73.1	15		13	4.8	44		46	12	68	--	1.8	52	14	2.7	323	
Aug. 1-5.....	48.6	14		17	5.7	77		34	14	135	.2	1.0	66	38	4.1	548	
Aug. 6-31.....	43.3	14		12	4.9	45		44	14	68	--	1.0	50	14	2.8	338	
Sept. 1-9.....	34.1	14		12	4.9	40		58	14	58	.3	1.0	50	11	2.5	309	
Sept. 10-14.....	42.8	13		12	5.6	61		57	14	88	--	1.5	53	6	3.6	423	
Sept. 15-30.....	44.3	13		12	5.4	46		49	15	68	--	.8	52	12	2.8	345	
Weighted average	418	15		11	4.9	30		28	22	46	--	0.8	46	23	2.7	245	
Time-weighted average.....	--	15		11	4.9	34		33	19	52	--	0.9	47	20	2.7	269	
Tons per day.....	--	17		12	5.5	34		32	25	52	--	0.9	--	--	--	--	

a Residue at 180°C.

NECHES RIVER BASIN--Continued

8-370. ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59, 200 feet upstream from Procella Creek, 1.5 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.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1963.

Water temperatures: October 1954 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 452 ppm Sept. 1-6; minimum, 70 ppm Apr. 7-9.

Hardness: Maximum, 82 ppm Sept. 1-6; minimum, 20 ppm Apr. 7-9.

Specific conductance: Maximum daily, 962 micromhos Sept. 9; minimum daily, 95 micromhos Apr. 8.

Water temperatures: Maximum, 86°F July 20, 21, 23, 24, Aug. 5; minimum, 34°F Jan. 28.

EXTREMES, 1954-63.--Dissolved solids: Maximum, 452 ppm Sept. 1-6, 1963; minimum, 36 ppm Oct. 16-18, 1957.

Hardness: Maximum, 82 ppm Sept. 1-6, 1963; minimum, 11 ppm Oct. 16-18, 1957, Dec. 10-12, 1962.

Specific conductance: Maximum daily, 962 micromhos Sept. 9, 1963; minimum daily, 38 micromhos Sept. 21, 1958, May 2, 1962.

Water temperatures: Maximum, 89°F July 9, 1957; minimum, freezing point Jan. 11, 12, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-3, 1962....	195	--	--	--	--	--	--	28		18	32	--	--	--	--	--	--	31	8	--	182	6.7	
Oct. 4-9.....	405	16	--	8.5	4.9	49	--	18		20	79	0.2	.5	--	--	187	0.25	204	41	27	3.3	335	6.5
Oct. 10-20.....	196	17	--	6.5	4.0	25	--	18		24	33	.1	.5	--	--	119	.16	63.0	33	18	1.9	193	6.3
Oct. 21-28.....	225	17	--	6.0	3.4	21	--	24		17	25	.2	.8	--	--	102	.14	62.0	29	9	1.7	160	6.7
Oct. 29-31.....	211	--	--	--	--	--	--	25		17	74	--	--	--	--	--	--	--	43	22	--	320	6.8
Nov. 1-4.....	154	17	--	9.0	5.2	53	--	26		18	83	.2	.5	--	--	199	.27	82.7	44	23	3.5	361	6.6
Nov. 5-14.....	203	19	--	6.0	3.7	26	--	27		16	33	--	.8	--	--	118	.16	64.7	30	8	2.1	188	6.6
Nov. 15-20.....	281	18	--	8.5	4.8	48	--	19		21	76	--	.5	--	--	a197	.27	149	41	25	3.3	337	6.3
Nov. 21-30.....	425	18	--	6.0	4.0	33	--	19		21	46	--	.5	--	--	138	.19	158	31	16	2.6	226	6.5
Dec. 1-10.....	563	17	--	8.5	4.0	41	--	14		28	60	.2	.2	--	--	166	.23	252	38	26	2.9	298	6.1
Dec. 11-20.....	319	17	--	9.0	4.0	41	--	21		24	60	--	.2	--	--	165	.22	142	39	22	2.9	297	6.2
Dec. 21-31.....	597	17	--	7.0	4.0	27	--	16		23	40	--	.2	--	--	a138	.19	222	34	21	2.0	219	6.3
Jan. 1-21, 1963...	779	15	--	9.0	5.7	35	--	12		34	54	.2	.2	--	--	159	.22	334	46	36	2.2	281	6.1
Jan. 22-25.....	524	16	--	8.0	5.4	24	--	14		31	36	--	.2	--	--	128	.17	181	42	31	1.6	220	6.2
Jan. 26-31.....	667	15	--	10	6.3	41	--	14		35	66	--	.0	--	--	180	.24	324	51	39	2.5	325	6.1
Feb. 1-9.....	482	14	--	9.0	5.7	29	--	18		36	40	.1	.2	--	--	143	.19	186	46	31	1.9	239	6.7
Feb. 10-14.....	456	9.7	--	10	6.1	45	--	18		33	70	--	.2	--	--	183	.25	225	50	35	2.8	332	6.8
Feb. 15-28.....	871	12	--	8.2	5.2	26	--	16		34	35	--	.2	--	--	a134	.18	315	42	29	1.7	216	6.5
Mar. 1-31.....	750	11	--	10	6.8	33	--	18		37	50	.2	.0	--	--	157	.21	318	53	38	2.0	294	6.3
Apr. 1-6.....	494	12	--	11	6.5	41	--	32		29	61	.2	.0	--	--	a185	.25	247	54	28	2.4	307	6.8
Apr. 7-9.....	1673	11	--	--	--	14	--	15		14	16	--	.8	--	--	70	.10	--	20	8	1.4	102	6.6
Apr. 10-15.....	1093	14	--	9.0	5.1	27	--	30		34	29	--	.5	--	--	a140	.19	413	43	19	1.8	197	6.8
Apr. 16-30.....	379	18	--	10	5.7	27	--	25		26	42	--	.8	--	--	142	.19	145	48	28	1.7	249	6.7
May 1-3.....	339	23	--	9.0	4.8	35	--	35		21	46	.6	1.5	--	--	158	.21	145	42	14	2.3	256	7.0
May 4-8.....	275	20	--	12	5.8	62	--	25		24	101	--	.8	--	--	238	.32	178	54	33	3.7	430	6.7
May 9-28.....	147	22	--	8.0	4.4	26	--	32		19	34	--	1.2	--	--	131	.18	52.0	38	12	1.8	207	6.6
May 29-31.....	204	19	--	12	6.3	66	--	18		31	107	--	.8	--	--	251	.34	138	56	41	3.8	454	6.5
June 1-7.....	217	18	--	9.8	4.8	49	--	18		28	74	.2	1.2	--	--	194	.26	114	44	29	3.2	338	6.5

a Residue at 180°C.

NECHES RIVER BASIN--Continued

8-370. ANGELINA RIVER NEAR LUFKIN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate		
June 8-20, 1963...	94.5	15		13	5.7	72		22	23	121	--	0.5	261	0.35	56	38	4.2	486
June 21-30.....	204	18		7.5	3.7	34		20	25	46	--	.5	145	.20	34	18	2.5	236
July 1-10.....	80.9	18		6.5	3.1	18		26	19	20	0.1	1.5	102	.14	29	8	1.5	162
July 11-21.....	66.0	17		6.8	3.4	22	2.7	34	16	24	--	1.2	107	.15	31	3	1.7	169
July 22-31.....	79.0	13		17	8.4	108		16	32	188	--	.2	375	.51	77	64	5.3	716
Aug. 1-6.....	62.8	14		16	7.8	112		22	24	193	.2	.2	378	.51	72	54	5.7	736
Aug. 7.....	51.0	16		8.5	4.3	50		23	18	77	--	.8	186	.25	39	20	3.5	345
Aug. 8-20.....	50.4	16		8.0	3.9	37		36	24	44	--	1.0	152	.21	36	6	2.7	263
Aug. 21-31.....	93.6	14		18	8.8	126		21	30	218	--	.2	425	.58	81	64	6.1	836
Sept. 1-6.....	60.0	13		18	9.0	137		25	30	232	.3	.8	452	.61	82	62	6.6	870
Sept. 7.....	138	11		14	7.1	91		26	30	149	--	.2	315	.43	64	42	4.9	607
Sept. 8-15.....	101	12		17	8.1	134		16	25	232	--	.8	437	.59	76	63	6.7	849
Sept. 16-30.....	30.9	12		16	7.8	118		24	23	202	--	.0	391	.53	72	52	6.0	759
Weighted average	365	15		9.0	5.3	36		19	29	53	--	0.3	158	0.21	44	29	2.3	275
Time-weighted average.....	--	16		9.9	5.4	48		22	26	75	--	0.5	193	--	47	29	2.9	346
Tons per day.....	--	14		8.8	5.3	35		19	29	52	--	0.3	--	--	--	--	--	--

NECHES RIVER BASIN--Continued

8-410. NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 96, 200 feet upstream from Gulf, Colorado and Santa Fe Railway Co. bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, and 15 miles upstream from Village Creek.

DRAINAGE AREA.--7,952 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1963.

Water temperatures: October 1947 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 159 ppm June 1-20; minimum, 14 ppm Sept. 17-21.

Hardness: Maximum, 50 ppm Apr. 1-10; minimum, 6 ppm Sept. 17-21.

Specific conductance: Maximum daily, 292 micromhos Sept. 11; minimum daily, 23 micromhos Sept. 19.

Water temperatures: Maximum, 93°F Aug. 1; minimum, 37°F Jan. 24.

EXTREMES, 1947-63.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 14 ppm Sept. 17-21, 1963.

Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 6 ppm Sept. 17-21, 1963.

Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 23 micromhos Sept. 19, 1963.

Water temperatures: Maximum, 94°F June 29, 1953; minimum, 37°F Jan. 30, 31, 1948, Jan. 31, 1949, Jan. 24, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-15, 1962...	535	18		11	4.6	33		42		19	44	0.2	0.5		151	0.21	218	46	12	2.1	251	6.4	
Oct. 16-31.....	697	16		10	4.2	30		36		20	40	--	.2		138	.19	260	42	13	2.0	233	6.2	
Nov. 1-30.....	1232	16		10	3.7	33		38		19	42	.2	.5		143	.19	476	40	9	2.3	248	7.0	
Dec. 1-10.....	1492	15		8.8	3.6	33		34		19	42	.2	.5		139	.19	560	37	9	2.4	232	6.6	
Dec. 11-22.....	2630	15		8.8	3.6	31		30		20	42	--	.2		a145	.20	1030	37	12	2.2	229	6.7	
Dec. 23-31.....	2609	14		7.8	3.0	23		22		18	33	--	.2		a121	.16	852	32	14	1.8	189	6.1	
Jan. 1-2, 1963....	11150							17		22	33	--					--	30	16	--	190	6.4	
Jan. 3-13.....	8015	7.7		6.5	2.1	16		12		19	20	.2	.2		78	.11	1690	24	14	1.4	135	6.0	
Jan. 14-31.....	2515	12		9.0	3.1	22		16		27	29	.2	.5		111	.15	754	36	22	1.6	189	6.2	
Feb. 1-10.....	2495	16		9.8	4.2	29		26		29	38	.2	.5		a150	.20	1010	42	20	1.9	226	7.6	
Feb. 11-19.....	2333	16		10	4.4	31		28		30	40	--	.5		a151	.21	951	43	20	2.1	244	6.9	
Feb. 20-28.....	7317	14		8.8	3.5	26		21		29	33	--	.5		125	.17	2470	36	20	1.9	201	6.5	
Mar. 1-15.....	5982	12		9.0	3.8	20		17		30	26	.2	.2		109	.15	1760	38	24	1.4	183	6.4	
Mar. 16-31.....	2460	13		10	4.9	27		21		33	37	--	.8		136	.18	903	45	28	1.7	226	6.4	
Apr. 1-10.....	2488	13		12	5.0	33		28		34	44	.2	.5		156	.21	1050	50	28	2.0	262	6.6	
Apr. 11-19.....	5268	11		12	4.5	30		27		31	41	--	.5		143	.19	2030	48	26	1.9	246	6.5	
Apr. 20-30.....	2252	12		9.8	4.1	27		30		29	32	--	.5		129	.18	784	42	17	1.8	211	6.4	
May 1-13.....	1114	14		11	4.0	26		30		28	33	.1	.8		132	.18	397	44	20	1.7	221	6.7	
May 14-31.....	1406	11		12	4.4	32		34		28	42	--	.8		147	.20	558	48	20	2.0	253	6.5	
June 1-20.....	1290	14		12	4.4	36		44		25	45	.2	.8		159	.22	554	48	12	2.3	264	6.7	
June 21-30.....	754	13		10	4.1	28		38		19	36	--	.8		130	.18	265	42	11	1.9	217	6.4	
July 1-15.....	971	14		11	3.5	28	2.9	38		19	40	.1	.8		138	.19	362	42	11	1.9	239	6.1	
July 16-31.....	947	14		10	3.6	32		39		18	42	--	.8		139	.19	355	40	8	2.2	242	6.2	
Aug. 1-31.....	730	16		11	3.5	33		42		17	43	.2	.8		146	.20	288	42	8	2.2	253	6.3	
Sept. 1-16.....	517	13		11	4.3	36		52		16	45	.2	.8		152	.21	212	45	2	2.3	276	6.4	
Sept. 17-21.....	5163	.0		2.5	.0	2.3	.9	6		2.8	2.0	.0	.5		14	.02	195	6	1	.4	29	5.7	
Sept. 22-24.....	1392	2.6		4.5	1.0	6.3	1.3	13		6.6	7.6	.2	1.0		37	.05	139	15	4	.7	68	6.2	
Sept. 25-30.....	364	13		10	3.2	19		38		10	25	.1	1.2		100	.14	98.3	38	7	1.3	178	6.2	
Weighted average	2153	12		9.2	3.6	26		25		24	33	--	0.5		122	0.17	711	38	17	1.8	205	6.3	
Time-weighted average.....	--	14		10	3.8	29		32		23	38	--	0.6		134	--	--	41	14	1.9	227	6.4	
Tons per day....	--	71		54	21	148		144		142	193	--	2.7		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

NECHES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN NECHES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			

FLAT CREEK AT FARM ROAD 607 NEAR ATHENS

Oct. 24, 1962	4.31	24		6.2	2.5	13	26	7.8	17	0.2	0.2	0.2	0.2	84	0.11	26	4	1.1	119	5.9		
Nov. 28	53.6	20		6.2	3.2	19	8	25	26	.2	.2	.2	.2	104	.14	29	22	1.5	158	5.4		
Mar. 13, 1963	11.9	15		9.5	5.2	26	20	27	39	.2	.8			146	.20	45	29	1.7	221	6.1		
Apr. 18	4.12	21		8.5	4.3	21	29	17	30	.2	.2	.2	.2	116	.16	39	15	1.5	176	6.0		
May 21	2.57	23		9.5	4.4	17	36	16	23	.2	.5	.2	.5	112	.15	42	12	1.1	168	5.8		
July 30	.11	23		2.5	.9	7.0	1.7	4.0	7.2	.3	.0			54	.07	10	0	1.0	63	6.0		

8-0314. LAKE PALESTINE NEAR FRANKSTON

Oct. 24, 1962		10		13	4.7	19	53	14	24	0.2	0.2	0.5		111	0.15	52	8	1.1	196	6.2		
Feb. 7, 1963		14		12	4.7	26	18	32	41	.2	.2	.0		139	.19	49	35	1.6	239	5.6		
May 22		4.6		9.5	3.5	18	23	21	26	.2	.5			94	.13	38	19	1.3	169	5.8		
July 2		9.4		13	4.8	22	48	15	32	.2	.5			121	.16	52	13	1.3	232	6.4		
Sept. 5		14		15	5.5	26	68	11	34	.2	.2			139	.19	60	4	1.5	246	6.5		

8-0333. PINEY CREEK NEAR GROVETON

Dec. 3, 1962	0.56	4.9		5.2	1.6	7.1	3.8	13	16	8.2	0.3	0.2		53	0.07	20	9	0.7	90	5.7		
Jan. 7, 1963	34.4	5.7		4.0	1.8	5.7	3.4	13	10	7.8	.2	.0		45	.06	17	7	.6	73	5.6		
Feb. 11	.51	15		22	7.5	46	23	81	58	.1	.5			251	.34	86	67	2.2	400	6.1		
Feb. 20	308	3.5		4.0	1.1	3.9	2.9	9	6.0	5.0	.2	.5		31	.04	14	7	.5	54	5.4		
Mar. 18	2.16	16		21	6.9	43	30	68	55	.2	.5			247	.34	81	56	2.1	370	6.1		

8-0340. LAKE TYLER NEAR WHITEHOUSE

Oct. 25, 1962	9.9			6.2	3.9	6.9	2.6	28	8.2	12	0.3	0.2		64	0.09	32	9	0.5	102	6.1		
Sept. 5, 1963	.3			7.0	3.1	7.4	2.7	28	10	1.1	.2	.2		56	.08	30	7	.6	110	6.4		

8-0345. MUD CREEK NEAR JACKSONVILLE

Oct. 25, 1962	36.2	24		8.5	4.1	34	26	22	47	0.2	0.0			156	0.21	38	17	2.4	243	6.1		
Nov. 29	215	22		9.5	5.3	25	11	43	33	.2	.0			143	.19	46	36	1.6	226	5.5		
Jan. 4, 1963	128	25		12	7.0	28	13	53	38	.1	.2			169	.23	59	48	1.6	266	5.7		
Feb. 7	108	19		13	6.8	30	14	52	42	.2	.0			180	.24	60	49	1.7	282	5.7		
Mar. 14	207	18		12	6.7	24	14	48	34	.2	.0			155	.21	58	46	1.4	244	5.5		
Apr. 19	49.8	21		12	6.9	35	24	44	49	.2	.5			184	.25	58	39	2.0	285	5.9		
May 22	33.9	21		10	4.9	34	18	33	49	.2	.8			162	.22	45	30	2.2	264	5.7		
July 30	25.2	16		7.0	2.8	21	14	28	23	.2	.0			105	.14	29	18	1.7	176	5.8		

a Residue at 180°C.

NECHES RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
LAKE JACKSONVILLE NEAR JACKSONVILLE																						
Oct. 25, 1962-----		11		6.0	2.6	7.3	1.9	34		5.2	7.8	0.1	0.0		59	0.08		26	0	0.6	92	6.2
LAKE STRIKER NEAR NEW SALEM																						
Oct. 25, 1962-----		8.6		14	7.1		100	28		15	171	0.3	0.0		342	0.47		64	41	5.4	644	6.3
8-0365. ANGELINA RIVER NEAR ALTO																						
Oct. 30, 1962-----	136	16		8.5	5.1		46	26		18	72	0.2	0.2		179	0.25		42	21	3.1	325	6.2
Dec. 4-----	585	16		9.5	5.2		50	14		30	79	.2	.0		a211	.29		45	34	3.2	351	5.7
Jan. 8, 1963-----	714	14		9.5	6.0		41	13		36	63	.1	.0		a186	.25		48	38	2.6	311	5.9
Feb. 12-----	331	7.3		9.0	5.5		27	18		36	36	.1	.0		130	.18		45	30	1.7	231	6.2
Mar. 19-----	580	10		10	5.9		34	22		36	48	.2	.2		a160	.22		49	31	2.1	266	7.6
Apr. 22-----	183	18		9.5	5.7		26	34		25	35	.3	.5		a146	.20		47	19	1.6	216	6.1
May 27-----	194	13		20	4.2		70	30		31	114	.2	.2		268	.36		67	43	3.7	504	7.2
July 2-----	61.2	16		6.0	2.7		19	26		18	19	.2	.0		94	.13		26	5	1.6	155	7.6
Sept. 16-----	23.4	12		16	7.8		103	28		24	175	.2	.2		352	.48		72	49	5.3	692	6.1
8-0380. ATTOYAC BAYOU NEAR CHIRENO																						
Oct. 15, 1962-----	45.5	17		4.0	2.4	7.4	1.7	24		6.0	7.5	0.2	0.0		57	0.08		20	2	0.6	75	5.9
Nov. 19-----	80.0	16		3.5	2.4	6.0	1.9	19		7.6	7.0	.1	.0		54	.07		19	3	.6	72	6.3
Dec. 17-----	77.4	16		4.0	2.8	6.6	1.2	18		9.0	9.0	.1	.0		58	.08		22	7	.6	79	5.8
Jan. 28, 1963-----	13.4	14		6.0	4.3		10	20		21	12	.1	.0		77	.10		33	16	.8	121	6.3
Mar. 4-----	369	14		9.0	6.1		14	18		38	16	.1	.2		106	.14		48	33	.9	176	5.6
Apr. 9-----	1,070	7.7		5.0	3.5	7.7	3.1	10		22	10	.2	2.2		66	.09		27	19	.6	101	5.6
8-0395. ANGELINA RIVER NEAR HORGER																						
Dec. 6, 1962-----	562	15		7.0	3.6		34	19		26	45	0.3	0.0		140	0.19		32	17	2.6	234	5.9
Jan. 10, 1963-----	2,110	15		8.0	4.5		28	13		35	36	.1	.2		133	.18		38	28	2.0	215	5.8
Feb. 14-----	1,150	11		9.0	4.2		26	24		34	29	.2	.8		126	.17		40	20	1.8	209	6.2
Mar. 20-----	1,320	11		12	6.3		39	31		40	52	.2	.2		176	.24		56	30	2.3	305	6.5
Apr. 24-----	634	14		12	6.4		39	35		33	54	.3	.5		a184	.25		56	28	2.3	297	6.1

a Residue at 180°C.

NECHES RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--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 (calculated)			Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-bicarbonate	

VILLAGE CREEK AT US HIGHWAY 69 NEAR KOUNTZE

Oct. 17, 1962	48.4	9.6		3.5	0.6	5.3	1.6	12	1.8	8.5	0.2	0.2	37	0.05		11	1	0.7	48	5.9
Dec. 20	50.2	15		4.0	1.4	5.0	.8	12	2.8	10	.1	.2	45	.06		16	6	.5	60	5.7
Mar. 7, 1963	165	12		5.5	1.4	6.3	.7	14	4.4	12	.1	.8	50	.07		19	8	.6	74	5.9
June 19	13.9	12		8.0	.7	5.4	1.2	26	.2	10	.2	.2	51	.07		23	2	.5	75	6.4
Sept. 20	300	9.5		3.2	1.0	4.5	1.2	5	1.0	8.0	.2	.2	31	.04		12	8	.6	54	5.1

HICKORY CREEK AT US HIGHWAY 69 NEAR WARREN

Oct. 17, 1962	46.6	11		2.5	1.1	4.1	1.0	10	0.4	8.2	0.1	0.2	34	.05		11	3	0.5	45	5.7
Dec. 19	30.1	14		2.5	1.3	4.3	.7	9	1.6	9.0	.1	.0	38	.05		12	4	.5	50	5.9
Mar. 7, 1963	81.6	12				5.3	.8	12	3.2	10	.1	.5				15	5	.6	62	6.0
June 19	13.6	12		4.5	.4	4.0	1.1	14	.0	8.0	.1	.2	37	.05		13	1	.5	52	5.9
Sept. 19	329	8.1		2.8	.2	2.8	.3	4	.4	5.5	.1	.2	22	.03		8	4	.4	39	5.4

BIG CYPRESS CREEK AT US HIGHWAY 69 NEAR HILLISTER

Oct. 17, 1962	67.5	8.7		5.8	1.4	4.0	1.2	15	4.4	8.8	0.2	0.5	42	0.06		20	8	0.4	61	6.2
Dec. 20	28.0	14		2.5	1.3	4.3	1.0	10	1.2	9.0	.1	.2	39	.05		12	3	.5	52	5.6
Mar. 7, 1963	60.1	13		5.0	1.7	5.4	1.1	16	3.2	11	.1	.5	49	.07		20	6	.5	68	6.0
June 19	14.1	13		4.2	.6	3.9	1.2	14	.2	7.5	.4	.2	38	.05		13	2	.5	49	6.0
Sept. 20	73.0	10		3.8	.6	3.8	1.5	8	4.0	7.2	.1	.2	35	.05		12	5	.5	53	5.3

BEECH CREEK NEAR VILLAGE MILLS

Oct. 17, 1962	10.1	14		6.5	2.4	84	5.0		2.8	142	0.2	0.2	278	0.38		26	22	7.2	496	5.4
Dec. 19	25.2	17		6.2	3.4	73	1		3.0	130	.1	.0	253	.34		29	29	5.9	437	5.1
Mar. 7, 1963	97.0	12		5.0	2.6	43	4		3.4	78	.1	.8	147	.20		23	20	3.9	275	5.4
June 19	1.93	11		9.0	3.5	81	7		.0	147	.1	.2	255	.35		37	31	5.8	497	6.1
Sept. 20	574	5.5		4.2	1.6	20	0		1.0	42	.2	.2	75	.10		17	17	2.1	171	4.3

8-0415. VILLAGE CREEK NEAR KOUNTZE

Oct. 17, 1962	75.8	13		4.5	1.4	20	14		2.4	32	0.2	0.2	81	0.11		17	6	2.1	127	5.7
Nov. 19	91.0	13		4.0	1.6	17	10		.4	31	.1	.0	72	.10		17	8	1.8	127	5.8
Dec. 20	160	15		4.5	1.9	19	11		2.6	34	.1	.0	82	.11		19	10	1.9	136	5.7
Jan. 29, 1963	387	15		5.0	1.7	19	8		5.0	34	.1	.2	84	.11		20	13	1.8	148	5.7
Mar. 7	585	12		6.0	2.1	22	7		4.0	43	.1	.5	93	.13		24	18	2.0	168	5.4
June 17	52.8	12		5.5	1.3	10	18		.6	18	.1	.2	57	.08		19	4	1.0	99	6.0
Sept. 18	3,960	1.5		2.0	.2	4.8	.9		2.0	8.0	.1	.2	22	.03		6	2	.9	44	5.5

TRINITY RIVER BASIN

8-625. 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 (revised).--8,146 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1963.

Water temperatures: October 1954 to April 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 604 ppm Apr. 1-23; minimum, 225 ppm Oct. 1-19.

Hardness: Maximum, 195 ppm Feb. 1-15; minimum, 104 ppm Aug. 16.

Specific conductance: Maximum daily, 1,160 micromhos Aug. 18; minimum daily, 342 micromhos Nov. 1.

Water temperatures: Minimum, 34°F Jan. 28.

EXTREMES, 1954-63.--Dissolved solids: Maximum, 1,800 ppm Aug. 21-31, 1956; minimum, 122 ppm July 28-31, 1962.

Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 64 ppm July 28-31, 1962.

Specific conductance: Maximum daily, 2,990 micromhos Oct. 13, 1956; minimum, 200 micromhos July 30, 1962.

Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F on several days during December and January most years.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (PO ₄)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Alkyl-benzene-sulfonate (ABS)			
												Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			Sorption ratio		
Oct. 1-19, 1962	6747	9.9	45	4.5		28		133	32	33	0.4	3.0	a225	0.31	4100	131	22	1.1	385	7.3	
Oct. 20-31, 1962	2053	11	53	4.7		54		153	60	52	--	9.6	a335	.46	1860	152	26	1.9	556	6.6	
Nov. 1-2, 1962	3400	--	--	--		--		148	40	21	--	--	--	--	--	136	15	--	373	7.8	
Nov. 3-10, 1962	1308	12	54	4.4		47		166	57	36	.6	8.2	a320	.44	1130	152	16	1.7	507	7.2	
Nov. 11-26, 1962	621	13	60	5.6		95		190	108	64	.8	2.2	a476	.65	798	172	17	3.2	752	6.9	
Nov. 27-30, 1962	6668	12	50	3.4		25		140	46	18	.4	4.8	229	.31	4120	139	24	.9	371	7.8	
Dec. 1-17, 1962	5932	8.9	51	4.9		28		152	37	28	.4	4.5	a240	.33	3840	147	23	1.0	411	7.1	
Dec. 18-31, 1962	1041	10	67	5.5		55		190	76	44	--	17	a380	.52	1070	190	34	1.7	628	6.7	
Jan. 1-15, 1963	896	10	68	5.7		70		194	91	52	.8	21	a450	.61	1090	193	34	2.2	696	7.3	
Jan. 16-31, 1963	646	10	64	5.9		82		185	98	61	--	27	a470	.64	820	184	32	2.6	742	6.9	
Feb. 1-15, 1963	523	10	68	6.2		105		187	124	74	.8	4.3	523	.71	739	195	42	3.3	856	6.8	
Feb. 16-28, 1963	456	9.6	64	6.4		122		202	131	78	--	48	558	.76	687	186	20	3.9	925	6.8	
Mar. 1-11, 1963	446	14	64	6.2		124		195	132	86	1.0	41	a594	.81	715	185	25	4.0	921	7.3	
Mar. 12-15, 1963	618	10	62	5.6		91		181	98	69	--	34	a479	.65	799	178	29	3.0	764	7.1	
Mar. 16-31, 1963	521	13	64	5.7		96		192	107	72	--	27	a509	.69	716	183	26	3.1	798	7.2	
Apr. 1-23, 1963	422	14	61	6.0		126		194	126	89	1.1	40	a604	.82	688	176	18	4.1	918	7.0	
Apr. 24-26, 1963	934	14	54	4.4		97		167	104	71	--	23	a488	.66	1230	152	16	3.4	758	7.1	
Apr. 27-30, 1963	8470	8.3	54	3.3		26		149	48	20	--	6.2	239	.33	5470	148	26	.9	406	7.1	
May 1-4, 1963	12510	11	50	3.7		27		142	44	22	.4	4.6	233	.32	7870	140	24	1.0	384	7.3	
May 5-20, 1963	4083	11	58	3.7		31		166	44	30	--	4.0	264	.36	2910	160	24	1.1	437	7.3	
May 21-31, 1963	1287	10	60	6.4		52		186	67	41	--	9.7	337	.46	1170	176	24	1.7	563	7.3	
June 1-22, 1963	2206	9.9	58	3.7		33		172	47	27	.5	6.0	274	.37	1630	160	19	1.2	446	7.4	
June 23-30, 1963	545	11	53	5.8		83		168	84	64	--	16	405	.55	596	156	18	2.9	667	7.0	
July 1-15, 1963	398	14	50	5.1		87	9.1	163	79	77	.8	21	5.8	.429	461	146	12	3.1	698	6.8	
July 16-31, 1963	419	15	48	6.3		104		159	102	77	--	21	6.6	.459	519	146	16	3.7	767	6.8	
Aug. 1-15, 1963	424	16	44	9.2		107	11	172	112	76	.9	26	9.2	.497	569	148	7	3.8	805	7.2	
Aug. 16, 1963	541	--	--	--		--	--	130	--	30	--	--	--	--	--	104	0	--	405	7.3	
Aug. 17-31, 1963	332	16	38	11		122	13	172	110	90	--	36	9.8	.532	477	140	0	4.5	869	6.7	
Sept. 1-10, 1963	377	16	42	7.5		116	11	163	114	80	1.0	29	11	.509	518	136	2	4.3	860	7.1	
Sept. 11-20, 1963	405	15	43	5.0		101	10	158	90	76	--	27	8.8	.455	498	128	0	3.9	780	6.8	
Sept. 21-30, 1963	291	16	44	6.3		116	12	171	98	90	--	27	11	.506	398	136	0	4.3	857	7.0	
Weighted average....	1752	11	53	4.7		44		157	54	37	--	9.4	--	.297	0.40	1410	151	23	2.0	491	7.1
Time-weighted average....	--	12	55	5.8		79		173	86	60	--	21	--	.421	--	--	162	20	3.5	683	7.0
Tons per day.	--	50	250	22		208		742	257	177	--	45	--	--	--	--	--	--	--	--	--

a Residue at 180°C.

TRINITY RIVER BASIN--Continued

8-645. 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, 6,000 feet upstream from city of Corsicana diversion dam, 6 miles east of Corsicana, Navarro County, and 17 miles upstream from Richland Creek.

DRAINAGE AREA.--963 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1963.

Water temperatures: September 1961 to September 1963. Maximum, 57.8 ppm July 1-4, 28-29; minimum, 17.4 ppm May 30-31.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 578 ppm July 1-4, 28-29; minimum, 174 ppm May 30-31.

Hardness: Maximum, 314 ppm Mar. 16-31; minimum, 104 ppm May 30-31.

Specific conductance: Maximum daily, 1,170 micromhos Mar. 17; minimum daily, 242 micromhos May 23.

Water temperatures: Maximum, 88°F June 14, 15; minimum, 33°F Jan. 25, 28.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 578 ppm July 1-4, 28-29, 1963; minimum, 114 ppm June 30, 1962.

Hardness: Maximum, 314 ppm Mar. 16-31, 1963; minimum, 66 ppm June 30, 1962.

Specific conductance: Maximum daily, 1,170 micromhos Mar. 17, 1963; minimum daily, 180 micromhos Sept. 8, 1961.

Water temperatures: Maximum, 91°F July 24, Aug. 9, 13, 1962; minimum, freezing point Jan. 11, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 5-27, 30-31, Aug. 1 to Sept. 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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		Specific conductance (micro-mhos at 25°C)			
														Parts per million	Tons per acre-foot	Tons per day	Calcium/Magnesium	Non-carbonate		Sodium adsorption ratio		
Oct. 1-7, 1962....	11.5	9.6		66	3.6	34		196	48	30	0.5	0.2		288	0.39	8.94	180	19	1.1	490	7.6	
Oct. 8-21.....	909	12		50	3.1	21		122	58	15	--	1.8		231	.31	567	138	38	.8	362	7.2	
Oct. 22-31.....	70.4	11		70	4.4	29		171	83	20	--	1.2		303	.41	57.6	192	52	.9	486	7.4	
Nov. 1-15.....	22.9	13		76	4.5	33		226	95	24	.6	2.0		368	.53	22.8	208	64	1.0	529	7.6	
Nov. 16-26.....	23.7	9.9		86	4.4	48		226	95	38	--	1.1		392	.50	25.1	232	48	1.4	630	7.8	
Nov. 27.....	264	19		76	6.9	103		190	58	158	--	3.8		518	.70	369	218	62	--	924	7.8	
Nov. 28-30.....	746	21		76	5.0	38		152	122	26	--	5.6		369	.50	743	210	86	1.1	560	7.6	
Dec. 1-10.....	114	14		95	4.4	41		204	131	26	--	4.3		416	.57	128	255	88	1.1	628	7.7	
Dec. 11-20.....	57.1	11		95	5.0	29		236	90	23	--	2.3		371	.50	57.2	258	64	.8	592	7.7	
Dec. 21-31, 1963....	191	13		105	5.3	42		190	112	27	--	4.2		376	.51	194	245	90	.9	594	7.6	
Jan. 1-31, 1963....	67.5	7.4		107	6.1	57		232	130	32	.5	4.0		440	.60	80.2	284	94	1.1	700	7.5	
Feb. 1-28.....	31.0	2.9		107	6.1	57		243	150	40	.6	3.8		498	.68	41.7	292	93	1.4	772	7.6	
Mar. 1-15.....	95.9	3.5		108	6.6	59		249	149	44	.6	2.8		496	.67	128	296	92	1.5	783	7.7	
Mar. 16-31.....	15.8	4.3		114	7.3	70		245	188	50	--	.8		567	.77	24.2	314	114	1.7	873	7.5	
Apr. 1-27.....	23.7	8.1		98	5.9	83		284	128	58	.7	1.5		825	.71	33.6	269	36	2.2	835	7.6	
Apr. 28.....	1110	12		--	--	85		244	107	51	--	5.6		--	--	--	204	4	2.6	790	7.0	
Apr. 29-30.....	2140	22		--	--	24		122	33	20	--	7.0		--	--	--	116	16	1.0	330	7.5	
May 1-5.....	243	13		70	4.3	38		165	89	31	.2	5.0		332	.45	218	192	57	1.2	535	7.2	
May 6-7.....	880	16		--	--	22		117	43	12	--	7.7		--	--	--	116	20	.9	316	7.5	
May 8-20.....	80.6	13		70	3.8	29		172	75	23	--	2.5		301	.41	65.5	190	49	.9	480	7.4	
May 21-23.....	822	13		40	1.5	26		113	36	22	--	3.0		198	.27	439	106	13	1.1	324	7.4	
May 24-29.....	335	12		60	2.7	32		133	84	23	--	2.0		281	.38	254	160	52	1.1	447	7.3	
May 30-31.....	436	12		--	--	19		119	30	30	9.0	5.0		174	.24	205	104	6	.8	274	7.5	
June 1-5.....	138	12		56	3.5	34		147	64	27	.6	2.8		272	.37	101	154	34	1.2	446	7.2	
June 6-20.....	12.6	11		76	4.0	50		182	108	37	--	1.2		376	.51	12.8	206	57	1.5	609	7.3	
June 21-30.....	5.0	7.9		67	4.1	105		262	98	68	--	.5		480	.65	6.48	184	0	3.4	790	7.2	
July 1-4, 28-29....	6.9	7.8		80	5.0	123	4.5	288	126	88	1.1	.2		578	.79	10.8	220	0	3.6	930	7.4	
Weighted average	b114	13		64	3.6	33		156	77	24	--	3.5		299	0.41	120	175	47	1.1	472	7.4	
Time-weighted average.....	--	9.3		86	4.9	500		213	112	37	--	2.5		411	--	--	236	63	1.4	649	7.5	
Tons per day.....	--	5.2		26	1.4	13		62	31	9.7	--	1.4		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge based on 365 days; mean discharge for 279 days of actual flow, 149 cfs.

TRINITY RIVER BASIN--Continued

8-646. 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 1963.

Water temperatures: April 1956 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 10,100 ppm Sept. 1-30; minimum, 173 ppm May 25.

Hardness: Maximum, 362 ppm Mar. 1-12, 14; minimum, 79 ppm Oct. 9-11.

Specific conductance: Maximum daily, 17,700 micromhos Sept. 20; minimum daily, 242 micromhos Oct. 10.

Water temperatures: Maximum, 95°F July 7, 24; minimum, 34°F Jan. 22.

EXTREMES, 1956-63.--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.--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 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-8, 1962....		9.8		51	8.1	664		191		33	1000	--	4.2			1860	2.53		160	4	23	3410	8.0
Oct. 9-11.....		16		28	2.3	34		103		17	34	0.4	12.2			185	.25		79	0	1.7	309	7.8
Oct. 13-21.....		15		46	3.4	46		128		44	55	--	1.5			a277	.38		129	24	1.8	469	7.7
Oct. 22-31.....		13		51	4.4	142		156		42	200	--	.8			530	.72		145	17	5.1	957	7.8
Nov. 1.....		--		--	--	--		158		113	120	--	--			--	--		202	72	--	859	7.6
Nov. 2-16.....		14		67	6.6	306		206		51	450	.5	.5			a1060	1.44		194	25	9.5	1820	7.7
Nov. 17-19.....		13		83	12	952		292		53	1440	--	.8			2700	3.67		256	17	26	4840	7.7
Nov. 20-22.....		12		52	4.6	71		159		39	92	--	2.5			a384	.52		148	18	2.5	625	7.3
Nov. 23-24.....		--		--	--	--		249		50	980	--	--			--	--		220	16	--	3420	7.5
Nov. 25-26.....		--		--	--	--		230		58	385	--	--			--	--		202	14	--	1690	7.9
Nov. 27-30.....		13		63	4.2	38		133		97	31	--	4.2			a338	.46		174	66	1.3	511	7.6
Dec. 1-5.....		14		79	5.1	111		198		88	142	.6	3.7			540	.73		218	56	3.3	916	7.8
Dec. 6.....		--		--	--	--		284		78	580	--	--			--	--		283	62	--	2380	7.9
Dec. 7.....		--		--	--	--		160		76	68	--	--			--	--		180	49	--	633	7.8
Dec. 8-15.....		12		96	7.5	245		242		103	352	--	2.6			a958	1.30		270	72	6.5	1640	7.8
Dec. 16-18, 23....		11		92	8.2	350		264		76	515	--	3.0			1190	1.62		263	46	9.4	2110	7.8
Dec. 19-22, 27-31.		12		84	6.7	173		220		80	246	--	2.9			713	.97		237	56	4.9	1260	7.9
Dec. 24-26.....		15		70	5.3	74		166		92	88	--	1.7			a445	.61		196	60	23	709	7.8
Jan. 1-3, 5-9, 1963		9.9		97	7.8	286		252		103	408	.5	6.5			1040	1.41		274	68	7.5	1840	7.7
Jan. 4.....		--		--	--	--		288		74	880	--	--			--	--		255	19	--	3240	7.4
Jan. 10.....		--		--	--	--		229		109	130	--	--			--	--		258	70	--	959	8.0
Jan. 11-19.....		8.6		100	8.0	278		255		112	395	--	6.1			1030	1.40		282	74	7.2	1820	7.8
Jan. 20-31.....		7.0		106	9.6	458		296		120	660	--	1.5			1510	2.05		304	62	11	2700	7.6
Feb. 1-8.....		5.8		99	9.8	520		272		128	750	.5	2.5			1650	2.24		288	64	13	2910	7.9
Feb. 9-28.....		3.8		94	11	637		284		98	940	--	3.5			1930	2.62		280	47	17	3460	7.8
Mar. 1-12, 14.....		2.0		122	14	642		276		224	920	--	2.0			2060	2.80		362	136	15	3620	7.2
Mar. 13, 15-25....		3.4		92	8.2	278		254		122	375	.6	2.2			1010	1.37		263	55	7.5	1790	7.7
Mar. 26-31.....		2.5		106	13	819		345		130	1190	--	3.5			2430	3.30		318	36	20	4330	7.0

a Residue at 180°C.

TRINITY RIVER BASIN--Continued

8-646. RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Apr. 1-26, 1963...		8.6		111	13	1070	8.5	382		110	1590	--	2.5		3100	4.22		330	18	26	5380	7.9
Apr. 27.....		--		--	--	--		362		--	1050	--	--		--	--		310	14	--	3910	8.0
Apr. 28.....		--		--	--	--		198		--	545	--	--		--	--		146	0	--	2060	7.7
Apr. 29.....		--		--	--	--		429		--	2350	--	--		--	--		342	0	--	7350	7.9
Apr. 30.....		9.7		36	1.5	27		113		20	26	0.5	3.5		180	.24		96	3	1.2	307	7.2
May 1-3.....		15		50	3.0	40		138		49	40	.5	2.8		268	.36		137	24	1.5	439	7.9
May 4-7, 10-12....		17		68	4.0	109		163		80	145	--	2.5		506	.69		186	52	3.5	870	7.9
May 8-9.....		20		56	2.8	64		134		68	75	--	4.8		357	.49		151	41	2.3	588	7.9
May 15.....		--		--	--	--		206		--	1070	--	--		--	--		166	0	--	3610	7.9
May 16.....		--		--	--	--		222		--	475	--	--		--	--		246	64	--	1960	8.0
May 21.....		--		--	--	--		214		--	402	--	--		--	--		240	64	--	1720	7.9
May 25.....		16		32	2.7	22		98		32	15	--	5.0		173	.24		91	11	1.0	271	7.4
May 22, 24, 26-31.		13		54	5.0	85		149		53	113	--	4.8		401	.55		155	33	3.0	704	7.5
June 1-2.....		15		50	4.6	57		141		48	70	.5	3.0		317	.43		144	28	2.1	545	7.0
June 25-30.....		1.5		96	19	1240		288		92	1900	--	1.0		3490	4.75		318	82	30	6110	7.1
July 1-15.....		1.2		88	20	1690	12	322		87	2620	--	--		4680	6.36		302	38	42	7900	7.7
July 16-31.....		.7		74	25	2440		358		79	3700	--	--		6490	8.83		288	0	62	10700	7.3
Aug. 1-31.....		.0		67	34	3420		416		45	5220	--	--		8990	12.3		307	0	85	14900	7.3
Sept. 1-30.....		.8		62	34	3880		476		59	5870	--	--		10100	13.8		294	0	99	16100	7.6
Time-weighted average		6.8		81	15	1220		290		85	1780	--	--		3390	4.61		261	35	31	5520	7.6

TRINITY RIVER BASIN--Continued

8-662. LONG KING CREEK AT LIVINGSTON, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 190, 2 miles west of Livingston, Polk County, 2 miles upstream from Choates Creek, and 14.8 miles upstream from mouth.

DRAINAGE AREA.--141 square miles.

RECORDS AVAILABLE.--Chemical analyses: January to September 1963.

Water temperatures: January to September 1963.

EXTREMES, January to September 1963.--Dissolved solids: Maximum, 316 ppm May 1-31; minimum, 52 ppm Feb. 19.

Hardness: Maximum, 183 ppm May 1-31; minimum, 40 ppm Feb. 19.

Specific conductance: Maximum daily, 557 micromhos May 29; minimum daily, 98 micromhos Feb. 19.

