TEXAS WATER COMMISSION

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

BULLETIN 6501

CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1962

By

L. S. Hughes
and
J. F. Blakey
U. S. Geological Survey

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

January 1965

Published and distributed
by the
Texas Water Commission
Post Office Box 12311
Austin, Texas 78711

TABLE OF CONTENTS

	Page
INTRODUCTION	1
COOPERATION	1
COLLECTION AND ANALYSIS OF SAMPLES	2
Texas Water Commission-U. S. Geological Survey Sampling Program	2
Reconnaissance Study	3
Low-Flow Investigations	3
International Boundary and Water Commission-U. S. Department of Agriculture Sampling Program	3
EXPRESSION OF RESULTS	3
SURFACE-WATER RUNOFF AND CHEMICAL-QUALITY CONDITIONS	6
Canadian River Basin	6
Red River Basin	6
Sulphur River Basin	9
Sabine River Basin	9
Neches River Basin	9
Trinity River Basin	11
San Jacinto River Basin	11
Brazos River Basin	11
Colorado River Basin	12
Lavaca River Basin	13
Guadalupe River Basin	13
San Antonio River Basin	14
San Antonio-Nueces Coastal Area	14

TABLE OF CONTENTS (Cont'd.)

	Page
Nueces River Basin	14
Rio Grande Basin	14
TABLES OF ANALYSES	23
Canadian River Basin	25
Canadian River near Amarillo	25
Miscellaneous Analyses	27
Red River Basin	28
Little Wichita River near Henrietta	28
Little Wichita River near Ringgold	30
Red River near Gainesville	32
Red River at Denison Dam near Denison	35
Miscellaneous Analyses	36
Sulphur River Basin	40
South Sulphur River near Cooper	40
Miscellaneous Analyses	42
Cypress Creek Basin	43
Miscellaneous Analyses	43
Sabine River Basin	44
Sabine River near Tatum	44
Sabine River near Ruliff	46
Miscellaneous Analyses	48
Neches River Basin	52
Neches River near Alto	52
Angelina River near Lufkin	54
Neches River at Evadale	56
Miscellaneous Analyses	58

TABLE OF CONTENTS (Cont'd.)

	Page
Trinity River Basin	59
Trinity River near Rosser	59
Chambers Creek near Corsicana	61
Richland Creek near Fairfield	63
Trinity River at Romayor	65
Trinity River near Moss Bluff	67
Old River near Cove	68
Trinity River at Anahuac	69
Trinity Bay at Mouth of Trinity River near Anahuac	71
Miscellaneous Analyses	73
San Jacinto River Basin	76
West Fork San Jacinto River near Conroe	76
Miscellaneous Analyses	77
Brazos River Basin	78
Double Mountain Fork Brazos River near Aspermont	78
Croton Creek near Jayton	80
Salt Croton Creek at Weir D near Aspermont	81
Haystack Creek near Aspermont	82
Salt Croton Creek near Aspermont	83
Salt Fork Brazos River near Aspermont	84
Brazos River at Seymour	86
Hubbard Creek near Albany	88
Salt Prong Hubbard Creek near Albany	89
Big Sandy Creek near Breckenridge	90
Hubbard Creek near Breckenridge	91
Clear Fork Brazos River at Eliasville	92

TABLE OF CONTENTS (Cont'd.)

	Page
Brazos River at Possum Kingdom Dam near Graford	94
Brazos River at Whitney Dam near Whitney	95
Lampasas River at Youngsport	96
Little River at Cameron	98
Brazos River at State Highway 21 near Bryan	100
Yegua Creek near Somerville	102
Navasota River near Bryan	104
Brazos River at Richmond	106
Brazos River at Harris Reservoir near Angelton	108
Brazos River at Brazoria Reservoir near Brazoria	109
Miscellaneous Analyses	110
Colorado River Basin	120
Colorado River near Ira	120
Colorado River at Colorado City	122
Beals Creek near Westbrook	124
Colorado River near Silver	126
Colorado River at Ballinger	128
Colorado River near San Saba	130
Colorado River at Austin	132
Colorado River at Wharton	133
Miscellaneous Analyses	134
Lavaca River Basin	140
Navidad River near Ganado	140
Miscellaneous Analyses	142
Guadalupe River Basin	143
Guadalupe River at Victoria	143

TABLE OF CONTENTS (Cont'd.)

	Page
Miscellaneous Analyses	144
San Antonio River Basin	145
San Antonio River at Goliad	145
Miscellaneous Analyses	147
San Antonio-Nueces Coastal Area	150
Mission River at Refugio	150
Miscellaneous Analyses	151
Nueces River Basin	152
Nueces River near Mathis	152
Miscellaneous Analyses	153
Nueces-Rio Grande Coastal Area	154
Miscellaneous Analyses	154
Rio Grande Basin	155
Rio Grande near El Paso	155
Rio Grande below Old Fort Quitman	156
Rio Grande at Upper Presidio	157
Rio Grande near Johnson Ranch	158
Rio Grande at Langtry	159
Pecos River below Red Bluff Dam near Orla	160
Pecos River near Girvin	161
Pecos River near Shumla	162
Rio Grande at Laredo	163
Rio Grande below Falcon Dam	164
Rio Grande at Fort Ringgold, Rio Grande City	165
Rio Grande at Anzalduas Dam	166
Miscellaneous Analyses	167

TABLE OF CONTENTS (Cont'd.)

Page

TABLE

1. Mean discharge and maximum, minimum, and weighted-average concentrations of dissolved solids for the 1962 water year for stations operated under the Texas Water Commission-U. S. Geological Survey cooperative program..... 8

ILLUSTRATIONS

Figures

1. Diagram for Classification of Irrigation Waters..... 5

2. Mean Discharge at Selected Stations for the 1961 and 1962 Water Years and for the Period of Record..... 7

3. Duration Curves for Dissolved Solids at Four Selected Stations..... 10

4. Periods of Operation of Quality-of-Water Sampling Stations in Texas..... 19

Plate

Follows

1. Quality-of-Water Stations, Water Year 1962..... Page 16

C H E M I C A L C O M P O S I T I O N O F

T E X A S S U R F A C E W A T E R S , 1 9 6 2

INTRODUCTION

This report contains data on the chemical quality of the surface waters of Texas for the water year 1962 (October 1, 1961 to September 30, 1962). Results are presented for chemical analyses of water samples obtained daily or less frequently at selected sites throughout the State.

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

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

COOPERATION

This is the seventeenth in a series of annual reports (water years 1946-62) on the chemical quality of surface waters of Texas prepared by the U. S. Geological Survey in cooperation with the Texas Water Commission (formerly the Texas Board of Water Engineers). In addition to the annual reports, two earlier 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 Commission, Austin, Texas.

Other agencies cooperating in the collection of these data were the Brazos River Authority, the Canadian River Municipal Water Authority, the Chambers-Liberty Counties Navigation District, the cities of Dallas, Fort Worth, and Wichita Falls, the Colorado River Municipal Water District, the 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, 1961 to September 30, 1962. 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 Commission-U. S. Geological Survey Sampling Program

During the period covered by this report samples were collected daily at 52 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 42 of the sampling stations and sediment data for one of the sampling stations are available in the files of the U. S. Geological Survey, Austin, Texas. Records of chemical quality of streams at 55 additional daily sampling stations have been published in previous reports of this series. The locations of the active and inactive stations are shown on the accompanying map, Plate 1. 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 (45) on the map.

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

Reconnaissance Study

The collection of samples at miscellaneous sites was greatly expanded during the 1962 water year with the initiation of a statewide reconnaissance study.[1] The study is a cooperative project of the Geological Survey and the Texas Water Commission, and was designed to evaluate water quality at locations where water-development projects are likely to be built and to delineate water-problem areas. Sampling during the 1962 water year was concentrated in the Sabine River Basin, and a report summarizing water quality in that basin has been prepared.[2] Similar reports are planned for the other major river basins of the State during the period 1964-68.

Low-Flow Investigations

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

Low-flow investigations were made during the 1962 water year in Hubbard Creek and the Navasota River in the Brazos River Basin, and in the Llano and Pedernales Rivers in the Colorado River Basin. Chemical analyses of samples collected during these investigations are included with miscellaneous analyses for the Brazos and Colorado River Basins.