Water temperatures: Maximum, 91°F June 16; minimum, not determined.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, January to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Jan. 29-Feb. 10, 1963.....	32.3	26		54	3.4	26		139		18	51	0.2	0.2		a264	0.36	23.0	149	35	0.9	418	6.9	
Feb. 11-13.....	114	15		29	2.3	14		75		10	28	--	.5		136	.18	41.9	82	20	.7	231	6.5	
Feb. 14-17.....	36.5	21		42	2.7	20		108		14	40	--	.5		193	.26	19.0	116	27	.8	329	6.7	
Feb. 18, 20-21.....	492	15		23	1.8	6.5		60		6.6	16	--	.5		99	.13	132	65	16	.4	164	6.9	
Feb. 19.....	1400	6.5		14	1.2	2.3		39		1.0	8.3	--	.2		52	.07	197	40	8	.2	98	5.9	
Feb. 22-28.....	75.1	18		35	2.6	14		89		12	30	--	.5		156	.21	31.6	98	25	.6	265	6.3	
Mar. 1-3.....	250	14		25	1.8	13		67		9.4	22	.3	.8		119	.16	80.3	70	15	.7	197	7.2	
Mar. 4-10.....	38.4	22		44	3.1	21		123		13	38	--	.2		201	.27	20.8	123	22	.8	335	7.3	
Mar. 11-31.....	18.5	25		60	3.9	27		164		14	53	--	.2		264	.36	13.2	166	31	.9	444	7.2	
Apr. 1-5.....	13.8	22		62	4.3	33		178		14	59	.3	.2		283	.38	10.5	172	27	1.1	471	7.4	
Apr. 6-11.....	121	17		34	2.1	17		102		8.2	27	--	.5		156	.21	51.0	94	10	.8	253	7.3	
Apr. 12-30.....	8.8	25		65	4.0	32		186		14	58	--	.0		289	.39	6.87	179	26	1.0	475	7.5	
May 1-31.....	2.6	29		57	10	40		176		17	76	.2	.2		316	.43	2.22	183	39	1.3	535	7.4	
June 1-20.....	1.6	31		55	2.9	40		148		14	70	.2	.5		287	.39	1.24	149	28	1.4	472	7.3	
June 21-30.....	3.4	26		48	3.2	33		125		13	62	--	.8		247	.34	2.27	133	30	1.2	414	7.1	
July 1-10.....	7.4	19		40	2.5	21	2.7	102		10	46	.2	.8		192	.26	3.84	110	26	.9	327	6.4	
July 11-14.....	20.9	14		28	1.7	9.8	2.2	85		5.2	15	1.0	--		119	.16	6.72	77	7	.5	193	6.6	
July 15-31.....	2.3	21		43	2.6	20		120		9.2	38	--	.8		194	.26	1.20	118	20	.8	330	6.5	
Aug. 1-15.....	.4	24		42	2.7	24		122		7.0	42	.2	.8		203	.28	.22	116	16	1.0	344	6.9	
Aug. 16-31.....	.6	24		42	2.7	34		119		7.6	60	--	.5		230	.31	.37	116	18	1.4	399	6.8	
Sept. 1-18.....	1.3	22		44	2.2	35		114		12	62	.2	.5		234	.32	.82	119	25	1.4	416	6.9	
Sept. 19.....	11.0	18		39	1.6	23		98		10	44	--	1.0		185	.25	5.49	104	24	1.0	329	7.1	
Sept. 20-30.....	1.4	23		48	3.5	34		131		12	62	--	.5		247	.34	.93	134	27	1.3	432	7.4	
Weighted average	b28.9	16		31	2.3	13		85		8.5	27	--	0.4		142	0.19	11.0	88	18	0.6	237	6.4	
Time-weighted average.....	--	24		49	3.9	29		136		12	54	--	0.4		240	--	--	137	26	1.1	404	6.9	
Tons per day....	--	1.2		2.4	0.2	1.1		7		0.7	2.1	--	0.0		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge for period of record; station started January 29, 1963.

TRINITY RIVER BASIN--Continued

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 1.9 miles downstream from Gulf, Colorado and Santa Fe Railroad Co. bridge, and 3.7 miles downstream from Big Creek.

DRAINAGE AREA (revised).--17,186 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1963.

Water temperatures: February 1950 to September 1951, April 1953 to January 1959, March 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 612 ppm May 1-3; minimum, 134 ppm Apr. 8-10.

Hardness: Maximum, 189 ppm May 1-3; minimum, 54 ppm Apr. 8-10.

Specific conductance: Maximum daily, 1,330 micromhos Sept. 3; minimum daily, 211 micromhos Dec. 30.

Water temperatures: Maximum, 92°F July 9, 22, Aug. 4, 5; minimum, 41°F Jan. 24, 28.

EXTREMES, 1945-50, 1953-63.--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, 1961-63): 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.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-14, 1962...	9634	9.9		44	4.8	40		134		29	52	0.4	1.8		a253	0.34	6580	130	20	1.5	433	7.5	
Oct. 15-31.....	6957	9.3		44	4.4	38		127		33	50	--	2.8		a249	.34	4680	128	24	1.5	432	7.2	
Nov. 1-15.....	2618	11		51	4.8	61		148		44	76	.4	4.2		a326	.44	2300	146	25	2.2	576	7.6	
Nov. 16-30.....	2018	12		52	4.9	75		153		44	97	--	3.5		a364	.50	1980	150	24	2.7	647	7.3	
Dec. 1-3.....	4430	20		47	5.4	118		122		59	160	.5	8.6		478	.65	5720	140	40	4.3	848	7.5	
Dec. 4-16.....	8495	13		47	4.4	34		134		37	41	--	4.2		a250	.34	5730	136	26	1.3	431	7.6	
Dec. 17-21.....	5634	9.7		48	4.7	45		134		34	63	--	3.8		a294	.40	4470	140	30	1.7	497	7.4	
Dec. 22-31.....	9297	11		34	2.7	29		93		25	40	--	1.8		190	.26	4770	96	20	1.3	336	7.0	
Jan. 1-9, 1963...	5273	14		28	2.9	31		72		29	41	.3	2.5		184	.25	2620	82	23	1.5	323	7.0	
Jan. 10-20.....	2560	15		53	6.0	81		138		58	110	--	6.2		a417	.57	2880	156	44	2.8	716	7.2	
Jan. 21-31.....	1980	16		55	6.3	75		138		65	100	--	5.0		a404	.55	2160	163	50	2.6	695	7.2	
Feb. 1-18.....	1556	14		56	6.3	86		147		65	113	.4	6.1		a438	.60	1840	166	45	2.9	745	7.1	
Feb. 19-28.....	6268	10		27	3.2	40		64		37	52	--	3.5		204	.28	3450	80	28	1.9	362	6.7	
Mar. 1-5.....	3224	13		33	4.3	55		74		50	73	.3	3.2		a300	.36	2610	100	40	2.4	469	7.1	
Mar. 6-16.....	1810	13		50	7.2	109		122		74	150	--	5.0		a492	.67	2400	154	54	3.8	846	7.0	
Mar. 17-31.....	1328	14		52	7.4	115		142		75	150	--	3.5		a516	.70	1850	160	44	4.0	882	7.3	
Apr. 1-6.....	1345	14		55	7.5	108		156		71	140	.4	3.2		476	.65	1730	168	40	3.6	827	7.4	
Apr. 7.....	11500	11		25	3.0	35		63		37	42	--	4.0		188	.26	5840	75	24	1.8	328	6.6	
Apr. 8-10.....	11210	8.5		17	2.8	25		47		27	28	--	2.2		134	.18	4060	54	16	1.5	224	6.6	
Apr. 11-13.....	3507	12		20	3.6	28		53		29	36	--	2.0		157	.21	1490	65	22	1.5	268	6.7	
Apr. 14-20.....	1534	12		43	6.7	78		113		56	108	--	1.8		a394	.54	1630	135	42	2.9	634	7.0	
Apr. 21-30.....	970	10		57	8.4	135		171		77	175	--	2.2		a584	.79	1530	176	36	4.4	960	7.4	
May 1-3.....	2767	22		62	8.4	148		186		88	185	.3	7.1		612	.83	4570	189	36	4.7	1040	7.7	
May 4.....	8460	16		46	4.6	--		149		--	52	--	11		--	--	--	134	12	--	--	537	7.4
May 5-14.....	14400	15		46	1.9	27		132		34	25	--	2.8		217	.30	8440	123	15	1.1	364	7.6	
May 15-29.....	4847	11		56	4.0	43		160		42	52	--	3.0		290	.39	3800	156	25	1.5	501	7.4	
May 30-31.....	2515	17		66	5.0	95		185		46	135	--	2.5		458	.62	3110	185	34	3.0	808	7.6	
June 1-30.....	2657	12		54	4.3	58		161		47	66	.5	4.0		325	.44	2330	152	20	2.0	559	7.2	
July 1-11.....	1256	15		53	4.6	52	4.7	160		42	69	.4	1.8		322	.44	1090	151	20	1.8	563	7.5	

a Residue at 180°C.

TRINITY RIVER BASIN--Continued

8-665. TRINITY RIVER AT ROMAYOR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
July 12-21, 1962..	764	16		58	5.2	87		180		44	115	--	0.8		415	0.56	856	166	18	2.9	735	7.3
July 22-31.....	780	16		60	5.7	131		200		67	158	--	2.0		538	.73	1130	173	9	4.3	940	7.7
Aug. 1-17.....	558	15		52	5.5	106		176		55	125	0.6	2.2		448	.61	675	152	8	3.7	822	6.8
Aug. 18-31.....	502	7.7		65	6.3	151		220		84	175	--	.8		598	.81	811	188	8	4.8	1090	6.8
Sept. 1-15.....	475	9.1		60	6.4	160		215		87	180	.7	1.8		611	.83	784	176	0	5.2	1100	7.3
Sept. 16-30.....	580	15		53	5.8	143		191		67	170	--	1.2		549	.75	860	156	0	5.0	1000	7.3
Weighted average	3495	12		45	4.3	51		128		41	64	--	3.2		287	0.39	2710	129	25	1.9	496	7.2
Time-weighted average.....	--	13		50	5.2	79		149		53	99	--	3.2		383	--	--	147	25	2.8	668	7.2
Tons per day....	--	114		423	40	479		1210		384	600	--	30		--	--	--	--	--	--	--	--

TRINITY RIVER BASIN--Continued

8-671. TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION.--At Devers Pumping Plant No. 1, 1 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 1963.
 EXTREMES, 1962-63.--Dissolved solids: Maximum, 612 ppm Sept. 1-15; minimum, 120 ppm Dec. 25-31.
 Hardness: Maximum, 196 ppm Aug. 21-31; minimum, 63 ppm Dec. 25-31.

Specific conductance: Maximum daily, 1,200 micromhos Sept. 10, 11; minimum daily, 207 micromhos Dec. 28.
 EXTREMES, 1949-63.--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.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate			
Oct. 1-15, 1962.....	10			46	4.9	34		132		29	48	0.4	3.2	a250	0.34		135	27	1.3	436	7.2
Oct. 16-31.....	12			47	4.4	38		134		32	51	--	3.0	a266	.36		135	26	1.4	457	7.1
Nov. 1-15.....	13			50	4.4	51		142		43	62	.5	4.0	a288	.41		143	26	1.9	525	7.1
Nov. 16-28.....	13			56	4.5	64		160		41	86	--	3.8	a381	.52		158	27	2.2	633	7.3
Nov. 29-30.....	--			--	--	--		126		27	44	--	--	--	--		118	15	--	406	7.6
Dec. 1-24.....	9.9			35	3.2	36		102		29	43	.4	3.0	210	.29		100	17	1.6	368	6.7
Dec. 25-31.....	8.8			22	2.0	17		62		16	22	--	1.8	120	.16		63	12	.9	212	6.7
Jan. 1-31, 1963.....	13			53	6.0	74		135		59	100	.4	5.0	a406	.55		156	46	2.6	677	6.8
Feb. 1.....	--			--	--	--		88		21	44	--	--	--	--		89	17	--	337	6.2
Feb. 2-8.....	12			61	6.6	81		167		63	105	.4	3.8	a434	.59		179	42	2.6	746	6.8
Feb. 9-12.....	8.4			31	2.5	32		85		21	45	--	1.8	184	.25		88	18	1.5	340	6.6
Feb. 13-16.....	--			--	--	--		166		68	112	--	--	--	--		181	45	--	774	6.9
Feb. 17-28.....	9.2			26	3.0	39		65		34	50	--	3.5	197	.27		77	24	1.9	353	6.3
Mar. 1-15.....	12			50	6.7	100		122		66	140	.4	4.0	439	.60		152	52	3.5	787	6.9
Mar. 16-31.....	14			54	7.3	117		146		68	160	--	3.0	495	.67		164	45	4.0	879	7.1
Apr. 4-8.....	14			58	7.3	111		168		69	144	.5	2.2	a512	.70		174	37	3.7	862	7.0
Apr. 9-17.....	11			25	3.3	37		64		33	48	--	1.5	190	.26		76	24	1.8	332	6.5
Apr. 19-23.....	9.0			50	7.1	82		140		56	112	--	1.0	a409	.56		154	40	2.9	690	6.9
Apr. 24-30.....	9.8			61	8.3	129		176		67	180	--	.2	a586	.80		186	42	4.1	985	6.9
May 1-5.....	17			61	9.0	141		185		91	173	.5	6.5	590	.80		189	38	4.5	1010	7.1
May 6-16.....	12			44	3.2	31		135		33	30	--	2.8	222	.30		123	12	1.2	376	6.9
May 17-31.....	8.3			54	4.9	43		159		41	52	--	2.8	284	.39		155	25	1.5	493	7.2
June 1-15.....	12			54	4.3	67		163		48	80	.6	.0	346	.47		152	18	2.4	605	7.2
June 17-30.....	10			57	4.4	49		174		43	55	--	3.2	308	.42		160	18	1.7	529	7.3
July 1-18.....	13			57	4.6	56	5.4	175		39	71	.4	2.2	335	.46		161	18	1.9	579	6.9
July 19-22, 27-31.....	15			65	5.8	113		200		57	146	--	2.2	502	.68		186	22	3.6	889	6.8
July 25-26.....	22			62	5.7	78		201		42	98	--	1.5	408	.55		178	14	2.5	689	7.7

a Residue at 180°C.

TRINITY RIVER BASIN--Continued

8-671. TRINITY RIVER NEAR MOSS BLUFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Aug. 1-10, 1963...		17		64	6.0	127		208		58	160	0.6	18		536	0.73		184	14	4.1	967	7.2
Aug. 11-20.....		19		54	5.2	103		192		49	120	--	2.2		446	.61		156	0	3.6	792	6.8
Aug. 21-31.....		12		68	6.4	125		220		66	155	--	1.5		542	.74		196	16	3.9	986	6.8
Sept. 1-15.....	9.9			66	6.7	155		232		75	184	.6	.8		612	.83		192	2	4.9	1110	6.9
Sept. 16-30.....	11			48	5.3	112		172		56	132	--	.8		450	.61		142	1	4.1	820	6.9
Time-weighted average b.....		12		51	5.2	74		150		48	94	--	2.7		368	0.50		148	25	2.6	643	6.9

b Represents 98 percent of days.

TRINITY RIVER BASIN--Continued
8-672. 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 1963.
EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,350 ppm July 15-20; minimum, 115 ppm Dec. 26-31.
Hardness: Maximum, 338 ppm July 15-20; minimum, 56 ppm Dec. 26-31.
Specific conductance: Maximum daily, 2,900 microhmhos July 19; minimum daily, 163 microhmhos Jan. 18, 19.

EXTREMES, 1949-63.--Dissolved solids: Maximum, 1,300 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 microhmhos Oct. 15, 17, 1956; minimum daily, 101 microhmhos 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 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Soil adsorption ratio	Specific conductance (microhmhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium			Non-carbonate	
Nov. 8-26, 1962...		16		50	5.4	56		153		39	70	0.7	2.2	147	22	0.43	147	22	2.0	534	7.7
Nov. 27-30.....		13		24	3.0	25		68		21	34		1.5	72	16	.22	72	16	1.3	264	7.1
Dec. 1-17.....		14		24	3.5	24		65		22	35	.3	.5	74	21	.23	74	21	1.2	269	6.6
Dec. 18-25.....		11		36	4.1	35		100		29	50		1.2	107	25	.31	107	25	1.5	387	6.9
Dec. 26-31.....		11		18	2.7	17		50		15	26		.5	56	15	.16	56	15	1.0	205	6.4
Jan. 1-15, 1963...		16		26	3.6	27		82		17	37	.3	1.0	80	12	.23	80	12	1.3	282	7.3
Jan. 16-31.....		11		22	3.2	22		71		14	33		.8	68	10	.19	68	10	1.2	240	7.1
Feb. 1-7.....		12		34	4.1	35		104		19	41	.3	.8	102	16	.28	102	16	1.5	358	7.3
Feb. 8-19.....		8.7		48	5.7	57		137		31	86		1.2	144	31	.44	144	31	2.1	545	7.5
Feb. 20-28.....		11		25	3.2	24		72		17	36		1.0	76	17	.21	76	17	1.2	285	7.0
Mar. 1-15.....		11		36	4.3	38		104		21	58	.3	1.2	108	22	.30	108	22	1.6	389	7.2
Mar. 16-31.....		10		51	6.4	72		140		40	109		1.0	154	39	.49	154	39	2.5	647	7.4
Apr. 1-11.....		12		56	6.7	90		159		41	133	.3	1.0	167	36	.57	167	36	3.0	743	7.6
Apr. 12-16.....		12		35	4.3	49		94		37	67		2.2	105	28	.34	105	28	2.1	442	7.2
May 19-31.....		9.1		53	4.6	46		159		40	56	.4	.2	151	20	.39	151	20	1.6	500	7.1
June 1-12.....		8.3		58	5.5	71		171		49	91	.3	.8	167	27	.50	167	27	2.4	643	7.0
June 13-24.....		6.8		55	9.5	116		169		55	165		.8	176	38	.67	176	38	3.8	864	6.9
June 25-30.....		6.8		56	5.5	55		175		45	65		.2	162	18	.44	162	18	1.9	558	7.0
July 1-4.....		17		54	6.0	50	4.7	170		46	64	.5	.2	158	20	.44	158	20	1.7	561	7.4
July 5-12.....		8.8		54	10	117		170		52	167		.2	176	36	.67	176	36	3.8	894	7.0
July 13-14.....		10		55	16	182		162		66	281		1.5	203	70	.94	203	70	5.6	1250	7.5
July 15-20.....		8.0		73	38	384		162		118	650		.8	338	206	1.84	338	206	9.1	2450	7.5
July 21-31.....		11		66	19	199		184		67	322		1.2	242	92	1.05	242	92	5.6	1410	7.2
Aug. 1-27.....		11		72	27	302		194		94	488	.6	.5	290	132	1.48	290	132	7.7	2020	6.9
Aug. 28-31.....		19		58	7.7	120		208		51	151		.0	176	6	.69	176	6	3.9	910	7.0
Sept. 1-4.....		16		69	12	188		202		78	270	.5	1.8	222	56	1.00	222	56	5.5	1340	7.0
Sept. 5-8.....		15		83	22	296		198		107	472		.8	298	135	1.48	298	135	7.5	2010	7.0
Sept. 9-21.....		16		71	13	188		213		69	278		.8	230	56	1.01	230	56	5.4	1360	6.8
Sept. 22-30.....		24		49	6.2	87		170		28	120		.2	148	8	.54	148	8	3.1	719	7.1
Time-weighted average b.....				48	9.1	101		140		44	153		0.9	158	43	0.60	158	43	3.1	786	7.0

a Residue at 180°C.

b Represents 81 percent of days.

TRINITY RIVER BASIN--Continued
8-673. 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 1963.
EXTREMES, 1949-56.--Dissolved solids: Maximum, 18,400 ppm Aug. 1-31, 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.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 3, 1962.								144		25	38							13			398	7.6
Oct. 10.								136		18	62							20			476	7.5
Oct. 17.								113		14	65							7			444	7.5
Oct. 24.								106		35	89							27			540	7.4
Oct. 31.								125		6.4	71							28			499	7.5
Nov. 7.								160		44	95							27			641	7.9
Nov. 14.								139		51	69							31			549	7.8
Nov. 21.								153		122	660							208			2500	7.8
Nov. 28.								138			120							27			719	7.6
Dec. 6.								146		63	195							48			1000	7.7
Dec. 13.								140		36	47							27			457	7.6
Dec. 23.								139		35	55							30			479	7.5
Jan. 2, 1963.								72		27	41							21			80	7.2
Jan. 9.								79		30	43							21			86	7.4
Jan. 16.								118		48	84							40			136	7.6
Jan. 26.								130		51	84							36			143	7.8
Jan. 30.								145		71	108							47			166	8.1
Feb. 6.								162		62	112							45			178	8.0
Feb. 13.								162		68	132							51			184	7.8
Feb. 19.								132		47	105							42			150	7.6
Feb. 27.								62		25	57							27			78	7.0
Mar. 6.								73		30	62							33			93	7.3
Mar. 15.								128		70	120							53			158	7.6
Mar. 20.								142		59	170							52			168	7.5
Mar. 27.								151		71	238							60			184	7.6
Apr. 1.								161			312							96			228	7.9
Apr. 3, 5.		24		82	82	735	28	156		228	1300	0.5	1.5				14			542	7.7	
Apr. 8.								158			155							48			178	7.5
Apr. 10, 12, 15.		13		24	2.2	31		57		32	39							22			69	7.2
Apr. 17, 19, 22, 24		12		46	32	305		82		105	518							180			246	6.9

TRINITY RIVER BASIN--Continued

8-673, TRINITY RIVER AT ANAHUAC, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Soilium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate
Apr. 26, 1963.....		--		--	--	--		110		--	1150	--	--		--	470	380	--	3910	7.6
Apr. 29.....		--		--	--	--		112		--	4200	--	--		--	1470	1380	--	12500	7.0
May 1.....		--		--	--	--		--		--	930	--	--		--	--	--	--	3360	--
May 3.....		--		--	--	--		--		--	2900	--	--		--	--	--	--	8980	--
May 6.....		--		--	--	--		--		--	200	--	--		--	--	--	--	1150	--
May 8, 10, 13.....		17		42	3.2	30		129		32	29	--	3.8		118	12	1.2	--	365	7.6
May 15-31.....		14		54	4.0	46		155		41	56	0.4	3.0		151	24	1.6	--	506	7.2
June 3-28.....		14		58	4.5	76		164		53	95	.6	3.5		163	28	2.6	--	663	7.3
July 1-10.....		16		56	6.2	72	5.5	167		51	96	.4	2.2		165	28	2.4	--	663	7.0
July 12.....		--		--	--	--		172			462	--	--		284	143	--	--	1860	7.5
July 15-19, 24-31.....		--		--	--	--		159		--	1400	--	--		595	464	--	--	4740	6.7
July 22.....		--		--	--	--		155		--	2300	--	--		885	758	--	--	7240	7.0
Aug. 2.....		--		--	--	--		--		--	1020	--	--		--	--	--	--	3650	--
Aug. 5.....		--		--	--	--		--		--	1380	--	--		--	--	--	--	4730	--
Aug. 7.....		--		--	--	--		--		--	1530	--	--		--	--	--	--	5190	--
Aug. 9.....		--		--	--	--		--		--	2180	--	--		--	--	--	--	7040	--
Aug. 12.....		--		--	--	--		--		--	2220	--	--		--	--	--	--	7150	--
Aug. 14.....		--		--	--	--		--		--	2650	--	--		--	--	--	--	8420	--
Aug. 16.....		--		--	--	--		--		--	3180	--	--		--	--	--	--	9860	--
Aug. 19.....		--		--	--	--		--		--	2700	--	--		--	--	--	--	8500	--
Aug. 21.....		--		--	--	--		--		--	3400	--	--		--	--	--	--	10400	--
Aug. 23.....		--		--	--	--		--		--	3550	--	--		--	--	--	--	10800	--
Aug. 26.....		--		--	--	--		--		--	3320	--	--		--	--	--	--	10200	--
Aug. 28.....		--		--	--	--		--		--	3280	--	--		--	--	--	--	10100	--
Aug. 30.....		--		--	--	--		--		--	3870	--	--		--	--	--	--	11600	--
Sept. 2-6.....		17		164	292	2520		165		629	4460	--	--		1610	1480	27	13300	7.3	
Sept. 9.....		19		148	197	1790		173		476	3150	--	--		1180	1040	23	9800	7.6	
Sept. 11, 13, 16.....		16		167	302	2590		174		657	4580	--	--		1660	1520	28	13600	7.6	
Sept. 19.....		13		102	158	1380		140		352	2420	--	--		904	790	20	7770	7.6	
Sept. 21.....		10		60	29	309		170		118	480	--	1.8		269	130	8.2	2020	7.6	
Sept. 23.....		11		27	6.9	78		85		40	109	.4	.5		96	26	3.5	616	7.0	
Sept. 25, 27, 30.....		13		147	370	3130		124		776	5520	--	--		1890	1790	31	15600	7.0	

TRINITY RIVER BASIN--Continued

8-674. 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 1.5 miles southwest of Station 2. Station 6: In Anahuac Channel at south end. Station 7: In Trinity Bay about 1.5 miles west of Station 6.
 RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1963.

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1962 to September 1963

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 3, 1962.....	400	38	402	39	407	40	5160	1580
Oct. 10.....	499	61	--	--	473	60	478	61
Oct. 17.....	433	64	445	66	457	70	--	--
Oct. 24.....	546	88	542	88	539	88	539	88
Oct. 31.....	437	53	535	51	439	52	5950	1850
Nov. 7.....	646	93	652	94	4450	1300	10700	6050
Nov. 14.....	620	67	548	66	847	147	2710	710
Nov. 21.....	1630	380	1970	500	2690	720	9170	1820
Nov. 28.....	748	123	715	124	722	125	16200	5550
Dec. 6.....	1090	225	1060	208	911	164	873	150
Dec. 15.....	446	46	444	46	443	46	446	47
Dec. 23.....	471	52	--	--	471	54	477	54
Jan. 2, 1963.....	310	42	312	42	421	77	424	79
Jan. 9.....	335	43	328	42	330	44	333	42
Jan. 16.....	564	84	562	85	570	86	899	184
Jan. 26.....	582	89	6770	2080	10300	3320	10200	3320
Jan. 30.....	747	113	747	113	775	123	12100	4030
Feb. 6.....	734	111	738	113	859	150	9910	3180
Feb. 13.....	818	134	835	139	850	143	820	136
Feb. 19.....	600	101	606	100	610	102	670	113
Feb. 27.....	364	58	362	59	355	57	417	65
Mar. 6.....	413	64	416	66	403	63	402	61
Mar. 15.....	743	120	757	122	759	127	3830	1080
Mar. 20.....	934	170	934	170	956	178	1370	300
Mar. 27.....	1150	245	1160	242	1190	252	9400	3120
Apr. 1.....	1720	412	2250	580	4830	1410	10300	3420
Apr. 3.....	4750	1410	6520	2020	8270	2600	15200	5380
Apr. 5.....	5830	1780	6610	2020	6740	2050	9650	3150
Apr. 8.....	893	156	891	156	920	161	2230	550
Apr. 10.....	270	33	264	32	266	32	282	34
Apr. 12.....	279	38	277	38	277	38	279	38
Apr. 15.....	356	56	371	61	--	--	441	81
Apr. 19.....	2750	845	3350	925	7160	2280	13600	4740
Apr. 17.....	954	227	923	220	--	--	--	--
Apr. 22.....	2120	572	3660	1080	6340	1980	16600	5920
Apr. 24.....	2060	542	2080	552	2260	630	3050	875
Apr. 26.....	3980	1180	4610	1380	5370	1620	5530	1700
Apr. 29.....	13200	4490	13800	4690	14000	4930	14200	4930
May 1.....	3620	1050	3960	1150	4990	1520	5810	1820
May 3.....	9780	3280	12300	4340	13000	4590	15300	5530
May 6.....	1200	202	1100	198	1120	205	5890	1820
May 8.....	328	22	323	32	343	27	337	30
May 10.....	330	25	330	20	333	30	329	24
May 13.....	369	28	370	28	371	29	381	30
May 15.....	421	38	417	38	421	38	414	37
May 17.....	437	40	420	39	419	40	421	39
May 20.....	489	59	494	58	489	58	489	58
May 22.....	492	58	487	57	511	61	492	59
May 24.....	503	59	501	62	506	62	504	61
May 27.....	543	66	585	79	674	105	630	101

TRINITY RIVER BASIN--Continued

8-674. 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 1962 to September 1963--Continued

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
May 29, 1963.....	547	58	553	71	555	73	549	72
May 31.....	581	74	573	74	570	76	587	80
June 3.....	621	83	604	77	619	83	3050	870
June 5.....	845	148	862	155	868	160	1380	312
June 7.....	519	70	533	75	551	80	614	97
June 10.....	736	115	718	109	708	105	695	99
June 12.....	740	120	755	136	755	136	762	136
June 14.....	617	92	625	97	672	108	673	115
June 17.....	666	89	686	94	703	98	833	138
June 19.....	682	96	689	99	696	101	2790	775
June 21.....	721	115	751	130	1190	262	2200	605
June 24.....	577	68	590	75	585	74	609	81
June 26.....	600	78	600	77	598	77	598	78
June 28.....	620	86	622	87	622	88	612	85
July 1.....	542	67	559	71	560	73	2050	535
July 3.....	612	82	586	78	588	79	6500	2050
July 5.....	647	85	673	101	2610	705	5010	1550
July 8.....	869	158	1780	435	4780	1450	7440	2420
July 10.....	824	133	882	163	797	140	865	159
July 12.....	1810	455	1910	482	1840	468	6590	2100
July 15.....	4480	1340	5430	1700	5840	1800	9660	3280
July 17.....	4130	1210	4450	1330	4300	1300	5910	1880
July 19.....	4050	1200	4400	1320	4830	1460	6970	2250
July 22.....	7710	2450	8340	2680	10300	3950	12900	4100
July 24.....	5250	1620	5390	1680	5540	1700	5860	1850
July 26.....	4850	1440	5790	1850	7790	2480	12100	4140
July 29.....	6080	1880	6840	2150	7150	2280	10800	3750
July 31.....	9720	3220	5720	1800	6500	2050	5580	1700
Aug. 2.....	3810	1060	4080	1160	4390	1280	9030	2850
Aug. 5.....	4860	1450	4970	1450	4970	1450	6110	1850
Aug. 7.....	5260	1570	5240	1550	5810	1750	7760	2400
Aug. 9.....	7490	2350	7780	2450	7670	2450	10800	3550
Aug. 12.....	7820	2450	9150	3000	10800	3580	14800	5050
Aug. 14.....	8730	2780	8570	2720	7360	2320	13500	4590
Aug. 16.....	10700	3500	11400	3790	11700	3890	13300	4540
Aug. 19.....	8490	2700	8630	2750	9030	2900	10700	3520
Aug. 21.....	10600	3420	10800	3550	10800	3550	10800	3550
Aug. 23.....	10700	3480	11000	3640	11000	3640	13500	4560
Aug. 26.....	10800	3550	12200	4040	12800	4290	17300	6090
Aug. 28.....	11600	3840	13300	4510	13700	4640	17000	6020
Aug. 30.....	11700	3890	12000	3990	13300	4510	15200	5250
Sept. 2.....	13500	4540	14000	4790	14400	4930	15400	5330
Sept. 4.....	13800	4740	14200	4830	14600	4980	--	--
Sept. 6.....	13100	4440	13500	4590	13600	4640	17500	6270
Sept. 9.....	10400	3400	11000	3590	11200	3690	13100	4440
Sept. 11.....	16200	5620	17000	5920	17400	6170	19900	7200
Sept. 13.....	11700	3890	14300	4880	16200	5620	17300	6070
Sept. 16.....	15500	5380	16600	5820	17200	6070	20600	7500
Sept. 19.....	13100	4440	13900	4790	16200	5670	21300	7800
Sept. 21.....	1220	272	11200	3640	14600	5030	24300	9070
Sept. 23.....	504	100	13300	4540	12100	4090	21100	7600
Sept. 25.....	21500	7850	--	--	25400	9510	25400	9600
Sept. 27.....	19300	6960	21700	7940	22900	8530	--	--
Sept. 30.....	15900	5530	16400	5720	17000	6070	21900	7990

TRINITY RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-0502. ELM FORK TRINITY RIVER SUBWATERSHED NO. 6-0 NEAR MUENSTER																						
Mar. 21, 1963-----		1.0		71	4.4	35		182		44	53	0.3	1.5		299	0.41		195	46	1.1	536	7.0
June 12-----		6.6		62	6.2	34		166		38	55	.4	.2		284	.39		180	44	1.1	498	6.7
8-0503. ELM FORK TRINITY RIVER NEAR MUENSTER																						
Mar. 21, 1963-----	7.7	7.0		111	8.5	55		258		31	132	0.3	0.0		472	0.64		312	100	1.4	853	7.0
June 12-----	3.52	7.4		126	10	103		212		22	270	.3	1.2		644	.88		356	182	2.4	1,190	7.2
8-0505. ELM FORK TRINITY RIVER NEAR SANGER																						
Oct. 30, 1962-----	53.2	9.1		72	6.3	67		212		42	94	0.3	1.8		a434	0.59		206	32	2.0	704	6.6
Dec. 4-----	382	11		70	4.9	38		194		29	61	.4	.8		310	.42		194	36	1.2	548	6.8
Dec. 13-----	64	12		103	6.8	55		277		42	92	.3	3.8		451	.61		285	58	1.4	799	6.9
Jan. 8, 1963-----	52.2	3.1		108	8.6	74		312		54	107	.3	2.2		510	.69		305	50	1.8	892	7.5
Feb. 14-----	29.8	1.2		108	9.2	100		320		59	140	.3	4.5		a601	.82		308	46	2.5	974	7.4
Mar. 26-----	17.2	4.5		103	9.4	85	2.9	322		61	105	.3	1.5		a545	.74		296	32	2.2	937	6.9
Apr. 26-----	9.07	15		102	8.9	91	3.7	326		55	115	.3	4.2		a559	.76		291	24	2.3	959	7.0
June 4-----	34.1	8.6		62	4.7	34		181		26	51	.3	.0		276	.38		174	26	1.1	506	6.6
Aug. 7-----	1.94	5.3		52	6.7	131		340		48	79	.4	.5		490	.67		157	0	4.5	860	6.7
Sept. 10-----	1.90	8.4		45	6.7	135		342		48	73	.4	.0		484	.66		140	0	5.0	825	6.9
8-0510. ISLE DU BOIS CREEK NEAR PILOT POINT																						
Oct. 30, 1962-----	83.8	9.7		42	10	59		87		23	126	0.4	0.2		313	0.43		146	74	2.1	601	6.4
Dec. 3-----	415	11		30	7.2	30		68		41	49	.3	.5		a214	.29		104	49	1.3	356	6.5
Dec. 13-----	14	16		91	20	91		209		92	169	.3	.0		a638	.87		310	138	2.2	1,020	6.8
Jan. 8, 1963-----	9.67	10		105	24	131		238		102	242	.4	2.5		a772	1.05		360	166	3.0	1,290	7.3
Mar. 26-----	3.90	6.0		113	26	139	3.8	252		107	268	.3	.5		788	1.07		389	182	3.1	1,400	6.9
Apr. 26-----	1.31	12		102	23	125	4.7	240		87	242	.4	2.5		717	.98		349	152	2.9	1,290	7.3
8-0527. LITTLE ELM CREEK NEAR AUBREY																						
June 3, 1963-----	4.4	10		68	4.5	23		147		101	8.0	0.5	0.2		287	0.39		188	68	0.7	467	6.9

a Residue at 180°C.

TRINITY RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-0605. LAVON RESERVOIR NEAR LAVON																						
Oct. 26, 1962-----		6.2		48	3.2	14	142			33	8.8	0.5	0.0		184	0.25		133	17	0.5	316	6.8
Aug. 12, 1963-----		5.3		47	2.9		17	134		37	11	.5	.2		187	.25		129	19	.7	334	6.4
WAXAHACHIE CREEK AT STATE HIGHWAY 34 NEAR BARDWELL																						
Nov. 27, 1962-----	96.3	11		66	3.5	25	173			59	15	0.7	8.4		a290	0.39		179	37	0.8	462	6.7
Feb. 13, 1963-----	14.6	2.2		92	3.3	30	284			33	24	.6	7.5		333	.45		243	10	.8	577	7.3
July 18-----	.34	10		75	2.4	38	240			37	31	.7	.2		312	.42		197	0	1.2	548	7.0
TEHUACANA CREEK NEAR FAIRFIELD																						
Oct. 23, 1962-----		6.1		26	10	313	63			28	500	0.5	0.0		a952	1.29		106	54	13	1,740	6.3
Nov. 28-----	296	7.3		28	10	402	44			10	665	.3	.0		1,140	1.55		111	75	17	2,250	5.8
COTTONWOOD CREEK NEAR FAIRFIELD																						
Oct. 23, 1962-----	b0.01	7.9		47	18	110	80			74	204	0.4	0.8		a543	0.74		192	126	3.5	938	6.5
Nov. 28-----	31.9	9.8		8.5	2.6	32	40			19	34	.5	.2		127	.17		32	0	2.5	224	5.8
Mar. 12, 1963-----	11.4	16		36	13	116	58			62	200	.4	.5		473	.64		144	96	4.2	882	5.8
8-0652. UPPER KEECHI CREEK NEAR OAKWOOD																						
Nov. 27, 1962-----	16.5	22		15	7.1	24	3			65	34	0.2	0.0		168	0.23		67	64	1.3	266	5.2
Jan. 2, 1963-----	6.59	28		19	10	34	0			92	47	.2	.2		a241	.33		89	89	1.6	366	4.5
Feb. 5-----	6.37	26		18	10	33	c0			91	47	.2	.2		a236	.32		86	86	1.5	367	4.2
Mar. 12-----	13.1	20		22	11	35	1			92	55	.2	1.0		236	.32		100	99	1.5	396	4.7
Apr. 17-----	3.22	18		24	11	40	16			89	61	.3	.5		252	.34		105	92	1.7	411	6.9
May 21-----	5.20	19		23	11	36	24			85	51	.3	.2		238	.32		103	83	1.5	388	5.8
July 2-----	.12	12		15	7.7	25	36			43	35	.2	.2		156	.21		69	40	1.3	282	6.5
BIG ELKHART CREEK NEAR GRAPELAND																						
Oct. 26, 1962-----	14.3	14		11	4.5	66	19			4.6	119	0.2	1.8		a242	0.33		46	30	4.2	439	7.0
Jan. 5, 1963-----	36.9	17		11	4.4	40	21			8.8	74	.1	.8		166	.23		46	28	2.6	305	6.0
Feb. 8-----	24.0	15		10	4.3	40	21			7.2	74	.1	1.5		162	.22		43	25	2.7	297	5.9
Mar. 15-----	23.4	15		10	4.6	39	27			6.4	70	.1	1.2		a166	.23		44	22	2.6	294	6.2
May 20-----	18.6	17		10	3.7	44	20			7.4	79	.1	.8		172	.23		40	24	3.0	304	6.0
July 4-----	10.2	17		10	4.1	54	22			3.2	98	.1	.0		197	.27		42	24	3.6	407	6.6

a Residue at 180°C.

b Field estimate.

c Contains 0.1 ppm total acidity as H⁺¹.

TRINITY RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
LOWER KEECHI CREEK NEAR MIDDLETON																						
Oct. 23, 1962-----	0.45	17		26	8.2	31	26		86	38	0.2	0.0		a225	0.31		99	77	1.4	352	6.2	
Nov. 26-----	5.10	25		20	6.6	30	18		71	38	.2	.0		a217	.30		77	62	1.5	315	5.9	
Feb. 5, 1963-----	11.3	22		23	8.2	31	26		70	45	.2	.2		a226	.31		91	70	1.4	347	6.0	
Mar. 11-----	15.2	20		30	10	34	33		82	54	.2	.0		246	.33		116	89	1.4	413	5.9	
Apr. 17-----	7.43	20		29	9.4	38	56		71	52	.3	.2		248	.34		111	65	1.6	395	6.3	
May 23-----	15.2	17		19	5.5	25	28		53	32	.2	.5		166	.23		70	47	1.3	265	6.0	
BEDIAS CREEK NEAR MADISONVILLE																						
Oct. 22, 1962-----	0.20	14		29	9.1	36	56		71	48	0.2	0.2		a254	0.35		110	64	1.5	395	6.2	
Nov. 30-----	129	7.6		6.2	1.6	6.7	5.2		12	9.2	.3	.2		59	.08		22	6	.6	95	5.7	
Mar. 11, 1963-----	8.90	17		26	7.7	39	34		76	52	.2	.2		a258	.35		96	69	1.7	388	5.8	
GAIL CREEK NEAR LOVELADY																						
Oct. 26, 1962-----	0.001	8.9		40	12	70	78		88	103	0.2	0.5		a368	0.50		150	86	2.5	638	6.5	
Nov. 30-----	8.68	8.1		11	3.4	18	18		34	21	.3	.0		105	.14		41	27	1.2	183	5.5	
Feb. 8, 1963-----	2.52	22		47	16	95	32		176	128	.2	.0		a545	.74		184	158	3.0	824	5.9	
Mar. 15-----	3.37	17		43	15	83	42		144	117	.2	.2		a468	.64		169	134	2.8	751	6.0	
May 20-----	.85	18		41	14	83	68		118	115	.2	.0		422	.57		160	104	2.9	724	6.4	
July 4-----	16.4	6.6		12	4.6	22	37		30	24	.3	.5		118	.16		49	19	1.4	218	6.3	
MENARD CREEK NEAR RYE																						
Sept. 19, 1963-----	75.1	11		12	1.7	41	9		3.0	82	0.1	0.2		155	0.21		37	30	2.9	307	5.6	
BIG CREEK NEAR SHEPHERD																						
Sept. 19, 1963-----	17.5	15		3.5	1.0	7.0	1.7	9	5.4	12	0.1	0.2		50	0.07		13	5	0.8	74	5.4	
LOST RIVER AT HIGHWAY 10 NEAR COVE																						
May 7, 1963-----		7.8		112	108	908		130	264	1,750				3,290			724	617		5,780	7.4	

a Residue at 180°C.

SAN JACINTO RIVER BASIN

8-680. WEST FORK SAN JACINTO RIVER NEAR CONROE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 75, 285 feet upstream from Missouri Pacific Railroad Co. bridge, 3.5 miles downstream from Lake Creek, and 4.2 miles south of Conroe, Montgomery County.

DRAINAGE AREA.--809 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1963.

Water temperatures: October 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 286 ppm Apr. 1-7; minimum, 57 ppm Jan. 1.

Hardness: Maximum, 154 ppm Apr. 1-7; minimum, 38 ppm Jan. 1.

Specific conductance: Maximum daily, 559 micromhos Apr. 7; minimum daily, 104 micromhos Jan. 1.

Water temperatures: Maximum, 95°F Sept. 5; minimum, 36°F Jan. 27.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 323 ppm Mar. 16-31, 1962; minimum, 57 ppm Jan. 1, 1963.

Hardness: Maximum, 172 ppm Feb. 17-28, 1962; minimum, 38 ppm Jan. 1, 1963.

Specific conductance: Maximum daily, 617 micromhos Mar. 21, 1962; minimum daily, 104 micromhos Jan. 1, 1963.

Water temperatures: Maximum, 95°F Sept. 5, 1963; minimum, 36°F Jan. 27, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate		Sodium adsorption ratio		
Oct. 1-15, 1962	27.7	24		28	3.9	34		88		8.0	56	0.2	0.0			a214	0.29	16.0	86	14	1.6	342	6.8
Oct. 16-31	28.1	23		31	4.2	36		95		8.2	61	--	0.0			210	.29	15.9	95	17	1.6	369	6.6
Nov. 1-15	27.5	23		28	3.9	35		84		7.0	59	.2	2.8			200	.27	14.8	86	17	1.6	344	7.1
Nov. 16-26	31.3	24		31	4.2	37		94		6.8	65	--	2.2			a220	.30	18.6	95	18	1.7	377	7.1
Nov. 27-30	489	14		24	2.7	20		69		8.8	34	--	1.2			139	.19	184	71	14	1.0	245	7.0
Dec. 1-10	214	20		32	3.3	21		80		12	42	.3	.8			170	.23	98.2	93	28	.9	304	6.7
Dec. 11-20	48.8			41	4.0	30		102		12	62	--	2.2			222	.30	29.3	119	35	1.2	404	7.1
Dec. 21-31	2459	12		21	1.8	10		57		6.6	20	--	1.0			100	.14	664	60	13	.6	178	6.7
Jan. 1, 1963	4790	--		--	--	--		41		8.0	8.0	--	--			57	.08	737	38	4	--	104	6.7
Jan. 2-4	1507	13		20	2.0	16		55		12	24	.2	.5			115	.16	468	58	13	.9	194	7.0
Jan. 5-20	540	16		32	2.9	21		82		12	41	.3	.2			165	.22	241	92	25	1.0	295	7.0
Jan. 21-31	233	21		45	4.1	31		100		18	68	.2	.2			236	.32	148	129	47	1.2	420	7.2
Feb. 1-17	139	21		49	4.6	38		114		16	80	.2	.8			266	.36	99.8	141	48	1.4	473	6.6
Feb. 20-24	1838	12		23	1.7	15		54		9.2	29	--	1.5			118	.16	586	64	20	.8	208	6.1
Feb. 18-19, 25-28	586	16		32	2.6	21		74		12	44	--	1.5			165	.22	261	91	30	1.0	297	6.4
Mar. 1-4	467	17		42	3.7	27		100		14	57	.3	1.0			211	.29	266	120	38	1.1	371	7.1
Mar. 5-31	131	21		51	4.8	37		128		14	76	--	.8			268	.36	94.8	147	42	1.3	480	7.5
Apr. 1-7	110	23		53	5.3	41		134		13	84	.2	.8			286	.39	84.9	154	44	1.4	498	7.4
Apr. 8	976	15		34	2.7	25		74		14	51	--	3.2			181	.25	477	96	35	1.1	315	6.7
Apr. 9-12	1642	16		29	2.7	18		77		9.8	34	--	1.2			149	.20	661	83	20	.9	255	6.6
Apr. 13-30	86.8	23		42	4.4	32		116		11	60	--	.8			230	.31	53.9	123	28	1.3	389	7.1
May 1-10	46.9	24		42	4.2	38		117		9.0	70	.2	1.2			247	.34	27.9	122	26	1.3	423	7.2
May 11-20	39.2	24		38	3.7	37		107		7.6	67	--	1.0			231	.31	24.4	110	22	1.5	398	7.2
May 21-31	143	20		32	2.7	25		91		7.0	44	--	1.5			177	.24	68.3	91	16	1.1	301	6.8
June 1-30	30.7	24		30	5.4	40		100		7.4	66	.1	1.0			223	.30	18.5	97	15	1.8	380	6.8

a Residue at 180°C.