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

This report includes chemical quality records for 10 stations in the Rio Grande Basin where samples were collected by the International Boundary and Water Commission and analyses made by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, California. At 2 of the stations, samples were collected daily; at the others, from 1 to 31 samples were collected each month. A single monthly composite sample was made for analysis by taking from each individual sample an amount of water proportional to the volume of riverflow represented by the sample. Results of these analyses are also published in equivalents per million in Water Bulletins Number 31 and 32 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

---

[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.

[2] Hughes, L. S., and Leifeste, D. K., 1964, Reconnaissance of the chemical quality of surface waters of the Sabine River Basin, Texas and Louisiana: Texas Water Commission Bull. 6405, 64 p., 12 figs., 2 pls.

million unit weights of water. Values for other characteristics are given in appropriate units.

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

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

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

Sodium-adsorption ratio (SAR) is used to express the relative activity of sodium ions in exchange reactions with the soil.

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

where the concentrations of the constituents are expressed in equivalents per million. Waters are divided into four classes with respect to sodium hazard depending upon the SAR value and the specific conductance. (See Figure 1.) At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are at SAR values of approximately 2.5, 6.5, and 11.

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

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

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

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

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

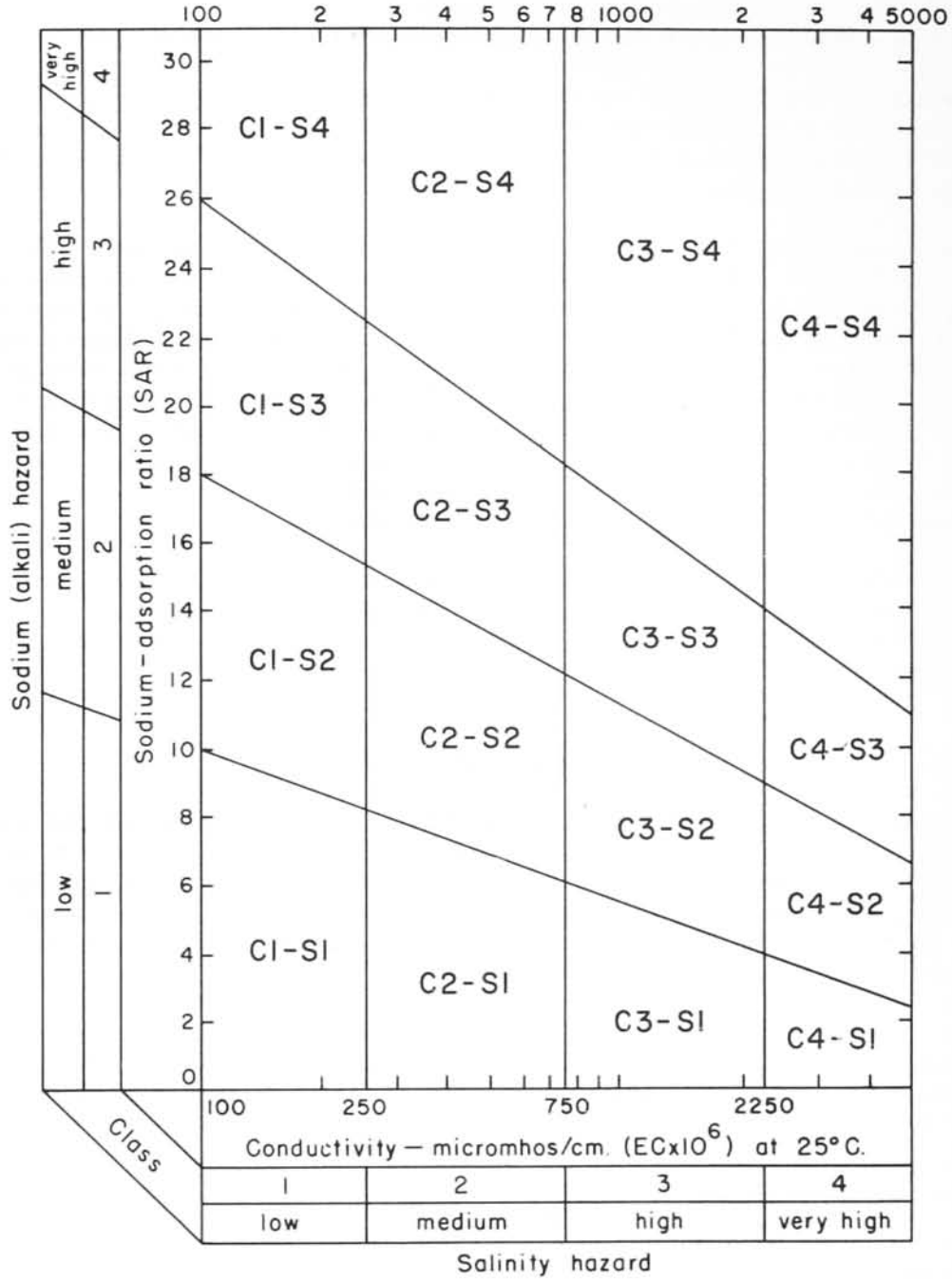


Figure 1

Diagram for the Classification of Irrigation Waters

(After United States Salinity Laboratory Staff, 1954, p. 80)

170

The samples were analyzed according to methods used by the U. S. Geological Survey.3/

SURFACE-WATER RUNOFF AND CHEMICAL-QUALITY CONDITIONS

Runoff during the 1962 water year was generally near average over the State except in the middle Colorado, Pecos, and Devils River Basins where runoff was deficient most of the year. Moderate to locally large floods occurred in some sections of the State in most months.

Mean discharges for selected stations for the 1961 and 1962 water years, as well as for the period of record, are shown in Figure 2. On many streams, changes in dissolved-solids concentration are closely related to the rate of discharge, and low flows are likely to be considerably more mineralized than are floodflows in the same stream. However, for streams whose discharge is controlled by reservoirs, the chemical composition of the water may remain relatively constant despite large fluctuations in discharge. Streams that are subject to pollution by oil fields or other sources of salts may show marked increases in dissolved solids at times when moderate storm runoff flushes oil-field wastes or salt residues into the streams.

In Table 1 are listed the mean discharges and the maximum, minimum, and weighted-average concentrations of dissolved solids for stations operated under the Texas Water Commission-U. S. Geological Survey cooperative program during the 1962 water year.

Canadian River Basin

Streamflow at the station Canadian River near Amarillo for the 1962 water year was about half that of the previous year and was only about 35 percent of the 25-year average. Two-thirds of the runoff occurred during the months of June, July, and August. This flow was of good quality, but the weighted average concentration of dissolved solids for the water year rose to 820 ppm, a slight increase from the 776 ppm in 1961.

Low flow is maintained by drainage of sewage effluent down East Amarillo Creek from the Amarillo sewage disposal plant, and analyses often show nitrates in excess of 20 ppm. The weighted average of nitrate concentrations for the 1962 water year was 9.2 ppm.

Red River Basin

Streamflow in the Red River Basin in Texas in 1962 was about equal to the long-term average. At many stations more than half the annual discharge was recorded in June and September.