SAN JACINTO RIVER BASIN--Continued
8-680. WEST FORK SAN JACINTO RIVER NEAR CONROE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate					
July 1, 1963.....	87.0	--		--	--	--		84		--	48	--	--	--		--	122	0.17	--	70	1	--	283	7.4
July 2-5.....	351	30		21	0.4	12	3.1	64		4.4	16	0.2	4.2			122	0.17	116	54	2	0.7	172	6.9	
July 6-31.....	36.6	23		34	3.4	33		98		6.0	59	--	1.5			208	.28	20.6	99	19	1.4	354	6.6	
Aug. 1-31.....	23.2	22		26	2.7	36		78		5.6	59	.1	1.8			191	.26	12.0	76	12	1.8	337	6.7	
Sept. 1-30.....	14.9	24		24	2.0	45		74		4.8	70	.2	1.2			207	.28	8.33	68	8	2.4	376	6.7	
Weighted average	249	15		28	2.5	19		72		9.2	36	--	1.0			146	0.20	98.0	80	20	0.9	256	6.6	
Time-weighted average.....	--	22		34	3.6	33		94		9.1	59	--	1.0			208	--	--	99	23	1.5	363	6.8	
Tons per day.....	--	10		19	1.7	12		49		6.2	24	--	0.7			--	--	--	--	--	--	--	--	--

SAN JACINTO RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS

Chemical analyses in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
WEST FORK SAN JACINTO RIVER AT STATE HIGHWAY 105 NEAR CONROE																						
Oct. 2, 1962-----	13.1	20		53	4.4	25	152			13	46	0.3	0.2		a242	0.33		150	26	0.9	413	6.9
Nov. 5-----	11.0	20		37	2.8	23	104			8.8	42	.2	.0		185	.25		104	19	1.0	315	6.4
Jan. 14, 1963-----	86.4	20		48	4.2	23	114			16	54	.2	.2		222	.30		137	44	.9	389	6.6
Apr. 29-----	22.8	23		57	5.0	43	154			12	83	.3	.2		300	.41		162	36	1.5	519	7.3
June 3-----	5.43	7.3		56	4.7	39	152			9.4	78	.2	.0		270	.37		159	34	1.3	517	7.0
July 9-----	12.8	15		24	0	20	54			6.6	37	.2	.2		130	.18		60	16	1.1	231	8.0
8-0685. SPRING CREEK NEAR SPRING																						
Oct. 1, 1962-----	9.86	17		24	5.0	46	63			3.6	88	0.2	0.0		a219	0.30		80	29	2.2	398	7.1
Nov. 5-----	12.4	17		20	4.0	46	58			3.4	82	.2	.0		a216	.29		66	19	2.5	369	6.3
Dec. 11-----	25.7	17		16	4.1	29	42			6.8	56	.1	.0		150	.20		57	22	1.7	265	6.0
Jan. 14, 1963-----	57.0	15		15	3.6	23	34			8.0	46	.2	.0		128	.17		52	24	1.4	226	6.0
Feb. 18-----	288	4.8		5.5	2.2	15	14			4.2	27	.2	.8		67	.09		23	11	1.4	125	5.7
Feb. 21-----	1,630	4.3		4.8	1.6	5.7	2.6			4.8	10	.2	.8		42	.06		19	7	.6	72	5.7
Apr. 30-----	19.9	17		24	4.9	43	62			4.4	83	.2	.0		206	.28		80	29	2.1	374	6.7
June 5-----	16.2	16		20	3.4	34	53			4.0	64	.1	.2		168	.23		64	20	1.8	321	6.3
July 9-----	12.2	15		18	3.7	49	50			3.6	86	.2	.2		201	.27		60	19	2.7	407	6.1
8-0690. CYPRESS CREEK NEAR WESTFIELD																						
Oct. 2, 1962-----	6.09	20		37	7.2	69	170			7.4	88	0.5	0.0		313	0.43		122	0	2.7	557	7.6
Nov. 5-----	1.03	11		31	6.0	94	156			11	117	.4	.2		a356	.48		102	0	4.0	646	6.6
Dec. 11-----	7.40	17		18	3.9	50	80			18	60	.3	.0		206	.28		61	0	2.8	356	6.2
Jan. 14, 1963-----	7.03	12		18	3.9	65	82			15	83	.3	.8		238	.32		61	0	3.6	429	6.5
Feb. 19-----	1,040	14		7.0	1.9	53	12			8.6	86	.2	.2		177	.24		25	15	4.6	328	5.2
Feb. 21-----	280	5.5		5.5	1.0	7.4	3.9			6.8	10	.3	.2		49	.07		18	4	.8	85	5.4
Apr. 30-----	.34	7.0		41	8.6	193	189			24	265	.5	1.0		a666	.91		138	0	7.1	1,170	7.1
June 5-----	.32	8.7		23	3.5	58	75			12	86	.3	2.5		231	.31		72	10	3.0	430	6.4
July 9-----	14.8	14		15	.1	48	46			6.6	64	.4	.0		175	.24		38	0	3.4	311	8.3
8-0700. EAST FORK SAN JACINTO RIVER NEAR CLEVELAND																						
Oct. 3, 1962-----	16.8	12		16	2.5	43	29			4.0	82	0.2	0.0		a192	0.24		50	26	2.6	324	5.8
Nov. 8-----	21.4	11		13	2.4	37	28			2.8	69	.1	.0		149	.20		42	19	2.5	278	6.1
Nov. 29-----	370	10		21	3.0	24	65			7.2	39	.3	.0		a148	.20		65	12	1.3	247	6.1
Dec. 10-----	30.4	14		19	3.1	32	40			6.8	64	.1	.0		a176	.24		60	27	1.8	290	6.3
Jan. 15, 1963-----	83.6	17		25	3.4	27	50			12	57	.2	.2		167	.23		76	35	1.3	291	6.1
Feb. 20-----	1,810	6.1		14	1.5	7.3	2.1			7.0	15	.2	.2		69	.09		41	14	.5	125	5.7

a Residue at 180°C.

SAN JACINTO RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day				

8-0700. EAST FORK SAN JACINTO RIVER NEAR CLEVELAND--Continued

May 1, 1963	21.9	9.6		22	3.3	37	51			3.6	72	0.2	0.2			173	0.24		68	27	1.9	325	6.7
June 4	13.0	12		17	2.8	33	40			3.0	63	.1	.0			151	.21		54	21	2.0	289	6.5
July 10	17.9	13		18	2.0	25	46			3.6	46	.2	.0			131	.18		53	15	1.5	236	6.7
July 22	15.0	10		16	2.5	35	35			3.0	67	.2	.0			151	.21		50	22	2.2	289	6.1
Sept. 19	38	11		11	2.1	30	22			2.8	56	.1	.2			124	.17		36	18	2.2	236	6.1
Sept. 30	11.1	11		12	2.0	28	25			4.4	52	.1	.2			122	.17		38	18	2.0	227	6.2

8-0705. CANEY CREEK NEAR SPLENDORA

Oct. 1, 1962	14.9	14		6.8	1.5	8.8	0.9	21		2.4	17	0.2	0.0			59	0.08		23	6	0.8	94	6.4
Dec. 12	19.5	14		10	2.1	11	30			4.2	20	.1	.0			76	.10		34	9	.8	123	5.9
Jan. 16, 1963	35.8	15		20	2.5	11	49			7.6	25	.1	.0			105	.14		60	20	.6	180	6.2
Feb. 20	195	5.2		14	1.5	6.2	2.0	37		6.0	14	.2	.8			68	.09		41	11	.4	118	6.1
Apr. 30	18.5	12		11	2.1	12	38			3.0	20	.2	.0			79	.11		36	5	.9	129	6.7
June 5	12.0	13		8.2	1.6	10	28			1.8	17	.1	.0			66	.09		27	4	.8	105	6.3

8-0710. PEACH CREEK AT SPLENDORA

Oct. 1, 1962	13.4	14		3.0	1.3	9.7	0.8	11		2.0	17	0.2	0.0			53	0.07		13	4	1.2	77	5.8
Nov. 6	13.2	14		3.0	1.1	12	10			1.4	20	.1	.0			57	.08		12	4	1.5	83	6.3
Dec. 12	18.8	15		4.0	1.9	9.6	.7	13		2.4	19	.1	.0			59	.08		18	7	1.0	92	6.0
Jan. 16, 1963	32.8	18		4.0	2.2	12	12			4.4	22	.1	.2			68	.09		19	10	1.2	105	5.9
Feb. 20	324	5.5		2.0	1.3	4.6	.8	5		4.4	7.8	.1	1.0			30	.04		10	6	.6	46	5.6
Apr. 30	16.4	13		4.0	1.9	16	16			.4	28	.1	.2			72	.10		18	5	1.6	115	6.2

8-0720. LAKE HOUSTON NEAR SHELDON

Nov. 9, 1962		10		18	2.3	29	48			7.2	50	0.2	0.0			141	0.19		54	15	1.7	260	6.3
Jan. 15, 1963	0.10	8.8		14	1.6	16	39			6.2	26	.2	.0			92	.13		42	10	1.1	162	6.2

8-0735. BUFFALO BAYOU NEAR ADDICKS

Oct. 23, 1962	114	18		20	4.9	22	88			7.0	26	0.3	0.8			3147	0.20		70	0	1.1	241	6.4
Nov. 29	1,220	6.5		8.0	1.7	19	34			5.0	24	.2	.2			82	.11		27	0	1.6	149	5.8
Feb. 6, 1963	13.5	8.4		32	6.6	76	120			21	106	.3	.5			310	.42		107	8	3.2	572	6.4
Mar. 12	9.19	9.6		58	12	103	212			53	133	.4	.0			473	.64		194	20	3.2	861	6.5

BRAZOS RIVER BASIN

8-805. 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 1963.

Water temperatures: November 1949 to November 1951, October 1956 to September 1963.

Sediment records: November 1949 to September 1951.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 6,200 ppm Mar. 1-31; minimum, 599 ppm June 2-12.

Hardness: Maximum, 2,720 ppm Mar. 1-31; minimum, 232 ppm June 2-12.

Specific conductance: Maximum daily, 9,130 micromhos Feb. 20; minimum daily, 760 micromhos June 10.

Water temperatures: Maximum, 99°F July 23; minimum, freezing point Jan. 11, 12, 15, 19.

EXTREMES, 1948-51, 1956-63.--Dissolved solids: Maximum, 6,450 ppm May 1-16, 1961; minimum, 599 ppm June 2-12, 1963.

Hardness: Maximum, 2,720 ppm Mar. 1-31, 1963; 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, 1956-63): Maximum, 99°F July 23, 1963; 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 flow Aug. 26-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-27, 1962...	22.5	15		505	81	1040		104	1450	1600	--	3.0			4740	6.45	288	1590	1510	11	6810	7.4
Oct. 28-31.....	136	9.1		328	35	307		82	928	420	0.6	2.5			2070	2.82	760	962	896	4.3	2880	7.1
Nov. 1-7.....	43.0	13		355	57	626		98	1060	920	--	.2			3080	4.19	358	1120	1040	8.1	4570	7.0
Nov. 8-26, 28-30..	11.6	13		570	91	1080		110	1600	1700	--	.0			5110	6.95	160	1800	1710	11	7220	7.2
Nov. 27.....	48.0	--		--	--	--		79	956	800	--	--			--	--	--	1070	1010	--	4010	7.3
Dec. 1-5.....	21.4	12		515	83	1120		90	1530	1700	--	.0			5000	6.80	289	1630	1550	12	7140	7.4
Dec. 6-12.....	40.9	12		290	51	569		98	936	790	--	.0			2700	3.67	298	934	853	8.1	3990	7.4
Dec. 13-21.....	11.9	13		460	93	966		128	1380	1480	--	.0			4460	6.07	143	1530	1420	11	6440	7.3
Dec. 22-31.....	7.4	11		580	105	1180		146	1640	1850	--	.0			5440	7.40	109	1880	1760	12	7750	7.5
Jan. 1-31, 1963...	3.6	11		665	118	1140		134	1750	1900	--	.5			5650	7.68	54.9	2140	2030	11	7760	7.3
Feb. 1-28.....	2.1	11		740	140	1170		90	1930	2050	--	--			6080	8.27	34.5	2420	2350	10	8410	7.1
Mar. 1-31.....	.5	12		830	158	1080		89	2080	2000	--	.0			6200	8.43	8.37	2720	2650	9.0	8260	7.0
Apr. 1-25.....	1.1	12		820	144	998		90	2040	1850	--	.5			5910	8.04	17.6	2640	2560	8.4	7880	7.3
Apr. 26-30.....	670	15		365	29	153		82	944	220	.5	2.5			1770	2.41	3200	1030	963	2.1	2280	7.4
May 1-8.....	161	17		--	--	--		80	--	560	--	--			--	--	--	1290	1220	--	3500	7.1
May 9-14.....	13.5	17		450	77	747		96	1240	1200	--	2.0			3780	5.14	138	1440	1360	8.6	5390	7.4
May 15-17.....	64.8	16		245	17	276		92	640	382	--	2.2			1620	2.20	283	682	606	4.6	2380	7.4
May 18-21.....	9.7	13		440	54	756		97	1550	900	--	1.0			3760	5.11	98.5	1320	1240	9.1	4460	7.5
May 22-31.....	825	17		143	34	225		140	452	280	1.7	3.2			1220	1.66	2720	497	382	4.4	1880	7.3
June 1.....	7250	18		145	23	127		148	402	135	--	2.8			926	1.26	18130	456	335	2.6	1320	7.4
June 2-12.....	2064	18		73	12	112		130	221	94	1.2	3.5			599	.81	3340	232	125	3.2	930	7.5
June 13-24.....	625	17		141	20	152		116	408	172	--	2.5			970	1.32	1640	434	340	3.2	1440	7.3
June 25-30.....	61.2	19		223	47	376		112	712	520	--	.5			1950	2.65	322	750	658	6.0	2870	7.2
July 1-4.....	23.5	19		290	62	504	11	96	936	760	--	.2			2630	3.58	167	978	900	7.0	3860	7.3
July 5-13.....	8.4	20		520	83	905		98	1490	1400	--	.5			4470	6.08	101	1640	1560	9.7	6240	7.0
July 14-18.....	65.2	12		400	39	345		80	1060	525	--	.2			2420	3.29	426	1160	1090	4.4	3340	7.1
July 19-29.....	1.7	15		690	107	693		89	1800	1220	--	.5			4570	6.22	21.0	2160	2090	6.5	5970	7.0
July 30-31.....	69.5	--		--	--	293		62	1080	440	--	--			--	--	--	1160	1110	3.8	3080	7.1
Aug. 1-3.....	10.3	14		392	42	342		73	1030	540	--	.0			2400	3.26	66.7	1150	1090	4.4	3340	7.1
Aug. 4-19.....	.6	17		740	125	728		87	1890	1350	--	.5			4890	6.65	7.92	2360	2290	6.5	6550	7.1

BRAZOS RIVER BASIN--Continued

8-805, DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids (calculated)		Total Tons per day	Calcium-Magnesium non-carbonate Hardness as CaCO ₃	Sodium-sulfate ratio (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH	
														Tons per acre-foot	Parts per million						
Aug. 20-25, 1963..	0.7	--	--	475	80	1500	840	--	--	840	--	--	--	--	--	3830	5.21	44.5	4.9	4730	7.3
Aug. 31-Sept. 5...	4.3	13	18	620	76	1840	710	0.8	710	1840	710	0.8	710	1840	5400	7.34	1630	6.7	4280	7.0	
Sept. 6-15.....	.3	18	158	790	158	1980	1600	.5	1600	1980	1600	.5	1600	1980	5400	7.34	2620	6.9	4280	7.0	
Sept. 16.....	2300	14	330	42	162	942	195	3.0	942	195	3.0	3.0	942	1740	2.37	906	2.2	2310	7.4		
Sept. 17-21.....	601	13	117	140	104	340	158	.7	340	158	.7	.7	340	840	1.14	996	2.2	2310	7.4		
Sept. 22-25.....	34.8	13	226	372	104	676	510	.2	676	510	.2	.2	676	1880	2.56	700	6.1	2860	7.2		
Sept. 26-30.....	8.2	15	395	624	98	1130	940	.4	1130	940	.4	.4	1130	3210	4.37	1230	7.7	4680	7.3		
Weighted average	164	17	159	182	124	457	220	3.0	457	220	3.0	3.0	457	1120	1.52	496	3.5	1640	7.4		
Time-weighted average.....	--	14	544	797	102	1470	1320	1.0	1470	1320	1.0	1.0	1470	4290	--	1740	8.2	5900	7.2		
Tons per day.....	--	7.5	71	82	55	205	99	1.3	205	99	1.3	1.3	205	1120	1.52	496	3.5	1640	7.4		

a Mean discharge based on 365 days; mean discharge for 360 days of actual flow, 166 cfs.

BRAZOS RIVER BASIN--Continued

8-812. CROTON CREEK NEAR JAYTON, TEX.

LOCATION (revised).--At gaging station in Stonewall County, 460 feet upstream from county road, 1.1 miles upstream from mouth, and 8.6 miles northeast of Jayton, Kent County.

DRAINAGE AREA (revised).--284 square miles.

RECORDS AVAILABLE.--Chemical analyses: May 1959 to September 1963.

Water temperatures: October 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 36,600 ppm Apr. 2-12; minimum, 3,030 ppm Nov. 26-27.

Hardness: Maximum, 5,210 ppm Apr. 2-12; minimum, 1,610 ppm Nov. 26-27.

Specific conductance: Maximum daily, 48,600 micromhos Apr. 5; minimum daily, 3,570 micromhos Nov. 27.

Water temperatures: Minimum, freezing point on several days in December and January.

EXTREMES, 1961-63.--Dissolved solids (1962-63): Maximum, 36,600 ppm Apr. 2-12, 1963; minimum, 1,610 ppm Nov. 26-27, 1962.

Hardness: Maximum, 5,210 ppm Apr. 2-12, 1963; minimum, 1,610 ppm Nov. 26-27, 1962.

Specific conductance: Maximum daily, 48,600 micromhos Apr. 5, 1963; minimum daily, 3,116 micromhos Sept. 4, 1962.

Water temperatures (1962-63): Minimum, freezing point on several days in December 1962 and January 1963.

REMARKS.--Values given are expressed in parts per million and should be multiplied by the density when computing loads. Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 18 to Apr. 1, Apr. 13 to May 4, May 16-20, June 30 to July 7, July 21-28, 31, Aug. 1-30, Sept. 7-14, 29, 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Soilium adsorption ratio (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium					Non-carbonate
Oct. 1-20, 1962	1.8	--	--	--	--	--	5950	--	--	3040	9760	--	--	--	3990	2060	41	26500	1.014		
Oct. 21-23, 1962	25.9	--	--	--	--	--	1350	72	1980	2080	2080	--	--	--	2120	2900	25	16000	1.007		
Oct. 24-27, 1962	2.6	--	--	--	--	--	3100	78	2480	5010	5010	--	--	--	1960	1900	9.1	6710	7.6		
Oct. 28-31, 1962	38.5	--	--	--	--	--	924	103	1800	1440	1440	--	--	--	2760	2680	21	14400	7.7		
Nov. 1-4, 1962	1.2	25	905	905	122	2520	5720	130	2310	4080	4080	--	--	--	3730	3630	41	26200	7.4		
Nov. 5-25, 1962	5	12	1150	1150	210	5720	334	70	1530	9180	9180	--	--	--	1610	1590	3.6	3970	7.5		
Nov. 26-27, 1962	202	18	595	595	30	334	394	30	1530	485	485	--	--	--	1610	1590	3.6	3970	7.5		
Nov. 28-29, 1962	29.0	16	720	720	58	1220	1220	88	1830	1920	1920	--	--	--	2040	1960	12	8190	7.5		
Nov. 30, 1962	13.0	13	904	904	130	2970	2970	131	2390	4720	4720	--	--	--	2790	2680	24	15900	7.3		
Dec. 1-3, 1962	14.7	12	815	815	134	2820	2820	132	2170	4500	4500	--	--	--	2580	2480	24	14800	7.3		
Dec. 4-5, 1962	17.0	11	700	700	61	1100	1100	80	1820	1720	1720	--	--	--	2000	1930	11	7470	7.5		
Dec. 10-31, 1962	2.5	11	1100	1100	232	6000	6000	153	2920	9620	9620	--	--	--	3700	3570	43	26200	7.0		
Jan. 1-31, 1963	8	13	1220	1220	295	7920	7920	164	3300	12700	12700	--	--	--	4260	4120	53	33300	7.0		
Feb. 1-28, 1963	8	12	1230	1230	324	9460	9460	123	3420	15100	15100	--	--	--	4400	4300	62	38800	7.2		
Mar. 1-17, 1963	1	25	1370	1370	324	9560	9560	80	3730	15300	15300	--	--	--	4750	4680	60	37900	7.2		
Apr. 2-12, 1963	3	23	1410	1410	411	11800	11800	104	3960	18900	18900	--	--	--	5210	5120	71	43300	7.4		
May 5-6, 1963	1600	22	915	915	116	2620	2620	71	1780	1300	1300	--	--	--	1940	1880	--	6210	7.7		
May 7-12, 1963	31.0	22	1220	1220	230	5790	5790	86	2400	4170	4170	--	--	--	2760	2690	22	13800	7.6		
May 13-15, 1963	25.3	26	815	815	123	2330	2330	74	3150	9380	9380	--	--	--	3990	3930	40	25900	7.4		
May 21-26, 1963	4	16	1020	1020	167	4190	4190	90	2240	3680	3680	--	--	--	2540	2470	20	12500	7.6		
May 27-30, 1963	126	23	830	830	80	1450	1450	101	1740	2600	2600	--	--	--	3230	3160	32	19900	7.6		
May 31-June 2, 1963	4.6	20	1060	1060	181	3930	3930	92	2810	6340	6340	--	--	--	2400	2320	13	9800	7.6		
June 3-6, 1963	275	21	700	700	52	648	648	69	1840	3990	3990	--	--	--	3390	3310	29	19200	7.3		
June 7-10, 17-21, 1963	25.0	16	827	827	104	2190	2190	84	2170	3490	3490	--	--	--	1960	1900	6.4	5550	7.5		
June 11-16, 1963	4.8	20	1150	1150	217	4860	4860	119	3090	7100	7100	--	--	--	2490	2420	19	11800	7.4		
June 22-29, 1963	3.2	23	1320	1320	271	6700	6700	114	3440	11000	11000	--	--	--	3760	3660	34	29500	7.3		
July 8-13, 1963	28.3	20	1060	1060	157	3520	3520	86	2790	5650	5650	--	--	--	3290	3220	27	17900	7.0		

BRAZOS RIVER BASIN--Continued
 8-812. CROTON CREEK NEAR JAYTON, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
July 29-30, 1963	0.2 19			1250	251		6460		111	3290	10400			21700	30.0	11.9	4150	4060	44	28600	6.9	1.016	
Aug. 31-Sept. 6	73.8 22			830	65		1290		74	2140	2030			6410	8.72	1280	2340	2280	12	8640	5.5	--	
Sept. 15-22.....	.5 17			1100	155		4120		109	2780	6630			14900	20.5	20.3	3380	3290	31	20300	7.2	1.011	
Sept. 23-28.....																							
Weighted average.....	25.4 18			748	64		1360		76	1920	1850			5490	7.47	498	2130	2070	12	7730	7.2	--	
Time-weighted average.....	-- 17			1092	214		5670		112	2900	9040			18900	--	--					24700	7.1	--
Tons per day.	-- 1.6			68	5.8		123		7	174	168			--	--	--				--	--	--	--

^a Mean discharge based on 365 days; mean discharge for 266 days of actual flow, 33.6 cfs.

BRAZOS RIVER BASIN--Continued

8-814. SALT CROTON CREEK AT WEIR D, NEAR ASPERMONT, TEX.

LOCATION.--About 500 feet upstream from Haystack Creek, 1,000 feet upstream from gaging station, and 20 miles northwest of Aspermont, Stonewall County.

RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1963.

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

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Nov. 13, 1962..	0.9						89500			2990	142000							8830		414	131000		1.189
Dec. 14.....	.6						83900			3210	133000							8530		394	128000		1.172
Jan. 17, 1963..	1.1						85000			3120	135000							8940		391	129000		1.174
Feb. 15.....	.8						76400			3600	121000							8390		362	126000		1.156
Mar. 14.....	a.6						94000			2970	149000							8980		--	168000		1.192
May 7.....	1.0						22900			2380	36600							4350		--	75400		1.046
June 12.....	9.6						6500			1420	10400							2020		--	27600		1.012
July 19.....	.4						99600			2620	159000							10500		--	171000		1.203
Aug. 14.....	.4						99200			2820	158000							10100		--	170000		1.203
Sept. 12.....	4.7						89900			2940	143000							9280		--	168000		1.185

a Field estimate.

BRAZOS RIVER BASIN--Continued
 8-814.5. HAYSTACK CREEK NEAR ASPERMONT, TEX.

LOCATION.--About 400 feet upstream from mouth and 20 miles northwest of Aspermont, Stonewall County.
 RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1963.
 REMARKS.--Values given are expressed in parts per million and should be multiplied by the density in any computation of loads.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Nov. 13, 1962..	a0.1						36900			4590	58200						6660		197	91000		1.073
Dec. 14.....	.2						26300			3410	41800						5320		157	73000		1.052
Jan. 17, 1963..	.2						32400			3690	51600						6100		181	84500		1.066
Feb. 15.....	.2						26600			3930	42200						5690		153	74400		1.055
May 7.....	.1						16900			3750	27300						5650		--	61200		1.036
June 12.....	1.0						5230			2440	8510						3170		--	24500		1.011
July 19.....	a.1						54800			5570	86600						7720		--	135000		1.112
Aug. 14.....	a.1						47700			5070	75300						7760		--	123000		1.095
Sept. 12.....	.6						17200			3110	27300						4260		--	61900		1.033

a Field estimate.

BRAZOS RIVER BASIN--Continued

8-815. SALT CROTON CREEK NEAR ASPERMONT, TEX.

LOCATION.--At gaging station, 0.1 mile downstream from Haystack Creek, 2.2 miles upstream from Salt Flat Creek, 8 miles upstream from Salt Fork Brazos River, and 20 miles northwest of Aspermont, Stonewall County.

RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1963. REMARKS.--Values given are expressed in parts per million and should be multiplied by the density, where given, in any computation of loads.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids		Total dissolved solids (TDS) (mg/l)	Total suspended solids (TSS) (mg/l)	Hardness as CaCO ₃ (mg/l)	Sodium adsorption ratio (SAR)	Specific conductance (microhm-cm at 25°C)	pH	Density (g/ml at 20°C)	
															Calcium (mg/l)	Non-carbonate (mg/l)								
Oct. 11, 1962	0.6																11700	17000	11700	347	123000	1.137	1.137	
Dec. 14, 1963	1.2																10500	12000	10500	325	119000	1.134	1.134	
Jan. 17, 1963	1.3																89700	76200	89700	380	122000	1.142	1.142	
Feb. 15, 1963	1.0																3400	8700	3400	280	116000	1.125	1.125	
Mar. 14, 1963	0.8																136000	90800	136000	280	164000	1.173	1.173	
May 5, 1963	480	11					7200	23									2000	11200	2000	63	29500	1.015	1.015	
May 5, 1963	2640						1740		204								1420	2600	1420	19	9480	1.033	1.033	
May 7, 1963	1.4						16600		2410								26600	4020	26600	180	59600	1.033	1.033	
May 31, 1963	480						1080		220								1850	1360	1850	1180	6730	1.012	1.012	
June 12, 1963	9.9						6200										9980	2530	9980		26800	1.012	1.012	
June 17, 1963	480						4780										1570	7540	1570		21000	1.008	1.008	
Aug. 14, 1963	7						95500										3020	152000	3020		168000	1.135	1.135	
Sept. 12, 1963	3.5						66700										106000	106000	106000		151000	1.135	1.135	
Sept. 15, 1963	5400	17					728										1030	1050	1030	976	4980	7.5	7.5	
Sept. 15, 1963	7600	18					840										1230	1230	1230	972	5610	7.5	7.5	

a Estimated.

BRAZOS RIVER BASIN--Continued

8-820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 83, 5.5 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 1963.

Water temperatures: October 1948 to September 1951, October 1956 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 87,400 ppm Aug. 19-20; minimum, 1,380 ppm June 18-20.

Hardness: Maximum, 5,410 ppm Aug. 1-18, 21-31; minimum, 404 ppm June 18-20.

Specific conductance: Maximum daily, 101,000 micromhos Aug. 19; minimum daily, 2,020 micromhos June 19.

Water temperatures: Maximum, 95°F Aug. 11; minimum, freezing point on several days during January.

EXTREMES, 1948-51, 1956-63.--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, 96°F July 13, 1962; minimum, freezing point on many days during winter months.

REMARKS.--Values are expressed in parts per million and should be multiplied by the density, when computing loads. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density (g/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-21, 1962	21.7	13		881	218		7590		135	2330	12100		--	23200	32.1	1380	3090	2980	59	30600	7.6	1.016
Oct. 22-27.....	24.2	12		707	160		5180		141	1910	8210		--	16200	22.3	1070	2420	2310	46	22800	7.6	1.011
Oct. 28-31.....	132	11		508	65		2120		88	1350	3310		--	7410	10.1	2650	1540	1460	24	11100	7.6	1.004
Nov. 1-4.....	22.2	22		596	121		3620		129	1560	5760		--	11700	16.0	706	1980	1880	35	16800	7.7	1.007
Nov. 5-18.....	6.3	12		914	223		8220		146	2380	13100		--	24900	34.4	431	3200	3080	63	31000	7.4	1.017
Nov. 19-25.....	5.1	12		1030	287		13400		175	2520	21400		--	38700	54.1	547	3750	3610	95	46200	7.2	1.027
Nov. 26-27.....	684	17		240	39		895		123	672	1350		--	3270	4.45	6040	760	658	14	5480	7.3	--
Nov. 28-Dec. 1.	108	13		469	82		2140		98	1250	3390		--	7390	10.1	2160	1510	1430	24	11200	7.4	1.003
Dec. 2-9.....	77.1	13		546	112		3530		136	1410	5610		--	11300	15.5	2370	1820	1710	36	16700	7.5	1.007
Dec. 10-18.....	17.9	15		740	210		6400		179	2010	10200		--	19700	27.1	964	2710	2560	53	26600	7.3	1.013
Dec. 19-31.....	15.0	12		845	232		9250		179	2210	14700		--	27300	37.8	1130	3060	2920	73	35400	7.3	1.018
Jan. 1-31, 1963	9.9	13		939	274		11400		131	2500	18100		--	33300	46.3	910	3470	3360	84	42900	7.3	1.022
Feb. 1-10, 13-28	9.0	12		973	311		12800		128	2580	20400		--	37100	51.9	927	3710	3600	91	47200	7.3	1.028
Feb. 11-12.....	11.0	12		1070	421		21900		103	2610	34900		--	61000	86.8	1900	4400	4320	143	70400	7.2	1.046
Mar. 1-30.....	4.5	14		1090	336		14600		117	2840	23300		--	42200	59.1	528	4100	4010	99	51400	6.5	1.030
Mar. 31-Apr. 1.	86.5	21		655	128		3510		159	1890	5460		--	11700	16.0	2750	2160	2030	33	17300	7.6	1.008
Apr. 2-5.....	22.5	12		720	154		7070		113	1830	11200		--	21000	29.0	1290	2430	2340	62	28500	7.4	1.014
Apr. 6-26.....	7.4	10		1070	319		12600		125	2880	20000		--	36900	51.5	756	3980	3880	87	45000	7.1	1.026
Apr. 27-28.....	152	19		547	98		3560		131	1480	5570		--	11300	15.5	4670	1770	1660	37	14700	7.6	1.006
Apr. 29-30.....	21.0	14		672	125		5610		100	1690	8890		--	17000	23.4	975	2190	2110	52	24100	7.5	1.012
May 1-4.....	7.4	--		--	--		--		100	--	15500		--	--	--	--	3280	3200	--	37800	7.2	1.019
May 5-9.....	655	17		240	39		895		123	672	1350		--	3270	4.45	5780	760	658	14	5480	7.6	--
May 10-11.....	44.5	22		330	82		1630		126	963	2550		--	5640	7.67	678	1160	1060	21	8560	7.8	--
May 12-14.....	14.5	21		562	128		3320		104	1560	5270		--	10900	14.9	429	1930	1840	33	15800	7.8	1.005
May 15-22.....	20.8	13		805	195		5900		99	2160	9440		--	18600	25.6	1060	2810	2730	48	25600	7.4	1.012
May 23-26.....	77.2	15		463	86		2510		100	1220	3980		--	8320	11.4	1740	1510	1430	28	12400	7.6	1.004
May 27-31.....	105	12		682	158		4910		104	1820	7830		--	15500	21.3	4430	2350	2270	44	21800	7.6	1.009
June 1-17.....	656	18		236	37		906		114	630	1390		0.5	3270	4.45	5790	741	648	14	5200	7.5	--
June 18-20.....	1191	24		129	20		332		124	344	472		.8	1380	1.88	4440	404	303	7.2	2250	7.7	--
June 21-25.....	311	19		169	31		587		120	452	890		.8	2210	3.01	1860	549	450	11	3590	7.4	--

BRAZOS RIVER BASIN--Continued

8-820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
June 26-30, 1963	33.0	20		458	114		2580		124	1240	4130		--	8600	11.7	769	1610	1510	28	12800	7.4	1.004
July 1-9.....	6.4	16		737	183		4850	20	101	2030	7910		--	15800	21.7	276	2590	2510	41	22700	7.1	1.011
July 10-14.....	4.3	13		1120	276		13300		98	2520	21400		--	38700	54.1	461	3930	3850	92	48900	7.0	1.027
July 15-19.....	26.8	15		813	134		3810		91	2160	6050		--	13000	17.8	948	2580	2500	33	18300	7.0	1.008
July 20-29.....	1.6	15		1300	301		13000		105	3250	20700		--	38600	53.9	171	4480	4400	84	48300	7.0	1.027
July 30-31.....	9.4	32		1210	394		25500		95	2550	40700		--	70400	101	1880	4640	4560	163	78100	7.1	1.051
Aug. 1-18, 21-31	4	19		1490	412		16900		109	3600	27200		--	49700	70.0	55.6	5410	5320	100	61000	7.0	1.036
Aug. 19-20.....	13.3	17		1320	369		32100		68	2720	50800		--	87400	122	3340	4810	4760	201	96100	6.6	1.064
Sept. 1.....	24.0	--		--	--		12300		98	2420	19000		--	--	--	--	2760	2690	102	45600	6.7	1.023
Sept. 2-4.....	30.6	18		776	76		2020		82	2000	3180		--	8110	11.1	673	2250	2180	19	11600	7.2	1.005
Sept. 5.....	2.2	--		--	--		5520		102	2390	8790		--	--	--	--	2960	2880	44	24900	6.9	1.013
Sept. 6-15.....	2.5	15		1330	302		14200		117	3290	22600		--	41800	58.6	291	4560	4460	91	52500	6.8	1.030
Sept. 16-21.....	424	13		285	44		1080		86	756	1690		--	3910	5.32	4480	892	822	16	6330	6.8	--
Sept. 22-25.....	14.8	13		656	130		4080		105	1630	6560		--	13100	17.9	527	2170	2080	38	19100	6.8	1.006
Sept. 26-30.....	1.9	14		1110	265		10100		126	2730	16200		--	30500	42.4	160	3860	3760	71	40400	6.8	1.022
Weighted average....	80.8	17		319	61		1850		116	854	2900		--	6070	8.26	1320	1050	955	20	8770	7.4	--
Time-weighted average....	--	15		879	233		9320		123	2270	14800		--	27600	--	--	3150	3050	67	35100	7.1	--
Tons per day.	--	3.8		70	13		405		25	186	634		--	1320	--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-825. BRAZOS RIVER AT SEYMOUR, TEX.

LOCATION.--At gaging station at bridge on U.S. Highways 277 and 283, 0.8 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 1963.

Water temperatures: August 1959 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 12,800 ppm Apr. 5, 7-27; minimum, 852 ppm June 1, 6-10.

Hardness: Maximum, 2,320 ppm Aug. 1; minimum, 286 ppm June 1, 6-10, July 10-11.

Specific conductance: Maximum daily, 23,400 micromhos Apr. 14; minimum daily, 1,200 micromhos June 1.

Water temperatures: Maximum, 99°F Sept. 3; minimum, freezing point on several days during December to February.

EXTREMES, 1959-63.--Dissolved solids: Maximum, 17,200 ppm Feb. 27-28, 1961; minimum, 723 ppm Oct. 14, 16, 1960.

Hardness: Maximum, 2,630 ppm Apr. 15-23, 1962; minimum, 230 ppm Mar. 17, 1961.

Specific conductance: Maximum daily, 28,600 micromhos Apr. 16, 1962; minimum daily, 1,080 micromhos Oct. 16, 1960.

Water temperatures: Maximum, 99°F Aug. 6, 1959, Sept. 3, 1963; minimum, freezing point on several days during December 1962 to February 1963.

REMARKS.--Values given are expressed in parts per million and should be multiplied by the density in any computation of loads. Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 15-24, 26-29.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micromhos at 25°C)	pH	Density (g/ml at 20°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
Oct. 1-13, 1962	126	14		498	100		2260	120	1380	3560					7870	10.8	2680	1650	1560	24	11900	7.7	1.005
Oct. 14-29.....	152	13		420	90		1850	155	1180	2900					6530	8.88	2680	1420	1290	21	9830	7.7	--
Oct. 30-31.....	536	12		290	53		933	97	1440	1440			1.0		3600	4.90	5210	942	862	13	5590	7.8	--
Nov. 1.....	358	--		--	--		3260	95	1110	5270					1590	1510	36	1590	1510	36	16000	7.4	1.006
Nov. 2-25.....	84.3	15		498	106		2030	132	1420	3190					7320	10.0	1670	1680	1570	22	11000	7.4	1.004
Nov. 26.....	711	--		--	--		883	134	600	1350					--	--	--	720	610	14	5270	7.7	--
Nov. 27.....	3180	--		--	--		297	93	464	430					--	--	--	520	444	5.7	2350	7.6	--
Nov. 28-30.....	1123	16		248	34		967	105	632	1500			1.0		3450	4.69	10460	759	673	15	5710	7.8	--
Dec. 1-6.....	318	12		330	56		1020	167	900	1860					3970	5.40	3410	1050	940	14	6300	7.6	--
Dec. 7-15.....	150	13		442	102		2000	147	1270	3120					7030	9.56	2850	1520	1390	22	10800	7.4	--
Dec. 16-31.....	91.4	11		502	128		2430	208	1440	3830					8440	11.5	2080	1780	1610	25	12700	7.6	1.006
Jan. 1-31, 1963	53.9	13		616	174		3160	211	1800	5020					10900	14.9	1590	2250	2080	29	15900	7.1	1.006
Feb. 1-28.....	38.8	12		576	179		3440	127	1780	5460					11500	15.7	1200	2170	2070	32	16700	7.2	1.007
Mar. 1-10.....	28.2	8.7		616	185		3470	137	1910	5490					11700	16.0	891	2300	2190	31	17000	7.1	1.007
Mar. 11-19.....	26.6	10		483	139		2340	167	1460	3690					8200	11.2	589	1780	1640	24	12000	7.2	1.004
Mar. 20-30.....	14.1	6.6		616	188		3210	158	1920	5070					11100	15.2	423	2310	2180	29	15900	7.3	1.006
Mar. 31.....	643	9.4		148	55		547	154	494	810			1.5		2140	2.91	3720	596	470	9.7	3480	7.8	--
Apr. 1-4.....	226	12		150	55		528	157	488	800			1.5		2120	2.88	1290	600	472	9.3	3440	7.7	--
Apr. 5, 7-27.....	24.0	7.7		615	181		3910	144	1850	6200					12800	17.5	829	2280	2160	36	18400	7.3	1.008
Apr. 6.....	73.0	9.7		--	--		1580	159	1300	2450					--	--	--	1510	1380	18	8890	7.6	--
Apr. 28-30.....	1001	20		452	54		563	105	1250	840			1.5		3230	4.39	8730	1350	1260	6.6	4430	7.5	--
May 1-14.....	372	15		350	48		854	104	968	1300			1.5		3590	4.88	3610	1070	986	11	5360	7.3	--
May 15-23.....	183	14		430	80		1310	116	1220	2050					5160	7.02	2550	1400	1310	15	7710	7.5	--
May 24-31.....	927	15		110	18		299	118	306	410		1.0			1220	1.66	3050	348	252	7.0	2020	7.7	--
June 1, 6-10.....	2462	14		88	19		183	136	254	222		1.1	4.2		852	1.16	5660	298	186	4.6	1400	7.4	--
June 2-5.....	4790	15		158	24		364	133	436	510			1.2		1570	2.14	20300	494	384	7.1	2540	7.3	--
June 11-13.....	2537	14		106	17		290	118	280	408			2.2		1180	1.60	8080	334	238	6.9	1940	7.6	--
June 14-30.....	1014	17		215	32		522	107	576	790			1.5		2210	3.01	6050	668	580	8.8	3450	7.2	--
July 1-9.....	80.8	20		392	86		1370	112	1140	2120					5200	7.07	1130	1330	1240	16	7990	6.8	--
July 10-11.....	72.0	14		90	18		278	95	248	400			1.0		1100	1.50	214	298	220	7.0	1910	6.8	--

BRAZOS RIVER BASIN--Continued

8-825. BRAZOS RIVER AT SEYMOUR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-bicarbonate					
July 12-14	117	15		342	65		880		93	944	1400	--	0.5	3690	5.02	1170	1120	1040	11	5760	6.7	--	
July 16-19, 1963	139	16		--	--		364		78	412	580	--	--	--	--	--	520	456	7.0	2560	6.7	--	
July 15	11.9	16		582	106		2260		82	1690	3530	--	.0	8220	11.2	264	1890	1820	23	12100	6.6	1.005	
July 20-28	9.0	12		390	75		1320		98	1180	2020	--	.5	5050	6.87	123	1280	1200	16	7650	6.9	--	
July 29-31	46.0	14		--	--		2150		121	2040	3380	--	--	--	--	--	2320	2220	19	12200	7.4	1.006	
Aug. 1	14.8	12		415	64		912		90	1130	1440	--	--	4020	5.47	161	1300	1220	11	6060	7.5	--	
Aug. 2-5	1.9	12		510	109		1620		97	1590	2480	--	--	6370	8.66	32.7	1720	1640	17	9370	6.9	--	
Aug. 6-14	100	9.0		145	21		275		79	428	380	--	--	1300	1.77	351	448	384	5.6	2080	7.1	--	
Aug. 25, 30	54.0	11		292	32		282		80	814	395	0.5	1.0	1870	2.54	273	860	794	4.2	2690	6.6	--	
Sept. 1-6	20.2	10		365	56		709		101	1100	1030	--	.5	3320	4.52	181	1140	1060	9.1	4930	6.7	--	
Sept. 7-15	49.0	--		--	--		--		89	300	320	--	--	--	--	--	332	289	--	1740	7.2	--	
Sept. 16	1340	12		480	69		2020		122	1230	3180	--	--	7050	9.59	25510	1480	1380	23	10700	6.9	--	
Sept. 17	515	11		200	27		440		92	550	650	--	1.2	1920	2.61	2670	610	534	7.7	3130	7.2	--	
Sept. 18-24	51.5	11		288	47		888		110	800	1360	--	1.0	3450	4.69	480	912	822	13	5450	6.9	--	
Sept. 25-30																							
Weighted average	a299	15		233	42		734		123	646	1110	--	--	2850	3.88	2390	753	652	10	4390	7.3	--	
Time-weighted average	--	13		439	105		1940		135	1280	3050	--	--	6900	--	--	1530	1420	20	10200	7.1	--	
Tons per day	--	12		195	35		616		104	543	936	--	--	--	--	--	--	--	--	--	--	--	

a Mean discharge based on 365 days; mean discharge for 351 days of actual flow, 311 cfs.

BRAZOS RIVER BASIN--Continued

8-848. CALIFORNIA CREEK NEAR STAMFORD, TEX.

LOCATION.--At gaging station at bridge on Farm Road 600, 6 miles northeast of Avoca, 9 miles east of Stamford, Jones County, and 17 miles upstream from Paint Creek.

DRAINAGE AREA.--465 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1963.

Water temperatures: October 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 7,580 ppm Aug. 17-31; minimum, 252 ppm May 31.

Hardness: Maximum, 2,850 ppm Aug. 17-31; minimum, 139 ppm May 31.

Specific conductance: Maximum daily, 11,500 micromhos Sept. 22; minimum daily, 279 micromhos May 31.