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

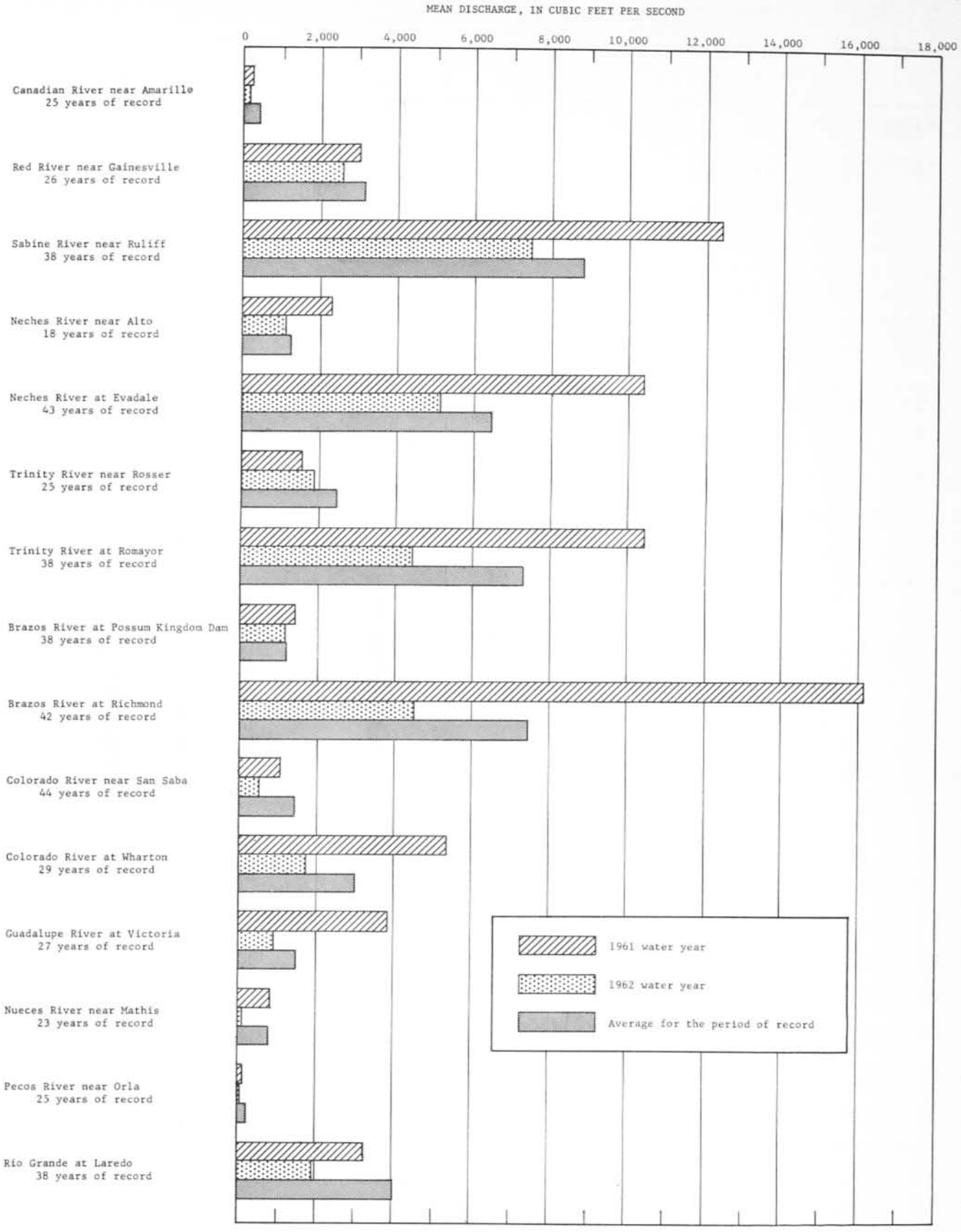


Figure 2.- Mean Discharge at Selected Stations for the 1961 and 1962 Water Years and for the Period of Record

Table 1.--Mean discharge and maximum, minimum, and weighted-average concentrations of dissolved solids for the 1962 water year for stations operated under the Texas Water Commission--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	162	1,740	352	820
RED RIVER BASIN				
Little Wichita River near Henrietta	105	1,710	76	234
Little Wichita River near Ringgold	164	1,870	45	168
Red River near Gainesville	2,591	3,880	221	1,340
Red River at Denison Dam near Denison	4,527	1,320	1,060	1,150
SULPHUR RIVER BASIN				
South Sulphur River near Cooper	331	529	84	134
SABINE RIVER BASIN				
Sabine River near Tatum	1,802	395	65	177
Sabine River near Ruliff	7,500	261	51	103
NECHES RIVER BASIN				
Neches River near Alto	1,139	165	68	121
Angelina River near Lufkin	1,372	209	38	87
Neches River at Evadale	5,174	161	56	102
TRINITY RIVER BASIN				
Trinity River near Rosser	1,903	658	121	287
Chambers Creek near Corsicana	215	570	114	268
Richland Creek near Fairfield	--	7,450	180	--
Trinity River at Romayor	4,469	631	141	295
Trinity River near Moss Bluff	--	719	184	--
Old River near Cove	--	878	134	--
Trinity River at Anahuac	--	--	--	--
Trinity Bay at mouth of Trinity River near Anahuac	--	--	--	--
SAN JACINTO RIVER BASIN				
West Fork San Jacinto River near Conroe (a)	157	323	117	213
BRAZOS RIVER BASIN				
Double Mountain Fork Brazos River near Aspermont	173	6,000	851	1,140
Croton Creek near Jayton	13.0	--	--	--
Salt Croton Creek near Aspermont	4.27	--	--	--
Salt Fork Brazos River near Aspermont	63.2	69,300	2,230	9,150
Brazos River at Seymour	308	16,700	946	2,750
Hubbard Creek near Albany (b)	32.0	2,310	182	403
Salt Prong Hubbard Creek near Albany (b)	17.8	3,660	397	846
Big Sandy Creek near Breckenridge (b)	31.2	6,730	142	243
Hubbard Creek near Breckenridge	68.5	2,440	208	469
Clear Fork Brazos River near Eliasville (a)	540	3,020	250	505
Brazos River at Possum Kingdom Dam near Graford	1,138	1,540	764	1,360
Brazos River at Whitney Dam near Whitney	1,737	1,430	830	1,030
Lampasas River at Youngsport	102	767	156	354
Little River at Cameron	854	401	201	302
Brazos River at Highway 21 near Bryan	3,538	952	234	669
Yegua Creek near Somerville	131	884	111	319
Navasota River near Bryan	289	1,810	132	328
Brazos River at Richmond	4,508	1,010	210	551
Brazos River at Harris Reservoir near Angleton (c)	--	--	--	--
Brazos River at Brazoria River near Brazoria (c)	--	--	--	--
COLORADO RIVER BASIN				
Colorado River near Ira	41.1	39,600	246	725
Colorado River at Colorado City	85.5	16,900	150	662
Beals Creek near Westbrook	35.0	6,340	216	569
Colorado River near Silver	190	13,800	228	486
Colorado River at Ballinger (a)	177	4,200	384	517
Colorado River near San Saba	508	2,440	209	440
Colorado River at Austin	1,414	330	268	293
Colorado River at Wharton	1,716	368	160	303
LAVACA RIVER BASIN				
Navidad River near Ganado	280	473	77	203
GUADALUPE RIVER BASIN				
Guadalupe River at Victoria	914	432	189	321
SAN ANTONIO RIVER BASIN				
San Antonio River at Goliad	374	718	137	488
SAN ANTONIO-NUECES COASTAL AREA				
Mission River at Refugio	41.9	47,000	181	3,330
NUECES RIVER BASIN				
Nueces River near Mathis	111	378	328	355
RIO GRANDE BASIN				
Pecos River below Red Bluff Dam near Orla	61.4	9,990	7,560	9,190
Pecos River near Girvin	28.1	18,800	6,290	13,600

a Station operation began in October 1961.
b Station operation began in February 1962.
c Station operation began in January 1962.

Except for periods of low flow, the Little Wichita River water was of good quality. The weighted-average concentrations of dissolved solids at the two stations on the Little Wichita River were 234 ppm near Henrietta and 168 ppm near Ringgold.

At the Gainesville station on the Red River just upstream from Lake Texoma, streamflow was slightly below average, but the weighted-average concentration of dissolved solids decreased from 1,820 ppm in 1961 to 1,340 ppm in the 1962 water year.

At Denison Dam, below Lake Texoma, water quality was about the same as in 1961; the weighted-average concentration of dissolved solids was 1,150 ppm.

Sulphur River Basin

Streamflow at the station on the South Sulphur River near Cooper in 1962 was 87 percent of the long-term average, and about 15 percent less than in 1961. The weighted-average concentration of dissolved solids increased slightly to 134 ppm, and dissolved solids ranged from a minimum of 84 ppm to a maximum of 529 ppm.

Sabine River Basin

The Sabine River Basin drains an area of high rainfall in East Texas and Western Louisiana. Runoff during the 1962 water year was below the long-term average and little more than half as much as runoff during the excessively wet year of 1961.