Water temperatures: Maximum, 95°F Aug. 28, Sept. 7; minimum, freezing point Jan. 12, 14, 23.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 12-22, 1962..	9.5	4.6		400	346	856		264		2390	1110	--	14		5250	7.14	135	2420	2200	7.6	6580	7.6	
Oct. 23-25.....	61.7	11		70	31	87		154		194	112	0.4	5.5		587	.80	97.8	302	176	2.2	963	7.7	
Oct. 26.....	28.0	--		--	--	--		171		400	264	--	--		--	--	--	554	414	--	1760	7.7	
Oct. 27-31.....	16.8	11		218	121	332		222		806	520	--	11		2130	2.90	96.6	1040	860	4.5	3090	7.5	
Nov. 1-4.....	13.4	12		272	144	460		236		964	760	--	2.5		2730	3.71	98.8	1270	1080	5.6	3960	7.7	
Nov. 5-14.....	5.4	9.8		372	218	735		239		1550	1140	--	5.0		4150	5.64	60.5	1820	1630	7.5	5620	7.5	
Nov. 15-30.....	4.3	5.8		--	--	--		--		2190	1120	--	7.0		--	--	--	--	--	--	--	6350	--
Dec. 1-31.....	3.7	6.8		400	350	857		264		2430	1100	--	4.5		5280	7.18	52.7	2440	2220	7.5	6650	7.4	
Jan. 1-31, 1963..	3.8	6.8		440	375	859		308		2540	1140	--	4.6		5520	7.51	56.6	2640	2390	7.3	6910	7.6	
Feb. 1-28.....	3.1	6.9		430	365	947		184		2620	1240	--	7.5		5710	7.77	47.8	2570	2420	8.1	7060	7.4	
Mar. 1-31.....	2.5	7.2		430	425	997		193		2850	1320	--	2.5		6130	8.34	41.4	2820	2660	8.2	7550	7.6	
Apr. 1-14.....	3.4	--		--	--	--		198		2640	1280	--	--		--	--	--	2600	2440	--	7120	7.5	
Apr. 15-25.....	1.3	--		440	414	1150		216		2810	1550	--	5.0		--	--	--	2800	2620	9.5	8010	7.5	
Apr. 26-28.....	96.0	21		160	117	270		136		822	350	.5	5.7		1810	2.46	469	880	768	4.0	2500	7.7	
Apr. 29-30.....	90.0	22		90	48	115		134		300	175	--	2.5		818	1.11	199	422	312	2.4	1310	7.7	
May 1-2, 7-11.....	17.9	18		110	55	175		147		372	260	.4	5.3		1070	1.46	51.7	500	380	3.4	1670	7.6	
May 3-4.....	2.7	16		180	100	390		192		672	600	--	6.2		2060	2.80	15.0	860	703	5.8	3110	7.6	
May 5-6.....	90.5	17		54	15	67		112		97	102	--	6.6		414	.56	101	196	104	2.1	714	7.5	
May 12-21.....	1.5	9.2		252	188	650		144		1230	1000	--	5.5		3410	4.64	13.8	1400	1280	7.5	4890	7.4	
May 22-24.....	1179	17		44	9.8	27		113		66	32	--	3.2		255	.35	812	150	58	1.0	439	7.5	
May 25-26.....	211	19		150	40	181		130		282	375	--	3.8		1110	1.51	632	538	432	3.4	1840	7.4	
May 27-29.....	38.3	19		225	92	331		172		630	610	--	3.2		2000	2.72	207	940	799	4.7	3050	7.7	
May 30.....	585	20		63	18	71		116		126	110	--	5.1		470	.64	742	231	136	2.0	789	7.5	
May 31.....	1260	23		40	9.5	30		113		48	42	--	3.2		252	.34	857	139	46	1.1	a406	7.6	
June 1-2.....	234	18		55	15	43		125		94	62	--	4.2		352	.48	222	198	96	1.3	576	7.3	
June 3-12.....	29.0	14		182	133	371		175		904	510	--	5.0		2200	2.99	172	1000	858	5.1	3150	7.4	
June 13.....	21.0	18		70	33	107		147		202	147	.3	4.8		654	.89	37.1	310	190	2.6	1070	7.6	
June 14-16.....	16.5	15		244	166	437		188		1080	680	--	4.2		2720	3.70	121	1290	1140	5.3	3870	7.6	
June 17.....	147	18		84	34	107		152		222	158	--	5.0		703	.96	279	350	225	2.5	1140	7.7	
June 18-20.....	556	17		45	9.7	32		112		57	48	--	3.2		267	.36	401	152	60	1.1	452	7.5	

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BRAZOS RIVER BASIN--Continued
8-848. CALIFORNIA CREEK NEAR STAMFORD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
June 21, 1963.....	609	19		114	27	138		110	146	320	--	2.0		820	1.12	1350	396	306	3.0	1430	7.4	
June 22-30.....	49.6	19		290	126	427		174	848	810	--	2.8		2610	3.55	350	1240	1100	5.3	3950	7.4	
July 1-31.....	4.3	5.1		390	269	815	11	148	1780	1320	--	2.5		4670	6.35	54.2	2080	1960	7.8	6400	7.2	
Aug. 1-16.....	1.3	4.1		510	371	1050		123	1820	2120	--	--		6040	8.20	21.2	2800	2700	8.6	8550	6.9	
Aug. 17-31.....	.3	7.9		560	353	1620		108	2070	2920	--	--		7580	10.3	6.14	2850	2760	13	10700	6.9	
Sept. 1-10, 12-30.	.3	8.7		450	396	1430	12	150	2580	2150	--	--		7100	9.66	5.75	2750	2630	12	9470	7.4	
Weighted average	a32.9	17		104	52	152		131	348	233	--	3.8		974	1.32	87.0	461	355	2.3	1420	7.5	
Time-weighted average.....	--	8.9		374	299	848		194	2000	1250	--	5.0		4880	--	--	2160	2000	7.7	6390	7.4	
Tons per day....	--	1.5		9.2	4.6	13		12	31	21	--	0.3		--	--	--	--	--	--	--	--	--

a Mean discharge for period of record; station started October 12, 1962.

BRAZOS RIVER BASIN--Continued
8-860.5. DEEP CREEK AT MORAN, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 380, 0.8 mile northeast of Moran, Shackelford County, 1.4 miles upstream from Post Oak Creek, and 9.5 miles upstream from Hubbard Creek.
DRAINAGE AREA.--235 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1963.
Water temperatures: October 1962 to September 1963.
EXTREMES, 1962-63.--Dissolved solids: Maximum, 4,150 ppm Mar. 10-13; minimum, 179 ppm May 30-31.
Hardness: Maximum, 1,460 ppm Mar. 10-13; minimum, 121 ppm May 30-31.
Specific conductance: Maximum daily, 6,850 micromhos Mar. 13; minimum daily, 229 micromhos May 30.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Nov. 9-21, Jan. 12, 13, 23, Feb. 8-11, 13-28, Mar. 1-9, 14-31, Apr. 1-27, May 4, 5, 13-21, July 1-31, Aug. 1-31, Sept. 1-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl sulfide (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)				
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate		Sodium adsorption ratio			
Oct. 31-Nov. 8, 22-30, 1962.....	0.4	4.8		94	29	174		120		112	365	0.3	0.5			839	1.14	0.91	354	256	4.0	1530	7.5	
Dec. 1-31.....	.1	4.1		137	44	318		124		118	700	.3	1.0			1380	1.88	.37	523	422	6.0	2470	7.6	
Jan. 1-11, 14-22, 24-31.....	.1	2.9		240	81	618		122		206	1390	--	.0			2600	3.54	.70	932	832	8.8	4610	7.3	
Feb. 1-7, 12.....	.1	4.0		300	110	798		90		282	1820	.4	.5			3360	4.57	.91	1200	1130	10	5700	7.2	
Mar. 10-13.....	.1	2.2		365	134	992		92		368	2240	--	--			4150	5.64	1.12	1460	1390	11	7070	6.8	
Apr. 28.....	60.0	11		235	91	474	6.7	82		365	1120	--	1.0			2340	3.18	379	961	894	6.6	3980	7.4	
Apr. 29-30.....	12.8	8.8		126	43	205	6.8	84		64	580	.3	5			1080	1.47	37.3	492	422	4.0	2020	7.4	
May 1-3.....	3.3	6.7		144	48	190		87		64	588	.2	2.8			1090	1.48	.88	557	486	3.5	2060	6.9	
May 6.....	18.0	--		--	--	--		99		--	1240	--	--			--	--	--	1180	1100	--	4030	7.4	
May 7-12.....	2.3	6.7		84	29	132		125		64	315	--	2.8			694	.94	4.31	329	226	3.2	1290	7.1	
May 22-24.....	325	13		39	7.0	32		108		25	57	--	2.2			228	.31	200	126	38	1.2	406	7.6	
May 25-29.....	86.2	9.3		44	8.5	50		102		24	101	--	3.0			290	.39	67.5	145	62	1.8	540	7.0	
May 30-31.....	1308	14		--	--	16		122		17	25	--	3.2			179	--	--	121	21	.6	308	7.5	
June 1-3.....	26.7	19		42	8.6	27		129		24	46	.3	3.2			233	.32	16.8	140	34	1.0	392	7.6	
June 4-8.....	3.2	13		62	13	59		141		41	126	--	2.0			385	.52	3.33	208	92	1.8	691	7.1	
June 9-16.....	2.6	12		85	24	127		126		63	295	--	2.5			670	.91	4.70	310	207	3.1	1240	7.0	
June 17.....	33.0	--		--	--	--		146		--	450	--	--			--	--	--	420	300	--	1720	7.6	
June 18.....	39.0	--		--	--	--		168		--	145	--	--			--	--	--	248	110	--	820	7.6	
June 19.....	33.0	--		--	--	--		104		--	330	--	--			--	--	--	270	185	--	1280	7.4	
June 20-21.....	24.0	15		37	7.7	34		103		23	62	--	2.5			232	.32	15.0	124	40	1.3	403	7.4	
June 22-30.....	1.0	8.8		67	19	84		130		56	185	--	1.0			485	.66	1.31	245	138	2.3	894	7.0	
Weighted average	413.2	13		44	9.7	37		117		28	75	--	2.9			267	0.36	23.0	151	55	1.0	470	7.4	
Time-weighted average.....	--	6.4		146	48	326		119		128	736	--	1.2			1450	--	--	560	464	5.4	2570	7.3	
Tons per day.....	--	1.1		3.8	0.8	3.1		10		2.3	6.3	--	0.2			23	--	--	--	--	--	--	--	--

a Mean discharge based on 335 days; mean discharge for 142 days of chemical analyses, 31.2 cfs.

BRAZOS RIVER BASIN--Continued

8-861. HUBBARD CREEK NEAR ALBANY, TEX.

LOCATION (revised).--At gaging station 348 feet upstream from bridge on State Farm Highway 601, 1.1 miles downstream from Deep Creek, 3.3 miles upstream from Salt Prong Hubbard Creek, and 8.1 miles southeast of Albany, Shackelford County.

DRAINAGE AREA.--461 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1962 to September 1963.

Water temperatures: February 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,180 ppm Jan. 1-11; minimum, 177 ppm May 22.

Hardness: Maximum, 520 ppm Jan. 1-11; minimum, 114 ppm May 22.

Specific conductance: Maximum daily, 2,480 micromhos Jan. 11; minimum daily, 313 micromhos May 29.

EXTREMES, February 1962 to September 1963.--Dissolved solids: Maximum, 2,310 ppm Apr. 5-6, 1962; minimum, 177 ppm May 22, 1963.

Hardness: Maximum, 842 ppm Apr. 5-6, 1962; minimum, 106 ppm Sept. 8-25, 1962.

Specific conductance: Maximum daily, 4,410 micromhos Apr. 6, 1962; minimum daily, 262 micromhos Sept. 8, 1962.

Water temperatures (1962): Maximum, 92°F Aug. 4, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Texas. No flow Oct. 1-7, 21-28, Nov. 12-30, Dec. 1-3, 15-24, Jan. 12-31, Feb. 1 to Apr. 27, May 16-21, July 1 to Sept. 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 8-9, 1962....	62.5	--		--	--	--		140		61	127	--	--		--	--	--	204	90	--	742	7.4	
Oct. 10-20, 29-31.	3.4	12		95	27	161		122		65	375	0.3	1.2		796	1.08	7.31	348	248	3.8	1500	7.0	
Nov. 1-11,																							
Dec. 4-14, 25-31	.4	12		75	17	168		63		82	304	--	1.0		722	.98	.78	256	151	4.6	1300	7.4	
Jan. 1-11, 1963...	.1	5.0		146	38	237		140		118	565	--	.5		1180	1.60	.32	520	406	4.5	2180	7.8	
Apr. 28-29.....	106	5.4		--	--	73		62		51	154	--	3.5		--	--	--	165	114	2.5	726	6.7	
Apr. 30.....	14.0	5.9		82	25	131		63		120	295	--	.8		691	.94	26.1	308	256	3.2	1270	6.7	
May 1-15.....	3.0	6.5		89	27	135		93		113	305	.4	2.2		724	.98	5.86	333	257	3.2	1300	6.9	
May 22.....	1330	8.2		38	4.7	19		110		14	38	--	1.5		177	.24	636	114	24	.8	316	7.4	
May 23-27.....	48.7	8.9		51	12	91		88		32	189	--	1.8		429	.58	56.4	176	104	3.0	792	7.1	
May 28-31.....	939	10		38	5.9	24		107		18	44	--	2.2		195	.27	494	119	31	1.0	348	7.6	
June 1-11.....	20.1	12		43	8.4	36		120		25	65	.4	2.5		251	.34	13.6	142	44	1.3	448	7.1	
June 12-13.....	49.5	9.6		--	--	60		108		29	121	--	2.0		--	--	--	161	72	2.1	628	7.5	
June 14-16.....	5.9	12		48	11	62		107		30	128	--	1.5		346	.47	5.51	165	78	2.1	634	7.0	
June 17-30.....	24.0	8.7		60	16	95		104		46	205	--	.8		482	.66	31.2	216	130	2.8	917	6.8	
Weighted average	a17.7	9.5		42	7.5	37		106		24	73	--	2.0		248	0.34	38.0	136	48	1.3	449	7.3	
Time-weighted average.....	--	9.7		77	20	130		98		70	273	--	1.4		636	--	--	271	177	3.4	1170	7.1	
Tons per day...	--	1.5		6.6	1.2	5.8		16		3.7	11	--	0.3		--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 114 days of actual flow, 57.6 cfs.

BRAZOS RIVER BASIN--Continued

8-861.5. NORTH FORK HUBBARD CREEK NEAR ALBANY, TEX.

LOCATYON.--At gaging station at bridge on U.S. Highway 380, 1.7 miles southeast of Albany, Shackelford County, and 1.6 miles upstream from Salt Prong Hubbard Creek.

DRAINAGE AREA.--38.4 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1962 to September 1963.

Water temperatures: November 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 5,060 ppm Apr. 1-26; minimum, 1,240 ppm June 11-12.

Hardness: Maximum, 2,360 ppm Apr. 1-26; minimum, 464 ppm June 11-12.

Specific conductance: Maximum daily, 9,000 micromhos Aug. 14; minimum daily, 2,340 micromhos June 12.

Water temperatures: Maximum, 85°F Aug. 6; minimum, freezing point Jan. 12.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 6-12, 22, 25-31, Sept. 4-7, 9-11.

Chemical analyses, in parts per million, November 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Alkyl benzene sulfonate (ABS)
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Nov. 1-30, 1962	0.5	8.8		480	150		849		113	108	2450			4100	5.58	5.54	1810	1720	8.7	7170	7.3	--
Dec. 1-31, 1962	.5	8.6		505	162		810		114	106	2470			4120	5.60	5.56	1930	1830	8.0	7340	7.0	--
Jan. 1-31, 1963	.4	8.6		565	189		895		109	116	2780		2.0	4610	6.27	4.98	2190	2100	8.3	8210	6.8	0.04
Feb. 1-28, 1963	.3	5.7		585	191		900		145	123	2800		4.8	4680	6.36	3.79	2340	2130	8.3	8240	6.8	.02
Mar. 1-31, 1963	.3	4.5		600	180		996		128	131	2950			4920	6.69	3.99	2340	2130	9.2	8510	7.0	--
Apr. 1-26, 1963	.4	8.6		620	197		999		116	128	3050			5060	6.88	5.46	2360	2260	8.9	8710	7.1	--
Apr. 27-29, 1963	6.0	9.1		360	102		583		110	59	1740		1.0	2820	3.97	47.3	1320	1230	7.1	5300	6.9	--
Apr. 30, 1963	.5	11		460	118		812		114	58	2300			3820	5.20	5.16	1630	1540	8.8	6770	6.8	--
May 1-21, 1963	.3	12		460	139		770		127	43	2300			3790	5.15	3.07	1720	1620	8.1	6780	7.4	--
May 22-30, 1963	6.0	8.3		268	71		512		100	42	1380		1.0	2330	3.17	37.7	960	878	7.2	4280	6.9	--
May 31, 1963	2.6	8.1		152	39		271		97	30	720	0.3	1.5	1270	1.73	8.92	540	460	6.5	2360	7.4	--
June 1-10, 1963	.6	13		273	81		496		122	61	1370		1.0	2360	3.21	3.82	1020	919	6.7	4290	7.4	.13
June 11-12, 1963	18.4	11		138	29		289		72	13	722	.2	1.5	1240	1.69	61.6	464	405	5.8	2340	7.0	--
June 13-30, 1963	1.2	12		378	101		775		112	58	2050			3430	4.66	11.1	1360	1270	9.1	6060	7.3	.05
July 1-31, 1963	.2	15		480	146		893	5.6	102	88	2520			4200	5.71	2.27	1800	1710	9.1	7320	7.1	.07
Aug. 1-5, 13-21, 23-24, 1963	.1	17		560	195		1090		116	120	2950		.6	4900	6.66	1.32	2200	2100	9.3	8520	6.5	.02
Sept. 1-3, 8, 12-30, 1963	.1	14		590	196		1000		108	126	3000		.0	4980	6.77	1.34	2280	2190	9.1	8740	6.7	--
Weighted average	0.7	9.5		368	108		651		105	67	1860			3120	4.24	6.00	1360	1280	7.6	5560	7.0	--
Time-weighted average.....	--	10		512	161		866		116	102	2570			4280	--	--	1940	1840	8.5	7520	6.9	--
Tons per day....	--	0.0		0.7	0.2		1.3		0	0.1	3.7			--	--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-862. SALT PRONG HUBBARD CREEK NEAR ALBANY, TEX.

LOCATION.--At gaging station at bridge on State Farm Highway 601, 2.7 miles downstream from North Fork Hubbard Creek, 4.9 miles upstream from mouth, and 5.2 miles southeast of Albany, Shackelford County.

DRAINAGE AREA.--116 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1962 to September 1963 (discontinued).

EXTREMES, 1962-63.--Dissolved solids: Maximum, 4,250 ppm May 1-21; minimum, 766 ppm May 22.

Hardness: Maximum, 1,980 ppm May 1-21; minimum, 346 May 22.

Specific conductance: Maximum daily, 7,640 micromhos May 1, 2; minimum daily, 1,470 micromhos May 22.

Water temperatures: Maximum, not determined; minimum, freezing point on Jan. 15.

EXTREMES, February 1962 to September 1963.--Dissolved solids: Maximum, 4,250 ppm May 1-21, 1963; minimum, 397 ppm June 10, 1962.

Hardness: Maximum, 1,980 ppm May 1-21, 1963; minimum, 200 ppm June 10, 1962.

Specific conductance: Maximum daily, 7,640 micromhos May 1, 2, 1963; minimum daily, 769 micromhos June 10, 1962.

Water temperatures: Maximum, 96°F Aug. 11, 1962; minimum, freezing point Jan 15, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 10-31, Aug. 1-31, Sept. 1-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium		Non-carbonate	Sodium adsorption ratio	
Oct. 1-31, 1962...	1.3	13		282	94	543		134		108	1450	--	3.5		2560	3.48	8.99	980	7.2	4600	7.1	
Nov. 1-30.....	1.0	8.9		315	104	644		174		314	1520	--	.5		2990	4.07	8.07	1070	8.0	4890	7.2	
Dec. 1-31.....	1.3	9.9		330	111	531		154		130	1540	--	.5		2730	3.71	9.58	1150	6.5	5030	7.0	
Jan. 1-31, 1963...	1.0	7.9		345	115	552		188		145	1580	--	1.0		2840	3.86	7.67	1180	6.6	5140	7.5	
Feb. 1-28.....	.9	5.8		340	120	549		165		152	1590	--	.5		2840	3.86	6.90	1210	6.5	5160	7.1	
Mar. 1-31.....	.6	3.2		328	117	568		109		166	1610	--	1.5		2850	3.88	4.62	1210	6.9	5100	7.1	
Apr. 1-28.....	.8	5.3		335	117	585		116		174	1640	--	.5		2910	3.96	6.29	1220	7.0	5180	7.2	
Apr. 29-30.....	4.2	8.3		495	159	835		110		152	2450	--	--		4150	5.64	47.1	1890	8.4	7280	7.2	
May 1-21.....	.2	8.8		502	177	836		96		159	2520	--	--		4250	5.70	2.30	1900	8.2	7280	6.8	
May 22.....	72.0	--		--	--	--		115		27	395	--	--		766	1.04	149	346	252	--	1470	7.6
May 23-31.....	7.8	8.0		178	49	324		99		46	865	0.2	1.5		1520	2.07	32.0	646	564	5.5	2850	7.1
June 1-12.....	4.0	11		178	51	304		126		52	820	--	.5		1480	2.01	16.0	654	550	5.2	2760	7.1
June 13.....	5.1	12		245	64	463		93		40	1250	--	1.0		2120	2.88	29.2	874	798	6.8	3930	7.1
June 14-30.....	1.7	11		245	70	440		117		63	1200	.3	.5		2090	2.84	9.59	900	804	6.4	3880	6.8
July 1-9.....	.2	13		268	88	505		108		90	1380	--	.0		2400	3.26	1.30	1030	942	6.8	4290	6.9
Weighted average	al.2	8.9		247	78	430		130		103	1180	--	1.1		2110	2.87	9.00	938	831	6.5	3820	7.1
Time-weighted average.....	--	8.4		320	108	559		138		150	1550	--	1.1		2770	--	--	1240	1130	6.9	4920	7.1
Tons per day.....	--	0.0		1.1	1.3	1.8		1		0.4	5.0	--	0.0		9	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 282 days of actual flow, 1.6 cfs.

BRAZOS RIVER BASIN--Continued

8-863. BIG SANDY CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on State Farm Highway 576, 1.5 miles downstream from Battle Creek, and 8.2 miles southwest of Breckenridge, Stephens County.

DRAINAGE AREA.--298 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1962 to September 1963.

Water temperatures: February 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 2,450 ppm June 22-25, July 11; minimum, 86 ppm May 30-31.

Hardness: Maximum, 908 ppm June 22-25, July 11; minimum, 56 ppm May 30-31.

Specific conductance: Maximum daily, 4,680 micromhos June 24; minimum daily, 109 micromhos May 23.

EXTREMES, February 1962 to September 1963.--Dissolved solids: Maximum, 6,730 ppm Apr. 1-2, 1962; minimum, 86 ppm May 30-31, 1963.

Hardness: Maximum, 2,550 ppm Apr. 1-2, 1962; minimum, 56 ppm May 30-31, 1963.

Specific conductance: Maximum daily, 13,300 micromhos Apr. 6, 1962; minimum daily, 109 micromhos May 23, 1963.

Water temperatures (1962): Maximum, 89°F July 21, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 1-7, 18-19, 23-27, Nov. 4-23, Jan. 10-31, Feb. 1, 3-10, 26-28, Mar. 1-10, 18-31, Apr. 1-25, May 15-21, June 26-30, July 1-10, 12-31, Aug. 1-9, 12, 23-31, Sept. 1-11, 14, 22-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 8-13, 1962...	91.0	9.2		32	3.7	21		87		11	40	0.3	2.2		162	0.22	39.8	95	24	0.9	307	7.0	
Oct. 14-17, 20-22.	.4	--		--	--	--		96		18	96	--	--		--	--	--	130	52	--	504	7.1	
Oct. 28-31.....	12.1	--		--	--	--		101		23	66	--	--		--	--	--	120	37	--	424	7.2	
Nov. 1-3.....	.4	--		--	--	--		93		29	140	.4	--		--	--	--	147	71	--	650	7.0	
Nov. 24-30.....	.3	--		--	--	--		97		87	530	--	--		--	--	--	418	338	--	1990	7.5	
Dec. 1-4.....	1.3	7.9		124	23	241		116		67	540	.4	.2		1060	1.44	3.72	404	309	5.2	2020	7.0	
Dec. 5-19.....	.4	7.8		250	44	521		126		109	1220	--	.0		2210	3.01	2.39	805	702	8.0	4090	7.1	
Dec. 20-21.....	30.7	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--	--
Dec. 22.....	1.4	--		--	--	--		64		29	126	--	--		--	--	--	136	84	--	610	7.1	
Dec. 23-Jan. 9....	.1	7.0		78	14	123		91		44	282	--	.0		593	.81	.16	252	178	3.4	1180	6.9	
Feb. 2, 11-25.....	.1	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--	--
Mar. 11.....	42.0	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--	--
Mar. 12-17.....	2.2	7.7		70	11	137		121		43	260	1.0	5.7		595	.81	3.53	220	120	4.0	1120	7.4	
Apr. 26-27, 29-30.	110	12		38	4.2	37		87		16	72	.3	3.2		226	.31	67.1	112	41	1.5	410	7.1	
Apr. 28.....	1260	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--	--
May 1-14.....	3.5	13		69	9.5	104		110		27	225	.3	1.2		503	.68	4.75	211	121	3.1	933	7.7	
May 22-23.....	2203	21		22	2.7	13		74		4.8	19	--	1.8		120	.16	714	66	5	.7	193	7.5	
May 24-29.....	94.8	12		62	8.6	81		93		21	190	--	1.5		422	.57	108	190	114	2.6	790	7.5	
May 30-31.....	1131	17		19	2.1	3.9		62		.8	3.5	--	9.8		86	.12	263	56	5	2.3	151	7.3	
June 1-3.....	27.5	25		56	7.9	64		122		24	131	--	2.2		370	.50	27.5	172	72	2.1	647	7.6	
June 4-10.....	1.7	17		111	20	189		145		55	420	.3	1.0		884	1.20	4.06	360	240	4.3	1610	7.4	
June 11-12.....	50.6	20		52	9.4	69		98		17	155	--	2.2		373	.51	60.0	168	88	2.3	693	7.5	
June 13-21.....	7.3	14		131	25	243		105		38	590	--	1.0		1090	1.48	21.5	430	344	5.1	2050	7.3	
June 22-25,																							
July 11.....	.4	12		262	62	576		113		62	1420	--	1.5		2450	3.33	2.65	908	816	8.3	4380	7.2	
Aug. 10-11, 13-22.	29.4	10		54	8.6	82		95		26	170	.5	1.8		400	.54	31.8	170	92	27	772	6.7	
Sept. 12-13, 15-17	10.9	10		--	--	18		61		8.0	27	1.1	4.0		--	--	--	63	13	1.0	214	7.3	
Sept. 18-21.....	.2	14		32	3.7	32		86		13	56	--	2.2		195	.27	.11	95	25	1.4	355	7.0	
Weighted average	a28.5	17		28	3.6	23		76		7.4	43	--	3.6		162	0.22	27.0	85	22	1.3	286	7.3	
Time-weighted average.....	--	10		95	17	166		106		42	377	--	1.5		759	--	--	304	217	3.8	1410	7.1	
Tons per day....	--	2.8		4.7	0.6	3.8		13		1.2	7.3	--	0.6		--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 166 days of actual flow, 62.6 cfs.

BRAZOS RIVER BASIN--Continued

8-886. BRAZOS RIVER AT POSSUM KINGDOM DAM, NEAR GRAFORD, TEX.

LOCATION.--Immediately below Possum Kingdom Dam, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Grafard, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.

DRAINAGE AREA.--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1963.

Water temperatures: October 1949 to September 1955.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,520 ppm Mar. 1-31; minimum, 966 ppm Oct. 1-31.

Hardness: Maximum, 464 ppm Mar. 1-31; minimum, 322 ppm Oct. 1-31.

Specific conductance: Maximum daily, 2,760 micromhos Mar. 11, 12; minimum daily, 1,250 micromhos Oct. 4.

EXTREMES, 1942-63.--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.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Palo Pinto. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-31, 1962...	727	12		101	17	220		106		222	340	0.4	1.5		966	1.31	1900	322	235	5.3	1680	7.3	
Nov. 1-30.....	691	12		104	20	244		117		236	375	.4	.5		1050	1.43	1960	342	246	5.7	1800	7.3	
Dec. 1-31.....	1045	12		124	24	305		126		284	475	.4	.2		1290	1.75	3640	408	304	6.6	2210	7.3	
Jan. 1-31, 1963...	778	12		122	24	306		126		286	472	.4	1.5		1290	1.75	2710	403	300	6.6	2160	7.4	
Feb. 1-28.....	400	10		128	24	334		127		292	520	.3	1.8		1370	1.86	1480	418	314	7.1	2330	7.2	
Mar. 1-31.....	144	9.7		138	29	371		134		312	592	.4	.8		1520	2.07	591	464	354	7.5	2560	7.2	
Apr. 1-30.....	319	11		136	28	367		135		310	580	.4	.5		1500	2.04	1290	454	344	7.5	2520	7.6	
May 1-31.....	773	11		125	26	314		130		276	500	.5	.5		1320	1.80	2750	419	312	6.7	2220	7.3	
June 1-30.....	3690	9.8		130	26	330		126		292	525	.4	.2		1380	1.88	13750	432	328	6.9	2320	7.3	
July 1-31.....	960	12		138	28	340	6.9	121		322	555	.3	.8		1460	1.99	3780	460	360	6.9	2430	6.7	
Aug. 1-31.....	641	11		134	28	329		124		316	520	---	.8		1400	1.90	2420	450	348	6.7	2380	6.8	
Sept. 1-30.....	238	12		134	24	334		129		308	520	---	.5		1400	1.90	900	433	328	7.0	2370	7.3	
Weighted average	867	11		126	25	314		124		286	496	0.4	0.6		1320	1.80	3100	417	315	6.7	2230	7.2	
Time-weighted average.....	--	11		126	25	316		125		288	498	0.4	0.8		1330	--	--	417	314	6.7	2250	7.1	
Tons per day....	--	26		295	58	734		291		670	1160	0.9	1.4		--	--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8--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 1963.

Water temperatures: October 1947 to May 1948, October 1948 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,060 ppm Sept. 1-30; minimum, 810 ppm Jan. 1-31.

Hardness: Maximum, 355 ppm Sept. 1-30; minimum, 283 ppm Jan. 1-31.

Specific conductance: Maximum daily, 2,020 micromhos Sept. 30; minimum daily, 1,320 micromhos Dec. 20.

Water temperatures: Maximum, 86°F July 4; minimum, 40°F Jan. 29-31.

EXTREMES, 1947-63.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.

Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.

Specific conductance: Maximum daily, 2,660 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.

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

REMARKS--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Whitney. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-31, 1962.....	2486	9.9		96	18	208		111		205	325	0.4	1.2		918	1.25	6160	314	222	5.1	1590	7.5	
Nov. 1-30.....	961	9.9		90	17	185		114		186	290	.3	.5		810	1.24	2360	294	201	4.7	1460	7.5	
Dec. 1-31.....	1163	8.8		88	16	167		123		172	260	.4	.2		836	1.14	2630	286	184	4.3	1350	7.4	
Jan. 1-31, 1963.....	839	8.8		87	16	169		128		168	262	.3	.5		810	1.10	1830	283	178	4.4	1350	7.6	
Feb. 1-28.....	611	11		92	16	181		132		173	282	.3	2.0		844	1.15	1390	296	188	4.6	1400	7.4	
Mar. 1-31.....	559	6.8		95	17	184		134		181	288	.3	1.2		878	1.19	1330	307	197	4.6	1440	7.3	
Apr. 1-30.....	593	5.9		96	17	195		141		186	300	.3	.2		890	1.21	1420	310	194	4.8	1490	7.2	
May 1-31.....	1173	6.0		100	18	203		145		192	315	--	1.2		906	1.23	2870	324	204	4.9	1490	7.5	
June 1-30.....	3572	6.6		94	17	192		139		178	298	.3	.8		855	1.16	8250	304	190	4.8	1460	6.9	
July 1-31.....	1392	6.7		100	19	207	5.4	130		200	340	.3	.0		942	1.28	3540	328	221	5.0	1630	6.8	
Aug. 1-31.....	621	7.1		104	21	246		130		214	390	.3	.8		1050	1.43	1760	346	240	5.8	1820	7.0	
Sept. 1-30.....	580	8.6		106	22	247		140		216	390	.4	1.3		1060	1.44	1660	355	240	5.7	1860	6.9	
Weighted average	1215	7.9		95	18	197		129		189	309	0.3	0.8		896	1.22	2940	310	204	4.9	1520	7.1	
Time-weighted average.....	--	8.0		96	18	199		131		189	312	0.3	0.8		909	--	--	312	205	4.9	--	1530	7.2
Tons per day.....	--	26		312	58	647		425		619	1010	1.0	2.6		--	--	--	--	--	--	--	--	--

a. Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-886. 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 1963.

Water temperatures: October 1949 to September 1955.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,520 ppm Mar. 1-31; minimum, 322 ppm Oct. 1-31.

Specific conductance: Maximum daily, 2,760 micromhos Mar. 11, 12; minimum daily, 1,250 micromhos Oct. 4.

EXTREMES, 1942-63.--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.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Palo Pinto. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃	Non-ad-cium (micro-mhos at 25°C)	Specific pH	
													Tons per acre-foot	Parts per million	Tons per acre-foot				
Oct. 1-31, 1962	727	12	104	12	17	220	106	222	340	0.4	1.5	966	1.31	1900	322	235	5.3	1680	7.3
Nov. 1-30	691	12	104	12	24	244	117	226	375	.4	.5	1050	1.43	1960	342	246	5.7	1800	7.3
Dec. 1-31, 1963	1045	12	124	24	24	305	126	284	475	.4	.2	1290	1.75	1960	3640	304	6.6	2210	7.3
Jan. 1-31, 1963	778	12	122	24	306	306	126	286	472	.4	.3	1290	1.75	1960	403	300	6.6	2160	7.4
Feb. 1-28	400	10	128	24	334	334	127	292	520	.3	1.8	1370	1.86	1480	418	314	7.1	2330	7.2
Mar. 1-31	144	9.7	138	29	371	371	134	312	592	.4	.8	1520	2.07	591	464	354	7.5	2560	7.2
Apr. 1-30	319	11	136	28	367	367	135	310	580	.4	.5	1500	2.04	1290	454	344	7.5	2520	7.6
May 1-31	773	11	125	26	314	314	130	276	500	.5	.5	1320	1.80	1290	419	312	6.7	2220	7.3
June 1-30	3690	9.8	130	26	330	330	126	292	525	.4	.2	1380	1.88	13750	432	328	6.9	2320	7.3
July 1-31	960	12	138	28	340	340	121	322	555	.3	.8	1460	1.99	13780	460	360	6.9	2430	6.7
Aug. 1-31	641	11	134	28	329	329	124	316	520	.8	.8	1400	1.90	2420	450	348	6.7	2380	6.8
Sept. 1-30	238	12	134	24	334	334	129	308	520	.5	.5	1400	1.90	900	433	328	7.0	2370	7.3
Weighted average	867	11	126	25	314	314	124	286	496	0.4	0.6	1320	1.80	3100	417	315	6.7	2230	7.2
Time-weighted average	11	11	126	25	316	316	125	288	498	0.4	0.8	1330	--	--	417	314	6.7	2250	7.1
Tons per day	--	26	295	58	734	734	291	670	1160	0.9	1.4	--	--	--	417	314	6.7	2250	7.1

BRAZOS RIVER BASIN--Continued

8--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 1963.

Water temperatures: October 1947 to May 1948, October 1948 to September 1963.

EXTREMES 1962-63.--Dissolved solids: Maximum, 1,060 ppm Sept. 1-30; minimum, 810 ppm Jan. 1-31.

Hardness: Maximum, 355 ppm Sept. 1-30; minimum, 283 ppm Jan. 1-31.

Specific conductance: Maximum daily, 2,020 micromhos Sept. 30; minimum daily, 1,320 micromhos Dec. 20.

Water temperatures: Maximum, 86°F July 4; minimum, 40°F Jan. 29-31.

EXTREMES, 1947-63.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.

Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.

Specific conductance: Maximum daily, 2,660 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.

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

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Whitney. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate		Sodium adsorption ratio		
Oct. 1-31, 1962....	2486	9.9		96	18	208		111		205	325	0.4	1.2		918	1.25	6160	314	222	5.1	1590	7.5	
Nov. 1-30.....	961	9.9		90	17	185		114		186	290	.3	.5		8910	1.24	2360	294	201	4.7	1460	7.5	
Dec. 1-31.....	1163	8.8		88	16	167		123		172	260	.4	.2		8836	1.14	2630	286	184	4.3	1350	7.4	
Jan. 1-31, 1963....	839	8.8		87	16	169		128		168	262	.3	.5		8810	1.10	1830	283	178	4.4	1350	7.6	
Feb. 1-28.....	611	11		92	16	181		132		173	282	.3	2.0		8844	1.15	1390	296	188	4.6	1400	7.4	
Mar. 1-31.....	559	6.8		95	17	184		134		181	288	.3	1.2		8878	1.19	1330	307	197	4.6	1440	7.3	
Apr. 1-30.....	593	5.9		96	17	195		141		186	300	.3	.2		8890	1.21	1420	310	194	4.8	1490	7.2	
May 1-31.....	1173	6.0		100	18	203		145		192	315	--	1.2		906	1.23	2870	324	204	4.9	1490	7.5	
June 1-30.....	3572	6.6		94	17	192		139		178	298	.3	.8		855	1.16	8250	304	190	4.8	1460	6.9	
July 1-31.....	1392	6.7		100	19	207	5.4	130		200	340	.3	.0		942	1.28	3540	328	221	5.0	1630	6.8	
Aug. 1-31.....	621	7.1		104	21	246		140		214	390	.3	.8		1050	1.43	1760	346	240	5.8	1820	7.0	
Sept. 1-30.....	580	8.6		106	22	247		140		216	390	.4	1.5		1060	1.44	1660	355	240	5.7	1860	6.9	
Weighted average	1215	7.9		95	18	197		129		189	309	0.3	0.8		896	1.22	2940	310	204	4.9	1520	7.1	
Time-weighted average.....	--	8.0		96	18	199		131		189	312	0.3	0.8		909	--	--	312	205	4.9	--	1530	7.2
Tons per day....	--	26		312	58	647		425		619	1010	1.0	2.6		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1040. LAMPASAS RIVER AT YOUNGSPORT, TEX.

LOCATION.--At county road bridge, 0.5 mile west of Youngsport, Bell County, 1.4 (revised) miles upstream from gaging station, and 3.0 miles downstream from Rocky Creek.

DRAINAGE AREA (revised).--1,244 square miles at gaging station.

RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1963.

Water temperatures: September 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 687 ppm Nov. 15-30; minimum, 194 ppm Oct. 9-13.

Hardness: Maximum, 301 ppm Nov. 15-30; minimum, 126 ppm Oct. 9-13.

Specific conductance: Maximum daily, 1,480 micromhos Nov. 26; minimum daily, 217 micromhos Oct. 10.

Water temperatures: Maximum, not determined; minimum, 34°F Jan. 13.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 767 ppm Sept. 1-7, 1962; minimum, 156 ppm June 27, 1962.

Hardness: Maximum, 301 ppm Sept. 1-7, Nov. 15-30, 1962; minimum, 110 ppm June 27, 1962.

Specific conductance: Maximum daily, 1,500 micromhos Sept. 7, 1962; minimum daily, 217 micromhos Oct. 10, 1962.

Water temperatures: Maximum, 95°F Aug. 8, 10, 11, 1962; minimum, freezing point Jan. 12, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 23 to Aug. 27, Sept. 4-12.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-8, 1962....	13.9	11		50	29	120		177		19	240	0.4	1.2		558	0.76	20.9	244	100	3.3	1080	7.7	
Oct. 9-13.....	1687	11		37	8.2	22		131		11	38	--	2.5		194	.26	884	126	19	.9	351	7.2	
Oct. 14-23.....	48.7	13		55	19	67		195		18	129	--	1.0		398	.54	52.3	215	55	2.0	735	7.5	
Oct. 24-31.....	59.0	11		64	25	106		225		22	202	--	2.0		543	.74	86.5	262	78	2.9	1020	7.7	
Nov. 1-14.....	24.5	8.7		53	25	88		212		28	158	.3	.5		466	.63	30.8	235	62	2.5	857	7.8	
Nov. 15-30.....	54.5	5.5		68	32	147		241		28	278	--	2.2		a687	.93	101	301	104	3.7	1260	7.6	
Dec. 1-20.....	62.3	7.9		66	27	78		254		34	142	.4	.5		a487	.66	82.1	276	68	2.0	882	7.6	
Dec. 21.....	633	--		--	--	--		134		18	32	--	2.0		--	--	--	132	22	--	--	350	7.6
Dec. 22-24.....	70.7	--		--	--	--		183		18	172	--	6.5		--	--	--	217	67	--	--	863	7.8
Dec. 25-31.....	55.0	8.8		52	18	65		201		21	112	--	1.2		377	.51	56.0	204	39	2.0	699	7.3	
Jan. 1-15, 1963...	47.0	5.9		58	32	94		238		35	176	.4	.5		a540	.73	68.5	276	81	2.5	967	7.7	
Jan. 16-31.....	37.2	3.7		61	34	106		246		37	200	--	.2		a593	.81	59.6	292	90	2.7	1070	7.6	
Feb. 1-28.....	38.3	2.8		62	34	115		246		36	215	.3	.2		a596	.81	61.6	294	93	2.9	1090	7.6	
Mar. 1-31.....	36.9	1.4		57	32	112		233		35	205	.3	.0		a592	.81	59.0	274	82	2.9	1050	7.6	
Apr. 1-30.....	19.5	3.2		57	34	129		229		28	245	.4	.5		610	.83	32.1	282	94	3.3	1160	7.6	
May 1-17.....	35.3	5.8		57	35	129		234		26	245	.4	1.0		614	.84	58.5	286	94	3.3	1140	7.4	
May 18-21.....	301	11		41	11	31		151		11	56	--	1.8		237	.32	193	148	24	1.1	428	7.7	
May 22-31.....	27.2	7.7		49	20	75		191		15	139	--	.2		400	.54	29.4	205	48	2.3	745	7.2	
June 1-10, 1963...	9.6	10		40	21	69		180		21	117	0.4	0.0		367	0.50	9.50	186	39	2.2	679	7.1	
June 11-19.....	37.4	7.7		46	29	122		192		17	230	--	.8		546	.74	55.1	234	77	3.5	1050	7.2	
June 20.....	59.0	11		43	25	64		206		24	110	--	.2		378	.51	60.2	210	42	1.9	696	7.7	
June 21-30.....	19.4	7.0		50	29	119		204		17	225	--	1.0		548	.75	28.7	244	78	3.3	1050	7.5	
July 1-5.....	70.8	12		45	27	110	6.2	182		18	210	.4	.0		518	.70	99.0	224	74	3.2	941	7.3	
July 6-22.....	6.9	13		36	21	65		176		16	112	--	.0		350	.48	6.52	176	32	2.1	642	7.2	
Aug. 28-31.....	.5	14		31	22	103		138		12	188	.5	.2		439	.60	.59	168	55	3.5	847	6.7	
Sept. 1-3, 13-16..	46.2	14		39	25	104		152		19	200	.4	.2		477	.65	59.5	200	76	3.2	926	6.8	
Sept. 17-21.....	8.4	8.7		39	9.9	40		138			72	--	.8		248	.34	5.62	138	25	1.5	463	6.8	
Sept. 22-30.....	4.2	9.4		44	19	75		164		11	146	--	.2		386	.52	4.38	188	54	2.4	741	6.9	
Weighted average	b57.4	8.7		48	19	64		180		20	119	--	1.6		373	0.51	66.0	197	50	1.9	682	7.3	
Time-weighted average.....	--	7.0		54	28	100		213		26	186	--	0.7		514	--	--	248	73	2.7	948	7.4	
Tons per day....	--	1.5		8.4	3.3	11		32		3.5	21	--	0.3		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge based on 365 days; mean discharge for 320 days of actual flow, 65.4 cfs.

BRAZOS RIVER BASIN--Continued

8-1065. LITTLE RIVER AT CAMERON, TEX.

LOCATION.--At bridge on U.S. Highway 77, 2,020 feet downstream from gaging station, 0.5 mile upstream from Gulf, Colorado and Santa Fe Railway Co. bridge, and 2 miles southeast of Cameron, Milam County.

DRAINAGE AREA (revised).--6,982 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1963.

Water temperatures: October 1959 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 539 ppm Sept. 21-30; minimum, 176 ppm Dec. 21-22.

Hardness: Maximum, 292 ppm Feb. 1-17; minimum, 108 ppm Dec. 21-22.

Specific conductance: Maximum daily, 1,280 micromhos Sept. 25, 26; minimum daily, 255 micromhos Nov. 28.

Water temperatures: Mximum, 90°F on many days during the summer months; minimum, 39°F Jan. 27.

EXTREMES, 1959-63.--Dissolved solids: Maximum, 607 ppm Sept. 29, 1960; minimum, 130 ppm June 25-26, 1960.

Hardness: Maximum, 292 ppm Feb. 1-17, 1963; minimum, 92 ppm June 25-26, 1960.

Specific conductance: Maximum daily, 1,280 micromhos Sept. 25, 26, 1963; minimum daily, 191 micromhos June 26, 1960.

Water temperatures: Maximum, 90°F on many days during summer months; minimum, 39°F Jan. 12, 13, 1962 Jan. 27, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-8, 1962....	294	14		53	11	36		184		39	42	0.4	4.2		a294	0.40	233	177	26	1.2	495	7.6	
Oct. 9-14.....	2188	13		38	5.2	15		115		31	14	--	3.0		a179	.24	1060	116	22	.6	294	7.3	
Oct. 15-Nov. 1....	799	12		52	12	29		180		34	40	--	2.8		a277	.38	598	179	32	.9	471	7.3	
Nov. 2-15.....	115	13		66	15	49		236		40	65	.4	5.0		a372	.51	116	226	32	1.4	634	7.9	
Nov. 16-26.....	165	11		76	17	59		275		47	76	--	6.9		428	.58	191	260	34	1.6	733	7.6	
Nov. 27-30.....	5474	14		40	4.5	19		118		32	18	--	5.7		191	.26	2820	118	22	.8	313	7.8	
Dec. 1-20.....	769	12		63	13	36		203		44	51	.4	3.8		a326	.44	677	210	44	1.1	566	7.5	
Dec. 21-22.....	3835	13		36	4.3	18		100		36	17	--	2.8		176	.24	1820	108	26	.8	291	7.4	
Dec. 23-31.....	826	10		68	11	41		191		62	56	--	5.7		a356	.48	794	214	58	1.2	603	7.0	
Jan. 1-15, 1963...	591	8.6		66	14	39		211		47	57	.4	3.2		a344	.47	549	222	49	1.1	601	7.2	
Jan. 16-31.....	257	6.6		81	17	48		261		59	69	--	4.8		a435	.59	302	272	58	1.3	739	7.4	
Feb. 1-17.....	176	3.0		84	20	60		286		62	82	.4	8.8		a469	.64	223	292	58	1.5	810	7.7	
Feb. 18-21.....	3806	8.0		52	6.4	28		129		54	34	--	9.3		a273	.37	2810	156	50	1.0	443	7.1	
Feb. 22-28.....	349	7.4		81	13	47		231		68	64	--	8.6		403	.55	380	256	66	1.3	708	7.0	
Mar. 1-23.....	289	4.1		80	17	52		247		62	78	.4	4.8		419	.57	327	270	67	1.4	751	7.1	
Mar. 24-31.....	395	7.1		65	14	41		210		49	59	--	2.2		a347	.47	370	220	48	1.2	606	7.1	
Apr. 1-30.....	352	6.3		74	15	49		239		58	65	.8	4.2		390	.53	371	246	50	1.4	681	7.2	
May 1-9.....	243	6.1		74	16	53	3.5	264		53	70	.5	3.6		410	.56	269	250	34	1.5	703	7.7	
May 10-20.....	584	8.1		57	14	39		202		38	56	--	1.5		313	.43	494	200	34	1.2	548	7.3	
May 21-31.....	240	8.5		61	16	51		216		42	76	--	2.0		362	.49	235	218	41	1.5	633	7.0	
June 1-15.....	315	8.0		58	16	42		218		41	56	.4	.5		329	.45	280	210	32	1.3	579	7.1	
June 16-30.....	510	7.1		52	14	44		182		41	64	--	.5		312	.42	430	187	38	1.4	563	7.1	
July 1-15.....	440	8.2		54	13	37	4.1	184		39	56	.4	.0		302	.41	359	188	37	1.2	525	7.0	
July 16-31.....	36.4	8.4		62	19	55		242		57	66	--	.0		386	.52	37.9	232	34	1.6	660	7.1	
Aug. 1-14.....	22.9	7.0		62	24	68		272		67	76	.4	.0		438	.60	27.1	253	30	1.9	772	7.3	
Aug. 15-31.....	19.6	8.2		63	25	81		294		74	84	--	.0		480	.65	25.4	260	19	2.2	833	7.5	
Sept. 1-15.....	18.1	9.9		62	26	76		296		73	76	.4	.0		469	.64	22.9	262	19	2.0	822	7.2	
Sept. 16-20.....	279	11		52	12	49		204		46	48	--	2.2		320	.44	241	179	13	1.6	561	7.2	
Sept. 21-30.....	39.8	10		63	22	108		196		41	198	--	.8		539	.73	57.9	248	87	3.0	1020	7.0	
Weighted average	475	9.9		57	11	35		181		44	46	--	4.1		301	0.41	385	187	39	1.1	516	7.3	
Time-weighted average.....	--	8.5		65	16	50		227		51	67	--	3.1		375	--	--	228	42	1.4	654	7.2	
Tons per day....	--	13		73	14	45		232		57	59	--	5.3		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1087. BRAZOS RIVER AT STATE HIGHWAY 21, NEAR BRYAN, TEX.

LOCATION.--At bridge on State Highway 21, 2 miles upstream from Little Brazos River, about 8 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 1961 to September 1963.

Water temperatures: August 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,200 ppm Nov. 28-29.

Hardness: Maximum, 488 ppm Apr. 11; minimum, 110 ppm Nov. 28-29.

Specific conductance: Maximum daily, 1,890 micromhos Sept. 26-28; minimum daily, 331 micromhos Nov. 29.

Water temperatures: Maximum, 88°F June 16, Aug. 12; minimum, 38°F Jan. 25.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 1,200 ppm Apr. 11, 1963; minimum, 186 ppm Nov. 28-29, 1962.

Hardness: Maximum, 488 ppm Apr. 11, 1963; minimum, 110 ppm Nov. 28-29, 1962.

Specific conductance: Maximum daily, 1,890 micromhos Sept. 26-28, 1963; minimum daily, 319 micromhos June 12, 1962.

Water temperatures: Maximum, 89°F Sept. 3, 8, 1961, June 24, 25, July 5, 1962; minimum, 38°F Jan. 25, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Bryan. 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 1962 to September 1963

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)	Boiron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium		Non-carbonate
Oct. 1-15, 1962...	5191	11		88	17	171		126	175	265	0.4	1.8		791	1,100	290	186	1,380	
Oct. 16-31.....	2706	9.9		81	16	138		147	142	212		1.8		673	4,920	268	148	1,190	
Nov. 1-15.....	1066	13		91	17	153		164	162	230		1.5		804	2,310	297	162	1,300	
Nov. 16-27.....	1428	7.4		93	18	158		172	163	240		.8		821	3,170	306	165	1,380	
Nov. 28-29.....	11850							100	35	29				186	5,950	110	28	331	
Nov. 30.....	5490							110	82	94					77	167	77	649	
Dec. 1-21.....	2434	8.6		81	15	122		148	134	188		.4	1.2	4685	4,500	264	142	1,100	
Dec. 22-31.....	3191	8.7		72	12	92		145	113	135			2.3	506	4,360	229	110	888	
Jan. 1-15, 1963...	1389	8.3		85	16	121		182	129	180		1.8		4660	2,480	278	129	1,100	
Feb. 1-17.....	924	3.8		90	18	139		196	146	202		1.8		4701	95	298	138	1,200	
Feb. 18-19.....	4990	5.2		64	14	78		146	106	109		2.2		450	61	217	98	785	
Feb. 20-21.....	7935	11		47	6.3	34		101	70	39			8.1	265	36	143	60	443	
Feb. 22-28.....	1861	7.4		80	13	108		157	128	158		3.2		4589	80	253	124	997	
Mar. 1-31.....	1095	2.9		86	17	130		187	140	190			3	4690	94	284	132	1,140	
Apr. 1-10.....	2168	7.4		84	15	113		167	140	164		2.0		4623	85	271	134	1,040	
Apr. 11.....	1040	18		146	30	244		478	303	220			1.2	1200	1.63	3370	488	1,840	
Apr. 12-30.....	952	3.9		86	17	144		180	148	210			1.2	4717	.98	284	137	1,210	
May 1-15.....	1627	6.5		87	16	151		164	155	222		.8		720	.98	283	148	1,220	
May 16-31.....	1841	6.2		86	16	155		163	146	235			1.0	725	.99	280	147	1,220	
June 1-30.....	3637	6.9		91	16	169		151	160	262		.3	.5	780	1.06	293	170	1,320	
July 1-15.....	2570	8.6		90	17	168	5.1	150	160	268		.3		791	1.08	294	172	1,360	
July 16-31.....	966	7.3		98	23	206		149	194	328			.0	929	1.26	339	217	1,600	
Aug. 1-31.....	640	7.6		98	23	228		152	204	352		.4	.5	988	1.34	339	214	1,730	
Sept. 1-16.....	535	7.1		95	25	228		140	210	355		.4	.5	990	1.35	340	226	1,750	
Sept. 17-30.....	551	7.7		95	23	203		172	186	310			.8	910	1.24	332	190	1,600	
Weighted average	1896	7.9		84	16	143		153	146	217			1.3	703	0.96	274	150	1,200	
Time-weighted average.....		7.3		88	18	156		162	157	237			1.1	758		292	159	1,290	
Tons per day.....		40		429	81	730		781	750	1110			6.7						

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1100. YEGUA CREEK NEAR SOMERVILLE, TEX.

LOCATION.--At gaging station at bridge on State Highway 36, 760 feet downstream from Gulf, Colorado and Santa Fe Railway Co. bridge, 2 miles south of Somerville, Burleson County, and 5 miles upstream from Davidson Creek.

DRAINAGE AREA (revised).--1,008 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1963.

Water temperatures: September 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 858 ppm Mar. 5-31; minimum, 82 ppm Nov. 27-30.

Hardness: Maximum, 430 ppm Apr. 1-4; minimum, 39 ppm Oct. 9-11.

Specific conductance: Maximum daily, 1,360 micromhos Apr. 2, 3; minimum daily, 84 micromhos Oct. 9.

Water temperatures: Minimum, 41°F Jan. 16, 23.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 884 ppm Apr. 1-15, 1962; minimum, 43 ppm Sept. 13-14, 1961.

Hardness: Maximum, 430 ppm Apr. 1-4, 1963; minimum, 18 ppm Sept. 13-14, 1961.

Specific conductance: Maximum daily, 1,380 micromhos Apr. 14, 1962; minimum daily, 53 micromhos Sept. 13, 1961.

Water temperatures: Minimum, 41°F Jan. 16, 23, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow June 22, 23, July 12 to Sept. 15, Sept. 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-8, 1962....	264	18		20	4.0	22		38		43	26	0.3	0.0		152	0.21	108	66	35	1.2	24	6.5
Oct. 9-11.....	450	--		--	--	--		24		24	12	--	--		--	--	--	39	19	--	140	6.3
Oct. 12-28.....	98.2	16		26	6.5	27		56		51	36	--	.0		190	.26	50.4	92	46	1.2	327	6.1
Oct. 29-31.....	759	--		--	--	--		38		20	17	--	--		--	--	--	47	16	--	157	6.6
Nov. 1-4.....	248	--		--	--	--		47		48	32	--	--		--	--	--	78	40	--	288	6.9
Nov. 5-16.....	18.4	17		42	9.5	44		75		89	59	.3	.8		a328	.45	16.3	144	82	1.6	496	7.0
Nov. 17-26.....	8.8	21		61	13	59		108		126	81	--	.5		a438	.60	10.4	206	117	1.8	675	7.0
Nov. 27-30.....	2762	--		--	--	--		35		16	13	--	--		82	--	--	40	11	--	136	6.7
Dec. 1-5.....	1618	12		16	4.1	16		39		28	20	.3	.8		116	.16	507	57	25	.9	191	6.7
Dec. 6-11.....	381	15		32	8.9	28		52		66	46	--	.8		223	.30	229	116	74	1.1	382	6.7
Dec. 12-24.....	144	20		55	12	49		86		113	74	--	.5		a399	.54	155	186	116	1.6	608	7.1
Dec. 25-31.....	2454	11		16	4.2	16		34		31	22	--	.8		118	.16	782	57	29	.9	199	6.1
Jan. 1-3, 1963....	696	17		34	7.9	32		54		71	47	.3	.8		237	.32	445	117	73	1.3	394	7.0
Jan. 4-19.....	96.2	24		81	18	73		106		177	116	--	.5		542	.74	141	276	189	1.9	882	7.2
Jan. 20-21.....	520	--		--	--	--		52		85	55	--	--		--	--	--	132	89	--	456	7.0
Jan. 22-31.....	117	20		84	22	80		90		207	131	--	.5		a646	.88	204	300	226	2.0	959	6.9
Feb. 1-17.....	47.2	18		116	29	114		121		290	181	.3	.2		a836	1.14	107	409	310	2.5	1280	6.8
Feb. 18.....	404	--		--	--	--		42		126	92	--	--		--	--	--	170	136	--	633	6.8
Feb. 19-21.....	3097	--		--	--	--		24		26	19	--	--		--	--	--	43	23	--	163	6.7
Feb. 22-26.....	156	11		23	6.5	25		34		55	38	--	.8		176	.24	746	84	56	1.2	299	6.0
Feb. 27-28.....	332	20		44	11	42		62		100	64	--	.8		312	.42	280	155	104	1.5	513	7.0
Mar. 1-4.....	123	19		72	17	69		90		171	104	.3	.8		a546	.74	181	250	176	1.9	808	7.3
Mar. 5-31.....	51.0	19		114	29	110		126		280	175	--	.5		858	1.17	118	404	300	2.4	1250	7.1
Apr. 1-4.....	28.0	22		123	30	123		148		295	190	.4	.5		857	1.17	64.8	430	309	2.6	1360	7.3
Apr. 5.....	134	18		73	16	76		76		168	124	--	1.5		514	.70	186	248	186	2.1	836	7.1
Apr. 6-13.....	911	14		34	8.8	35		46		80	54	--	1.0		250	.34	615	121	83	1.4	420	6.9
Apr. 14-17.....	106	18		58	15	60		80		134	92	--	1.0		417	.57	119	206	140	1.8	688	7.0
Apr. 18-30.....	34.2	21		91	25	91		120		214	146	--	.8		648	.88	59.8	330	232	2.2	1040	7.2
May 1-20.....	21.1	22		92	25	98		120		218	154	.4	1.0		669	.91	38.1	332	234	2.3	1060	7.5
May 21.....	47.0	15		57	13	60		76		131	90	--	1.5		404	.55	51.3	196	133	1.9	673	7.2

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1100. YEGUA CREEK NEAR SOMERVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
May 22-31, 1963...	25.8	17		82	22	88		102		196	140	--	1.0		596	0.81	41.5	295	212	2.2	969	7.3	
June 1-21,	1.9	18		91	24	94		139		187	155	1.0	.8		639	.87	3.28	326	212	2.3	1050	7.2	
June 24-30,	15.1	15		59	14	72		91		146	95	--	1.2		447	.61	18.2	204	130	2.2	738	7.0	
July 1-11,	7.1	21		45	10	45	5.2	138		61	59	.5	1.2		316	.43	6.06	154	40	1.6	521	7.2	
Sept. 16-19,	32.2	11		22	4.6	27		27		67	28	--	1.5		174	.24	15.1	74	52	1.4	302	6.4	
Sept. 20-29,	2.6	17		68	16	70		65		186	100	--	.8		490	.67	3.44	236	182	2.0	811	6.8	
Weighted average	b234	13		27	6.5	26		44		57	39	--	0.6		194	0.26	151	93	57	1.2	316	6.4	
Time-weighted average.....	--	18		66	16	66		91		151	101	--	0.6		479	--	--	232	158	1.9	754	6.7	
Tons per day....	--	10		21	5.1	21		35		44	30	--	0.5		--	--	--	--	--	--	--	--	--

b Mean discharge based on 365 days; mean discharge for 296 days of actual flow, 288 cfs.

BRAZOS RIVER BASIN--Continued

8-1110. 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 (revised).--1,429 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1963.

Water temperatures: October 1958 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,410 ppm Apr. 12-21; minimum, 64 ppm June 20-22.

Hardness: Maximum, 258 ppm Apr. 12-21; minimum, 26 ppm June 20-22.

Specific conductance: Maximum daily, 3,000 micromhos Apr. 16; minimum daily, 83 micromhos June 20.

Water temperatures: Maximum, 86°F July 10, 11, 21; minimum, 35°F Jan. 24.

EXTREMES, 1958-63.--Dissolved solids: Maximum, 1,810 ppm Dec. 1-4, 1961; minimum, 52 ppm Nov. 22, 1960.

Hardness: Maximum, 355 ppm June 25, 1960; minimum, 22 ppm Nov. 22, 1960.

Specific conductance: Maximum daily, 3,880 micromhos Dec. 2, 1961; minimum daily, 83 micromhos June 20, 1963.

Water temperatures: Maximum, 89°F Aug. 4, 1959; minimum, 33°F Jan. 13, 1962.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Sept. 1-21.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-6, 1962....	59.3	14		26	7.2	49		55		56	69	0.2	0.8		a260	0.35	41.6	94	49	2.2	443	7.2
Oct. 7-15.....	19.5	11		36	8.1	91		59		49	157	--	1.2		a404	.55	21.3	124	75	3.5	717	6.9
Oct. 16-31.....	9.5	12		30	7.3	79		59		38	133	--	.8		a358	.49	9.18	105	56	3.3	614	7.2
Nov. 1-14.....	18.6	15		24	6.6	52		60		35	81	.3	.0		244	.33	12.3	87	38	2.4	438	6.7
Nov. 15-26.....	28.1	16		22	6.6	46		60		39	65	--	.2		a245	.33	18.6	82	33	2.2	392	6.9
Nov. 27-30.....	151	14		16	5.0	30		37		35	41	--	.2		159	.22	64.8	60	30	1.7	281	6.3
Dec. 1-2.....	191	--		--	--	--		34		35	60	--	--		--	--	--	67	39	--	333	6.7
Dec. 3.....	95	--		--	--	--		56		42	136	--	--		--	--	--	115	69	--	631	7.0
Dec. 4-9.....	53.5	12		42	9.6	167		56		35	300	.3	.5		594	.81	85.8	144	98	6.0	1170	6.9
Dec. 10-20.....	37.9	13		26	7.1	83		53		33	138	.2	.5		327	.44	33.5	94	50	3.7	632	6.6
Dec. 21-28.....	70.6	14		20	5.9	44		43		38	67	.2	.5		211	.29	40.2	74	39	2.2	379	6.7
Dec. 29-31.....	113	15		15	4.7	24		31		34	33	.2	.2		141	.19	43.0	57	31	2.4	244	6.8
Jan. 1-15, 1963...	45.8	20		24	7.8	43		40		48	72	.2	.5		236	.32	29.2	92	59	1.9	416	6.6
Jan. 16-31.....	39.2	20		28	8.9	56		43		54	96	--	.5		284	.39	30.1	106	71	2.4	510	6.4
Feb. 1-18.....	31.6	19		31	9.2	75		38		58	133	.2	.2		a364	.50	31.1	116	84	3.0	621	6.9
Feb. 19-20.....	732	12		12	3.1	25		25		25	35	--	2.0		126	.17	249	43	22	1.7	220	7.1
Feb. 21-28.....	227	13		22	6.6	49		29		50	79	--	1.2		235	.32	144	82	58	2.4	421	6.4
Mar. 1-7.....	90.0	15		38	13	116		42		67	210	.2	.2		480	.65	117	148	114	4.1	888	6.7
Mar. 8-10.....	68.0	17		65	17	320		58		72	570	--	.5		1090	1.48	200	232	184	9.1	1760	7.0
Mar. 11-20.....	54.3	16		36	11	93		49		73	157	--	.5		a445	.61	65.2	135	95	3.5	752	7.0
Mar. 21-31.....	37.1	15		36	11	91		63		63	152	--	.5		a432	.59	43.3	135	84	3.4	725	6.7
Apr. 1-4.....	29.2	17		31	9.6	63	4.5	63		62	102	.3	.8		321	.44	25.3	117	66	2.5	567	6.9
Apr. 5-7.....	598	13		14	3.9	16		29		19	30	--	--		110	.15	178	51	27	1.0	212	6.8
Apr. 8-10.....	298	15		26	8.8	45		29		79	65	--	1.0		254	.35	204	101	77	1.9	422	6.3
Apr. 11.....	120	--		--	--	--		44		--	155	--	--		--	--	--	142	106	--	725	6.6
Apr. 12-21.....	40.1	14		72	19	440		68		54	780	--	1.8		1410	1.92	153	258	202	12	2670	6.7
Apr. 22-30.....	24.3	15		46	13	230		72		55	390	--	1.8		786	1.07	51.6	168	110	7.7	1500	6.5
May 1-2.....	17.0	22		44	13	183		78		63	305	.3	.8		669	.91	30.7	164	100	6.2	1200	7.5

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1110. NAVASOTA RIVER NEAR BRYAN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonylate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
May 3-20, 1963.....	24.0	16		34	9.5	123		73		50	198	--	0.8			467	0.64	30.3	124	64	4.8	846	
May 21-23.....	346	9.9		14	4.4	32		27		30	48	--	1.8			153	.21	143	53	31	1.9	274	
May 24-26.....	80.3	14		24	7.3	86		39		36	147	--	1.5			335	.46	72.6	90	58	3.9	616	
May 27-31.....	19.8	12		18	5.1	43		45		29	64	--	1.8			195	.27	10.4	66	29	2.3	347	
June 1-19.....	25.2	15		20	6.8	43		48		40	62	.3	1.5			213	.29	14.5	78	38	2.1	369	
June 20-22.....	210	5.3		7.5	1.8	11		18		13	13	--	1.8			64	.09	36.3	26	11	.9	113	
June 23-24.....	25.0	--		--	--	--		36		20	20	--	--			--	--	--	44	14	--	171	
June 25-30.....	11.2	13		22	5.6	38		58		32	56	--	.8			196	.27	5.93	78	30	1.9	344	
July 1-31.....	5.4	12		30	8.8	70	4.4	82		39	114	.3	.8			319	.43	4.65	111	44	2.9	583	
Aug. 1-31.....	8.12			36	10	87		106		46	130	.4	.8			374	.51	8.1	131	44	3.3	690	
Sept. 22-30.....	2.0	10		38	12	92		116		45	142	.3	.8			397	.54	2.14	144	50	3.3	753	
Weighted average	b48.7	14		24	7.2	66		40		43	110	--	1.0			288	0.39	40.0	90	57	4.0	516	
Time-weighted average.....	--	14		30	8.8	88		61		46	145	--	0.8			370	--	--	112	62	4.6	667	
Tons per day.....	--	1.9		3.4	1.0	9.2		6		6.0	15	--	0.1			--	--	--	--	--	--	--	--

b Mean discharge based on 365 days; mean discharge for 344 days of actual flow, 51.7 cfs.

BRAZOS RIVER BASIN--Continued
8-1140. BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59 in Richmond, Fort Bend County, and 925 feet downstream from Texas and New Orleans Railroad Co. bridge. DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1963.

Water temperatures: November 1950 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 903 ppm Aug. 1-19; minimum, 159 ppm Dec. 26.

Hardness: Maximum, 325 ppm Aug. 1-19; minimum, 97 ppm Dec. 26.

Specific conductance: Maximum daily, 1,690 micromhos Sept. 9; minimum daily, 257 micromhos Dec. 26.

Water temperatures: Maximum, 87°F Sept. 7, 8; minimum, 39°F Jan. 28, 29.

EXTREMES, 1945-63.--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 (1950-63): Maximum, 91°F Aug. 5, 1951; minimum, 39°F Jan. 4, 1959, Jan. 28, 29, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)			
													Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate		Sodium sulfate ratio		
Oct. 1-12, 1962	4024	13		80	16	155		130		156	235	0.4	1.2	8783	1.06	8510	266	159	4.1	1280	7.8
Oct. 13-31	5432	12		77	15	132		141		136	200		.8	8695	.95	10190	254	138	3.6	1120	7.6
Nov. 1-15	2169	11		80	15	122		177		123	178	.3	.5	8643	.87	3770	261	116	3.3	1060	7.2
Nov. 16-28	1537	12		96	17	140		227		138	202		.2	8743	1.01	3080	310	124	3.5	1220	7.4
Nov. 29-30	10640	11		52	9.1	76		120		75	110		1.5	394	.54	11320	167	68	2.6	691	7.7
Dec. 1-4	11100	10		35	4.6	23		100		32	27	.4	3.2	1184	.25	5510	106	24	60	321	7.0
Dec. 5-12	4926	12		52	7.5	63		106		73	94		1.8	355	.48	4720	160	74	2.2	626	7.0
Dec. 13-25	3121	11		76	12	104		154		111	158		1.5	8553	.75	4660	239	113	2.9	957	7.2
Dec. 26	9120							98		21	24			159	.22	3980	97	16	--	257	7.0
Dec. 27-29	9540							103		54	62			--	--	--	134	50	--	480	7.3
Dec. 30-31	14800							97		25	30			--	--	--	101	22	--	285	7.1
Jan. 1-4, 1963	8438	11		32	4.2	20		87		27	28	.3	.8	166	.23	3780	98	26	.9	290	7.1
Jan. 5-9	3668	11		42	6.5	36		104		45	54		1.5	247	.34	2450	132	46	1.4	434	7.1
Jan. 10-17	2605	11		74	12	83		174		94	123		1.2	8500	.68	3520	234	92	2.4	841	7.4
Jan. 18-31	2887	9.2		70	13	80		160		92	123		1.0	8476	.65	3710	228	97	2.3	818	7.1
Feb. 1-18	1539	8.7		86	17	108		208		117	160	.4	.8	8622	.85	2580	284	114	2.8	1040	7.2
Feb. 19-21	7477	7.9		58	10	66		144		70	96		1.8	381	.52	7690	186	68	2.1	676	7.2
Feb. 22-28	8560	11		37	5.1	32		92		46	41		2.5	220	.30	5080	114	38	1.3	378	7.0
Mar. 1-4	3055	13		46	7.3	50		96		64	76	.3	1.8	305	.41	2520	145	66	1.8	537	6.9
Mar. 5-12	1825	12		66	11	72		156		84	106		1.0	429	.58	2110	210	82	2.2	747	7.1
Mar. 13-31	1512	9.2		85	16	104		204		114	155		.0	583	.79	2380	278	111	2.7	1020	7.1
Apr. 1-6	1277	7.5		84	17	119		205		120	172	.5	.5	8632	.86	2180	280	112	3.1	1060	7.5
Apr. 7-16	5816	12		41	5.9	32		103		46	44		3.0	235	.32	3690	127	42	1.2	405	7.1
Apr. 17-20	1998	10		57	9.7	72		122		89	103		1.0	8411	.56	2220	182	82	2.3	691	7.0
Apr. 21-30	870	11		82	16	110		190		113	168		.0	8626	.85	1470	270	115	2.9	1020	7.4
May 1-28	1247	9.6		82	17	140		186		137	200	.4	1.5	678	.92	2280	274	122	3.7	1140	7.4
May 29-31	1837	12		59	12	89		144		85	129		1.2	458	.62	2270	196	78	2.8	791	7.6

a. Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1140. BRAZOS RIVER AT RICHMOND, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
June 1-9, 1963.....	1656	11		81	17	140		160		135	215	0.4	0.8	679	0.92	272	141	3.7	1170	7.1	
June 10-30.....	3751	10		89	17	162		147		156	255	--	1.2	762	1.04	292	172	4.1	1320	7.2	
July 1-31.....	1950	12		84	19	157	5.3	158		147	245	.3	1.0	749	1.02	288	158	4.0	1280	6.8	
Aug. 1-19.....	700	14		94	22	201		171		178	308	.4	1.5	903	1.23	325	185	4.8	1580	7.0	
Aug. 20-31.....	312	15		90	23	187		191		162	282	--	2.2	855	1.16	319	162	4.5	1490	7.0	
Sept. 1-15.....	483	14		86	23	207		162		179	310	.4	.5	900	1.22	309	176	5.1	1580	7.1	
Sept. 16-30.....	661	13		86	22	191		176		166	285	--	1.8	852	1.16	305	161	4.8	1500	7.0	
Weighted average...	2759	11		66	12	97		140		100	145	--	1.3	513	0.70	215	100	2.8	871	7.2	
Time-weighted average.....	--	11		77	16	125		162		123	188	--	1.1	631	--	256	123	3.3	1080	7.1	
Tons per day.....	--	82		491	91	721		1040		748	1080	--	10	--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-1167. BRAZOS RIVER AT HARRIS RESERVOIR NEAR ANGLETON, TEX.

LOCATION.--At Harris Pumping Plant of Dow Chemical Company, 10 miles northwest of Angleton, Brazoria County.

DRAINAGE AREA.--44,000 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1962 to September 1963.

EXTREMES, 1962-63.--Specific conductance: Maximum daily, 2,190 micromhos Dec. 4, Jan. 19; minimum daily, 294 micromhos Jan. 4.

EXTREMES, January 1962 to September 1963.--Specific conductance: Maximum daily, 3,050 micromhos May 29, 1962; minimum daily, 294 micromhos Jan. 4, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-12, 1962...		16		81	15	158		130		154	238	0.4	2.8		a743	1.01		264	157	4.2	1250	7.5
Nov. 13-16, 19-21, 23.....		16		83	18	138		193		135	200	--	.8		a707	.96		281	123	3.6	1190	7.8
Dec. 10-19.....		12		66	10	84		138		93	124	.4	2.2		460	.63		206	92	2.5	797	7.4
Jan. 1-6, 1963....		13		33	4.6	23		94		26	33	.3	1.0		180	.24		101	24	1.0	318	7.0
Feb. 2-18.....		10		87	17	113		214		118	165	.4	.8		616	.84		287	112	2.9	1050	7.8
Mar. 14-31.....		9.3		86	17	104		214		111	155	.3	.0		588	.80		284	109	2.7	1010	7.7
Apr. 11-16.....		14		35	6.0	35		93		47	42	.4	3.2		229	.31		112	36	1.4	377	7.0
Apr. 25-30.....		12		92	19	107		257		91	165	.5	.5		613	.83		308	97	2.7	1050	7.8
May 1-28.....		11		70	19	139		180		118	200	.3	.5		644	.88		252	105	3.8	1090	7.8
June 10-30.....		11		86	16	170		146		155	260	.3	2.0		772	1.05		280	161	4.4	1310	7.5
July 5-14.....		15		79	14	140	5.3	146		133	222	.3	1.0		682	.93		254	135	3.8	1160	7.2
Aug. 4-15.....		16		93	23	181		201		148	282	.4	2.2		845	1.15		326	162	4.4	1500	7.3
Sept. 1-15.....		18		75	25	180		182		142	270	.3	2.5		802	1.09		290	141	4.6	1400	7.4

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1172. BRAZOS RIVER AT BRAZORIA RESERVOIR, NEAR BRAZORIA, TEX.

LOCATION.--At Brazoria Pumping Plant of Dow Chemical Company, 1.5 miles east of Brazoria, Brazoria County.
 DRAINAGE AREA.--44,000 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: January 1962 to September 1963.
 EXTREMES 1962-63.--Specific conductance: Maximum daily, 37,000 micromhos Aug. 28; minimum daily, 273 micromhos Jan. 4.
 EXTREMES, January 1962 to September 1963.--Specific conductance: Maximum daily, 37,000 micromhos Aug. 28, 1963; minimum daily, 273 micromhos Jan. 4, 1963.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-5, 8-12, 1962.....		12		82	15		163		127	162	245	0.4	2.5	a754	1.03		266	162	4.4	1270	7.5	--
Nov. 19-21, 23, 26-29.....		10		86	18		141		209	135	200	--	.5	a710	.97		288	117	3.6	1210	7.7	--
Dec. 11-20.....		12		63	10		79		134	89	117	.4	2.0	438	.60		198	88	2.4	769	7.3	--
Jan. 1-7, 1963.		12		32	4.0		25		86	27	35	.8	1.2	179	.26		96	26	1.1	309	7.6	--
Feb. 3-19.....		9.4		86	17		116		211	117	170	.4	.5	a645	.88		284	112	3.0	1060	7.7	--
Mar. 15, 18-22, 25-31.....		10		81	17		101		202	109	150	.3	.0	567	.77		272	106	2.7	994	7.5	--
Apr. 12-17.....		13		37	5.8		34		96	46	43	.3	2.2	228	.31		116	38	1.4	386	7.0	--
Apr. 26-30.....		12		80	89		788		124	248	1360	--	1.5	2640	3.59		566	464	14	4570	7.2	--
May 1-13.....		11		120	180		1600		134	444	2800	--	--	5220	7.10		1040	930	22	8600	7.5	--
May 17-20.....		14		72	24		140		232	96	205	.4	1.8	667	.91		278	88	3.7	1190	7.8	--
June 10-30.....		9.5		86	16		163		148	150	252	.3	1.8	752	1.02		280	159	4.2	1300	7.6	--
July 6-15.....		12		75	16		140		144	128	215	.5	2.2	660	.90		253	135	3.8	1140	7.4	--
Aug. 5-16.....		9.6		210	456		4040		176	1030	7060	--	--	12900	17.7		2400	2260	36	19500	7.1	1.008
Sept. 1-6, 9-13		9.4		286	750		6540		143	1620	11500	--	--	20800	28.7		3800	3680	46	30100	7.1	1.014

a. Residue at 180°C.

BRAZOS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			

8-0808. WHITE RIVER NEAR CROSBYTON

May 8, 1963	0.92	33		38	41	63	11	408		48	22	4.0	0.2		461	0.63	264	0	1.7		738	7.7
Aug. 8	.36	35		39	36	71	384		45	20	20	4.1	.0		439	.60	246	0	2.0		702	7.2

8-0810.5. SHORT CROTON CREEK AT MOUTH NEAR JAYTON

Oct. 12, 1962	a0.05									3,260	12,500						3,740		57		32,600	
Jan. 18, 1963	a .01									3,070	14,200						3,930		62		34,400	
Feb. 14	a .03									3,720	21,200						4,760		84		47,300	
Mar. 14	.02									3,590	19,200						4,480		--		47,000	
June 12	1.62									2,030	4,130						2,430		--		14,100	
Sept. 12	.62									3,510	19,500						4,300		--		46,400	

8-0811. CROTON CREEK BELOW SHORT CROTON CREEK NEAR JAYTON

Dec. 13, 1962	2.41									3,070	10,800						3,900		46		28,100	
Jan. 18, 1963	.85									3,300	13,700						4,020		59		33,700	
Feb. 14	1.20									3,560	15,200						4,460		62		37,000	
Mar. 14	.12									4,390	19,300						4,950		--		47,300	
May 8	9.29									2,210	2,900						2,480		--		10,800	
June 12	72.4									1,880	2,150						2,120		--		8,750	
July 19	.56									2,770	4,670						3,100		--		15,600	
Sept. 12	1.36									3,090	11,000						3,650		50		29,900	

8-0827. MILLERS CREEK NEAR MUNDAY

Oct. 10, 1962	434									4.8	30	0.3	2.2		111	0.15	87	1	0.2		191	6.9
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MILLERS CREEK NEAR SEYMOUR

Nov. 13, 1962	a0.14	11		92	38					244	56	0.3	1.0		b638	0.87	386	209	1.3		943	6.8
Dec. 13	2.55	13		101	38	58	216			202	80	.3	1.0		b670	.91	408	184	1.4		1,000	6.9
Jan. 17, 1963	a .20	2.3		109	33	63	150			305	72	.3	1.0		660	.90	408	284	1.4		1,010	7.1
Feb. 14	a .10	1.4		210	115	218	316			784	280	.4	1.2		1,760	2.39	997	738	3.0		2,440	6.9
Mar. 8	a .2	1.2		228	134	266	304			956	320	.4	1.8		2,060	2.80	1,120	871	3.5		2,750	7.0
Apr. 8	6.42	14		72	25	53	188			147	63	.4	1.8		468	.64	282	128	1.4		750	6.7
May 9	2.59	10		47	14	24	142			77	28	.2	2.0		b300	.41	175	58	1.4		462	6.9
June 11	34.7	12		36	7.1	20	137			24	17	.4	.0		184	.25	119	7	.8		321	6.7

a Field estimate.
b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)
														parts per million	Tons per acre-foot	Calcium Magnesium	Non-carbonate	

LAKE FORT PHANTOM HILL NEAR ABILENE

Aug. 16, 1963		4.0	0.01	46	15	46		160		42	72	0.4	0.5	305	0.41	176	46	1.5	549	7.1
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NORTH ANSON LAKE NEAR ANSON

Aug. 15, 1963		9.2	0.01	72	23	44		160		157	52	0.4	1.0	438	0.60	274	143	1.2	694	7.2
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CALIFORNIA CREEK AT U.S. HIGHWAY 277 NEAR STAMFORD

Nov. 14, 1962	2.19	3.2		465	307	751		251		2,180	1,120		1.5	4,950	6.73	2,420	2,220	6.6	6,350	6.8	
Jan. 18, 1963	1.43	12				1,220	16			4,460	2,240									11,300	
Mar. 13	1.26	1.6		525	448	916	246	246		3,120	1,200		1.5	6,330	8.61	3,150	2,950	7.1	7,440	6.7	
May 9	2.23	7.2		180	120	246	8.8	188		808	360	0.4	4.9	1,830	2.49	942	788	3.5	2,590	7.0	
June 11	2.21	5.2		438	298	734	226	226		2,010	1,160		1.5	4,760	6.47	2,320	2,130	6.6	6,140	6.8	
Aug. 15	a .04	.9		362	235	820		222		1,680	1,220		1.0	4,430	6.02	1,870	1,690	8.3	6,090	6.8	

8-0860.2. HUBBARD CREEK AT U.S. HIGHWAY 380 NEAR MORAN

Jan. 2, 1963	a0.10			410	146	1,200	88			129	4,470			4,780	6.50						
Mar. 20	a .03	3.3						79		149	2,820					1,620	1,560	13	8,240	7.3	
May 27	a .06							145		69	620					480	361		2,270	7.4	

8-0861.1. SALT PRONG HUBBARD CREEK BELOW LAKE McCARTY NEAR ALBANY

Oct. 16, 1962	a0.21	19		51	26	77	209			34	137		0.8	448	0.61	234	62	2.2	826	7.3
Jan. 3, 1963	a .20	18		35	27	76	144			40	145			412	.56	198	80	2.3	767	7.2
Mar. 20	a .38									31	149									
May 28	a .35									25	124									
Sept. 19	a .05	12		63	14	89	130			30	190	0.2	2.8	465	.63	214	108	2.6	906	7.6

8-0861.2. SALT PRONG HUBBARD CREEK AT U.S. HIGHWAY 380 NEAR ALBANY

Oct. 16, 1962	a0.10									39	430									
Jan. 2, 1963	a .40									55	460									
Mar. 20	a .20									59	480									
May 27	a .06						121			20	112					149	50		603	7.3

a Field estimate.

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate				
8-0861.3. COOK CREEK NEAR ALBANY																					
May 28, 1963-----	a0.06							94	72	3,380							2,140	2,060	9,500	6.0	
8-0862.1. SNAILUM CREEK NEAR ALBANY																					
Oct. 16, 1962-----	a0.01	17		321	85	600		82	98	1,620			0.0		2,780	3.78	1,150	1,080	7.7	5,090	7.4
Mar. 4, 1963-----	a0.5	0.1		490	122	942		128	203	2,450					4,270	5.81	1,720	1,620	9.9	7,540	6.8
LAKE CISCO NEAR CISCO																					
Mar. 4, 1963-----		1.9		41	6.2	7.6	5.5	134	18	1.4	0.4	0.0			161	0.21	128	18	0.3	285	7.0
8-0862.2. BIG SANDY CREEK NEAR EOLIAN																					
Oct. 16, 1962-----	a0.36	16		32	3.4	13		86	20	20			2.8		149	0.20	94	23	0.6	253	6.6
May 28, 1963-----	a200							104	19	22							107	22		287	7.2
8-0862.3. BATTLE CREEK NEAR PUTNAM																					
Oct. 15, 1962-----	a0.15	21		102	36	63		301	189	68			0.0		627	0.85	402	156	1.4	991	7.2
Jan. 2, 1963-----	a.06							--	148	65							--	--	--	--	--
Mar. 21-----	a.08							--	98	52							--	--	--	--	--
May 27-----	a.04							169	65	30							189	50		503	6.5
May 28-----	5.19							97	10	13							90	10		229	7.3
8-0862.5. PECAN CREEK AT FARM ROAD 1853 NEAR EOLIAN																					
May 28, 1963-----	4.0							74	29	358							250	190		1,340	6.5
8-0862.6. PECAN CREEK NEAR EOLIAN																					
May 28, 1963-----	a30							87	65	3,580							2,160	2,090		10,100	7.1

a Field estimate.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
BIG SANDY CREEK AT HIGHWAY 180 NEAR BRECKENRIDGE																						
Mar. 4, 1963-----		0.0		72	12		94	113		29	220	0.3	0.2		484	0.66		229	136	2.7	963	6.9
8-0864. HUBBARD CREEK RESERVOIR NEAR BRECKENRIDGE																						
June 11, 1963----		5.5		47	7.2		46	104		15	102	0.3	1.0		275	0.37		147	62	1.7	528	6.8
Sept. 30-----		3.7	0.34	68	10	58	7.8	166		16	138	.2	.0		384	.52		210	74	1.7	737	7.1
LAKE DANIELS NEAR BRECKENRIDGE																						
Mar. 4, 1963-----		2.4		44	4.5	8.3	5.6	144		8.4	17	0.3	0.0		162	0.22		128	10	0.3	292	6.5
LAKE GRAHAM NEAR GRAHAM																						
Nov. 13, 1962----		2.7		40	7.1		47	113		6.8	92	0.3	0.0		252	0.34		129	36	1.8	505	6.8
BRAZOS RIVER AT BUNGER ROAD CROSSING NEAR GRAHAM																						
Mar. 5, 1963-----		3.3		400	122		1,800	192		1,110	2,900				6,430	8.74		1,500	1,340	20	9,970	7.1
KEECHI CREEK NEAR GRAFORD																						
Dec. 11, 1962----	14.4	9.2		84	12		35	265		43	51	0.3	0.2		b374	0.51		259	42	0.9	643	7.0
Jan. 10, 1963----	8.98	--		--	--		--	--		--	89	--	--		--	--		--	--	--	--	--
Mar. 12-----	2.38	8.8		84	20		98	227		112	143	.2	.0		b610	.83		292	106	2.5	974	7.2
Apr. 10-----	1.88	7.1		102	20	99	3.4	259		111	161	.3	.0		631	.86		337	124	2.3	1,080	7.1
May 9-----	14.3	11		80	12	51	3.9	230		60	83	.3	.2		b450	.61		249	60	1.4	715	7.2
June 11-----	1.46	9.6		49	8.2		36	146		29	59	.4	1.2		264	.36		156	36	1.3	483	6.9
July 18-----	a .02	17		74	13		53	236		46	78	.4	.0		397	.54		238	44	1.5	680	7.1

a Field estimate.
b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium			Non-carbonate

8-0905. PALO PINTO CREEK NEAR SANTO

Oct. 8, 1962	5,600	5.8		38	3.3	1.6	3.4	132	0.8	1.0	0.2	1.5	121	0.16	108	0	0.7	215	7.3
Oct. 9	7,000							142		12					125	9		278	7.3
Oct. 14	48	9.8		58	9.8		39	188	34	56	.3	.2	b312	.42	185	31	1.2	525	7.1
Oct. 21	15							259		70					256	44		711	7.3
Oct. 28	30							309		76					304	51		806	7.4
Oct. 29	78							212		75					232	58		671	7.3
Nov. 5	11	9.3		97	20		85	270	82	142	.3	.2	b605	.82	324	103	2.1	997	7.4
Nov. 27	240							159		108					232	102		763	7.0
Nov. 28	56							173		142					273	131		971	7.0

8-0920 NOLANDS RIVER AT BLODM

Oct. 10, 1962	31.4	9.6		35	2.9		23	136	18	12	0.4	0.8	169	0.23	99	0	1.0	290	6.6
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8-0935. AQUILLA CREEK NEAR AQUILLA

Oct. 10, 1962	124	9.9		87	2.6		17	206	73	12	0.5	1.8	328	0.45	228	58	0.5	501	6.6
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8-0940. GREEN CREEK SUBWATERSHED NO. 1 NEAR DUBLIN

Oct. 17, 1962		4.9		29	4.4		18	95	10	29	0.3	0.2	143	0.19	90	13	0.8	267	6.2
May 22, 1963		4.7		40	5.2		21	138	15	26	.3	.5*	181	.25	121	8	.8	338	6.7
Aug. 15		1.6		18	3.4		25	70	10	31	.3	2.0	125	.17	59	2	1.4	240	6.7

GREEN CREEK SUBWATERSHED NO. 2 NEAR DUBLIN

Oct. 17, 1962		3.8		36	7.3		30	100	23	55	0.2	0.2	204	0.28	120	38	1.2	387	6.5
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GREEN CREEK SUBWATERSHED NO. 3 NEAR DUBLIN

Oct. 17, 1962		2.7		31	5.6		28	84	17	52	0.3	0.0	178	0.24	100	32	1.2	343	6.3
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GREEN CREEK SUBWATERSHED NO. 4 NEAR DUBLIN

Oct. 17, 1962		2.0		39	6.5		25	102	23	50	0.3	0.5	196	0.27	124	40	1.0	376	6.4
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b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium			Non-carbonate

GREEN CREEK SUBWATERSHED NO. 5 NEAR DUBLIN

Oct. 17, 1962		1.7		29	8.5	22	88	17	45			0.3	0.0	166	0.23	107	35	0.9	323	6.5
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GREEN CREEK SUBWATERSHED NO. 6 NEAR DUBLIN

Oct. 16, 1962		5.3		30	3.3	4.8	9.8	9.4	12			0.2	3.0	126	0.17	88	8	0.2	224	6.3
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GREEN CREEK SUBWATERSHED NO. 7 NEAR DUBLIN

Oct. 17, 1962		0.4		31	6.8	35	100	37	42			0.3	0.2	202	0.27	105	23	1.5	373	6.5
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GREEN CREEK SUBWATERSHED NO. 8 NEAR DUBLIN

Oct. 18, 1962		3.9		29	9.6	33	122	24	40			0.5	0.2	b210	0.29	112	12	1.4	366	6.3
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8-0945. GREEN CREEK NEAR ALEXANDER

Oct. 18, 1962	0.25	3.6		41	10	32	134	29	51			0.3	0.0	233	0.32	143	34	1.2	429	6.6
Jan. 18, 1963	.65	3.3		47	18	40	197	38	55			.4	.2	299	.41	192	30	1.3	530	7.6

8-0950. NORTH BOSQUE RIVER NEAR CLIFTON

Oct. 1, 1962	8.18	10		67	6.4	13	217	18	16			0.2	3.8	b251	0.34	193	16	0.4	410	7.1
Oct. 9	3,630	8.7		44	4.1	4.9	145	8.8	7.5			.4	1.2	154	.21	127	8	.2	274	6.8
Oct. 31	59.2	7.0		56	6.4	16	188	21	16			.4	2.0	217	.30	166	12	.5	382	7.6
Nov. 30	72.9	8.9		70	7.5	21	229	29	22			.3	1.5	273	.37	206	18	.6	480	7.1
Dec. 31	24.9	6.8		77	8.5	17	238	31	24			.4	2.5	284	.39	227	32	.5	502	7.0
Jan. 30, 1963	18.2	4.2		78	9.4	22	241	39	28			.3	2.7	b312	.42	233	36	.6	528	7.3
Feb. 28	11.5	2.4		74	9.3	23	238	36	26			.4	2.2	b292	.40	223	28	.7	514	7.4
Apr. 1	7.70	5.1		66	8.8	23	215	32	28			.3	.8	b276	.38	200	24	.7	479	6.8
Apr. 30	181	6.2		64	22	63	252	57	85			.4	.2	250	.57	250	44	1.7	741	7.2
May 30	142	6.8		40	3.7	6.2	130	10	10			.2	1.8	148	.20	115	8	.3	253	6.7
June 29	11.6	8.4		39	6.5	13	140	13	16			.3	.2	165	.22	124	9	.5	285	6.9
July 31	.27	11		66	5.9	17	210	20	21			.3	2.8	247	.34	189	17	.5	418	6.9
Aug. 29	.10	12		38	7.6	21	157	12	21			.4	.0	189	.26	126	0	.8	333	6.7
Sept. 30	.07	9.8		32	7.8	23	142	11	24			.3	.2	178	.24	112	0	.9	316	7.7

b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-0953. MIDDLE BOSQUE RIVER NEAR MCGREGOR																						
Oct. 1, 1962-----	a0.05	7.2		36	2.4	6.9	2.4	110		17	5.5	0.3	0.0		132	0.18		100	10	0.3	226	6.9
Oct. 31-----	a .04	4.5		38	2.6	13		110		25	12	.5	.0		150	.20		106	15	.5	262	7.4
Nov. 30-----	a .05	4.5		47	2.6	11		127		28	12	.3	1.2		169	.23		128	24	.4	296	6.8
Dec. 31-----	a3.3	7.9		47	2.1	5.8	1.9	136		16	7.0	.4	2.0		157	.21		126	14	.2	265	7.5
Jan. 30, 1963----	3.40	4.1		66	2.8	11		183		29	10	.4	6.0		b228	.31		176	26	.4	380	7.2
Feb. 27-----	a3.1	1.5		55	2.6	12		156		27	11	.4	1.2		188	.26		148	20	.4	335	7.5
Apr. 1-----	.80	4.5		44	2.5	13		125		24	14	.4	.0		163	.22		120	18	.5	292	6.7
Apr. 30-----	a3.4	9.1		50	2.4	8.4		147		16	10	.3	1.2		169	.23		135	14	.3	291	7.0
May 29-----	32.7	9.6		44	1.0	4.9	2.0	130		9.6	5.2	.4	.8		142	.19		114	7	.2	238	6.8
8-0956. BOSQUE RIVER NEAR WACO																						
Oct. 23, 1962----	5.84	9.4		46	5.6	8.7	3.2	148		20	12	0.0	0.8		b180	0.24		138	16	0.3	310	7.1
Nov. 28-----	4.08	7.9		64	5.9	16		196		32	16	.3	.5		239	.33		184	23	.5	409	7.3
Jan. 8, 1963----	19.4	6.3		57	5.5	13		178		25	14	.4	.2		b221	.30		165	19	.4	369	6.9
Feb. 5-----	4.63	5.6		64	5.6	15		193		30	18	.3	.0		b246	.33		183	25	.5	403	6.9
Mar. 9-----	5.14	3.2		62	6.3	19		192		33	19	.3	.0		237	.32		181	23	.6	416	6.9
May 22-----	15.4	4.8		53	5.8	24		162		39	23	.4	.5		230	.31		156	23	.8	391	6.8
June 18-----	8.23	9.4		46	6.1	51		172		58	34	.4	.0		290	.39		140	0	1.9	478	7.1
COW BAYOU SUBWATERSHED NO. 1 NEAR BRUCEVILLE																						
Oct. 22, 1962----		1.2		104	10	61		128		282	23	0.7	1.0		b564	0.77		300	196	1.5	813	6.6
COW BAYOU SUBWATERSHED NO. 2 NEAR BRUCEVILLE																						
Oct. 22, 1962----		5.9		53	4.0	33		69		126	22	0.8	0.0		b281	0.38		149	92	1.2	447	6.9
COW BAYOU SUBWATERSHED NO. 3 NEAR BRUCEVILLE																						
Oct. 22, 1962----		1.6		48	4.2	23		70		96	19	0.8	0.0		b244	0.33		137	80	0.9	379	6.8

a Estimated.