The water of the basin is almost always low in dissolved solids, but as a result of decreased flow the weighted-average concentration of dissolved solids in 1962 for the Tatum station was 177 ppm as compared to 146 ppm for the 1961 water year, and at the downstream station near Ruliff the weighted average increased to 103 ppm in 1962 from 90 ppm in the 1961 water year. 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 1962 water year and during the combined period of 1954-62 water years.

Neches River Basin

Runoff in the Neches River Basin was near average during the 1962 water year, but was less than half as much as in 1961.

Although often high in organic color and turbidity, the water in the Neches River Basin is usually of good quality. An increase of 20 to 30 percent in the weighted-average concentration of dissolved solids accompanied the 1962 decrease in streamflow. The weighted-average concentration of dissolved solids increased at the station on the Neches River near Alto from 94 ppm in 1961 to 121 ppm in 1962, from 74 ppm in 1961 to 87 ppm in 1962 at the station on the Angelina River near Lufkin, and from 77 ppm to 102 ppm at the Evadale station. 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 1962 water year and during water years 1948-62.

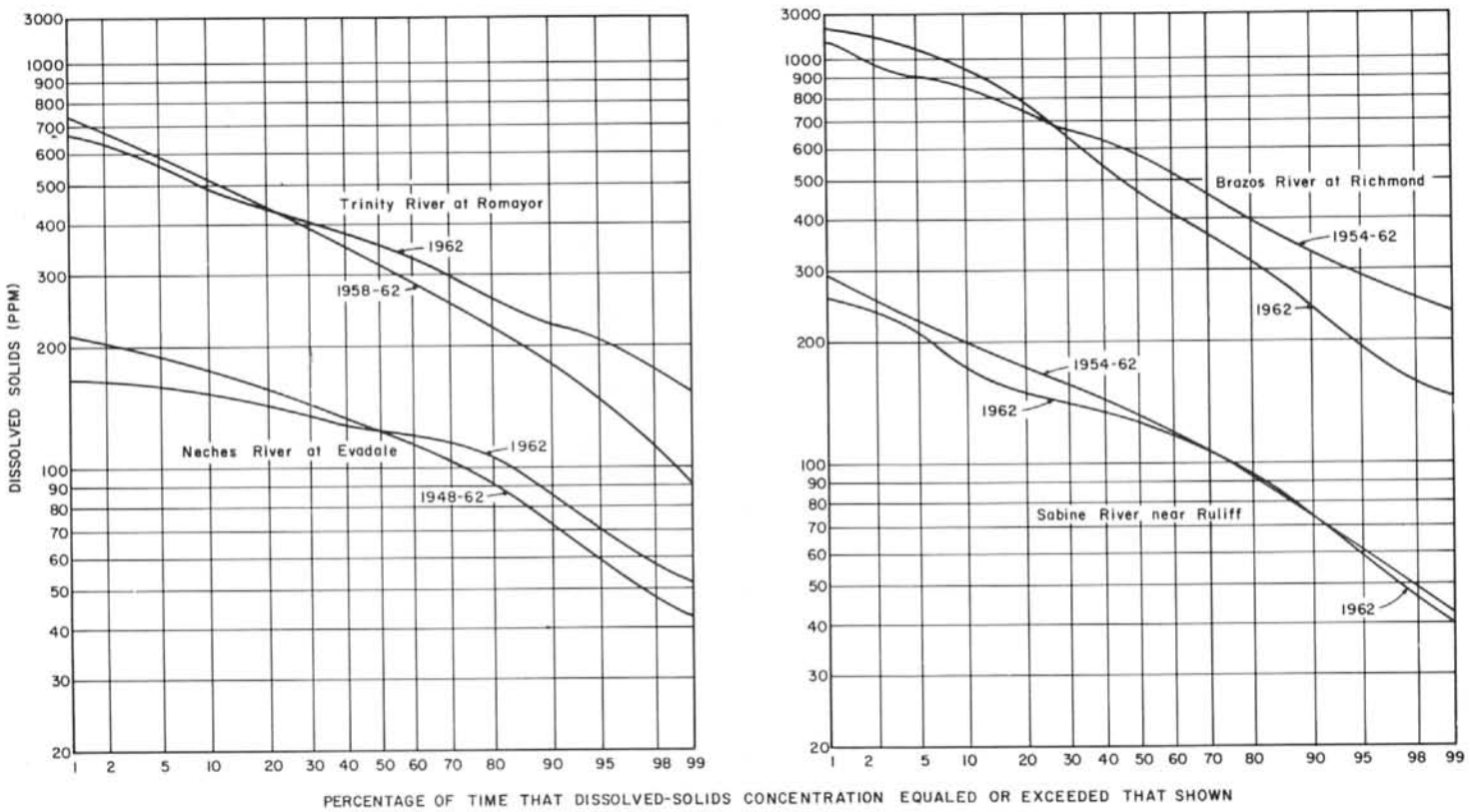


Figure 3

Duration Curves for Dissolved Solids at Four Selected Stations

170

Trinity River Basin

During the 1962 water year, streamflow in most of the streams in the upper Trinity River Basin above Fort Worth and Dallas was near the long-term average, and was greater than in 1961.

Streamflow of the Trinity River at Rosser was 60 percent greater than in 1961. At this station streamflow is largely regulated by reservoirs above Dallas and by Lavon Reservoir on the East Fork Trinity River, and during periods of low flow much of the water is sewage effluent from Fort Worth and Dallas. High nitrate concentrations in samples collected at low flow show the effects of this sewage effluent. The maximum nitrate value during 1962 was 47 ppm and the weighted average of nitrate concentrations for the water year was 8.7 ppm. The weighted-average concentration of dissolved solids was 287 ppm, as compared with 328 ppm in the 1961 water year.

Runoff in the lower Trinity River Basin was less than the long-term average and at the station on the Trinity River at Romayor was less than half of the runoff in 1961. Generally, dissolved-solids concentrations vary inversely with runoff, and at the Romayor station the weighted-average concentration of dissolved solids increased from 185 ppm in 1961 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 1962 water year and during water years 1958-62.

San Jacinto River Basin

The only daily chemical-quality station in the Basin was established on the West Fork San Jacinto River near Conroe at the beginning of the 1962 water year. The average discharge for the 1962 water year was less than 30 percent of the long-term average. Analyses of daily samples showed that the water was consistently of good quality. Dissolved-solids content during the year ranged from 117 ppm to 323 ppm and the weighted-average concentration of dissolved solids was 213 ppm.

Brazos River Basin

Runoff in the Brazos River Basin was near average during the 1962 water year, but far below that in the wet year of 1961. The water was generally of poorer quality than in 1961.

The 1962 average discharge of the Double Mountain Fork Brazos River near Aspermont was slightly lower than the 33-year average for the station and less than half the average discharge for 1961. The weighted-average concentration of dissolved solids was 1,140 ppm, about the same as in 1961. The average discharge of the Salt Fork Brazos River near Aspermont for the year was less than half the long-term average and only 25 percent of the 1961 average discharge. The weighted-average concentration of dissolved solids increased from 5,030 ppm in 1961 to 9,150 ppm in 1962.

Streamflow of the Brazos River at Seymour, downstream from the junction of the Double Mountain Fork and Salt Fork of the Brazos River, was 70 percent of the long-term average and 38 percent of the 1961 average. The water of poor

quality contributed by the Salt Fork resulted in an increase in the weighted-average concentration of dissolved solids from 2,270 in 1961 to 2,750 in 1962.

Three chemical-quality stations were established in the Hubbard Creek watershed in February 1962. The Breckenridge station now measures the quality of outflow from Hubbard Creek Reservoir, where storage began in September 1962, and the three new stations measure quality of inflow to the reservoir from Hubbard Creek near Albany, Salt Prong Hubbard Creek near Albany, and Big Sandy Creek near Breckenridge. Streamflow at the Hubbard Creek station near Breckenridge in 1962 was about half that in 1961 and the weighted-average concentration of dissolved solids increased from 300 ppm in 1961 to 469 ppm in 1962.

In October 1961 a chemical-quality station was established on the Clear Fork Brazos River at Eliasville. The mean discharge at this station for the 1962 water year was 540 cfs and the weighted-average concentration of dissolved solids was 505 ppm.

Storage in Possum Kingdom Reservoir increased from 611,400 acre-feet on October 1, 1961 to 690,700 acre-feet on September 30, 1962, and the quality of the outflow improved. The weighted-average concentration of dissolved solids in the outflow decreased from 1,800 ppm in 1961 to 1,430 ppm in 1962.

Storage in Whitney Reservoir was about the same at the end of the water year as at the beginning, but the average outflow decreased from 2,054 cfs in 1961 to 1,737 cfs in the 1962 water year. The weighted-average concentration of dissolved solids was about the same both years, 1,040 ppm in 1961 and 1,030 ppm in 1962.

The average discharge of 4,508 cfs of the Brazos River at Richmond in 1962 was only 60 percent of the 42-year average at this station and only 28 percent of the 1961 average discharge. The weighted-average concentration of dissolved solids increased from 312 ppm in the high-flow year of 1961 to 551 ppm in the 1962 water year. Duration curves for dissolved solids for the Richmond station for 1962 and for 1954-62 are given in Figure 3.

Two chemical-quality stations were established on the Brazos River below Richmond in January 1962. They are Brazos River at Harris Reservoir near Angleton and Brazos River at Brazoria Reservoir near Brazoria. In addition to the chemical analyses in this report, the results of daily chloride determinations are available in the files of the Geological Survey. Discharge records are not available for these two stations.

Colorado River Basin

Streamflow for the 1962 water year was near average in the upper Colorado River Basin, but was only about half the long-term average in the middle and coastal sections.

Average discharge at the stations on the Colorado River near Ira and at Colorado City was about the same as in the 1961 water year. The weighted-average concentration of dissolved solids increased slightly at the Ira station from 660 ppm in 1961 to 725 ppm in 1962, and the weighted average decreased at the Colorado City station from 1,010 ppm in 1961 to 662 ppm in 1962.

The 1962 mean discharge of Beals Creek near Westbrook was 18 percent less than in 1961, and the weighted-average concentration of dissolved solids increased from 481 ppm in 1961 to 569 ppm in 1962.

The average discharge in 1962 at the station on the Colorado River near Silver was 10 percent greater than in 1961, and the weighted-average concentration of dissolved solids decreased 25 percent from 653 ppm in 1961 to 486 ppm in 1962.

A chemical-quality station was established in October 1961 on the Colorado River at Ballinger. The weighted-average concentration of dissolved solids at the Ballinger station in 1962 was 517 ppm. The mean discharge for 1962 was only half the 55-year average at this station, and 80 percent of the flow occurred during the month of September.

A chemical-quality station was established in September 1962 on the San Saba River at San Saba.

The station on the Colorado River near San Saba measures inflow to Lake Buchanan, the uppermost of the six Highland Lakes. The mean discharge at the San Saba station in 1962 was only half the 1961 average and less than 40 percent of the long-term average. The weighted-average concentration of dissolved solids increased from 357 ppm in 1961 to 440 ppm in the 1962 water year, the highest in 15 years of record at this station.

The station on the Colorado River at Austin measures the chemical quality of water that has been thoroughly mixed by passage through the six Highland Lakes. The weighted-average concentration of dissolved solids in 1962 was 293 ppm, slightly more than the 276 ppm in 1961.

Much of the streamflow below Austin is maintained by releases from the Highland Lakes. At the Wharton station, streamflow for the 1962 water year was well below the long-term average, and the weighted-average concentration of dissolved solids was 303 ppm.

Lavaca River Basin

The daily chemical-quality station on the Navidad River near Ganado is the only one in the Lavaca River Basin. Streamflow was less than 60 percent of the long-term average with much of the runoff for the year occurring in November and the last few days of April. The mean discharge in 1962 at the Ganado station was only 19 percent of the mean discharge for the high-flow year of 1961. The weighted-average concentration of dissolved solids of 203 ppm in 1962 was almost double the 107 ppm average of 1961.

Guadalupe River Basin

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

At the Victoria station the mean discharge of the river in 1962 was only about 25 percent as great as in the wet year of 1961. However, the weighted-average concentration of dissolved solids increased only slightly from 258 ppm in 1961 to 321 ppm in 1962.

San Antonio River Basin

The San Antonio River flows almost parallel to the Guadalupe River and the two streams converge a few miles upstream from the mouth of the Guadalupe River. Streamflow in 1962 in the San Antonio River, as in the Guadalupe, was below the long-term average and far below the wet year of 1961.

At the station on the San Antonio River at Goliad the weighted-average concentration of dissolved solids increased from 347 ppm in 1961 to 488 ppm in 1962.

San Antonio-Nueces Coastal Area

Streamflow in the San Antonio-Nueces Coastal Area in the 1962 water year was about half the long-term average. The mean discharge of the Mission River at Refugio was about 55 percent of the 28-year average and far below the average of 1961. Dissolved-solids concentrations at Refugio ranged from 181 ppm to 47,000 ppm and the weighted average was 3,300 ppm. The highly mineralized waters were a sodium chloride type and occurred during periods of low flow. These brine flows apparently resulted from oil-field activities in the area.

Nueces River Basin

Runoff in the Nueces River Basin in 1962 was far below the long-term average. Storage in Lake Corpus Christi decreased over 40,000 acre-feet during the water year, and at the end of the water year the lake contained only 127,300 acre-feet, less than 70 percent of capacity.

At the Mathis station, just below Lake Corpus Christi, the weighted-average concentration of dissolved solids increased from 266 ppm in 1961 to 355 ppm in 1962, the highest in 15 years of chemical-quality record.

Rio Grande Basin

During the 1962 water year streamflow in the Rio Grande Basin was even less than for the deficient year of 1961. Storage in Red Bluff Reservoir near Orla decreased 19,700 acre-feet during the water year, and on September 30, 1962, was only 30,300 acre-feet. The mean discharge of the Pecos River below Red Bluff Dam for 1962 was 62.6 cfs, less than 30 percent of the 25-year average. The weighted-average concentration of dissolved solids at the station near Orla increased from 6,270 ppm in 1961 to 9,190 ppm in 1962. Downstream on the Pecos River near Girvin, the mean discharge was 28.1 cfs and the weighted average of this saline flow was 13,600 ppm. The records show that the salt load as well as the discharge of the river decreases between the two stations.

Inflow to Falcon Reservoir in the lower Rio Grande Basin was less than in 1961, but the quality of the outflow from the reservoir was about the same as in 1961. The dissolved-solids concentrations ranged from 516 ppm to 595 ppm in the 1962 water year.