b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)
															Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate	

8-0968. COW BAYOU SUBWATERSHED NO. 4 NEAR BRUCEVILLE

Oct. 22, 1962	0.10	2.0		97	7.5	34	46	264		22	1.2	0.0			b460	0.63	273	236	0.9	670	6.7
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COW BAYOU SUBWATERSHED NO. 5 NEAR BRUCEVILLE

Oct. 22, 1962		6.7		41	2.8	11	84	45		15	0.5	0.0			b175	0.24	114	45	0.4	279	6.7
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COW BAYOU SUBWATERSHED NO. 6 NEAR BRUCEVILLE

Oct. 22, 1962		7.2		32	3.1	13	98	21		12	0.6	0.0			b141	0.19	93	12	0.6	237	7.1
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COW BAYOU SUBWATERSHED NO. 7 NEAR BRUCEVILLE

Oct. 22, 1962		6.8		38	2.8	15	139	8.2		10	0.4	1.2			b160	0.22	106	0	0.6	273	6.6
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COW BAYOU SUBWATERSHED NO. 8 NEAR BRUCEVILLE

Oct. 22, 1962		4.7		35	1.9	10	106	16		9.0	0.4	0.2			129	0.18	95	8	0.4	221	6.8
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COW BAYOU SUBWATERSHED NO. 10 NEAR BRUCEVILLE

Oct. 22, 1962		13		156	5.0	55	402	149		30	1.0	0.5			b614	0.84	410	80	1.2	939	6.8
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8-0970. COW BAYOU AT MOOREVILLE

Oct. 22, 1962	a0.15	9.0		59	4.3	24	197	28		17	0.7	0.0			239	0.33	165	3	0.8	414	7.0
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8-0990. LEON RESERVOIR NEAR RANGER

Mar. 4, 1963		1.6		43	6.7	21	118	18		46	0.3	0.0			b212	0.29	135	38	0.8	379	6.7
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a Field estimate.
b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium, silicon	Non-carbonate			
Oct. 23, 1962	246	7.0		48	13	26		171		32	39	0.4	0.0		b258	0.35	173	33	0.9	453	6.8
Nov. 27	31	6.5		45	13	26		163		32	38	.4	.2		241	.28	166	32	.9	437	6.9
Jan. 10, 1963	273	5.7		38	11	22		132		26	37	.4	.2		205	.40	140	32	.8	382	6.9
Feb. 4	12.6	4.9		56	13	32		194		36	46	.4	.2		b292	.41	193	34	1.0	515	6.8
Mar. 14	9.29	6.0		54	13	36		194		37	48	.4	1.0		b301	.39	188	29	1.1	514	6.9
Apr. 24	18	6.3		54	12	37		192		35	49	.5	.8		289	.41	184	26	1.2	505	7.7
May 23	15.7	7.0		54	13	39		192		39	52	.4	.2		299	.37	188	30	1.2	521	6.9
June 19	349	6.0		46	14	36		160		38	56	.3	.0		275	.42	172	42	1.2	481	7.3
July 23	13.2	7.5		50	13	46		184		41	60	.4	.0		308	.47	178	28	1.5	538	6.7
Aug. 28	3.66	8.0		47	14	60		191		49	69	.5	.0		342	.21	175	18	2.0	611	6.8

8-1025. LEON RIVER NEAR BELTON

8-1039. SOUTH FORK ROCKY CREEK NEAR BRIGGS

Mar. 20, 1963	0.1	9.4		54	24	12		254		23	18	0.5	0.0		266	0.36	233	25	0.3	474	7.0
May 6-8	cl.6	10		---	---	19		175		12	30	.3	.5		---	---	158	15	.7	366	7.6
May 18	al35	8.1		28	3.7	1.6		3.9		4.0	2.5	.2	2.8		104	.14	85	3	.1	175	7.2
May 18-19	cl.5	11		---	---	5.3		146		9.2	5.5	---	1.8		---	---	127	7	.2	247	7.5
June 17-23	cl.7	10		38	10	2.7		3.7		8.0	3.6	.4	.2		156	.21	136	5	.1	272	7.0

8-1041. LAMPASAS RIVER NEAR BELTON

Apr. 24, 1963	18.6	4.0		60	30	108		232		24	207	0.3	0.8		b552	0.75	273	83	2.8	1,030	7.3
May 23	29.8	7.3		42	12	31		164		11	52	.4	1.5		238	.32	154	20	1.1	429	6.8
June 19	159	7.8		46	21	69		196		15	124	.4	.2		379	.52	202	41	2.1	703	6.9
July 22	.76	10		42	21	55		202		13	92	.4	.0		332	.45	192	26	1.7	605	7.1
Aug. 26	.89	9.7		37	19	28		208		12	33	.5	.2		241	.33	170	0	.9	442	7.0

NORTH SAN GABRIEL RIVER AT GEORGETOWN

Oct. 31, 1962	15.7	7.9		45	9.2	5.4		2.0		12	10	0.3	0.0		b178	0.24	150	17	0.2	307	6.6
Nov. 26	4.56	5.3		41	20	13		175		24	30	.2	1.2		220	.30	185	41	.4	409	7.5
Jan. 11, 1963	1.63	5.7		47	15	11		154		42	21	.3	2.0		221	.30	179	53	.4	394	6.9
Feb. 5	5.53	3.6		5.5	21	14		216		26	33	.2	2.2		b268	.36	224	46	.4	480	7.3
Mar. 22	5.92	4.6		48	18	14		196		24	26	.3	.8		232	.32	194	33	.4	428	7.1
Apr. 25	4.53	7.0		39	19	20		173		19	40	.5	.8		b237	.32	175	34	.7	420	7.2
May 27	1.75	9.6		33	16	16		152		15	30	.3	.0		195	.27	148	24	.6	344	7.4
June 20	.64	20		32	19	24		140		21	52	.3	.2		238	.32	158	43	.8	401	7.2

a Field estimate.
b Residue at 180°C.
c Mean daily discharge.

BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 31, 1962	5.64	9.4		43	12	14	137			42	21	0.3	0.0		b217	0.30	157	44	0.5	368	6.5
Nov. 26	2.63	5.9		44	14	12	1.5	141		45	20	.2	2.0		b216	.29	167	52	.4	379	7.2
Jan. 11, 1963	10.8	5.1		50	18	11	.8	194		21	24	.3	5.5		231	.31	199	40	.3	422	6.9
Feb. 5	1.32	5.0		52	16	17	180			44	25	.3	3.5		b254	.35	196	48	.5	436	7.1
Mar. 18	2.61	4.2		45	15	14	158			41	22	.3	1.2		221	.30	174	44	.5	388	7.0
Apr. 25	1.66	7.3		36	15	16	137			37	23	.7	.8		203	.28	152	39	.6	347	7.5
May 27	.04	7.3		28	17	16	126			29	28	.3	.5		188	.26	140	36	.6	340	6.5
June 20	.25	6.8		18	18	16	136			26	25	.3	6.0		193	.26	144	32	.6	334	7.3

SOUTH SAN GABRIEL RIVER AT GEORGETOWN

8-1050. SAN GABRIEL RIVER AT GEORGETOWN

Nov. 14, 1962	13	7.6		65	19	15	255			20	24	0.3	10		286	0.39	240	31	0.4	509	7.0
Nov. 26	17	7.3		74	18	12	274			23	22	.3	6.2		298	.41	258	34	.3	537	7.1
Jan. 11, 1963	19.7	4.0		39	12	7.8	.6	146		14	16	.2	5.1		171	.23	147	27	.3	333	7.3
Feb. 5	16	6.9		71	19	13	266			23	24	.2	9.0		307	.42	255	37	.4	529	7.1
Mar. 18	21	6.8		66	17	15	250			24	23	.3	4.8		296	.40	234	30	.4	495	7.0
Apr. 25	15.4	5.3		76	17	19	286			21	26	.7	7.3		b318	.43	260	25	.5	521	7.8
May 27	16.4	8.5		80	19	13	304			18	21	.3	8.8		318	.43	278	28	.3	542	7.2
June 20	7.95	10		76	20	16	300			18	26	.3	6.8		321	.44	272	26	.4	549	7.3
Aug. 1	1.54	15		39	19	16	198			16	21	.3	1.2		224	.30	175	13	.5	393	7.5
Sept. 5	2.7	12		86	22	11	342			14	19	.3	8.1		340	.46	305	24	.3	596	6.8

LITTLE BRAZOS RIVER AT STATE HIGHWAY 21 NEAR BRYAN

Oct. 24, 1962	3.94	13		43	8.7	68	209			40	55	0.4	0.0		b341	0.46	144	0	2.5	573	7.5
Jan. 2, 1963	30.4	15		51	11	60	152			76	70	.3	.0		b370	.50	172	48	2.0	596	6.5
Mar. 13	24.2	11		56	13	68	146			94	86	.3	.0		b424	.58	193	74	2.1	681	6.6
May 22	90.6	15		59	13	84	200			89	88	.4	1.5		448	.61	200	36	2.6	734	6.9
July 25	6.66	13		84	23	234	318			178	258	.3	1.8		948	1.29	304	44	5.8	1,560	6.8

b Residue at 180°C.

BRAZOS RIVER BASIN--Continued

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

Chloride, in parts per million, and specific conductance, micromhos at 25°C, October 1962 to September 1963

Date of collection	Discharge (cfs estimated)	Chloride (ppm)	Specific conductance (micromhos at 25° C)
BIG CREEK AT FARM ROAD 1994 NEAR GUY			
Oct. 9, 1962-----	13	120	806
Nov. 14-----	4.5	138	874
Dec. 3-----	890	10	116
Jan. 22, 1963-----	67	20	199
Feb. 14-----	2	75	564
Mar. 12-----	2.7	130	944
Apr. 10-----	4.5	155	965
May 22-----	22	202	1,090
June 19-----	22	107	657
July 11-----	67	106	665
Aug. 15-----	--	260	1,300
Aug. 21-----	--	275	1,350
Sept. 18-----	2.2	255	1,310
BIG CREEK AT FARM ROAD 762 NEAR GUY			
Oct. 9, 1962-----	18	135	868
Nov. 14-----	6.7	125	839
Dec. 3-----	1,100	689	18,700
Jan. 22, 1963-----	89	262	1,050
Feb. 14-----	2	85	652
Mar. 12-----	3.3	168	1,120
Apr. 10-----	8.9	131	795
May 22-----	33	212	1,160
June 19-----	45	72	494
July 11-----	89	85	626
Aug. 15-----	67	260	1,280
Aug. 21-----	--	270	1,370
Sept. 18-----	3.3	262	1,350
BIG CREEK AT COUNTY ROAD 9 MILES NORTHEAST OF GUY			
Oct. 9, 1962-----	18	142	802
Nov. 14-----	11	144	917
Dec. 3-----	1,100	5,460	15,300
Jan. 22, 1963-----	111	338	1,320
Feb. 14-----	2	121	954
Mar. 12-----	3.3	175	1,050
Apr. 10-----	11	95	707
May 22-----	67	178	959
June 19, 1963-----	45	248	1,280
July 11-----	111	86	547
Aug. 15-----	--	252	1,250
Aug. 21-----	--	275	1,380
Sept. 18-----	3.3	275	1,400
COW CREEK AT KITTY NASH RANCH ROAD 8 MILES NORTHEAST OF DAMON			
Oct. 9, 1962-----	.01	362	1,530
Nov. 14-----	1.1	448	1,810
Dec. 3-----	45	10	164
Jan. 22, 1963-----	.2	28	269
Feb. 14-----	.3	46	320
Mar. 12-----	.01	86	574
Apr. 10-----	--	460	1,860
May 22-----	1.1	255	1,230
June 19-----	1.1	102	764
July 11-----	4.5	94	585
Aug. 15-----	220	12	180
Aug. 21-----	4	220	1,030
Sept. 18-----	1.1	198	1,090

BRAZOS RIVER BASIN--Continued

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

Chloride, in parts per million, and specific conductance, micromhos at 25°C, October 1962 to September 1963

Date of collection	Discharge (cfs estimated)	Chloride (ppm)	Specific conductance (micromhos at 25° C)
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VARNER CREEK 2 MILES NORTH OF WEST COLUMBIA, ABOUT 3 MILES ABOVE MOUTH

Oct. 9, 1962-----	--	5,270	14,400
Nov. 14-----	--	5,270	14,100
Dec. 3-----	8.9	560	1,930
Jan. 22, 1963-----	.2	1,750	5,450
Feb. 14-----	.02	2,280	6,880
Mar. 12-----	.07	6,500	17,500
Apr. 10-----	--	17,400	38,300
May 22-----	11	198	904
June 19-----	2.0	535	2,010
July 11-----	8.9	99	519
Aug. 15-----	11	1,780	5,410
Aug. 21-----	3	58	413
Sept. 18-----	--	650	2,400

WEST COLUMBIA OIL FIELD WASTE DISCHARGE DITCH, ABOUT 2 MILES NORTH OF WEST COLUMBIA

Oct. 9, 1962-----	--	3,950	10,500
Nov. 14-----	--	7,920	19,400
Dec. 3-----	2.2	2,180	6,510
Jan. 22, 1963-----	.1	6,500	17,300
Feb. 14-----	--	7,090	18,500
Mar. 12-----	.01	10,500	25,900
Apr. 10-----	--	10,900	26,400
May 22-----	--	4,870	13,300
June 19-----	--	6,010	16,100
July 11-----	.1	1,880	5,680
Aug. 15-----	22	1,180	3,730
Aug. 21-----	.04	8,900	23,100
Sept. 18-----	--	10,300	26,500

VARNER CREEK AT STATE HIGHWAY 35 AT EAST COLUMBIA

Oct. 9, 1962-----	--	235	1,280
Nov. 14-----	--	262	1,360
Dec. 3-----	13	1,060	3,460
Jan. 22, 1963-----	.4	490	2,050
Feb. 14-----	.08	1,520	5,000
Mar. 12-----	.4	442	1,970
Apr. 10-----	--	185	1,090
May 22-----	11	222	959
June 19-----	2.2	488	1,870
July 11-----	11	159	720
Aug. 15-----	45	385	1,540
Aug. 21-----	3	103	554
Sept. 18-----	1.0	598	2,260

BRAZOS RIVER BASIN--Continued
LAMPASAS RIVER LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on the Lampasas River and its tributaries from the mouth of Sulphur Creek in Lampasas County to the confluence of the Lampasas and Leon Rivers in Bell County, a distance of 80 miles.

Chemical analyses, in parts per million, June 1963

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
June 3	Lampasas River	1 mile above Sulphur Creek	2.27	9.0	38	26	18	220	25	23	0.4	0.0	0.34	202	21	0.6	440	7.6	
Do.	Sulphur Creek	At mouth	8.58	4.3	72	47	318	218	22	610	.3	1.2	1,180	373	194	7.2	2,220	7.6	
Do.	Lampasas River	At gaging station near Kempner	10.1	5.3	56	40	230	192	21	440	.4	.1	887	302	144	5.8	1,680	7.5	
June 6	Taylor Creek	At mouth near Kempner	.01	13	98	26	14	393	22	26	.3	.0	392	352	30	.3	682	7.0	
June 3	Rocky Creek	At mouth 0.5 mile north of Oakville	.52	7.5	58	19	8.0	256	15	10	.3	.0	245	223	13	.2	437	7.1	
Do.	Lampasas River	100 feet below Rocky Creek	9.25	8.0	56	33	140	234	20	258	.4	1.0	631	275	83	3.7	1,180	7.5	
June 4	do.	1 mile upstream from Reese Creek	9.71	--	--	--	--	221	--	190	--	--	a510	244	63	--	962	7.5	
Do.	Reese Creek	At mouth	.01	21	43	9.2	16	162	12	24	.3	.0	206	145	12	.6	340	7.6	
Do.	Lampasas River	At Farm Road 440	8.95	--	--	--	--	217	--	202	--	--	a525	245	67	--	988	7.5	
Do.	Rocky Creek	At mouth, 2.3 miles south-east of Ding Dong	.08	14	90	16	11	316	25	20	.3	.0	331	290	32	.3	576	7.1	
Do.	Lampasas River	At gaging station at Youngsfort	9.37	6.2	52	29	124	201	17	238	.3	1.5	567	249	84	3.4	1,080	7.5	
June 5	do.	7.8 miles downstream from gaging station at Youngsfort	7.52	--	--	--	--	196	--	195	--	--	a490	230	70	--	925	7.5	
Do.	do.	2.6 miles upstream from bridge on Farm Road 1670	8.28	6.7	44	20	68	190	15	119	.3	.2	366	192	37	2.1	689	7.5	
Do.	do.	At bridge on Farm Road 1670	7.82	--	--	--	--	183	--	114	--	--	a350	189	39	--	665	7.5	
Do.	do.	4.7 miles below bridge on Farm Road 1670	8.77	--	--	--	--	191	--	108	--	--	a345	191	34	--	653	7.5	
June 6	Unnamed tributary	1.3 miles upstream from bridge on U.S. Highway 81	.68	9.1	53	21	15	251	14	17	.3	6.7	259	218	13	.4	462	7.3	
Do.	Spring flow	At bridge on U.S. Highway 81	.06	12	79	21	6.9	313	16	10	.8	8.1	308	284	27	.2	555	6.9	
Do.	Lampasas River	At gaging station near Belton	7.52	7.3	46	19	55	195	14	98	.3	.0	336	193	33	1.7	625	7.6	
Do.	Salado Creek	At mouth	9.29	11	47	16	11	194	16	16	.3	11	223	183	24	.4	389	7.5	
Do.	Lampasas River	0.3 mile upstream from mouth	16.0	10	50	16	26	201	16	42	.3	6.0	265	191	26	.8	469	7.5	

a Residue at 180° C.

COLORADO RIVER BASIN

8-1195. COLORADO RIVER NEAR IRA, TEX.

LOCATION.--At gaging station at bridge on State Highway 350, 3.8 miles downstream 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 1963.

Water temperatures: Maximum, 63.0; minimum, 44.300 ppm Apr. 19-23, 25-26; minimum, 954 ppm May 22-23.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 44,300 ppm Apr. 19-23, 25-26; minimum, 196 ppm May 22-23.

Hardness: Maximum, 4,750 ppm Apr. 19-23, 25-26; minimum, 196 ppm May 22-23.

Specific conductance: Maximum daily, 58,000 micromhos Apr. 26; minimum daily, 1,150 micromhos May 23.

Water temperatures: Minimum, freezing point on several days during January and February.

EXTREMES, 1958-63.--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, 305 micromhos Sept. 6, 1962.

Water temperatures: Maximum, 95°F July 10, 1960; minimum, freezing point on many days during winter months.

REMARKS.--Values given are expressed in parts per million and should be multiplied by the density when computing loads. Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Apr. 24, June 30 to July 7, July 10 to Aug. 12, Aug. 22 to Sept. 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)		
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-bicarbonate					
Oct. 1-2, 1962.	16.0	--	--	125	37	--	1230	180	162	820	--	--	--	3690	5.02	71.7	258	110	3090	7.9	--	
Oct. 3-9,	7.2	6.3	--	242	80	--	2790	178	322	1880	--	0.8	--	8240	11.3	53.4	464	318	25	6260	7.5	--
Oct. 10-19,	2.4	5.6	--	--	--	--	1680	150	676	4360	--	--	--	--	--	--	933	796	40	13000	7.3	1.004
Oct. 20-22,	13.1	--	--	--	--	--	3000	151	491	2650	--	--	--	--	--	--	725	602	27	8500	7.5	--
Oct. 23-27,	14.7	--	--	--	--	--	--	117	786	4750	--	--	--	--	--	--	1120	996	39	14000	7.3	1.005
Oct. 28-31,	14.3	--	--	--	--	--	1590	108	232	1220	--	--	--	--	--	--	395	299	--	4320	7.2	--
Nov. 1-3, .....	.9	--	--	--	--	--	--	108	396	2520	--	--	--	--	--	--	600	512	28	7920	7.6	--
Nov. 4-30, .....	.8	2.9	--	391	138	--	4760	151	1110	7530	--	--	--	14000	19.2	30.2	1540	1420	53	19800	7.4	1.009
Dec. 1-3,	2.7	--	--	--	--	--	5100	86	278	1490	--	--	--	15100	20.7	24.5	410	340	--	5150	7.3	--
Dec. 4-15, .....	.6	3.3	--	436	158	--	5730	174	1310	8020	--	--	--	17000	23.4	50.5	1740	1600	53	21700	7.5	1.010
Dec. 16-31,	1.1	2.4	--	485	178	--	7060	188	1490	9000	--	--	--	20900	28.8	33.9	1940	1790	57	23700	7.0	1.011
Jan. 1-31, 1963	.6	3.1	--	592	217	--	8070	191	1830	11100	--	--	--	23700	32.7	38.4	2370	2210	63	29600	7.0	1.014
Feb. 1-28, .....	.6	3.8	--	616	246	--	10500	156	2110	12600	--	--	--	30700	42.7	24.9	2550	2420	69	32100	7.1	1.015
Mar. 1-31, .....	.3	3.3	--	772	304	--	--	119	2660	16400	--	--	--	33600	46.8	36.3	3460	3340	85	42800	7.0	1.024
Apr. 1-4, 10-18	.4	2.3	--	859	320	--	11500	146	2890	18000	--	--	--	22900	31.6	117	2570	2440	67	31200	7.2	1.015
Apr. 5-9,	1.9	3.6	--	621	248	--	7760	164	2020	12200	--	--	--	44300	62.2	12.0	4750	4640	95	53400	7.0	1.032
Apr. 19-23,	1.1	1.8	--	1120	475	--	15100	130	3840	23700	--	1.0	--	3280	4.46	275	468	372	21	5670	7.2	--
Apr. 27-30,	31.1	7.6	--	128	36	--	1060	116	336	1650	--	--	--	--	--	--	1010	950	--	13800	6.6	1.004
May 1-6, .....	.4	--	--	--	--	--	--	74	--	4680	--	--	--	--	--	--	1960	1900	--	25700	6.6	1.012
May 7-12, .....	.2	--	--	--	--	--	--	75	--	9980	--	--	--	--	--	--	--	--	--	--	--	--
May 13-16,	11.7	13	--	115	31	--	898	130	246	1420	--	2.0	--	2790	3.79	88.1	414	308	19	4910	7.6	--
May 17-21, .....	.3	4.9	--	188	60	--	2150	90	482	3420	--	--	--	6350	8.64	5.14	716	642	35	10300	6.9	--
May 22-23,	296	16	--	62	10	--	280	119	95	428	--	1.1	4.0	954	1.30	762	196	98	8.7	1720	7.7	--
May 24-26,	7.7	25	--	108	28	--	818	126	215	1300	--	1.5	--	2560	3.48	53.2	384	281	18	4430	7.5	--
May 27-31,	1.0	8.0	--	188	61	--	1800	122	460	2880	--	--	--	5460	7.43	14.7	720	620	29	8990	7.1	--
June 1-16, .....	.2	4.8	--	407	130	--	4720	93	1060	7540	--	--	--	13900	19.1	7.51	1550	1470	52	19700	6.8	1.008
June 17,	166	--	--	--	--	--	473	102	181	730	--	.5	1.0	--	--	--	276	192	12	2890	7.6	--

COLORADO RIVER BASIN--Continued
8-1195. COLORADO RIVER NEAR IRA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate	
June 18-21, 1963	43.4	13		60	12		291		98	91	463	--	1.0		981	1.33	115	199	118	9.0	1860	7.7	--	
June 22-24.....	1.1	13		130	35		1180		88	276	1890	--	.5		3570	4.86	10.6	468	396	24	6010	7.5	--	
June 25-29.....	.2	5.1		215	69		2230		76	504	3600	--	--		6660	9.06	3.60	820	758	34	10700	6.8	--	
July 8-9.....	.1	--		--	--		--		55	--	1750	--	--		--	--	--	450	405	--	5660	6.9	--	
Aug. 13-14.....	18.0	5.0		277	87		2620		54	839	4130	--	--		7980	10.9	388	1050	1000	35	12700	6.9	1.004	
Aug. 15-21.....	.5	3.2		421	141		4460		65	1220	7090	--	--		13400	18.4	18.1	1630	1580	48	20200	6.4	1.008	
Weighted average.....	44.1	12		125	37		1110		121	314	1740	--	--		3400	4.62	49.0	464	365	16	5340	7.5	--	
Time-weighted average.....	--	4.7		468	173		5780		139	1450	9080	--	--		17000	--	--	1880	1760	56	23500	7.0	--	
Tons per day.	--	0.2		1.8	0.5		16		2	4.5	25	--	--		--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 282 days of actual flow, 5.3 cfs.

COLORADO RIVER BASIN--Continued

8-1210. 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 and Pacific Railway Co. bridge, and 1.6 miles upstream from Lone Wolf Creek.
 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 1963.
 Water temperatures: November 1952 to September 1954, November 1956 to September 1963.
 EXTREMES, 1962-63.--Dissolved solids: Maximum, 19,400 ppm Apr. 1-26; minimum, 380 ppm May 23.
 Hardness: Maximum, 2,850 ppm Apr. 1-26; minimum, 131 ppm May 23.
 Specific conductance: Maximum daily, 32,000 micromhos Apr. 25; minimum daily, 714 micromhos May 23.
 Water temperatures: Maximum, 95°F Sept. 4; minimum, 40°F Feb. 12.
 EXTREMES, 1946-54, 1956-63.--Dissolved solids: Maximum, 48,600 ppm May 1-17, 1961; minimum, 150 ppm Sept. 5-7, 1962.
 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 (1956-63): Maximum, 98°F July 29, 1960; minimum, freezing point on many days during winter months.
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 12-28, 31, Aug. 1-12, 29-30, Sept. 7-10, 22-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density (g/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-6, 1962.	23.5	5.5		159	54		1260		176	352	2020	--	--		3940	5.36	250	618	474	22	6690	7.3	--
Oct. 7-27.....	16.9	5.1		238	85		1960		134	564	3200	--	--		6120	8.32	279	944	834	28	9820	7.6	--
Oct. 28-31.....	69.2	3.8		137	45		907		114	304	1480	--	1.5		2930	3.98	547	527	434	17	5020	7.2	--
Nov. 1-4.....	9.5	6.7		238	77		1930		152	616	3080	--	--		6020	8.19	154	910	786	28	9680	7.6	--
Nov. 5-25.....	3.0	5.7		343	124		2930		197	889	4720	--	--		9110	12.5	73.8	1370	1200	34	14000	7.7	1.006
Nov. 26-30.....	16.4	3.3		252	96		1930		116	620	3180	--	--		6140	8.35	272	1020	928	26	9940	7.2	--
Dec. 1-31.....	6.6	4.8		348	134		2970		208	917	4780	--	--		9260	12.7	165	1420	1250	34	14300	7.6	1.005
Jan. 1-31, 1963	4.2	2.5		422	162		3580		244	1120	5770	--	--		11200	15.3	127	1720	1520	38	16900	7.1	1.006
Feb. 1-28.....	4.0	4.5		413	177		3630		203	1230	5820	--	--		11400	15.6	123	1760	1590	38	17300	7.2	1.006
Mar. 1-15.....	2.3	3.2		494	219		4700		184	1540	7510	--	--		14600	20.1	90.7	2130	1980	44	21300	7.1	1.012
Mar. 16-31.....	1.5	2.9		611	269		6020		156	1880	9660	--	--		18500	25.5	74.9	2630	2500	51	25900	6.9	1.015
Apr. 1-26.....	2.3	3.1		661	291		6340		118	1250	10800	--	--		19400	26.8	120	2850	2750	52	28000	7.1	1.014
Apr. 27-30.....	82.5	8.6		178	62		1290		168	520	2000	--	2.0		4140	5.63	922	699	562	21	6610	7.2	--
May 1-8.....	5.4	3.8		218	83		1920		83	432	3220	--	--		5920	8.05	86.3	886	818	28	10000	6.8	--
May 9-18.....	4.4	3.3		328	129		3230		68	918	5220	--	--		9860	13.5	117	1350	1290	38	15100	6.1	1.006
May 19-22.....	178	7.0		174	56		1510		98	600	2300	--	--		4700	6.39	2260	664	584	26	7270	6.7	--
May 23.....	1650	13		--	--		89		122	43	123	0.5	6.1		380	--	1690	131	31	3.4	714	7.6	--
May 24-25.....	119	--		--	--		--		107	--	532	--	--		--	--	--	235	148	--	1980	7.6	--
May 26-31.....	19.5	9.3		167	51		1220		133	352	1980	--	1.5		3850	5.24	203	626	518	21	6420	6.8	--
June 1-16.....	5.6	7.2		245	87		2080		118	580	3400	--	--		6460	8.79	97.7	970	873	29	10400	7.2	--
June 17-18.....	182	10		100	27		630		118	214	1000	--	1.5		2040	2.77	1000	360	264	14	3570	7.6	--
June 19-20.....	202	14		53	11		234		104	98	352	.4	1.5		815	1.11	445	177	92	7.7	1480	7.7	--
June 21-22.....	39.0	12		95	30		679		124	202	1080	--	.5		2160	2.94	227	360	259	16	3750	7.7	--
June 23-30.....	5.2	7.5		140	54		1360		102	390	2150	--	--		4150	5.64	58.3	572	488	25	6920	6.7	--
July 1-11.....	.4	9.4		210	84		2140	14	92	628	3420	--	--		6550	8.91	7.07	870	794	31	10600	6.4	--
July 29-30.....	.8	5.7		--	--		1030		42	344	1660	--	4.0		--	--	--	500	466	20	5640	6.7	--
Aug. 13.....	8.1	16		178	77		1610		135	632	2480	--	--		5060	6.88	111	760	650	25	8380	7.5	--
Aug. 14-18.....	79.6	9.3		122	32		840		86	288	1340	--	1.0		2670	3.63	574	436	366	17	4670	7.3	--
Aug. 19-28.....	1.1	5.8		177	60		1640		68	476	2620	--	--		5010	6.81	14.9	688	633	27	8430	6.8	--
Aug. 31.....	35.0	7.8		117	29		973		76	266	1550	--	1.5		2980	4.05	282	412	349	21	5240	7.1	--

COLORADO RIVER BASIN--Continued
8-1210. COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)	
														Parts per million	Tons per acre-foot	Tons per day						
Sept. 1-2, 1963	8.0	8.3		182	49		1560		66	388	2550	--	--	4770	6.49	103	602	27	8250	6.6	--	
Sept. 3-6.....	.9	6.3		249	77		2380		66	542	3890	--	--	7180	9.79	17.4	884	3.4	11900	6.8	1.003	
Sept. 11-16....	3.9	5.6		96	24		719		75	196	1160	--	0.5	2240	3.05	23.6	276	17	4130	7.2	--	
Sept. 17-21....	.4	5.2		316	102		3190		61	811	5140	--	--	9590	13.1	10.4	1210	40	15300	6.5	1.006	
Weighted average	16.8	9.1		146	51		1120		126	368	1790	--	--	3550	4.83	184	572	18	5670	7.2	--	
Time-weighted average.....	--	5.2		336	133		3010		151	870	4900	--	--	9330	--	--	1390	34	14200	6.9	--	
Tons per day....	--	0.5		7.5	2.6		58		7	19	93	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 320 days of actual flow, 19.2 cfs.

COLORADO RIVER BASIN--Continued
8-1238. BEALS CREEK NEAR WESTBROOK, TEX.

LOCATION (revised).--At gaging station at bridge on State Highway 163, 1.5 miles downstream from Crystal Creek, 11 miles south of Westbrook, Mitchell County, 12 miles upstream from Colorado River, and 16 miles southwest of Colorado City.
DRAINAGE AREA.--9,903 square miles, of which 8,930 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1963.
Water temperatures: November 1958 to September 1963.
EXTREMES, 1962-63.--Dissolved solids: Maximum, 6,100 ppm June 20.
Hardness: Maximum, 1,890 ppm Mar. 1-31; minimum, 117 ppm June 20.
Specific conductance: Maximum daily, 10,200 micromhos Mar. 24, 26; minimum daily, 457 micromhos June 20.
Water temperatures: Maximum, 94°F June 9; minimum, 33°F Jan. 13, 14, 27.
EXTREMES, 1958-63.--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 on several days during 1958, 1959 and 1961 to 1963.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 13-28, Aug. 3-12, 26-31, Sept. 1-9, 11, 19-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)			
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		Sodium sorption ratio		
Oct. 1-27, 1962...	3.1	4.3		195	275	1290		218		1220	2100	1.0	6.8	5200	7.07	43.5	1620	1440	14	7820	7.6
Oct. 28-30.....	21.4	12		119	132	636		228		588	1010	--	--	2610	3.55	151	840	653	9.5	4330	7.5
Oct. 31-Nov. 17.....	1.5	5.5		82	57	330		146		288	520	.8	.5	1360	1.85	320	439	320	6.9	2370	7.7
Nov. 18-30.....	1.7	6.7		172	190	986		244		916	1560	--	1.5	3950	5.37	18.1	1210	1010	12.3	6270	7.5
Dec. 1-31.....	2.3	9.4		130	188	887		235		836	1390	--	3.0	3560	4.84	22.1	1100	905	12	5680	7.6
Jan. 1-31, 1963.....	1.5	9.2		150	249	1100		150		1150	1750	--	4.0	4490	6.11	18.2	1400	1280	13	6800	8.0
Feb. 1-28.....	2.9	15		160	228	1050		250		1040	1650	--	5.5	4270	5.81	33.4	1340	1130	12	6720	6.9
Mar. 1-31.....	1.4	11		225	323	1500		236		1520	2400	--	--	6100	9.52	23.1	1890	1700	15	8920	7.3
Apr. 1-27.....	1.4	14		210	286	1340	30	396		1260	2120	--	--	5460	7.43	20.6	1700	1380	14	8200	7.4
Apr. 28.....	284	16				248		210		228	370	--	--		--	--	392	220	5.5	1820	7.4
Apr. 29.....	157	8.9		36	13	48		121		47	68	.6	2.8	284	.39	120	143	44	1.7	520	6.9
Apr. 30.....	24	12		70	33	201		142		118	186	--	--		--	38.6	230	114	3.6	1050	7.5
May 1-5.....	4.4	14		61	22	152		147		186	300	.8	10	887	1.21	10.5	310	190	5.0	1520	7.5
May 6-7.....	80.5	12		130	124	591		130		126	235	--	4.6	677	.92	147	242	136	4.2	1190	7.3
May 8-13.....	10.1	12		130	124	591		138		656	970	--	4.8	2580	3.51	70.4	884	771	8.6	4130	7.3
May 14.....	19.0	8.9		34	12	101		76		94	136	--	3.0	426	.58	21.9	134	72	3.8	751	7.3
May 15-18.....	23.7	16		104	80	397		164		406	630	--	6.9	1720	2.34	110	588	454	7.1	2850	7.4
May 19-21.....	135	12		60	23	155		127		129	240	--	5.3	686	.93	250	244	140	4.3	1210	7.2
May 22-24.....	384	12		44	14	85		115		68	132	--	2.0	414	.66	429	168	74	2.8	743	7.3
May 25-31.....	6.1	11		70	31	175		125		179	278	--	3.0	808	1.10	13.3	302	200	4.4	1380	7.0
June 1-12.....	3.4	6.0		108	67	326		139		337	558	--	2.0	1470	2.00	13.5	545	431	6.1	2450	7.0
June 13-18.....	1.6	4.4		130	101	486		106		502	840	--	2.2	2120	2.88	9.16	740	653	7.8	3470	6.9
June 19.....	68							73		141	225	--	--		--	--	204	144	--	1090	7.1
June 20.....	362	7.0		33	8.4	48		114		31	65	--	4.4	253	.34	247	117	24	1.9	457	7.5
June 21-24.....	54.8	10		73	37	191		119		199	312	--	5.2	887	1.21	131	334	236	4.5	1520	7.1

COLORADO RIVER BASIN--Continued
8-1238. BEALS CREEK NEAR WESTBROOK, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carb- on- ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluor- ide (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		So- dum ad- sorp- tion ratio	Specific con- duct- ance (micro- mhos at 25° C)		
															Parts per million	Tons per acre- foot	Tons per day	Cal- cium, Mag- nes- ium	Non- car- bon- ate				
June 25-30, 1963..	4.7	8.8		114	77	353		134	381	610			1.8		1610	2.19	20.4	601	491	6.2	2660	7.3	
July 1-3, 5-12....	.9	6.6		185	160	720		124	774	1260			1.5		3170	4.31	7.70	1120	1020	9.4	5100	7.1	
July 4.....	1.4	8.1		117	72	356		144	380	600			1.2		1610	2.19	6.09	588	470	6.4	2710	7.3	
July 29-Aug. 2....	1.8	5.6		91	52	255		52	304	450			1.8		1190	1.62	5.78	441	398	5.3	2060	6.6	
Aug. 13-25.....	6.4	10		55	28	230		103	150	362		0.7	.2		887	1.21	15.3	252	168	6.3	1610	7.0	
Sept. 10, 12.....	5.3	7.2		85	42	252		114	276	390			2.2		1110	1.51	15.9	384	291	5.6	1900	6.7	
Sept. 13-14.....	60.5	10		42	8.5	73		111	36	118			4.6		347	.47	56.7	140	49	2.7	648	7.0	
Sept. 15-18.....	1.4	7.9		44	17	130		94	82	210			.6	3.0	540	.73	2.04	180	103	4.2	994	6.9	
Weighted average	a10.6	11		70	49	255		140	238	403			3.5		1100	1.50	37.0	378	264	4.8	1800	7.2	
Time-weighted average.....	--	9.6		144	178	841		198	824	1350			3.5		3450	--	--	1090	930	10	5340	7.2	
Tons per day....	--	0.4		2.4	1.7	8.6		5	8.0	14			0.1		--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 311 days of actual flow, 12.4 cfs.

COLORADO RIVER BASIN--Continued

8-1239. COLORADO RIVER NEAR SILVER, TEX.

LOCATION.--At gaging station at bridge on Farm Road 2059, 4.7 miles southwest of Silver, Coke County, 11 miles upstream from Pecan Creek, and 18.1 miles downstream from Big Silver Creek.

DRAINAGE AREA.--15,480 square miles, approximately, of which 11,600 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1963.

Water temperatures: October 1956 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 8,060 ppm Apr. 7-17; minimum, 203 ppm Sept. 9-10, 12-13.

Hardness: Maximum, 2,070 ppm Apr. 7-17; minimum, 112 ppm Aug. 14.

Specific conductance: Maximum daily, 12,500 micromhos Apr. 16, 17; minimum daily, 262 micromhos Sept. 10.

Water temperatures: Maximum, 90°F June 29; minimum, 34°F Mar. 14.

EXTREMES, 1956-63.--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.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 19 to Apr. 6, Apr. 18-27, July 8 to Aug. 13, Aug. 24 to Sept. 8, Sept. 11, 23-30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate		Sodium adsorption ratio	
Oct. 1-10, 1962...	51.0	8.6		134	46	638		161		352	1000	--	2.0	2260	3.07	311	524	392	12	3820	7.5
Oct. 11-25.....	36.6	6.1		184	63	883		136		486	1430	--	3.5	3120	4.24	308	718	606	14	5170	7.4
Oct. 26-28.....	50.0	7.9		256	87	1620		149		624	2560	--	--	5320	7.24	718	996	874	22	8450	7.4
Oct. 29-31.....	194	5.8		82	44	397		99		342	640	0.4	3.8	1460	1.99	765	377	296	8.9	2550	7.5
Nov. 1-10.....	19.1	5.8		132	44	587		102		322	970	--	--	2110	2.87	109	510	427	11	3690	7.2
Nov. 11-20.....	5.6	6.3		205	63	796		123		516	1320	--	.0	2970	4.04	44.9	770	670	12	4980	7.3
Nov. 21-28.....	13.5	6.6		250	76	954		108		652	1590	--	.0	3580	4.87	130	936	848	14	5910	7.2
Nov. 29-30.....	32.0	--		--	--	--		105		238	600	--	--	--	--	--	384	298	--	2510	7.5
Dec. 1-31.....	12.3	5.1		280	99	1390		126		750	2300	--	--	4890	6.65	162	1110	1000	18	7840	7.4
Jan. 1-31, 1963...	5.7	4.0		340	120	1630		152		952	2680	--	--	5800	7.89	89.3	1340	1220	19	9140	7.5
Feb. 1-28.....	6.0	3.0		385	139	1920		147		1090	3150	--	--	6760	9.19	110	1530	1410	21	10500	7.5
Mar. 1-18.....	1.2	3.0		439	183	2080		146		1350	3440	--	--	7570	10.3	24.5	1850	1730	21	11400	7.4
Apr. 7-17.....	3.3	6.2		517	190	2150	16	105		1550	3580	--	--	8060	11.0	71.8	2070	1990	21	11800	7.2
Apr. 28-29.....	390	14		112	54	416		163		344	645	.7	2.8	1670	2.27	1760	502	368	8.1	2520	7.4
Apr. 30.....	154	13		63	23	189		125		149	285	--	4.2	787	1.07	327	252	149	5.2	1400	7.3
May 1-2.....	55.5	10		94	31	359		114		233	570	.4	3.2	1360	1.85	204	1360	268	8.2	2320	7.2
May 3-8.....	37.3	--		--	--	--		112		--	2200	--	--	--	--	--	875	783	--	7320	7.2
May 9-16.....	21.9	7.9		154	77	636		161		478	1030	--	.8	2460	3.35	145	700	568	10	4080	7.5
May 17.....	50.0	11		70	23	213		104		172	330	--	2.8	873	1.19	118	269	184	5.6	1500	7.4
May 18-19.....	18.5	--		--	--	--		104		1560	680	--	--	--	--	--	758	673	--	5510	7.3
May 20-21.....	108	10		110	53	422		123		332	680	--	5.6	1670	2.27	487	492	392	8.3	2840	7.2
May 22.....	719	12		52	11	70		117		67	111	--	4.8	386	.52	749	174	78	2.3	667	7.1
May 23.....	1880	15		74	19	262		140		133	408	--	5.8	986	1.34	5000	262	148	7.0	1710	7.4
May 24.....	1350	17		44	7.5	109		116		59	153	--	6.1	453	.62	1650	141	46	4.0	802	7.5
May 25-26.....	210	15		56	13	148		112		102	222	--	5.5	616	.84	349	193	101	4.6	1070	7.5
May 27-31.....	44.8	13		88	24	380		110		197	600	--	2.0	1360	1.85	165	318	228	9.3	2320	7.2
June 1-7.....	11.9	12		134	44	596		126		326	970	--	.5	2140	2.91	68.8	516	412	11	3640	7.4
June 8-13.....	14.5	9.4		117	32	441		89		282	720	--	.8	1650	2.24	64.6	424	350	9.3	2800	7.4
June 14-16.....	25.3	11		196	67	964		77		532	1590	--	.2	3400	4.62	232	764	702	15	5560	7.0
June 17-18.....	39.0	9.4		116	35	510		74		286	840	--	.2	1830	2.49	193	434	373	11	3190	7.2

COLORADO RIVER BASIN--Continued
 8-1239. COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--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		Specific conductance (micro-mhos at 25° C)			
														Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate		Sorption ratio		
June 19, 1963.....	242	13		161	58	1120		109	380	1830	--	0.2		3620	4.92	2370	640	550	19	6040	7.3	
June 20.....	352	11		95	27	534		105	202	860	--	.2		1780	2.42	1690	348	262	12	3130	7.4	
June 21-22.....	344	12		49	14	139		129	76	210	--	2.5		566	.77	526	180	74	4.5	1040	7.8	
June 23-30.....	39.2	12		85	30	317		113	218	500	--	1.5		1220	1.66	129	336	243	7.5	2080	7.3	
July 1-7.....	1.4	10		124	46	530	9.7	74	378	870	--	.8		2000	2.72	7.56	498	438	10	3510	7.3	
Aug. 14.....	14.0	12		34	6.6	41		80	50	58	0.5	1.2		242	.33	9.15	112	46	1.7	441	7.7	
Aug. 15.....	116	14		210	50	905		98	494	1490	--	.5		3210	4.37	1010	730	649	15	5420	7.4	
Aug. 16.....	113	14		101	23	516		102	205	830	--	.5		1740	2.37	531	346	263	12	3110	7.6	
Aug. 17-23.....	17.1	8.9		128	50	483		74	383	790	--	.8		1880	2.56	86.8	525	464	9.2	3250	7.3	
Sept. 9-10, 12-13.	9.3	12		36	5.9	26		93	36	38	.4	2.6		203	.28	5.10	114	38	1.1	354	7.6	
Sept. 14.....	20.0	27		124	37	362		58	355	590	--	.2		1520	2.07	82.1	462	414	7.3	2550	7.0	
Sept. 15-16.....	20.0	15		212	66	924		42	660	1480	--	.5		3380	4.60	183	800	766	14	5540	7.0	
Sept. 17-22.....	4.1	5.4		133	51	460		75	472	700	--	.8		1860	2.53	20.6	542	480	8.6	3120	6.9	
Weighted average	a32.2	12		113	38	489		125	275	785	--	--		1780	2.42	206	439	336	8.8	2980	7.4	
Time-weighted average.....	--	7.0		240	86	1110		124	667	1830	--	1.6		4010	--	--	--	955	853	15	6390	7.3
Tons per day.....	--	1.3		13	4.4	57		14	32	91	--	0.4		--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 274 days of actual flow, 42.9 cfs.