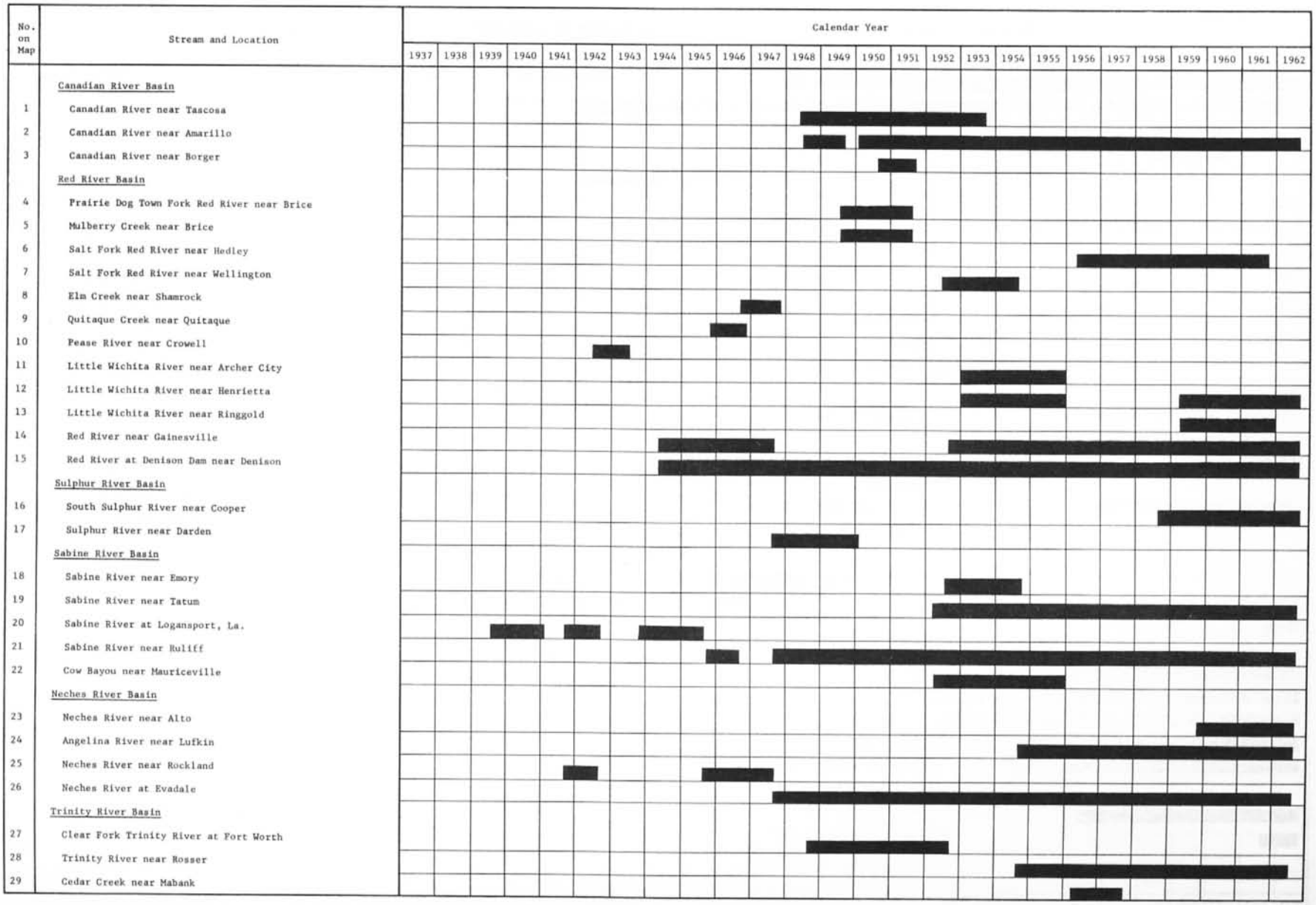


Figure 4.- Periods of Operation of Quality-of-Water Sampling Stations in Texas

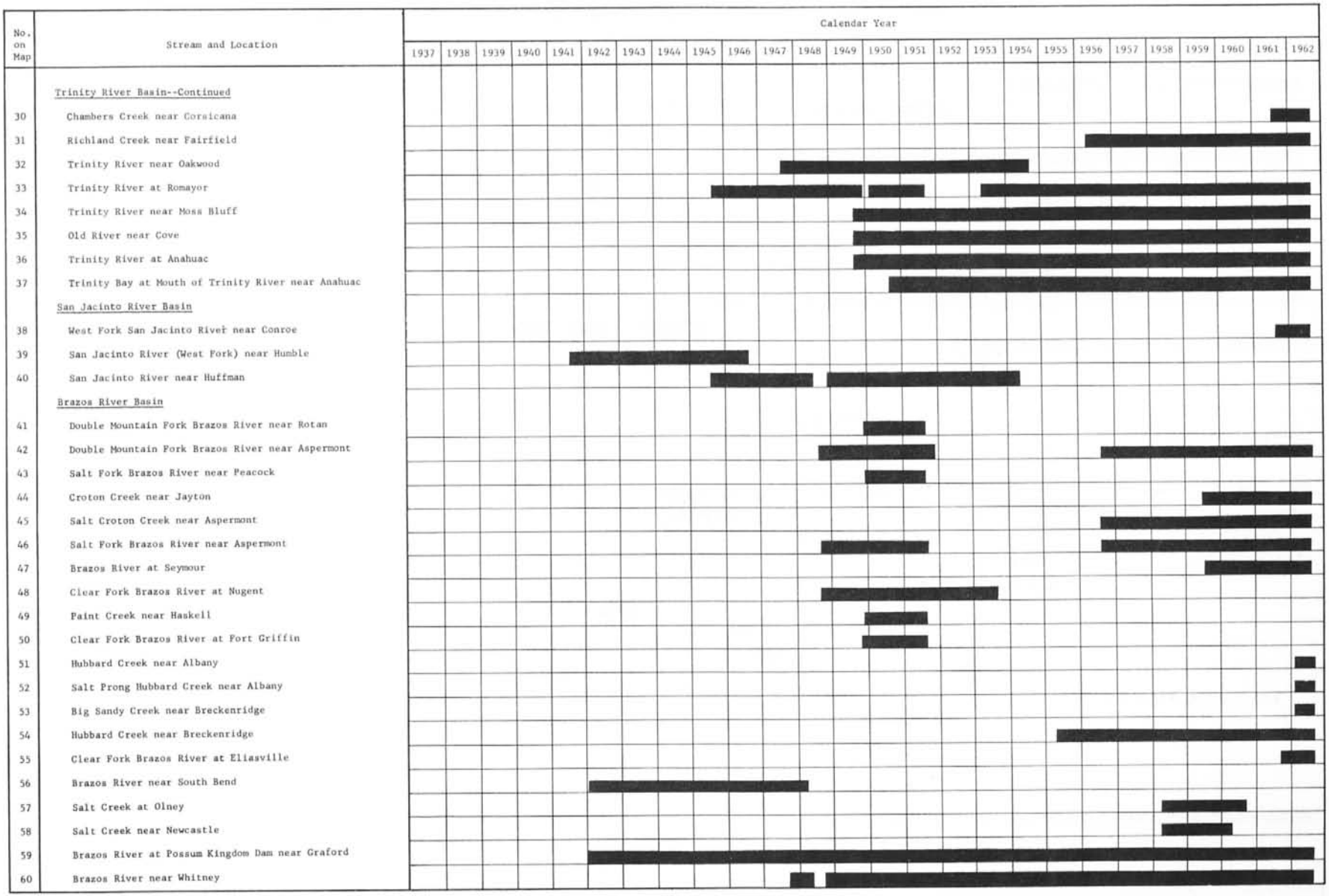


Figure 4. - Periods of Operation of Quality-of-Water Sampling Stations in Texas - Continued