COLORADO RIVER BASIN--Continued

8-1265. COLORADO RIVER AT BALLINGER, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 83 in Ballinger, Runnels County, and 2,000 feet upstream from Elm Creek. DRAINAGE AREA.--16,840 square miles, approximately, of which 11,600 square miles is probably noncontributing. RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1963. Water temperatures: October 1961 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 6,900 ppm May 2-5; minimum, 144 ppm Aug. 14.

Hardness: Maximum, 1,550 ppm May 1-5; minimum, 97 ppm Aug. 14. Specific conductance: Maximum daily, 13,500 microhos May 3; minimum daily, 249 microhos Aug. 14.

Water temperatures: Maximum, 90°F June 15, Aug. 21, 24, Sept. 5, 7; minimum, 34°F Jan. 12, 27. EXTREMES, 1961-63.--Dissolved solids: Maximum, 6,900 ppm May 2-5, 1963; minimum, 144 ppm Aug. 14, 1963.

Hardness: Maximum, 1,550 ppm May 1-5, 1963; minimum, 97 ppm Aug. 14, 1963.

Specific conductance: Maximum daily, 13,500 microhos May 3, 1963; minimum daily, 249 microhos Aug. 14, 1963.

Water temperatures: Maximum, 90°F June 15, Aug. 21, 24, Sept. 5, 7, 1963; minimum, 34°F Jan. 10, 13, 1962, Jan. 12, 27, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 22-31, Apr. 1-3, 23, July 12-31, Aug. 1-7, Sept. 29, 30.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhos at 25°C)
													Parts per million	Tons per acre-foot	Calcium Magnesium	Non-carbonate		Tons per day	Soil adsorption ratio
Oct. 1-23, 1962...	61.6	7.9	97	28	261	116	224	420	3.8	1100	1.50	183	357	262	6.0	1910	6.9
Oct. 24-31.....	101	6.3	146	42	499	126	372	800	3.5	1930	2.62	526	537	434	6.0	3260	7.6
Nov. 1-9.....	61.4	5.0	185	54	802	125	444	1320	5	2870	3.90	476	684	580	13.3	4870	7.6
Nov. 10-30.....	16.0	4.8	172	57	512	152	448	840	1.5	2110	2.87	91.2	664	539	8.7	3510	7.6
Dec. 1-31.....	17.0	5.8	210	67	469	170	528	800	1.5	2170	2.95	99.6	800	660	7.2	3520	7.6
Jan. 1-31, 1963...	10.8	7.3	270	86	634	194	692	1080	2.0	2870	3.90	83.7	1030	868	8.6	4560	7.5
Feb. 1-14.....	7.4	6.2	290	93	599	200	772	1020	3.5	2880	3.92	57.5	1110	942	7.8	4460	7.1
Feb. 15-28.....	7.2	5.2	270	95	496	190	726	870	3.5	2560	3.48	49.8	1060	908	6.6	3980	7.1
Mar. 1-21.....	1.0	2.3	265	99	584	152	756	1010	3.0	2790	3.79	7.53	1070	944	7.8	4350	7.3
Apr. 4-22, 24-30..	2.4	3.5	215	98	491	146	704	840	1.8	2430	3.30	15.7	940	820	7.0	3760	7.2
May 1.....	312	4.9	430	116	747	84	1220	1300	1.0	3860	5.25	3250	1550	1480	8.2	5610	7.5
May 2-5.....	160	5.0	395	137	1960	129	1140	3200	--	6900	9.38	2980	1550	1440	22	10600	7.4
May 6-19.....	37.6	5.0	150	60	549	128	448	880	1.8	2160	2.94	219	621	516	9.6	3620	7.1
May 20-21.....	322	9.7	65	18	157	105	146	238	0.4	690	0.94	600	236	150	4.4	1200	7.8
May 22.....	3650	11	81	20	222	128	136	388	--	903	1.23	8900	284	180	5.7	1580	7.7
May 23-24.....	1900	13	64	14	92	128	94	150	--	492	0.67	2520	217	112	2.7	855	7.0
May 25-31.....	369	8.5	53	13	155	126	94	225	--	614	0.84	612	186	82	4.9	1080	7.0
June 1.....	30.5	8.5	83	26	178	128	188	280	5	830	1.13	68.4	314	209	4.4	1420	6.8
June 1-11.....	114	13	36	9.0	39	87	62	52	--	257	0.35	79.1	127	56	1.5	433	7.2
June 12-13.....	21.3	--	--	--	--	114	180	268	--	--	--	--	298	204	--	1340	7.4
June 14-16.....	863	7.3	46	5.2	29	78	74	39	--	241	0.33	562	136	72	1.1	410	7.2
June 17.....	228	11	99	23	275	100	196	462	--	1120	1.52	689	342	260	6.5	1920	7.3
June 18-20.....	364	8.1	80	19	316	91	156	515	--	1140	1.55	1120	278	203	8.2	2020	7.2
June 21-23.....	76.7	2.2	99	34	469	84	266	790	--	1660	2.26	344	387	318	10	2890	6.4
June 24-30.....	2.6	7.4	114	52	394	122	364	610	0.6	1610	2.19	11.3	498	398	7.7	2690	6.4
July 1-11.....	20.0	8.0	125	60	443	145	412	690	--	1810	2.46	97.7	559	440	8.2	3030	7.3
Aug. 8.....	3.4	8.3	62	21	142	104	126	235	0.4	648	0.88	5.94	241	156	4.0	1180	7.0
Aug. 9-13.....	622	9.2	32	4.2	13	105	15	15	--	144	0.20	242	97	11	0.6	249	7.4
Aug. 14.....	31.4	8.6	83	21	75	76	218	118	--	562	0.76	47.6	294	231	1.9	929	6.6
Aug. 15-24.....	2.1	9.4	105	33	106	94	296	172	--	768	1.04	4.35	398	320	2.3	1250	6.6
Aug. 25-31.....	5.1	10	130	43	122	131	344	212	0.4	928	1.26	12.8	502	394	2.4	1540	7.2
Sept. 1-17.....	2.5	10	174	59	205	138	456	378	--	1350	1.84	9.11	676	564	3.4	2210	7.2
Sept. 18-28.....	a58.7	9.1	105	30	300	121	235	488	--	1230	1.67	220	383	283	5.9	2050	7.2
Weighted average	--	6.5	178	61	433	143	477	725	--	1950	--	--	695	578	7.0	3160	7.0
Time-weighted average.....	--	1.6	19	5.3	54	22	42	87	--	--	--	--	--	--	--	--	--
Tons per day.....	--	1.6	19	5.3	54	22	42	87	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 322 days of actual flow, 66.3 cfs.

COLORADO RIVER BASIN--Continued

8-1460. SAN SABA RIVER AT SAN SABA, TEX.

LOCATION.--At gaging station at bridge on State Highway 16, 1.2 miles north of San Saba, San Saba County, 4.8 miles downstream from China Creek, 5.0 miles upstream from Simpson Creek, and 15.5 miles upstream from mouth.

DRAINAGE AREA.--3,042 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1962 to September 1963.

Water temperatures: September 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 316 ppm Dec. 1-31; minimum, 204 ppm May 8-16.

Hardness: Maximum, 282 ppm Dec. 1-31; minimum, 164 ppm May 8-16.

Specific conductance: Maximum daily, 709 micromhos Feb. 25; minimum daily, 304 micromhos June 2.

Water temperatures: Maximum, 89°F on several days in July and August; minimum, 38°F Jan. 20.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow July 17-20, 25-31, Aug. 1-5.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-15, 1962...	55.1	17		41	30	19		272	17	18	0.3	0.2			276	0.38	41.1	226	3	0.5	476	7.7
Oct. 16-31.....	74.5	17		46	28	19		274	16	20	--	1.8			a286	.39	57.5	230	6	.5	486	7.7
Nov. 1-16.....	55.7	15		45	29	16		276	15	16	.3	2.5			275	.37	41.4	232	6	.5	476	7.8
Nov. 17-30.....	66.9	14		58	30	12		312	14	16	--	2.5			a305	.41	55.1	268	12	.3	532	7.6
Dec. 1-31.....	66.5	12		62	31	14		323	16	20	.3	1.8			316	.43	56.7	282	18	.4	556	7.6
Jan. 1-31, 1963...	65.1	12		44	31	10		260	16	20	.2	2.2			a273	.37	48.0	238	24	.3	486	7.3
Feb. 1-28.....	68.0	9.5		52	33	13		292	17	24	.3	2.0			a295	.40	54.2	265	26	.3	539	7.3
Mar. 1-31.....	58.0	8.6		56	31	13		296	18	23	.3	1.0			297	.40	46.5	267	24	.3	543	7.0
Apr. 1-30.....	44.9	10		54	31	21		314	17	22	.3	1.0			a313	.43	37.9	262	4	.6	538	7.4
May 1-7.....	77.0	12		58	30	17		308	18	23	.0	.8			310	.42	64.4	268	16	.5	538	7.4
May 8-16.....	52.6	11		41	15	13		192	14	14	--	1.5			204	.28	29.0	164	7	.4	357	7.2
May 17-31.....	163	12		48	19	14		231	14	17	--	1.2			239	.33	105	198	9	.4	417	7.2
June 1-15.....	54.7	13		47	16	11		210	13	13	.3	1.8			218	.30	32.2	183	11	.4	375	7.0
June 16-30.....	51.2	15		50	23	14		252	15	20	--	.5			262	.36	36.2	220	13	.4	452	7.1
July 1-16, 21-24..	7.9	15		45	27	20	3.6	252	21	27	.3	.2			283	.38	6.04	224	17	.6	493	7.2
Aug. 6-31.....	13.9	14		45	31	25		272	24	32	.3	.0			305	.41	11.4	240	17	.7	542	6.9
Sept. 1-18.....	20.0	15		44	33	15		286	19	16	.3	.2			284	.39	15.3	246	11	.4	502	7.5
Sept. 19-30.....	27.0	14		50	30	10		286	16	12	.3	2.0			275	.37	20.0	248	14	.3	496	7.4
Weighted average	b52.7	12		51	28	15		276	16	20	0.3	1.5			281	0.38	42.0	241	15	0.4	494	7.3
Time-weighted average.....	--	13		50	29	16		278	17	21	0.3	1.3			285	--	--	243	15	0.4	501	7.3
Tons per day....	--	1.8		7.5	4.2	2.2		41	2.4	2.9	0.0	0.2			--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge based on 365 days; mean discharge for 349 days of actual flow, 55.1 cfs.

COLORADO RIVER BASIN--Continued

8-1470. 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, and 9.2 miles east of San Saba, San Saba County.
DRAINAGE AREA.--30,600 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: September 1947 to September 1963.

Water temperatures: September 1947 to September 1963.

Sediment records: December 1950 to September 1962.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 1,360 ppm May 7; minimum, 155 ppm Oct. 9-16.

Hardness: Maximum, 576 ppm May 7; minimum, 102 ppm Oct. 9-16.

Specific conductance: Maximum daily, 2,410 micromhos May 20; minimum daily, 227 micromhos Oct. 11.

Water temperatures: Maximum, 85°F Sept. 6, 8; minimum, 36°F Jan. 28.

EXTREMES, 1947-63.--Dissolved solids: Maximum, 2,440 ppm June 24-27, 1962; minimum, 102 ppm Sept. 23-25, 1955.

Hardness: Maximum, 842 ppm June 24-27, 1962; minimum, 71 ppm June 25-30, 1949.

Specific conductance: Maximum daily, 5,660 micromhos June 28, 1962; minimum daily, 161 micromhos Sept. 11, 1952.

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

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 3-13.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-8, 1962....	342	13		45	12	46		144		35	74	0.4	1.2		a321	0.44	296	162	44	1.6	570	7.6	
Oct. 9-16.....	4005	11		32	5.4	13	3.9	112		13	21	.3	.2		155	.21	1680	102	10	.6	276	7.4	
Oct. 17-31.....	604	11		44	11	28		151		22	48	--	1.2		a253	.34	413	155	31	1.0	436	7.3	
Nov. 1-15.....	279	15		50	14	33		178		31	52	.3	1.5		285	.39	215	182	36	1.1	501	7.6	
Nov. 16-30.....	130	13		68	22	45		234		53	78	--	1.2		395	.54	139	260	68	1.2	704	7.7	
Dec. 1-15.....	139	11		82	28	95		255		84	162	.3	1.2		a615	.84	231	320	110	2.3	1050	7.6	
Dec. 16-31.....	127	10		86	32	123		266		98	208	--	.8		a717	.98	246	346	128	2.9	1240	7.7	
Jan. 1-31, 1963...	123	9.1		89	34	152		259		108	258	.3	2.5		a853	1.16	283	362	150	3.5	1380	7.3	
Feb. 1-28.....	121	6.4		82	36	132		257		105	225	.4	2.2		715	.97	234	352	142	3.1	1270	7.5	
Mar. 1-31.....	90.5	6.6		70	34	87		265		76	146	.3	.2		550	.75	134	314	98	2.1	994	7.3	
Apr. 1-16.....	69.2	7.4		74	34	88		285		76	144	.4	.2		564	.77	105	324	91	2.1	994	7.5	
Apr. 17-30.....	50.4	9.4		66	32	60		284		50	100	--	.5		458	.62	62.3	296	64	1.5	810	7.4	
May 1-6.....	68.2	9.2		76	34	106		272		87	175	.2	.2		622	.85	115	330	106	2.5	1070	7.3	
May 7.....	696	--		--	--	--		212		--	490	--	--		1360	1.85	2560	576	402	--	2320	6.9	
May 8-9.....	1309	--		--	--	--		161		--	82	--	--		--	--	--	200	68	--	619	7.1	
May 10-21.....	322	7.4		140	53	228		149		334	420	--	1.0		1260	1.71	1100	568	446	4.1	2060	6.9	
May 22, 24-29.....	2800	8.9		76	17	96		166		90	168	--	1.5		539	.73	4070	260	124	2.6	953	7.1	
May 23.....	3830	--		--	--	--		132		--	342	--	--		--	--	--	356	248	--	1580	7.3	
May 30-31.....	2485	13		54	11	31		173		38	46	--	2.0		280	.38	1880	180	38	1.0	484	7.7	
June 1.....	10500	9.1		66	9.6	62		194		41	95	--	3.5		381	.52	10800	204	45	1.9	679	7.6	
June 2-10.....	1763	8.8		55	7.0	35		159		25	60	.3	.2		269	.37	1280	166	36	1.2	483	7.7	
June 11-30.....	1401	9.0		58	7.9	37		160		31	67	--	.5		289	.39	1090	177	46	1.2	521	7.0	
July 1-15.....	252	7.8		55	9.0	42	4.8	151		33	80	.3	.0		306	.42	208	174	50	1.4	562	6.6	
July 16-31.....	4.3	8.2		54	13	47		166		32	86	--	.0		322	.44	3.74	188	52	1.5	597	6.9	
Aug. 1-2, 14-24...	61.4	10		53	16	53		188		30	90	.3	.2		344	.47	57.0	198	44	1.6	673	7.0	
Aug. 25-31.....	36.0	12		67	27	73		214		54	145	--	.2		483	.66	46.9	278	102	1.9	926	7.0	
Sept. 1-17.....	29.8	12		56	31	73		224		48	135	.3	.0		465	.63	37.4	267	84	1.9	890	7.1	
Sept. 18-30.....	85.9	10		80	34	153		216		108	270	--	1.2		762	1.04	177	340	162	3.6	1430	7.1	
Weighted average	b446	9.8		59	14	59		165		54	101	--	1.0		384	0.52	477	206	71	1.5	674	7.2	
Time-weighted average.....	--	9.5		70	25	86		216		74	149	--	0.9		530	--	--	277	101	2.1	931	7.2	
Tons per day....	--	12		74	18	73		204		67	126	--	1.2		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

b Mean discharge based on 365 days; mean discharge for 354 days of actual flow, 460 cfs.

COLORADO RIVER BASIN--Continued
8-1580. 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, 0.5 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 1963.
Water temperatures: October 1947 to September 1963.
EXTREMES. 1962-63. --Dissolved solids: Maximum, 348 ppm Sept. 1-30; minimum, 313 ppm Oct. 1-31.
Hardness: Maximum, 244 ppm Mar. 1-31; minimum, 193 ppm Dec. 1-31.
Specific conductance: Maximum, 84°F Sept. 10; minimum, 48°F Jan. 25, 27-29.
Water temperatures: Maximum, 84°F Sept. 10; minimum, 48°F Jan. 25, 27-29.
EXTREMES, 1947-63. --Dissolved solids: Maximum, 348 ppm Sept. 1-30, 1963; minimum, 184 ppm July 1-31, 1957.
Hardness: Maximum, 244 ppm Mar. 1-31, 1963; minimum, 120 ppm Oct. 8-31, 1959.
Specific conductance: 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. 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 1962 to September 1963

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) (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)	
													Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate		Sodium adsorption ratio
Oct. 1-31, 1962....	283	13		49	20	37		203	35	57	0.4	1.2		313	0.43	205	38	561
Nov. 1-30.....	414	12		47	20	38		191	37	61	.3	.8		8320	.44	200	44	554
Dec. 1-31.....	623	9.3		46	19	43		181	39	68	.3	1.2		8318	.43	193	44	565
Jan. 1-31, 1963....	573	8.2		51	22	37		195	39	68	.3	1.0		8338	.46	218	58	583
Feb. 1-28.....	767	11		48	22	38		187	40	69	.4	1.2		322	.44	210	58	585
Mar. 1-31.....	244	11		60	23	27		222	37	56	.3	2.2		326	.44	244	62	589
Apr. 1-30.....	1112	10		50	21	43		195	41	71	.3	.8		333	.45	212	52	596
May 1-31.....	1632	11		44	22	48		182	42	79	.3	.8		336	.46	200	52	588
June 1-30.....	1997	11		46	21	48		168	43	83	.3	7.6		343	.47	202	64	609
July 1-31.....	1816	9.6		48	21	46	4.2	182	44	83	.3	.5		346	.47	206	58	608
Aug. 1-31.....	1742	11		44	22	51		177	45	84	.4	.5		345	.47	200	56	625
Sept. 1-30.....	1462	11		44	22	52		175	45	87	.3	.2		348	.47	200	57	638
Weighted average	1056	11		47	21	46		182	42	78	0.3	1.8		338	0.46	204	56	603
Time-weighted average.....	--	11		48	21	42		188	41	72	0.3	1.5		332	--	208	54	592
Tons per day....	--	30		133	61	131		518	121	222	0.9	5.1		--	--	--	--	--

a Residue at 180°C.

COLORADO RIVER BASIN--Continued

8-1620. 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 and New Orleans Railroad Co. bridge, and 12 miles upstream from Jones Creek.

DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1963.

Water temperatures: October 1945 to September 1948, March 1950 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 360 ppm Aug. 1-31; minimum, 206 ppm Feb. 20-25.

Hardness: Maximum, 240 ppm Mar. 1-31; minimum, 134 ppm Feb. 20-25.

Specific conductance: Maximum daily, 868 micromhos July 29; minimum daily, 293 micromhos Dec. 31.

Water temperatures: Maximum, 86°F July 10, 11, 13; minimum, 37°F Jan. 13, 24.

EXTREMES, 1944-63.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.

Hardness: Maximum, 240 ppm Mar. 1-31, 1963; minimum, 66 ppm Sept. 27-29, 1957.

Specific conductance: Maximum daily, 868 micromhos July 29, 1963; minimum daily, 146 micromhos Sept. 27, 1957.

Water temperatures (1945-48, 1950-63): Maximum, 95°F July 26, 1954; minimum, 37°F Jan. 12, 1962, Jan. 13, 24, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-31, 1962...	902	14		54	14	31		186		44	41	0.4	1.8		a292	0.40	711	192	40	1.0	496	7.4
Nov. 1-30.....	676	14		54	16	33		200		42	45	.3	1.0		a305	.41	557	200	36	1.0	521	7.5
Dec. 1-31.....	1400	14		55	14	33		180		47	47	.4	3.5		a309	.42	1170	194	47	1.0	525	7.6
Jan. 1-31, 1963...	977	13		59	15	36		201		42	53	.3	3.2		a336	.46	886	208	44	1.1	559	7.4
Feb. 1-19.....	774	7.8		60	19	40		214		44	65	.3	1.2		a352	.48	736	228	52	1.2	617	7.3
Feb. 20-25.....	4610	10		42	7.0	19		108		42	28	--	5.4		206	.28	2560	134	46	.7	365	7.1
Feb. 26-28.....	1870	11		53	11	31		148		50	48	--	4.5		282	.38	1420	177	56	1.0	493	7.3
Mar. 1-31.....	615	13		65	19	37		224		48	61	.3	1.0		354	.48	588	240	56	1.0	624	7.3
Apr. 1-30.....	919	11		53	16	43		177		56	61	.4	1.8		329	.45	816	198	53	1.3	567	7.6
May 1-31.....	926	8.9		50	20	51		191		46	79	.3	.8		350	.48	875	208	51	1.5	601	7.8
June 1-30.....	1032	10		46	20	50		177		44	80	.3	.8		338	.46	942	198	52	1.5	599	7.1
July 1-31.....	1073	11		48	20	46	4.5	180		43	80	.3	1.2		343	.47	994	202	55	1.4	607	7.3
Aug. 1-31.....	841	12		49	21	53		183		45	89	.3	.8		360	.49	817	209	59	1.6	645	7.0
Sept. 1-30.....	941	11		47	22	52		184		45	86	.3	1.0		354	.48	899	208	57	1.6	648	7.2
Weighted average	997	12		52	17	40		182		45	62	0.3	2.0		323	0.44	869	199	50	1.2	563	7.3
Time-weighted average.....	--	12		53	18	42		189		46	65	0.3	1.6		332	--	--	205	50	1.3	579	7.3
Tons per day.....	--	31		140	46	108		490		122	168	0.9	5.3		--	--	--	--	--	--	--	--

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate
LAKE WINTERS NEAR WINTERS																				
Aug. 16, 1963		9.0	0.24	44	11	23	176	22	26	0.5	1.0			224	0.30	155	11	0.8	377	7.5
8-1340. NORTH CONCHO RIVER NEAR CARLSBAD																				
May 23, 1963	234	10		34	4.4	2.3	4.3	120		5.2	3.0	0.2	4.9	127	0.17	103	5	0.1	214	6.9
May 24	67.7	10		40	5.4	6.2	4.5	142		9.6	8.5	.3	3.0	158	.21	122	6	.2	266	6.8
May 27	1.90	11		37	8.9		11	136		21	12	.4	2.2	170	.23	129	17	.4	291	6.5
May 29	.09	--		--	--	13	4.5	178		17	--	--	.0	--	--	134	0	.5	409	6.7
Aug. 15	1.43	7.0		28	4.4	4.0	4.7	102		10	4.4	.3	1.2	114	.16	88	4	.2	194	7.1
8-1370. MUKEWATER SUBWATERSHED NO. 9 NEAR TRICKHAM																				
May 23, 1963	2.2	4.8		18	2.7	3.8	5.8	68		4.0	6.0	0.2	0.0	78	0.11	56	0	0.2	137	6.2
8-1375. MUKEWATER CREEK NEAR TRICKHAM																				
Oct. 18, 1962	0.1	11		27	2.5	3.9	4.9	95		5.2	4.0	0.3	0.2	106	0.14	78	0	0.2	173	6.7
May 21, 1963	360	9.9		40	1.0	2.9	5.0	125		6.2	5.0	.2	.0	131	.18	104	1	.1	222	6.6
June 17	290	10		30	2.0	6.5	4.6	94		4.2	14	.2	1.2	119	.16	83	6	.3	205	7.1
JIM NED CREEK NEAR COLEMAN																				
Oct. 15, 1962	37.2	9.8		47	9.1	37	160		36	46	0.4	0.0		155	0.37	155	24	1.3	458	6.8
May 23, 1963	117	8.1		44	4.9	15	146		13	20	.3	.5		130	.24	130	10	.6	310	6.5
May 30	35.5	--		--	--	--	119		19	28	--	--		--	--	116	18	--	327	7.1
May 31	al, 470	--		--	--	--	102		8.2	14	--	--		--	--	91	7	--	236	7.3
8-1570. WALLER CREEK AT 38TH STREET AT AUSTIN																				
Nov. 6, 1962	0.49	13		106	7.5	38	297		40	56	0.4	17		424	0.58	296	52	1.0	709	7.6
Dec. 20	2.31					205	28		28					173		173	5		442	6.5
Do.	43.4					174	4.8		4.8					148		148	5		300	6.7

a Field estimate.
b Residue at 180°C.

COLORADO RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate		
Nov. 6, 1962	0.84	11		90	9.8	43		242		53	70	0.4	8.0		404	0.55	265	66	1.1	685
Dec. 20	42.4							224			24						200	16		459
Do.	85.8							168			5.5						142	4		292

8-1575. WALLER CREEK AT 23RD STREET AT AUSTIN

8-1610. COLORADO RIVER AT COLUMBUS

June 6, 1963	1,810							176			81						182	38		598	6.9
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LAVACA RIVER BASIN

8-1645. NAVIDAD RIVER NEAR GANADO, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59, 170 feet upstream from Texas and New Orleans Railroad Co. bridge, 0.2 mile downstream from Sandy Creek, and 2.2 miles southwest of Ganado, Jackson County.

DRAINAGE AREA.--1,116 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1963.

Water temperatures: October 1959 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 486 ppm June 1-17; minimum, 87 ppm Jan. 18-22.

Hardness: Maximum, 253 ppm Nov. 16-30; minimum, 42 ppm Dec. 13-31.

Specific conductance: Maximum daily, 1,050 micromhos June 13; minimum daily, 125 micromhos Jan. 20.

Water temperatures: Maximum, 86°F July 22, Aug. 11, Sept. 8, 12; minimum, freezing point Feb. 22.

EXTREMES, 1959-63.--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, 1,070 micromhos Feb. 23, 1962; minimum daily, 63 micromhos Sept. 12, 1961.

Water temperatures: Maximum, 98°F July 21, 27, 28, 1962; minimum, freezing point Jan. 9-11, 1962, Feb. 22, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 1-9, 1962....	64.6	30		38	9.9	57		174		13	72	0.5	1.0		a316	0.43	55.1	136	0	2.1	527	7.7
Oct. 10-13.....	10.0	31		73	9.9	69		272		12	97	--	1.2		a440	.60	11.9	222	0	2.0	738	7.4
Oct. 14-22.....	17.1	14		20	3.9	30		85		7.2	38	--	1.2		156	.21	7.20	66	0	1.6	279	7.0
Oct. 23-29.....	37.7	27		32	7.4	63		156		11	75	--	1.8		a304	.41	30.9	110	0	2.6	509	7.5
Oct. 30-31.....	136	21		31	6.5	54		139		12	66	.3	.2		a268	.36	98.4	104	0	2.3	452	7.0
Nov. 1-15.....	18.1	26		73	7.9	63		260		15	86	.4	1.0		400	.54	19.5	214	2	1.9	691	7.4
Nov. 16-30.....	9.6	22		90	6.9	63		294		14	96	--	.2		437	.59	11.3	253	12	1.7	770	7.3
Dec. 1-12.....	37.5	19		47	6.0	46		162		16	64	.4	1.2		a301	.41	30.5	142	9	1.7	491	7.3
Dec. 13-31.....	265	15		12	3.0	22		46		13	26	--	2.0		116	.16	83.0	42	5	1.5	202	6.2
Jan. 1-17, 1963...	55.2	17		63	5.6	43		202		17	64	.4	.2		a332	.45	49.5	180	14	1.4	539	7.3
Jan. 18-22.....	1120	8.0		16	2.8	10		52		8.2	15	.3	1.0		87	.12	263	51	9	.6	157	6.6
Jan. 23-25.....	181	12		27	3.5	20		90		11	28	--	.2		146	.20	71.4	82	8	1.0	261	7.0
Jan. 26-31.....	58.0	15		66	5.6	38		206		16	60	--	.2		a323	.44	50.6	188	18	1.2	534	7.4
Feb. 1-18.....	31.7	16		85	6.2	59		268		18	90	.4	.2		407	.55	34.8	238	18	1.7	713	7.9
Feb. 19.....	1890	14		38	3.9	35		126		12	49	--	2.5		216	.29	1100	111	8	1.4	378	7.7
Feb. 20-22.....	1781	15		24	2.3	12		78		8.0	15	--	2.8		117	.16	563	69	5	.6	196	7.3
Feb. 23-28.....	132	16		50	4.0	27		155		15	40	--	1.8		a252	.34	89.8	141	14	1.0	394	7.7
Mar. 1-10.....	50.9	18		80	6.2	48		246		19	75	.4	.5		a369	.50	50.7	225	24	1.4	647	7.6
Mar. 11-31.....	34.0	21		86	6.6	58		266		18	93	--	.2		a416	.57	38.2	242	24	1.6	730	7.6
Apr. 1-16.....	33.1	20		68	7.2	69		231		18	99	.4	.2		a409	.56	36.6	199	10	2.1	699	7.6
Apr. 17-30.....	26.6	24		76	8.2	82		267		21	113	--	.2		455	.62	32.7	223	4	2.4	793	7.5
May 1-19.....	31.4	26		66	8.4	92		256		20	117	.5	1.0		457	.62	38.7	199	0	2.8	776	7.7
May 20-23.....	184	17		36	8.3	51		145		20	67	--	2.0		272	.37	135	124	5	2.0	483	7.2
May 24-31.....	25.9	25		56	11	92		254		21	108	--	1.0		439	.60	30.7	184	0	3.0	745	7.7
June 1-17.....	3.5	34		64	9.8	101		278		18	121	.5	.8		486	.66	4.59	200	0	3.1	804	7.7
June 18-24.....	57.9	23		52	12	65		202		23	92	--	1.0		367	.50	57.4	179	14	2.1	637	7.2
June 25.....	147	15		26	4.7	36		114		10	41	--	1.2		190	.26	75.4	84	0	1.7	326	6.6
June 26-30.....	294	24		36	9.3	48		152		17	64	--	1.2		274	.37	218	128	4	1.8	470	7.1
July 1-2, 7-11....	378	13		35	7.7	34	2.9	139		12	48	.3	1.2		222	.30	227	119	5	1.4	396	6.8

a Residue at 180°C.

LAVACA RIVER BASIN--Continued

8-1645. NAVIDAD RIVER NEAR GANADO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)				
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		Sodium adsorption ratio			
July 3-6, 1963....	1558	21		31	4.8	22		112		9.2	30	--	2.2			175	0.24	736	97	5	1.0	291	7.0	
July 12-31.....	96.1	30		48	13	59		198		21	83	--	.8			352	.48	91.3	174	11	1.9	606	7.2	
Aug. 1-31.....	79.3	35		50	18	73		215		30	106	.4	.8			419	.57	89.7	199	23	2.2	726	7.4	
Sept. 1-30.....	75.5	37		52	21	78		228		28	119	.5	.8			448	.61	91.3	216	29	2.3	781	7.3	
Weighted average	122	19		35	6.7	36		131		14	50	--	1.5			228	0.31	75.0	116	9	1.4	393	6.8	
Time-weighted average.....	--	24		56	9.4	60		208		19	85	--	0.8			361	--	--	179	12	1.9	619	7.1	
Tons per day....	--	6.3		12	2.2	12		43		4.7	16	--	0.5			--	--	--	--	--	--	--	--	--

LAVACA RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN LAVACA RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-1635. LAVACA RIVER AT HALLETTSVILLE																						
Jan. 7, 1963-----	4.15	9.0		81	6.4	77	242			42	108	0.6	0.5		a486	0.66		228	30	2.2	790	7.0
Mar. 19-----	5.26	11		74	7.0	83	212			42	124	.6	.0		a463	.63		214	40	2.5	799	7.1
May 30-----	.79	27		40	6.3	83	154			27	107	.7	.0		367	.50		126	0	3.2	627	7.2
July 1-----	12.0	20		49	3.3	53	175			16	63	.6	.0		291	.40		136	0	2.0	477	7.4
July 29-----	.52	27		32	4.9	75	132			22	92	.7	.0		319	.43		100	0	3.3	543	7.3
Sept. 3-----	.85	24		41	4.7	79	166			21	95	.7	.2		348	.47		122	0	3.1	607	6.3
8-1640. LAVACA RIVER NEAR EDNA																						
Oct. 30, 1962-----	947	13		39	2.6	19	130			10	20	0.4	4.0		a177	0.24		108	1	0.8	299	7.0
Jan. 8, 1963-----	35.1	17		99	6.5	52	304			27	75	.5	1.0		a464	.62		274	24	1.4	747	7.1
Mar. 20-----	43.3	10		64	6.6	61	212			29	82	.4	.0		357	.49		186	13	1.9	637	7.4
May 28-----	23.7	25		94	7.2	69	328			21	86	.5	.2		464	.63		264	0	1.8	773	7.3
July 2-----	685	5.2		50	1.8	9.7 | 2.9	176		4.8	7.0		.3	.2		169	.23		132	0	.4	286	6.4
July 30-----	10.3	23		86	6.7	61	300			19	76	.4	.0		420	.57		242	0	1.7	710	7.1
Sept. 4-----	6.04	23		67	6.8	68	256			15	82	.5	.0		388	.53		195	0	2.1	676	6.8
8-1643. NAVIDAD RIVER NEAR HALLETTSVILLE																						
Mar. 19, 1963-----	23.8	15		100	6.2	68	305			20	106	0.5	0.8		466	0.63		275	25	1.8	819	6.9

a Residue at 180° C.

GUADALUPE RIVER BASIN

8-1765. 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 and New Orleans Railroad Co. bridge, and 10 miles upstream from Coleta Creek.

DRAINAGE AREA.--5,161 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1963.

Water temperatures: November 1950 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 372 ppm Sept. 10-15; minimum, 225 ppm June 18.

Hardness: Maximum, 248 ppm Dec. 16-31; minimum, 140 ppm June 18.

Specific conductance: Maximum daily, 720 micromhos Sept. 12; minimum daily, 346 micromhos July 4.

Water temperatures: Maximum, 85°F on many days during summer months; minimum, 36°F Jan. 24.

EXTREMES, 1945-46, 1948-63.--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 (1950-63): Maximum, 90°F Aug. 4, 27, 1952; minimum, 36°F Jan. 11, 12, 1962, Jan. 24, 1963.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate				
Oct. 1-15, 1962...	635	18		58	13	29		202		36	38	0.4	3.2		a314	0.43	538	198	32	0.9	494	7.8	
Oct. 16-31.....	667	18		64	15	30		243		30	38	--	2.8		317	.43	571	221	22	.9	537	7.7	
Nov. 1-30.....	687	16		66	14	31		243		30	39	.3	3.2		a324	.44	601	222	23	.9	548	7.6	
Dec. 1-15.....	807	15		66	14	32		243		31	39	.3	3.8		a324	.44	706	222	23	.9	552	7.7	
Dec. 16-31.....	802	14		73	16	30		268		32	40	--	3.8		a343	.47	743	248	28	.8	589	7.9	
Jan. 1-31, 1963...	697	13		68	17	29		250		31	43	.3	3.0		a333	.45	627	240	34	.8	573	7.4	
Feb. 1-19.....	714	11		64	18	31		248		30	44	.3	3.8		324	.44	625	234	30	.9	569	7.4	
Feb. 20-28.....	1739	12		47	8.8	27		152		36	33	--	5.0		244	.34	1150	154	29	.9	421	7.0	
Mar. 1-31.....	663	13		62	18	30		226		34	48	.3	4.7		a334	.45	598	228	44	.9	565	7.3	
Apr. 1-30.....	738	15		62	16	33		237		33	42	.3	4.2		a323	.44	644	220	26	1.0	549	7.7	
May 1-15.....	580	17		56	16	32		227		27	40	.3	3.2		304	.41	476	206	20	1.0	500	7.8	
May 16-31.....	405	15		64	15	34		244		28	46	--	2.5		324	.44	354	221	21	1.0	541	7.7	
June 1-17.....	361	14		57	16	34		230		27	44	.3	1.8		307	.42	299	208	20	1.0	526	7.4	
June 18.....	550	--		--	--	27		157		19	34	--	1.8		225	--	--	140	12	1.0	375	7.5	
June 19-30.....	363	16		58	16	32		230		28	43	--	1.8		308	.42	302	210	22	1.0	518	7.4	
July 1-12.....	448	18		48	12	25	2.7	187		22	37	.3	2.0		259	.35	313	170	16	.8	439	7.6	
July 13-31.....	213	8.5		54	17	39		227		29	51	--	.8		311	.42	179	204	18	1.2	533	7.5	
Aug. 1-31.....	172	20		48	17	37		206		29	50	.3	.8		303	.41	141	190	21	1.2	532	7.2	
Sept. 1-9.....	166	19		44	18	44		200		31	57	.3	1.0		312	.42	140	184	20	1.4	542	7.3	
Sept. 10-15.....	165	18		58	18	53		228		34	78	--	1.0		372	.51	166	218	32	1.6	663	7.4	
Sept. 16-30.....	236	19		59	18	43		250		30	54	--	1.8		348	.47	222	221	16	1.3	599	7.6	
Weighted average	565	15		61	15	31		230		31	42	--	3.4		316	0.43	483	216	27	0.9	538	7.5	
Time-weighted average.....	--	15		60	16	33		230		30	44	--	2.8		318	--	--	215	26	1.0	542	7.5	
Tons per day....	--	22		94	23	48		351		48	64	--	5.2		--	--	--	--	--	--	--	--	--

a Residue at 180°C.

GUADALUPE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		
8-1710. BLANCO RIVER AT WIMBERLEY																				
Nov. 28, 1962-----	32.7	12		40	18	7.1	1.5	171		26	14	0.3	3.8	a210	0.29	174	34	0.2	366	7.5
Jan. 3, 1963-----	46.0	8.5		76	17	7.1	.8	272		23	14	.3	3.8	284	.39	260	36	.2	501	6.9
Apr. 19-----	57.8	12		70	14	7.2	1.0	250		18	14	.3	3.2	a270	.37	232	27	.2	455	7.2
June 12-----	20.0	11		52	15	6.5	1.9	200		20	13	.3	1.5	219	.30	191	28	.2	372	7.5
July 18-----	13.7	11		50	19	7.8	1.6	206		26	16	.3	.8	234	.32	203	34	.2	390	7.2
Aug. 21-----	13.6	11		50	18	7.5	1.5	202		25	14	.3	.5	227	.31	199	33	.2	404	6.9
Sept. 24-----	11.4	12		52	19	7.8	1.6	208		33	14	.3	1.2	243	.33	208	37	.2	421	7.0

8-1720. SAN MARCOS RIVER AT LULING

Mar. 13, 1963-----	160	8.9		76	20	28	266		33	55	55	0.3	3.0	355	0.48	272	54	0.7	637	6.9
July 17-----	97.2	12		61	18	18	231		26	32	32	.3	3.2	284	.39	226	36	.5	478	7.0
Sept. 23-----	90.9	12		62	17	19	232		26	31	31	.3	4.5	286	.39	224	34	.6	502	6.9

8-1724. PLUM CREEK AT LOCKHART

Oct. 24, 1962-----	0.90	13		66	4.9	35	161		94	21	21	0.7	0.2	a332	0.45	184	52	1.1	503	6.6
Jan. 3, 1963-----	4.37	7.1		88	7.6	52	202		121	50	50	.6	.8	a443	.60	251	86	1.4	695	7.1
Apr. 18-----	1.63	8.5		99	10	61	176		202	45	45	.7	.2	a518	.70	288	144	1.6	786	7.0

8-1730. PLUM CREEK NEAR LULING

Mar. 13, 1963-----	9.14	5.5		164	22	264	284		141	490	490	0.6	2.5	1,230	1.67	500	267	5.1	2,140	7.5
June 10-----	.53	9.1		116	13	262	400		98	340	340	.8	.8	1,040	1.41	343	15	6.2	1,760	7.2
July 17-----	.51	11		106	13	225	328		94	310	310	.7	.0	921	1.25	318	49	5.5	1,560	7.6
Sept. 23-----	1.26	13		60	6.4	11.4	244		40	128	128	.6	1.0	483	.66	176	0	3.7	858	7.3

8-1735. SAN MARCOS RIVER NEAR OTTINE

Mar. 13, 1963-----	b170	9.1		84	19	41	288		40	70	70	0.4	0.0	406	0.55	288	52	1.0	728	6.5
July 17-----	b100	11		62	18	29	236		28	47	47	.3	2.8	314	.43	228	35	.8	531	7.3

8-1746. PEACH CREEK NEAR DILWORTH

Oct. 29, 1962-----	205	10		25	1.8	6.7	4.9	81		13	5.8	0.4	1.8	109	0.15	70	3	0.3	184	6.9
Jan. 7, 1963-----	1.18	13		25	3.1	21	76		33	16	16	.3	.2	149	.20	75	13	1.1	245	6.5
Mar. 19-----	.60	19		78	12	60	150		142	72	72	.3	.0	a478	.65	244	121	1.7	740	7.2

a Residue at 180°C.
b Field estimate.

GUADALUPE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-1750. SANDIES CREEK NEAR WESTHOFF																						
Nov. 1, 1962-----	30.8	11		14	3.8	112	206		18	75	0.5	0.2			a362	0.49		50	0	6.9	596	6.3
Jan. 11, 1963-----	6.29	17		25	4.2	83	145		46	64	.4	1.8			312	.42		80	0	4.0	532	6.6
Mar. 22-----	4.46	15		51	11	137	233		82	137	.4	.0			548	.75		172	0	4.5	933	6.7
Apr. 26-----	1.82	17		53	12	290	512		50	238	1.2	1.8			a923	1.26		182	0	9.3	1,520	7.7
May 27-----	.22	39		42	5.6	263	510		42	168	.6	.2			811	1.10		128	0	10	1,290	7.2
July 5-----	5.82	15		27	6.0	469	536		20	458	1.1	2.5			1,260	1.71		92	0	21	2,160	7.0
Aug. 1-----	.12	46		35	3.0	257	508		41	140	.6	.2			773	1.05		100	0	11	1,230	7.4
Sept. 6-----	.13	46		33	3.0	251	492		40	138	.5	.0			754	1.03		95	0	11	1,230	7.1
8-1770. COLETO CREEK NEAR SCHROEDER																						
Nov. 1, 1962-----	2.09	28		61	9.7	74	177		30	124	0.5	0.0			a436	0.59		192	47	2.3	731	7.5
Dec. 3-----	156	21		69	8.7	80	202		35	125	.5	3.0			a457	.62		208	42	2.4	785	6.7
Mar. 20, 1963-----	3.69	20		71	12	84	205		33	146	.4	.0			a496	.67		226	58	2.4	826	7.4
May 28-----	b .09	31		72	9.1	70	225		24	113	.4	.0			430	.58		217	32	2.1	734	7.2
July 3-----	88.8	11		37	1.9	16	114		7.0	22	.2	2.0			153	.21		100	7	.7	263	6.7
Sept. 4-----	b .18	31		70	9.4	62	232		19	97	.4	.0			403	.55		213	23	1.8	698	7.1

a Residue at 180°C.
b Field estimate.

SAN ANTONIO RIVER BASIN
8-1885. 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 (revised).---3,921 square miles.

RECORDS AVAILABLE.---Chemical analyses: September 1945 to September 1946, September 1958 to September 1963.

Water temperatures: September 1958 to September 1963.

EXTREMES, 1962-63.---Dissolved solids: Maximum, 761 ppm Aug. 1-31; minimum, 158 ppm Dec. 22.

Hardness: Maximum, 372 ppm Aug. 1-31; minimum, 86 ppm Dec. 22.

Specific conductance: Maximum daily, 1,430 microhos Sept. 12; minimum daily, 262 microhos Dec. 22.

Water temperatures: Maximum, 89°F Aug. 2; minimum, 43°F Jan. 15.

EXTREMES, 1945-46, 1958-63.---Dissolved solids: Maximum, 808 ppm Sept. 18, 1959; minimum, 85 ppm Oct. 27, 1960.

Hardness: Maximum, 372 ppm Aug. 1-31, 1963; minimum, 57 ppm Oct. 27, 1960.

Specific conductance: Maximum daily, 1,430 microhos Sept. 12, 1963; minimum daily, 138 microhos Oct. 27, 1960.

Water temperatures (1958-63): Maximum, 89°F Sept. 5, 1961, Aug. 10, 1962, Aug. 2, 1963; minimum, 42°F Jan. 10, 11, 1962.

REMARKS.---Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Specific conductance (microhos at 25°C)			
												Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate		Sodium sorption ratio	pH	
Oct. 1-15, 1962....	160	24	88	88	19	99	284	284	98	118	0.7	12	0.84	266	298	65	2.5	982	7.9	
Oct. 16-31.....	145	22	90	90	20	106	298	298	104	125	--	11	.86	249	307	63	2.6	1030	7.9	
Nov. 1-15.....	170	21	88	88	20	99	274	274	108	117	.6	17	.83	279	302	78	2.5	985	7.9	
Nov. 16-27.....	180	20	92	92	19	101	283	283	105	123	--	16	.84	299	308	76	2.5	1010	7.8	
Nov. 28-29.....	778	--	--	--	--	--	123	123	33	31	--	--	--	--	109	8	--	--	369	7.5
Nov. 30.....	790	--	--	--	--	--	204	204	90	71	--	--	--	--	210	43	--	--	737	7.4
Dec. 1-4.....	726	--	--	--	--	--	151	151	57	44	--	--	--	--	172	48	--	--	511	7.6
Dec. 5-11.....	363	16	68	68	12	54	194	194	70	67	.5	9.2	.53	384	219	60	1.6	667	7.7	
Dec. 12-21.....	220	17	91	91	19	83	270	270	94	109	.6	14	.76	333	305	84	2.1	949	7.6	
Dec. 22.....	1060	--	--	--	--	--	99	99	12	22	--	--	.21	452	86	5	--	--	262	7.4
Dec. 23-24.....	335	--	--	--	--	--	224	224	74	78	--	--	--	--	230	46	--	--	751	7.9
Dec. 25-28.....	266	16	88	88	18	82	270	270	92	106	.6	4.4	.73	388	294	72	2.1	946	7.4	
Dec. 29-31.....	433	--	--	--	--	--	154	154	60	54	--	--	--	--	170	44	--	--	568	7.7
Jan. 1-31, 1963....	215	18	99	99	21	84	279	279	106	119	.6	10	.88	375	334	105	2.0	1010	7.6	
Feb. 1-17.....	216	12	101	101	22	97	291	291	113	128	.6	19	.86	371	342	104	2.3	1060	7.8	
Feb. 18-19, 26-28.	334	15	78	78	15	63	216	216	85	83	--	14	.62	414	256	79	1.7	782	7.6	
Feb. 20-25.....	907	12	48	48	8.2	39	144	144	53	42	--	8.2	.39	700	154	36	1.4	482	7.1	
Mar. 1-15.....	223	19	100	100	23	92	284	284	112	124	.6	22	.88	388	344	112	2.2	1020	7.8	
Mar. 16-31.....	175	15	106	106	25	105	300	300	126	146	--	16	.97	337	368	122	2.4	1130	7.6	
Apr. 1-7.....	140	21	108	108	24	120	310	310	134	160	.6	11	1.00	278	368	114	2.7	1180	8.0	
Apr. 8-14.....	356	17	69	69	14	66	200	200	82	81	--	11	.438	421	230	66	1.9	735	7.7	
Apr. 15-29.....	146	20	100	100	22	105	291	291	121	138	--	11	.60	260	340	102	2.5	1090	7.6	
Apr. 30-May 1.....	644	17	35	35	2.8	19	114	114	9.4	21	--	8.4	.23	294	99	5	.8	280	7.5	
May 2-3.....	154	23	78	78	13	78	220	220	83	105	--	4.4	.67	.205	248	68	2.2	809	8.0	

a Residue at 180°C.

SAN ANTONIO RIVER BASIN--Continued

8-1885. SAN ANTONIO RIVER AT GOLJAD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
May 4-31, 1963.....	135	21		95	20	98		284		108	129	0.6	5.8			617	0.84	225	320	87	2.4	1010	7.6	
June 1-24.....	90.2	23		96	22	115		273		123	138	.6	5.2			677	.92	165	330	106	2.7	1100	7.6	
June 25-30.....	269	19		69	14	69		207		75	90	--	5.6			444	.60	322	230	60	2.0	747	7.4	
July 1-15.....	150	23		76	16	79	7.4	238		80	104	.6	11			514	.70	208	256	60	2.1	843	7.6	
July 16-31.....	78.8	20		90	22	109		278		106	148	--	7.1			639	.87	136	315	87	2.7	1080	7.5	
Aug. 1-31.....	47.9	24		106	26	132		316		132	182	.6	3.5			761	1.03	98.4	372	112	3.0	1290	7.6	
Sept. 1-16.....	67.5	21		98	23	128		295		123	172	.6	3.5			714	.97	130	339	97	3.0	1250	7.5	
Sept. 17-22.....	407	15		55	9.0	43		158		58	50	--	7.8			316	.43	347	174	44	1.4	567	7.4	
Sept. 23-30.....	122	19		79	14	74		230		89	89	--	9.9			487	.66	160	254	66	2.0	855	7.3	
Weighted average	196	18		81	17	79		239		91	102	--	11			524	0.71	277	271	75	2.1	863	7.5	
Time-weighted average.....	--	20		90	20	95		269		104	125	--	10			605	--	--	307	87	2.4	997	7.6	
Tons per day.....	--	9.4		43	8.9	42		127		48	54	--	5.7			--	--	--	--	--	--	--	--	--

SAN ANTONIO RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium		Non-carbonate

8-1824. CALAVERAS CREEK SUBWATERSHED NO. 6 NEAR ELMENDORF

Apr. 29, 1963		4.6		50	9.6	28	133		86	18	0.5	0.2		262	0.36	164	55	1.0	437	6.9
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8-1825. CALAVERAS CREEK NEAR ELMENDORF

Apr. 5, 1963	23.5	6.2		24	2.4	3.9	6.7	76		13	6.0	0.4	1.2	101	0.14	70	7	0.2	172	6.4
Sept. 13	43.9	8.5		39	3.6	11	126	23		23	5.1	.5	1.5	154	.21	112	9	.5	281	6.5

8-1860. CIBOLO CREEK NEAR FALLS CITY

Oct. 18, 1962	10.2	15		82	18	118	218		190	112	0.3	0.2		648	0.94	278	100	3.1	1,030	7.6
Nov. 26	14.0	16		87	21	123	236		205	115	.3	.2		684	.93	304	110	3.1	1,090	7.6
Jan. 3, 1963	19.2	14		98	19	103	226		198	110	.4	.0		8661	.90	322	138	2.5	1,030	7.5
Aug. 7	4.81	19		82	21	169	216		226	173	.5	.0		796	1.08	291	114	4.3	1,270	7.3

8-1870. ESCONDIDO RESERVOIR SUBWATERSHED NO. 1 NEAR KENEDY

Mar. 7, 1963		6.6		43	2.4	4.3	5.6	153		0.2	2.8	0.3	0.2	140	0.19	117	0	0.2	256	6.9
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8-1875. ESCONDIDO CREEK AT KENEDY

May 1, 1963	11.2	16		36	2.9	27	145		20	12	1.0	1.0		187	0.25	102	0	1.2	309	6.8
Apr. 30	82.7	23		28	2.1	16	100		11	11	.6	2.2		143	.19	78	0	.8	221	6.9

a. Residue at 180° C.

SAN ANTONIO RIVER BASIN--Continued

CIBOLO CREEK LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on Cibolo Creek and its tributaries from Schertz in Guadalupe County to the mouth of Cibolo Creek in Karnes County, a distance of 80 miles.

Chemical analyses, in parts per million, March 1963

Date	Stream	Location	Discharge (cfs)	Silica (SiO ₂) (ppm)	Calcium (Ca) (ppm)	Magnesium (Mg) (ppm)	Sodium (Na) (ppm)	Bicarbonate (HCO ₃) (ppm)	Sulfate (SO ₄) (ppm)	Chloride (Cl) (ppm)	Fluoride (F) (ppm)	Nitrate (NO ₃) (ppm)	Dissolved solids (calculated)			Total Hardness as CaCO ₃ (ppm)	Non-carbonate Hardness (ppm)	Sodium sulfate ratio (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH	Detergents (ABS)
													Parts per million	Tons per acre-foot	Calcium chloride (ppm)						
Mar. 5	Cibolo Creek	Unnamed tributary	0.21	---	---	---	---	470	49	65	0.0	---	575	---	278	0	---	1,010	6.8	2.7	
Do.	Cibolo Creek	500 feet below Randolph Field sewer plant	1.77	18	70	18	54	267	58	46	1.7	21	448	0.61	248	30	1.5	756	6.6	.97	
Do.	Do.	1,000 feet above U.S. Highway 90	1.17	---	---	---	---	228	31	32	---	4.5	300	---	205	18	---	524	7.2	.14	
Do.	Do.	400 feet above Farm Road 2538	4.10	---	---	---	---	180	52	62	---	8.7	350	---	177	30	---	624	6.6	.03	
Do.	Martinez Creek	2.5 miles above mouth	1.61	3.7	202	53	201	150	534	350	.8	---	1,420	1.93	722	599	3.1	2,190	7.1	.03	
Mar. 6	Cibolo Creek	100 feet below Farm Road 775	5.23	---	---	---	---	171	83	70	---	1.0	385	---	202	62	---	659	6.8	.02	
Do.	Elm Creek	0.3 mile above mouth	b. 1	---	---	---	---	249	344	750	---	---	1,880	---	920	716	---	3,140	6.8	.02	
Do.	Cibolo Creek	At county road, 3.2 miles above Sutherland Springs	6.13	---	---	---	---	219	88	74	---	4.5	440	---	251	62	---	745	7.0	.02	
Do.	Do.	About 1 mile above Sutherland Springs	9.76	---	---	---	---	196	77	61	---	4.2	385	---	227	66	---	669	6.8	.00	
Do.	Do.	At State Highway 97 near Stockdale	18.2	16	68	11	56	186	94	58	3.3	3.0	406	.55	214	62	1.7	691	6.9	.00	
Do.	Do.	At Farm Road 537	16.0	---	---	---	---	206	163	74	---	3.0	535	---	281	112	---	885	6.9	.00	
Do.	Do.	At Farm Road 541	17.9	---	---	---	---	211	181	90	---	2.5	585	---	294	121	---	953	7.3	.00	
Mar. 7	Do.	Gaging station (8-1860) near Falls City	17.4	8.8	95	18	100	212	197	104	1.5	2.2	637	.87	311	138	2.5	1,020	7.2	.01	
Do.	Do.	At Farm Road 81	18.6	---	---	---	---	208	198	104	---	---	625	---	305	134	---	1,010	7.2	.00	

a Residue at 180°C.
b Estimated.

SAN ANTONIO-NUECES COASTAL AREA

8-1895. 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 0.2 mile southwest of Refugio, Refugio County.

DRAINAGE AREA.--643 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1963.

Water temperatures: November 1962 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 66,900 ppm Aug. 1-10, 13-30; minimum, 324 ppm Nov. 27-28.

Hardness: Maximum, 5,990 ppm Aug. 1-10, 13-30; minimum, 60 ppm Nov. 27-28.

Specific conductance: Maximum daily, 83,100 micromhos Aug. 10; minimum daily, 696 micromhos May 2.

Water temperatures: Maximum, 95°F on several days during August and September; minimum, 39°F Jan. 13.

EXTREMES, 1961-63.--Dissolved solids: Maximum, 66,900 ppm Aug. 1-10, 13-30, 1963; minimum, 181 ppm June 2-4, 1962.

Hardness: Maximum, 5,990 ppm Aug. 1-10, 13-30, 1963; minimum, 60 ppm Nov. 27-28, 1962.

Specific conductance: Maximum daily, 83,100 micromhos Aug. 10, 1963; minimum daily, 239 micromhos June 3, 1962.

REMARKS.--Values given are expressed in parts per million and should be multiplied by the density in any computation of loads. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density (g/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1962	5.4	48		589	76		6340		205	27	10900	--	--		18100	24.9	264	1780	1610	65	25500	7.2	1.011
Nov. 1-26.....	5.5	50		1050	141		11300		178	23	19600	--	--		32300	44.9	480	3200	3050	87	41200	7.3	1.022
Nov. 27-28.....	395	--		--	--		--		52	2.8	151	--	--		324	.44	346	60	18	--	724	7.2	--
Nov. 29.....	184	--		--	--		--		80	4.0	348	--	--		--	--	--	108	42	--	1200	7.5	--
Nov. 30.....	54	--		--	--		--		82	5.2	950	--	--		--	--	--	194	127	--	3040	7.7	--
Dec. 1-2.....	29.5	28		135	19		1310		90	11	2250	--	--		3800	5.17	303	415	341	28	6700	7.5	--
Dec. 3-4.....	314	14		31	3.8		144		82	.4	240	0.2	.8		474	.64	402	93	26	6.5	928	7.6	--
Dec. 5-8.....	36	18		105	16		991		96	4.7	1700	--	1.5		2880	3.92	280	328	250	24	5270	7.6	--
Dec. 9-23.....	8.8	22		476	65		4910		192	13	8480	--	--		14100	19.3	335	1460	1300	56	21600	6.9	1.008
Dec. 24-27.....	34.0	18		140	22		1220		132	24	2100	--	--		3590	4.88	330	440	332	25	6540	7.8	--
Dec. 28-31.....	15.8	19		284	42		2830		153	15	4880	--	--		8140	11.1	347	881	756	41	13500	7.7	1.004
Jan. 1-15, 1963	6.5	22		574	83		5770		227	18	10000	--	--		16600	22.8	291	1770	1590	59	25000	7.3	1.010
Jan. 16-31.....	5.8	25		731	112		7300		260	20	12700	--	--		21000	28.9	329	2280	2070	67	30800	7.1	1.013
Feb. 1-28.....	5.2	26		813	116		8750		229	32	15100	--	--		25000	34.5	351	2510	2320	76	34400	6.5	1.015
Mar. 1-31.....	3.8	30		900	127		9900		184	26	17100	--	--		28200	39.2	289	2770	2620	82	39600	6.5	1.022
Apr. 1-30.....	2.2	33		1130	164		13000		199	23	22400	--	--		36800	51.3	219	3490	3330	96	47000	6.8	1.025
May 1-2.....	118	18		--	--		--		137	6.2	155	--	--		--	--	--	132	20	--	696	8.1	--
May 3-5.....	17.4	26		154	22		1400		134	4.3	2420	--	--		4090	5.56	192	474	364	28	7120	7.8	--
May 6-10.....	4.0	28		574	89		6120		176	6.7	10600	--	--		17500	24.1	189	1800	1650	62	26300	7.3	1.011
May 11-31.....	1.5	29		1320	211		15000		164	8.4	26000	--	--		42600	59.7	173	4160	4030	101	54000	6.4	1.030
June 1-16, 18-26	2.0	41		1710	249		19800		135	10	34200	--	--		56100	79.3	303	5290	5180	118	64200	6.7	1.039
June 17, 27-30.	5.3	37		768	118		8960		156	20	15400	--	--		25400	35.1	363	2400	2270	79	35100	7.2	1.016
July 1-31.....	1.6	14		1410	217		16700		155	18	28600	--	--		47100	66.2	203	4410	4280	109	57700	6.4	1.033
Aug. 1-10, 13-30	1.0	43		1880	316		23800		135	4.7	40800	--	--		66900	95.3	181	5990	5880	134	80500	6.4	1.048
Aug. 11-12.....	3.2	25		1270	173		--		135	--	25400	--	--		--	--	--	3880	3770	--	55500	7.5	1.030
Aug. 31.....	1.1	20		753	876		--		112	--	12900	--	--		--	--	--	5480	5390	--	31400	7.0	1.014
Sept. 1-14.....	1.3	--		--	--		--		153	--	40100	--	--		--	--	--	5730	5600	--	79300	7.0	1.047
Sept. 15.....	139	8.9		--	--		171		91	3.4	282	.2	4.0		--	--	--	107	32	7.2	1090	7.4	--

SAN ANTONIO-NUECES COASTAL AREA--Continued

8-1895. MISSION RIVER AT REFUGIO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate						
Sept. 16-17, 1963.....	48.0	14		103	14				99		1680		1.0				314	234		5240	7.4	--		
Sept. 18.....	43.0	11							80		675		1.2				156	90		2380	7.3	--		
Sept. 19-20.....	13.3	16		190	27				95		3400						585	507		9970	7.3	--		
Sept. 21-24.....	3.8	17		441	61		5020		126	5.1	8620				146	14200	1250	1250	5.9	22100	7.1	1.009		
Sept. 25-30.....	2.4	--		--	--		--		166	--	18600	--	--	--	--	--	2940	2800	--	42900	6.6	1.020		
Weighted average....	10.6	25		311	49		3400		120	9.6	5790	--	--		277	9650	13.12	277	878	45	13300	7.1	--	
Time-weighted average....	--	31		979	178		11830		175	18	20100	--	--		--	33300	--	--	3170	3030	85	42500	6.7	--
Tons per day.	--	0.7		8.9	1.4		97		3	0.3	166	--	--		277	--	--	--	--	--	--	--	--	--

SAN ANTONIO-NUECES COASTAL AREA--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO-NUECES COASTAL AREA

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
BLANCO CREEK NEAR REFUGIO																						
Oct. 31, 1962-----	13.2	27		52	13	79		184		30	122	0.4	0.0		a422	0.57		183	32	2.5	722	7.4
Jan. 9, 1963-----	1.25	18		59	9.4	54		212		20	76	.4	.2		341	.46		186	12	1.7	606	7.4
Mar. 21-----	b .36	29		64	21	131		240		50	200	.4	.0		a631	.86		246	50	3.6	1,070	7.4
8-1893. MEDIO CREEK NEAR BEEVILLE																						
Nov. 1, 1962-----	b0.10	9.5		23	2.4	11		89		4.6	7.8	0.4	1.8		104	0.14		67	0	0.6	188	7.0
MEDIO CREEK NEAR REFUGIO																						
Oct. 31, 1962-----	1.01	29		68	16	91		239		25	148	0.5	0.0		a505	0.69		236	40	2.6	869	7.3
Jan. 9, 1963-----	1.12	19		61	12	75		232		25	105	.3	.0		411	.56		202	12	2.3	728	6.9
Mar. 21-----	.61	25		84	24	142		288		46	235	.5	.2		a741	1.01		308	72	3.5	1,240	7.0
May 29-----	.05	26		58	16	125		237		34	178	.5	.0		554	.75		210	16	3.8	957	7.0
8-1897. ARANSAS RIVER NEAR SKIDMORE																						
Jan. 10, 1963-----	b0.7	8.1		36	5.3	124		218		15	132	0.5	1.2		429	0.58		112	0	5.1	792	7.0
Mar. 21-----	b .45	3.6		22	7.7	440		490		30	430	1.4	1.8		1,180	1.60		86	0	21	2,100	8.0

a Residue at 180°C.
b Field estimate.

NUECES RIVER BASIN

8-2110. 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

DRAINAGE AREA.--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1963.

Water temperatures: October 1947 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 428 ppm June 1-30; minimum, 344 ppm Oct. 1-31.

Hardness: Maximum, 168 ppm Feb. 1-28; minimum, 141 ppm July 1-31.

Specific conductance: Maximum daily, 904 micromhos June 17; minimum daily, 576 micromhos Oct. 1.

Water temperatures: Maximum, 88°F on many days during summer months; minimum, 46°F Jan. 27.

EXTREMES, 1947-63.--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.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (calculated)			Hardness as CaCO ₃	Non-ad-dium con-duct-ance (micro-mhos at 25°C)	pH			
													Tons per day	Tons per acre-foot	parts per million						
Oct. 1-31, 1962...	107	17	46	7.5	68	179	38	0.3	0.8	76	0.3	0.8	0.47	344	0.47	99.4	146	0	2.4	599	7.7
Nov. 1-30, 1962...	83.6	16	48	7.9	71	185	40	0.3	0.8	79	0.3	0.8	.49	357	.49	80.6	152	1	2.5	621	7.7
Dec. 1-31, 1963...	65.6	15	52	7.8	71	198	40	0.3	0.8	80	0.3	0.8	.51	372	.51	65.9	162	2	2.4	638	7.5
Jan. 1-31, 1963...	88.3	12	54	7.9	72	200	40	0.3	0.8	83	0.3	0.8	.54	374	.54	89.2	167	3	2.4	651	7.7
Feb. 1-28, 1963...	83.4	12	54	8.1	76	206	40	0.3	0.8	86	0.3	0.8	.54	395	.54	88.9	168	0	2.5	666	7.6
Mar. 1-31, 1963...	90.1	13	54	7.9	78	206	41	0.3	0.8	88	0.3	0.8	.52	384	.52	93.4	167	0	2.6	677	7.6
Apr. 1-30, 1963...	110	15	50	8.4	84	202	42	0.3	0.8	94	0.3	0.8	.53	393	.53	117	160	0	2.9	682	7.8
May 1-31, 1963...	146	16	46	7.5	92	191	44	0.3	1.0	101	0.3	1.0	.55	402	.55	146	158	0	3.3	688	7.6
June 1-30, 1963...	128	19	46	8.0	101	196	46	0.3	1.0	111	0.3	1.0	.58	428	.58	148	148	0	3.6	730	7.5
July 1-31, 1963...	143	17	44	7.5	80	196	41	0.3	1.0	87	0.3	1.0	.52	384	.52	148	148	0	2.9	656	7.1
Aug. 1-31, 1963...	157	20	48	6.3	77	204	37	0.3	1.0	76	0.3	1.0	.50	366	.50	155	146	0	2.8	628	7.6
Sept. 1-30, 1963...	108	19	50	6.6	76	216	36	0.3	0.7	72	0.3	0.7	.50	366	.50	107	152	0	2.7	626	7.5
Weighted average	109	16	49	7.6	80	198	41	0.3	0.7	87	0.3	0.7	0.52	382	0.52	113	153	0	2.8	657	7.5
Time-weighted average	--	--	16	7.6	79	198	40	0.3	0.7	86	0.3	0.7	--	380	--	--	--	1	2.8	655	7.5
Tons per day.....	4.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Residue at 180°C.

NUECES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate		
8-1920. NUECES RIVER BELOW UVALDE																				
Nov. 5, 1962-----	11.2	13		56	11	9.7	10	184		22	22	0.3	2.0		226	0.31	185	34	0.3	398
Jan. 16, 1963-----	13.5	12		64	12	9.7	0.7	208		23	22	.2	3.5		a268	.36	209	39	.3	436
Mar. 27-----	13.3	13		56	11	11	1.1	181		22	24	.2	3.2		a242	.33	185	37	.4	398
June 5-----	25.4	11		56	11	7.8	1.1	190		18	17	.2	3.8		219	.30	185	29	.2	375
Aug. 12-----	9.97	16		44	12	9.2	1.1	162		20	18	.3	.8		201	.27	159	26	.3	339
8-1940. NUECES RIVER AT COTULLA																				
May 14, 1963-----	809	14		51	4.6		14	158		20	17	0.3	1.2		200	0.27	146	17	0.5	336
8-2055. FRIO RIVER NEAR DERBY																				
May 14, 1963-----	12.5	12		52	4.9		11	154		22	17	0.3	0.8		196	0.27	150	24	0.4	326
8-2070. FRIO RIVER AT CALLIHAM																				
Dec. 28, 1962-----	b0.02	9.9		84	8.3	797	160	172		172	1,180		1.5		2,330	3.17	244	112	22	4,100
Jan. 30, 1963-----	.81	10		87	9.5	570	256	95		95	840	0.5	.0		1,740	2.37	256	46	16	3,060
Mar. 6-----	.70	8.3		28	2.8	101	138	48		48	96	.3	.5		a370	.50	82	0	4.8	625
May 15-----	143	12		45	5.7	60	188	36		36	51	.3	3.2		305	.41	136	0	2.2	513

a Residue at 180°C.
b Field estimate.

NUECES-RIO GRANDE COASTAL AREA

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES-RIO GRANDE COASTAL AREA

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
8-2120. SAN FERNANDO CREEK NEAR ALICE																						
Oct. 17, 1962-----	0.56	41		42	17	518	570			147	478	2.4	0.0		1,530	2.08		175	0	17	2,620	7.1
Nov. 20-----	.57	23		54	14	385	350			146	375	2.3	69		1,240	1.69		192	0	12	2,080	6.9
Dec. 27-----	1.01	23		37	12	356	300			110	335	2.7	95		1,120	1.52		142	0	13	1,930	7.0

RIO GRANDE BASIN

8-3640. RIO GRANDE NEAR EL PASO, TEX.

LOCATION.--At gaging station 5 miles northwest of El Paso, 6 miles northwest of Juarez, Chihuahua, and 1.9 river miles above the American Dam. DRAINAGE AREA.--29,267 square miles.

RECORDS AVAILABLE.--Chemical analyses: 1933 to 1963.

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 1962 to September 1963 given in *International Boundary and Water Commission Water Bulletin Numbers 32 and 23*.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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 adsorption ratio	Specific conductance (micro-mhos at 25° C)	pft
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
October 1962----	31	216	--		107	28	285	--	218	460	246	--	0.6	0.35	1,342	1.83	384	206	6.3	1,900	8.0	
November-----	30	149	--		111	30	325	--	207	542	273	--	.6	.32	1,470	2.00	399	229	7.1	2,170	8.0	
December-----	31	132	--		137	29	309	--	272	539	272	--	.6	.38	1,494	2.03	460	238	6.3	2,200	8.0	
January 1963----	31	98.7	27		131	31	347	12	275	551	301	1.0	.6	.38	1,621	2.20	453	228	7.1	2,360	8.0	
February-----	28	76.7	--		138	27	362	--	284	573	317	--	a	.44	1,629	2.22	454	222	7.4	2,450	8.1	
March-----	31	788	--		84	15	120	--	201	212	113	--	a	.20	713	.97	269	104	3.2	1,080	7.7	
April-----	30	550	--		92	17	153	--	215	266	128	--	a	.20	839	1.14	298	122	3.8	1,270	7.9	
May-----	31	361	--		102	21	178	--	241	317	151	--	a	.23	938	1.28	341	144	4.2	1,440	8.0	
June-----	30	692	--		83	17	123	--	215	222	105	--	a	.23	699	.95	278	102	3.2	1,070	8.0	
July-----	31	782	16		81	16	124	9.0	205	219	107	8	.6	.16	689	.94	267	99	3.3	1,070	8.1	
August-----	31	479	--		95	18	170	--	238	283	138	--	1.2	2.7	912	1.24	308	114	4.2	1,350	7.8	
September-----	30	278	--		109	24	218	--	256	369	190	--	1.2	.30	1,107	1.51	370	160	4.9	1,660	8.2	

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued
8-3705. 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, and 81.1 river miles below the American Dam at El Paso. DRAINAGE AREA.--32,085 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 32). RECORDS AVAILABLE.--Chemical analyses: 1933 to 1963. 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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1962----	5	219	--		262	59	633	--	323	746	907	--	3.1	0.42	2,954	4.02		897	632		9.2	4,180	7.9
November-----	4	137	--		259	60	638	--	348	779	848	--	4.3	.48	2,969	4.04		895	610		9.3	4,360	7.8
December-----	4	125	--		256	54	630	--	326	771	862	--	1.2	.50	2,882	3.92		862	594		9.3	4,320	7.8
January 1963----	5	59.6	30		302	71	777	13	328	883	1,120	0.8	3.1	.58	3,505	4.77		1,050	776		10	5,220	7.9
February-----	2	19.9	--		417	110	1,250	--	317	1,250	1,910	--	a	.80	5,324	7.24		1,490	1,230		14	7,780	7.9
March-----	4	9.3	--		632	205	2,070	--	282	1,780	3,480	--	1.2	1.10	8,826	12.0		2,420	2,190		18	12,200	7.8
April-----	3	34.6	--		413	111	1,210	--	311	1,200	1,890	--	a	.80	5,310	7.22		1,490	1,230		14	7,690	7.9
May-----	5	24.6	--		483	152	1,550	--	259	1,450	2,470	--	.6	.88	6,516	8.86		1,830	1,620		16	9,360	7.8
June-----	4	7.7	--		624	241	2,270	--	247	1,890	3,790	--	.6	1.06	9,344	12.7		2,550	2,350		20	13,000	7.9
July-----	9	15.9	19		223	60	620	10	215	578	984	1.0	1.2	.42	2,736	3.72		801	625		9.5	4,160	7.8
August-----	7	38.1	--		136	13	196	--	303	203	268	--	1.2	.27	1,054	1.43		399	150		4.3	1,650	7.9
September-----	4	35.1	--		317	96	1,070	--	242	622	1,900	--	1.9	.83	4,477	6.09		1,190	990		13	6,570	7.9

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued
8--3750. RIO GRANDE AT 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 32).
RECORDS AVAILABLE.--Chemical analyses: 1948 to 1962.
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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

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	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate
October 1962----	8	1,430	--	--	--	--	143	--	179	--	95	--	--	--	--	836	1.14	298	152	3.6	1,140	--
November-----	8	672	--	--	--	201	201	--	204	--	155	--	--	--	--	1,094	1.49	378	210	4.5	1,590	--
December-----	8	634	--	--	--	196	--	--	201	--	142	--	--	--	--	1,066	1.45	373	208	4.4	1,550	--
January 1963----	6	514	30	--	115	21	190	7.0	214	413	133	1.7	3.1	0.36	1,078	1.47	375	200	4.3	1,540	7.7	
February-----	5	382	--	--	--	--	187	--	195	--	115	--	--	--	1,018	1.38	353	194	4.3	1,480	--	
March-----	6	276	--	--	--	204	204	--	166	--	124	--	--	--	1,130	1.54	368	232	4.6	1,580	--	
April-----	9	244	--	--	--	155	155	--	147	--	80	--	--	--	940	1.28	346	226	3.6	1,320	--	
May-----	8	507	--	--	--	99	99	--	157	--	55	--	--	--	694	.94	297	168	2.5	1,000	--	
June-----	9	542	--	--	--	97	97	--	148	--	53	--	--	--	794	1.08	373	252	2.2	1,080	--	
July-----	10	1,040	20	--	109	11	81	5.9	152	311	35	1.1	1.9	.16	670	.91	319	194	2.0	928	7.8	
August-----	10	1,430	--	--	--	--	90	--	185	--	35	--	--	--	688	.94	289	137	2.3	928	--	
September-----	9	1,700	--	--	--	80	80	--	176	--	37	--	--	--	665	.90	299	155	2.0	902	--	

RIO GRANDE BASIN--Continued
8-3775. RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Texas, 24.1 river 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 32.
RECORDS AVAILABLE.--Chemical analyses: 1944 to 1963.
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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number of samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
October 1962	8	2,240	--	--	97	8.9	90	--	192	237	55	--	3.1	0.17	654	0.89	279	122		2.4	904	7.7
November	9	1,937	--	--	102	19	150	--	201	324	119	--	3.1	.31	684	1.20	333	168		3.6	1,290	7.8
December	5	931	--	--	94	20	138	--	196	306	98	--	1.9	.24	804	1.09	316	156		3.4	1,210	7.7
January 1963	8	821	26	--	100	21	150	6.3	206	318	115	1.5	3.7	.24	897	1.22	334	166		3.6	1,310	7.9
February	9	697	--	--	92	18	127	--	189	295	84	--	.6	.24	769	1.05	304	149		3.2	1,130	8.2
March	8	594	--	--	82	19	125	--	165	302	79	--	1.2	.32	759	1.03	284	148		3.2	1,100	7.7
April	8	320	--	--	96	12	102	--	160	284	60	--	1.2	.24	695	.95	288	158		2.6	1,000	7.8
May	8	947	--	--	100	12	94	--	207	242	60	--	1.9	.20	649	.88	301	131		2.4	962	7.9
June	7	1,250	--	--	91	9.7	42	--	192	158	28	--	a	.10	449	.61	267	110		1.1	676	8.1
July	9	1,320	20	--	119	11	87	6.3	223	290	37	--	2.5	.17	708	.96	344	161		2.0	987	7.9
August	7	1,740	--	--	95	8.5	93	--	204	235	42	--	.6	.20	666	.91	272	104		2.5	906	8.0
September	8	2,160	--	--	96	8.3	72	--	214	200	34	--	3.7	.20	583	.79	273	98		1.9	818	7.8

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued

8-4101. 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 1963.

Water temperatures: March 1953 to September 1963.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 10,400 ppm Oct. 1-31, Nov. 1-30; minimum, 8,270 ppm July 1-31.

Hardness: Maximum, 2,860 ppm Nov. 1-30; minimum, 2,490 ppm July 1-31.

Specific conductance: Maximum daily, 15,700 micromhos Apr. 9; minimum daily, 10,700 micromhos Aug. 30.

EXTREMES, 1937-63.--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.--Values given are expressed in parts per million and should be multiplied by the density in any computation of loads. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Orla. 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 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	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	Sorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density (g/ml at 20°C)		
															Parts per million	Tons per acre-foot	Tons per day							
Oct. 1-31, 1962	101	12		685	263		2680		118	2540	4170					10400	14.2	2840	2790	2690	22	14000	7.2	1.007
Nov. 1-30,	212	12		695	274		2650		133	2520	4170					10400	14.2	5950	2860	2750	22	14300	7.0	1.007
Dec. 1-31,	6.5	10		636	242		2350		156	2310	3650					8870	12.7	163	2580	2450	20	12900	7.6	1.006
Jan. 1-31, 1963	5.7	6.7		607	267		2190		138	2250	3480					8870	12.1	136	2610	2500	19	12400	7.4	1.005
Feb. 1-28,	6.3	6.0		598	262		2200		118	2250	3490					8860	12.1	151	2570	2470	19	12500	6.7	1.004
Mar. 1-31,	4.9	4.5		596	264		2300		99	2280	3630					9120	12.5	121	2570	2490	20	12600	7.1	1.006
Apr. 1-30,	4.6	7.4		601	282		2720		114	2360	4270					10300	14.1	128	2660	2570	23	14100	7.0	1.007
May 1-31,	64.5	4.6		645	285		2610		114	2470	4100					10200	14.0	1780	2780	2690	22	13400	7.3	1.007
June 1-30,	62.6	6.8		656	263		2450		114	2390	3880					9700	13.3	1640	2720	2620	20	13100	6.9	1.006
July 1-31,	71.0	8.1		652	210		1930	57	95	2260	3110					8270	11.3	1590	2490	2410	17	11400	6.5	1.005
Aug. 1-31,	82.9	9.5		681	221		2270		97	2320	3580					9130	12.5	2040	2610	2530	19	12800	6.6	1.005
Sept. 1-30,	19.0	11		657	212		2000		89	2210	3180					8310	11.4	426	2510	2440	17	11900	6.3	1.005
Weighted average	53.6	9.7		673	256		2470		116	2430	3890					9790	13.3	1420	2730	2630	21	13400	6.8	--
Time-weighted average,	--	8.2		643	254		2360		115	2350	3730					9400	--	--	2650	2550	20	12900	6.8	--
Tons per day,	--	1.4		97	37		357		17	352	562					--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-4465. PECOS RIVER NEAR GIRVIN, TEX.

LOCATION.--At supplementary gage at bridge on U.S. Highway 67, about 0.5 mile downstream from Panhandle and Santa Fe Railway Co. bridge, 2.1 miles east of Girvin, Pecos County, 5.4 (revised) 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 1963.

Water temperatures: October 1953 to January 1959.

EXTREMES, 1962-63.--Dissolved solids: Maximum, 20,000 ppm May 1-31; minimum, 11,200 ppm Nov. 1-30.

Hardness: Maximum, 5,280 ppm Sept. 1-30; minimum, 3,090 ppm Nov. 1-30.

Specific conductance: Maximum daily, 25,600 micromhos Sept. 2; minimum daily, 14,400 micromhos Nov. 22.

EXTREMES, 1939-41, 1946-47, 1953-63.--Dissolved solids (1960-63): Maximum, 20,000 ppm May 1-31, 1963; minimum, 1,410 ppm Mar. 28-29, 1961.

Hardness: Maximum, 5,280 ppm Sept. 1-30, 1963; minimum, 330 ppm May 18, 1957.

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

REMARKS.--Values given are expressed in parts per million and should be multiplied by the density in any computation of loads. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density (g/ml at 20°C)	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1962	45.5	7.7		811	450		3860		57	3460	6110				14700	20.2	1810	3870	3930	27	18900	7.3	1.011	
Nov. 1-30.....	184	9.4		740	303		2850		106	2710	4520				11200	15.3	5560	3090	3010	22	15000	7.4	1.007	
Dec. 1-31.....	41.0	6.6		734	354		3390		143	3170	5130				12900	17.7	1430	3290	3170	26	17000	7.3	1.008	
Jan. 1-31, 1963	31.2	12		793	466		3790		206	3440	5950				14600	20.0	1230	3900	3730	26	19200	7.0	1.009	
Feb. 1-28.....	29.5	15		793	580		4080		223	3710	6520				15800	21.7	1260	4360	4180	27	20600	7.5	1.009	
Mar. 1-31.....	23.6	9.1		828	577		4690		199	4020	7290				17500	24.2	1120	4440	4280	31	22100	7.1	1.015	
Apr. 1-30.....	15.6	3.4		819	641		4670		115	4250	7310				17800	24.5	750	4680	4590	30	22700	7.4	1.013	
May 1-31.....	10.6	8.6		926	688		5300		74	4730	8280				20000	27.6	572	5140	5080	32	24800	7.3	1.015	
June 1-30.....	25.2	14		889	589		4870		59	4130	7710				18200	25.0	1240	4640	4590	31	22700	6.7	1.012	
July 1-31.....	17.7	16		851	447		3920	65	53	3580	6090				15000	20.6	717	3960	3920	27	19700	6.1	1.010	
Aug. 1-31.....	9.0	19		958	584		4540		66	4270	7210				17600	--	428	4790	4740	29	22700	6.2	1.010	
Sept. 1-30.....	10.4	10		1030	659		4710		48	4440	7700				18600	25.6	522	5280	5240	28	24300	6.7	1.013	
Weighted average	36.8	10		790	424		3610		116	3310	5690				13900	18.9	1380	3720	3630	26	18100	7.0	--	
Time-weighted average.....	--	11		848	528		4220		112	3830	6650				16200	--	--	4280	4200	28	20800	6.7	--	
Tons per day....	--	1.0		78	42		358		12	328	564				--	--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-4474. PECOS RIVER NEAR SHUMLA, TEX.

LOCATION.--At gaging station located 13.0 river miles upstream from the Pecos High Bridge, and 18.5 river miles above the confluence with the Rio Grande, which confluence is 638.2 river miles below the American Dam at El Paso.
DRAINAGE AREA.--35,308 square miles (from International Boundary and Water Commission Water Bulletin Number 32.)
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1963.

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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number of samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1962	5	496	--		97	25	178	--	179	159	295	--	5.6	0.11	950	1.29		344	196		4.2	1,450	7.7
November	4	260	--		234	91	705	--	180	686	1,170	--	2.5	.29	3,203	4.36		959	812		9.9	4,850	7.7
December	4	188	--		258	102	801	--	176	768	1,330	--	7.4	.29	3,572	4.86		1,060	920		11	5,370	7.7
January 1963	5	168	15		216	90	635	11	189	621	1,070	1.0	3.1	.24	2,972	4.04		908	753		9.2	4,530	7.7
February	4	155	--		202	89	628	--	171	608	1,060	--	1.2	.28	2,947	4.01		869	739		9.3	4,410	7.6
March	2	133	--		203	88	637	--	159	600	1,080	--	1.2	.28	2,838	3.86		869	739		9.4	4,420	7.6
April	5	189	--		168	67	492	--	159	458	822	--	3.1	.26	2,196	2.99		693	563		8.1	3,310	7.9
May	4	291	--		132	55	376	--	164	351	634	--	1.9	.21	1,743	2.37		558	424		6.9	2,810	7.8
June	3	206	--		127	57	378	--	164	353	619	--	1.2	.14	1,703	2.32		550	416		7.0	2,740	8.0
July	5	113	16		125	57	371	8.2	150	342	627	1.0	1.9	.22	1,693	2.30		546	423		6.9	2,750	7.7
August	3	97.6	--		118	51	354	--	150	319	586	--	1.2	.21	1,685	2.29		506	382		6.8	2,770	7.7
September	5	105	--		123	55	373	--	151	336	631	--	a	.27	1,705	2.32		534	410		7.0	2,750	7.7

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued
8-4590. RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station 0.9 mile downstream from the highway bridge between Laredo, Texas and Nuevo Laredo, Tamaulipas, and 890.8 river 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 32).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September, 1963.
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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number of samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids		Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium					Non-carbonate
October 1962----	31	4,350	--	--	--	--	77	--	157	--	66	--	--	--	515	.70	218	89	2.3	758	--	
November-----	30	2,180	--	--	--	--	112	--	171	--	122	--	--	--	672	.91	287	147	2.9	1,050	--	
December-----	31	1,810	--	--	--	--	190	--	162	--	243	--	--	--	978	1.33	356	224	4.4	1,360	--	
January 1963----	31	1,620	27	--	81	24	150	4.7	151	249	175	1.0	5.6	0.23	833	1.13	299	175	3.8	1,310	7.9	
February-----	28	1,490	--	--	--	--	136	--	156	--	160	--	--	--	784	1.07	302	174	3.4	1,220	--	
March-----	31	1,000	--	--	--	--	147	--	146	--	172	--	--	--	820	1.12	300	181	3.7	1,260	--	
April-----	30	1,500	--	--	--	--	112	--	144	--	134	--	--	--	665	.90	261	145	3.0	1,040	--	
May-----	31	2,200	--	--	--	--	85	--	146	--	108	--	--	--	529	.72	242	122	2.4	871	--	
June-----	30	2,390	--	--	--	--	82	--	143	--	99	--	--	--	497	.68	241	124	2.3	834	--	
July-----	31	1,810	24	--	81	14	85	5.5	153	205	75	1.0	5.6	.14	593	.81	260	135	2.3	878	8.0	
August-----	30	1,820	--	--	--	--	91	--	162	--	69	--	--	--	634	.86	253	120	2.5	895	--	
September-----	31	2,840	--	--	--	--	74	--	160	--	58	--	--	--	552	.75	246	114	2.0	813	--	

RIO GRANDE BASIN--Continued
8-4613. RIO GRANDE BELOW FALCON DAM, TEX.

LOCATION.--U.S. Tailrace at Falcon Dam.
DRAINAGE AREA.--164,482 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 32.)
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1963.
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 1962 to September 1963 given in International Boundary and Water Commission Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number of samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1962----	13	1,450	--		65	17	99	--	130	195	99	--	a	0.20	0.79		230	124		2.8	882	7.7	
November-----	8	1,839	--		69	17	97	--	134	198	103	--	0.6	.19	.79		240	130		2.7	925	7.8	
December-----	7	1,020	--		73	14	98	--	134	199	97	--	.6	.16	.79		238	128		2.7	933	7.8	
January 1963----	7	2,170	9		72	17	99	5.5	140	208	99	0.8	a	.14	.82		252	136		2.7	963	7.8	
February-----	10	3,660	--		75	16	103	--	142	207	105	--	.6	.17	.84		252	136		2.8	969	7.8	
March-----	11	2,600	--		80	15	106	--	146	211	113	--	a	.20	.88		262	142		2.9	1,020	7.5	
April-----	13	7,010	--		86	13	113	--	149	214	121	--	a	.22	.92		269	146		3.0	1,040	7.6	
May-----	2	951	--		86	18	123	--	145	224	146	--	6.2	.25	.96		286	167		3.2	1,110	7.9	
June-----	6	4,460	--		77	19	116	--	138	214	131	--	a	.14	.90		270	157		3.1	1,040	7.8	
July-----	9	1,080	12		69	18	104	5.9	128	196	117	.8	.6	.20	.83		243	138		2.9	963	7.8	
August-----	9	1,990	--		68	16	109	--	127	195	117	--	.6	.17	.87		237	133		3.1	968	7.7	
September-----	5	640	--		67	17	109	--	124	205	117	--	1.2	.20	.85		238	136		3.1	974	7.8	

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued
8-4647. 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 32).
RECORDS AVAILABLE.--Chemical analyses; January 1959 to September 1963.
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 1962 to September 1963 given in *International Boundary and Water Commission Water Bulletin* Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number of samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1962----	15	1,600	--	--	70	15	101	--	144	189	105	--	0.6	0.20	0.84	235	117	2.9	896	7.6			
November-----	13	848	--	--	73	18	120	--	145	217	128	--	.6	.24	.90	256	138	3.3	1,060	7.8			
December-----	11	1,050	--	--	72	17	100	--	142	205	114	--	.6	.18	.85	250	133	2.7	1,010	7.6			
January 1963----	17	1,990	15	--	72	18	106	5.9	143	208	108	1.0	a	.21	.86	252	135	2.9	1,991	7.7			
February-----	17	3,840	--	--	75	16	104	--	143	208	106	--	.6	.20	.86	254	136	2.8	983	7.7			
March-----	13	2,600	--	--	84	14	112	--	151	214	117	--	a	.26	.91	268	144	3.0	1,040	7.6			
April-----	14	7,080	--	--	82	17	114	--	136	217	123	--	a	.19	.92	276	148	3.0	1,050	7.8			
May-----	18	1,320	--	--	81	16	117	--	156	205	133	--	a	.24	.89	270	142	3.1	1,050	7.7			
June-----	10	5,320	--	--	77	17	108	--	148	196	124	--	.6	.20	.84	261	140	2.9	988	7.8			
July-----	12	1,140	12	--	75	18	121	5.9	139	210	140	.8	.6	.23	.91	263	149	3.2	1,070	7.8			
August-----	13	2,100	--	--	70	18	118	--	139	206	128	--	.6	.27	.92	252	138	3.2	1,030	7.8			
September-----	14	863	--	--	67	15	107	--	135	177	122	--	.6	.21	.82	229	118	3.1	1,955	7.9			

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued
8-4692. 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 32). RECORDS AVAILABLE.--Chemical analyses: March 1959 to September 1963. 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 1962 to September 1963 given in International Boundary and Water Commission Water Bulletin Numbers 32 and 33.

Chemical analyses, in parts per million, water year October 1962 to September 1963

Month	Number samples	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1962-----	27	922	--		73	20	150	--	126	223	180	--	a	0.34	784	1.07		262	159	4.0	1,160	7.7	
November-----	13	69	--		90	26	194	--	146	278	246	--	0.6	0.46	973	1.32		331	211	4.6	1,530	8.0	
December-----	13	921	--		88	23	167	--	153	259	210	--	a	0.6	873	1.19		315	190	4.1	1,420	7.7	
January 1963-----	13	1,060	10		83	24	157	5.5	147	255	192	0.8		0.32	849	1.15		308	188	3.9	1,340	7.8	
February-----	12	1,140	--		80	17	118	--	145	222	132	--	a	0.6	692	.94		268	150	3.1	1,100	7.8	
March-----	13	1,460	--		89	21	160	--	153	249	192	--	a	0.41	850	1.16		309	184	4.0	1,340	7.6	
April-----	13	2,190	--		82	17	123	--	148	223	134	--	a	0.23	687	.93		274	152	3.2	1,110	8.1	
May-----	14	594	--		91	25	201	--	140	272	262	--	a	0.44	961	1.31		330	215	4.8	1,560	7.8	
June-----	12	3,050	--		83	17	121	--	156	203	145	--	a	0.22	662	.90		275	147	3.2	1,080	8.0	
July-----	14	653	14		99	29	234	6.6	151	304	311	1.0	3.1	0.49	1,113	1.51		369	245	5.3	1,760	7.8	
August-----	13	1,040	--		74	21	147	--	132	232	177	--	0.6	0.24	799	1.09		272	164	3.9	1,220	8.0	
September-----	13	550	--		78	21	168	--	129	236	213	--	0.6	0.25	848	1.15		280	174	4.4	1,340	7.8	

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1962 to September 1963

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
LAKE WALK NEAR DEL RIO																						
Jan. 17, 1963-----		12	0.02	57	12	9.8	218			7.6	14	0.3	7.1		241	0.33		192	13	0.3	388	7.4
RIO GRANDE NEAR EAGLE PASS																						
Feb. 19, 1963-----		17	0.01	83	23	136	182			210	160	1.0	3.0		730	0.99		302	152	3.4	1,170	7.2