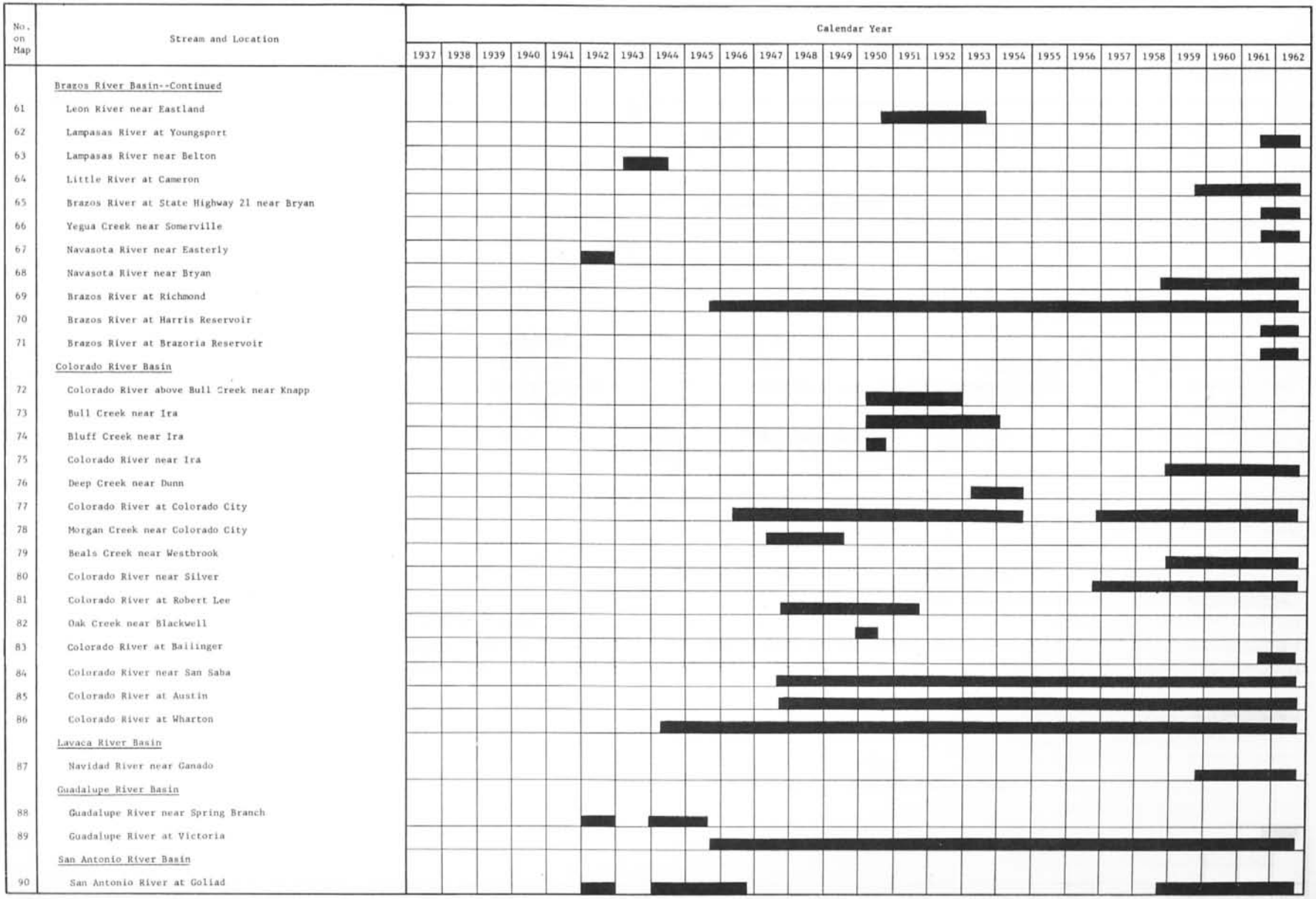
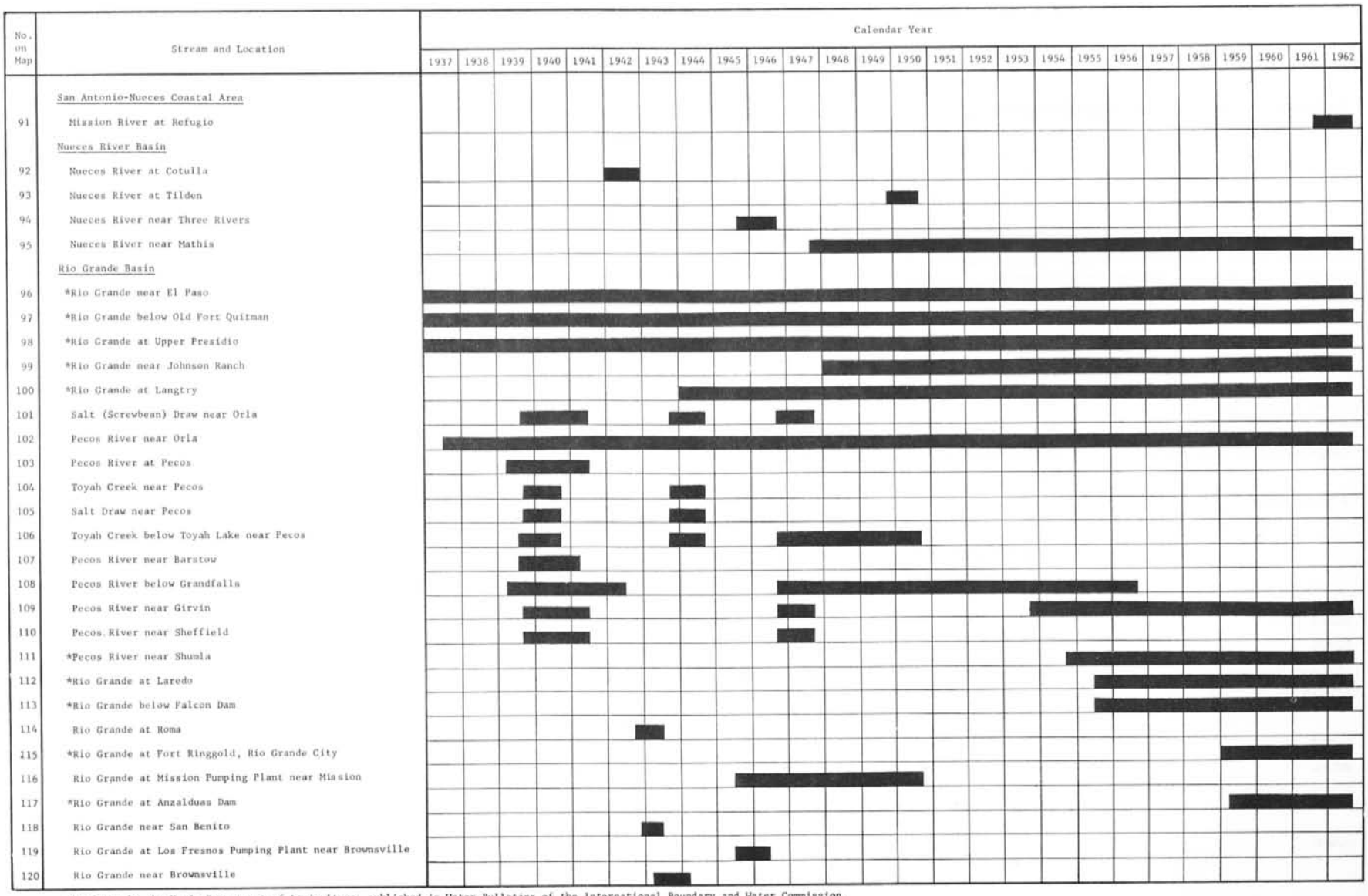


Figure 4. - Periods of Operation of Quality-of-Water Sampling Stations in Texas - Continued



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

Figure 4.- Periods of Operation of Quality-of-Water Sampling Stations in Texas - 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 1961 to September 1962" 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

Sampling station

Sampling site

Month

Number of samples

Mean discharge (cfs)

Dissolved solids - Tons per acre-foot

Dissolved solids - Tons per day

Chloride - Tons per day

Percent sodium

Sodium-adsorption ratio

Specific conductance (micromhos at 25°C)

pH

Density at 20°C

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 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 1962.
Water temperatures: August 1949 to September 1962.
Sediment records: August 1949 to September 1952.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,740 ppm Jan. 11-21; minimum, 352 ppm July 23-26.
Hardness: Maximum, 562 ppm Jan. 11-21; minimum, 87 ppm July 23-26.
Specific conductance: Maximum daily, 3,670 micromhos May 22; minimum daily, 554 micromhos July 24.
Water temperatures: Maximum, 80°F July 10; minimum, freezing point on many days during winter months.
EXTREMES, 1948-62.--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 (1949-62): 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-15, 1961...	93.9	23		84	31	201		217		303	180	1.1	28		a1,000	1.36	254	337	159	4.8	1,500	7.0
Oct. 16-31.....	40.6	31		97	36	272		238		360	275	1.4	24		1,210	1.65	133	390	195	6.0	1,940	6.7
Nov. 1-15.....	174	21		80	31	263		228		328	255	.8	12		1,100	1.50	517	327	140	6.3	1,790	7.0
Nov. 16-30.....	268	17		73	29	265		248		296	255	.8	7.4		1,070	1.46	774	302	98	6.6	1,700	7.1
Dec. 1-15.....	45.7	21		100	43	308		273		360	340	1.1	20		1,330	1.81	164	426	203	6.5	2,210	7.2
Dec. 16-31.....	75.3	19		100	38	305		294		332	330	1.1	16		1,290	1.75	262	406	165	6.6	2,170	7.3
Jan. 1-10, 1962...	38.1	34		107	40	325		280		366	360	1.2	20		1,390	1.89	143	432	202	6.8	2,270	7.2
Jan. 11-21.....	50.9	49		146	48	388		280		486	460	1.4	21		1,740	2.37	239	562	332	7.1	2,750	7.2
Jan. 22-31.....	95.1	24		86	33	250		240		284	280	1.1	3.8		1,080	1.47	277	350	154	5.8	1,890	6.9
Feb. 1-26, 28.....	58.4	27		99	43	344		263		394	380	1.2	10		1,430	1.94	225	424	208	6.3	2,300	6.9
Feb. 27.....	30.0			92	39	--		284		276	245	--	--		--	--	--	390	158	--	1,800	7.9
Mar. 1-15.....	44.9	33		106	42	331		267		384	365	1.4	23		1,420	1.93	172	437	218	6.9	2,260	6.8
Mar. 16-31.....	33.7	29		114	48	391		272		472	430	1.2	11		1,630	2.22	148	482	259	7.7	2,590	6.8
Apr. 1-22.....	46.8	32		112	51	396		263		448	460	1.2	19		1,650	2.24	208	490	274	7.8	2,600	6.6
Apr. 23-30.....	9.3	52		78	31	168		459		107	135	2.4	3.8		803	1.09	20.2	322	0	4.1	1,330	6.9
May 1-4, 8-9,11-21	17.7	47		63	32	137		328		88	120	2.2	63		a748	1.02	35.7	288	20	3.5	1,250	7.0
May 5-7, 10.....	17.0	41		104	43	342		268		404	355	1.7	42		1,460	1.99	67.0	436	217	7.1	2,310	6.5
May 22-26.....	90.6	23		91	45	418		290		484	400	1.4	14		1,620	2.20	396	412	174	8.9	2,560	6.9

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 27-31, 1962...	19.2	54		71	31	153		426		88	132	2.4	4.2		a782	1.06	40.5	304	0	3.8	1,330	6.5
June 1-12.....	29.7	37		74	30	228		284		228	218	1.6	27		a1,010	1.37	81.0	308	76	5.7	1,630	6.6
June 13-15.....	577	--		--	--	--		196		106	99	--	--		--	--	--	126	0	--	857	6.9
June 16-23.....	206	22		64	28	290		217		318	275	1.0	7.2		1,110	1.51	617	274	96	7.6	1,810	7.0
June 24-28.....	463	--		--	--	--		238		118	102	--	18		--	--	--	192	0	--	1,020	8.0
June 29-30.....	655	--		--	--	--		201		274	260	--	1.8		--	--	--	230	66	--	1,680	7.9
July 1-13.....	147	23		64	27	263		221		312	232	1.0	7.7		1,040	1.41	413	270	90	7.0	1,710	7.3
July 14-22.....	157	20		49	21	205		200		222	180	.9	3.5		a813	1.11	345	209	45	6.2	1,340	6.9
July 23-26.....	390	--		--	--	--		176		67	51	--	--		352	.48	371	87	0	--	581	7.9
July 27-31.....	2,327	16		32	12	143		168		138	110	.7	3.0		a538	.73	3,380	130	0	5.4	903	7.5
Aug. 1-9.....	1,508	18		35	13	145		198		140	102	.8	3.5		a556	.76	2,260	141	0	5.3	922	7.3
Aug. 10-31.....	42.3	38		67	28	146		254		152	134	1.8	49		a785	1.07	89.7	282	74	3.8	1,280	6.5
Sept. 1-30.....	118	24		66	26	221		213		256	209	1.1	17		a925	1.26	295	272	97	5.8	1,480	6.6
Weighted average	162	21		56	22	202		214		218	183	0.9	9.2		820	1.12	359	230	64	5.9	1,340	7.1
Time-weighted average.....	--	29		83	34	264		258		299	270	1.0	19		1,130	--	--	348	140	6.1	1,830	6.8
Tons per day....	--	9.1		24	9.7	89		94		96	80	0.4	4.0		--	--	--	---	---	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN CANADIAN RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
EAST AMARILLO CREEK NEAR AMARILLO																						
Oct. 6, 1961----------	18.5	59		60	27	105		340	62	86	2.4	22		a590	0.80		260	0	47	2.8	962	6.8
7-2335. PALO DURO CREEK NEAR SPEARMAN																						
July 17, 1962---------	23.0	18		58	9.3	16		217	22	10	0.9	0.0		261	0.35		183	5	16	0.5	415	6.6
July 25----------	510	20		53	7.5	5.0	7.5	194	7.8	8.2	.5	.2		218	.30		163	4	6	.2	349	6.6
July 25----------	325	18		52	6.6	4.6	7.1	188	8.8	6.5	.5	.2		215	.29		157	3	6	.2	333	6.5
July 25----------	215	16		55	6.2	4.1	7.0	197	8.2	5.2	.5	.2		211	.29		163	1	5	.1	344	6.6

a Calculated from determined constituents.

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 1962.
Water temperatures: December 1952 to January 1956, March 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,710 ppm Nov. 4; minimum, 76 ppm June 30.
Hardness: Maximum, 392 ppm Nov. 4; minimum, 34 ppm June 30.
Specific conductance: Maximum daily, 5,820 micromhos Nov. 4; minimum daily, 114 micromhos June 29.
EXTREMES, 1952-56, 1959-62.--Dissolved solids: Maximum, 4,120 ppm June 2, 1960; minimum, 57 ppm May 19, 1955.
Hardness: Maximum, 1,060 ppm June 2, 1960; minimum, 25 ppm Feb. 20, 1955.
Specific conductance: Maximum daily, 7,520 micromhos June 2, 1960; minimum daily, 66 micromhos Oct. 15, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 1, 22-31, Nov. 1, Dec. 31, Jan. 1-31, Feb. 1-28, Mar. 1-27, Apr. 1-3, 20-22, May 8-26, July 11-15, Aug. 11-31.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 2-6, 1961....	23.4	9.3		19	5.6	38		90		6.0	50	0.4	2.5		175	.24	11.1	70	0	2.0	333	7.0
Oct. 7-8.....	8.7	11		31	9.4	75		132		6.4	116	.4	1.5		316	.43	7.42	116	8	3.0	600	7.5
Oct. 9-14.....	47.7	8.3		13	3.4	23		61		4.0	28	.4	2.0		112	.15	14.4	46	0	1.5	209	6.9
Oct. 15-21.....	.9	7.9		24	7.5	57		92		6.8	93	.3	1.2		243	.33	.59	91	15	2.6	473	7.1
Nov. 2-3.....	99.5	10		20	5.8	39		78		6.8	61	.3	2.2		a197	.27	52.9	74	10	2.0	345	7.2
Nov. 4.....	147	8.8		109	29	505		79		16	1,000	.4	7.4		1,710	2.33	679	392	327	11	3,170	7.2
Nov. 5-14.....	15.2	9.1		78	24	339		81		13	670	.3	4.8		1,180	1.60	48.4	293	226	8.6	2,290	7.3
Nov. 15-19.....	61.4	7.9		18	5.9	58		67		6.8	94	.3	.2		224	.30	37.1	69	14	3.0	438	7.4
Nov. 20.....	24.0	8.3		66	19	376		52		12	710	.3	2.2		1,220	1.66	79.1	242	200	10	2,350	7.2
Nov. 21.....	13.0	6.6		22	7.8	122		38		7.0	220	.3	3.8		a428	.58	15.0	87	56	5.7	802	7.0
Nov. 22-23.....	334	8.0		11	2.7	16		54		4.2	16	.3	2.2		87	.12	78.5	39	0	1.1	159	7.0
Nov. 24-25.....	784	8.5		19	4.0	33		70		5.2	49	.3	3.2		156	.21	330	64	6	1.8	294	7.1
Nov. 26-30.....	35.3	8.2		23	5.8	52		60		6.8	96	.3	2.2		224	.30	21.3	81	32	2.5	458	7.1
Dec. 1-8.....	21.4	9.4		24	7.2	53		86		7.2	88	.2	2.0		a248	.34	14.3	90	19	2.4	442	7.1
Dec. 9-11.....	110	7.3		15	4.4	20		53		5.6	33	.2	2.8		114	.16	33.9	56	12	1.2	219	6.5
Dec. 12.....	70.0	--		--	--	--		66		6.2	84	--	--		--	--	--	78	24	--	400	7.0
Dec. 13-14.....	15.5	7.9		32	10	103		91		10	182	.3	2.0		392	.53	16.4	121	46	4.1	774	7.4
Dec. 15.....	7.6	--		--	--	--		91		8.6	100	--	--		--	--	--	84	9	--	491	7.5
Dec. 16.....	15.0	--		--	--	--		68		8.0	310	--	--		--	--	--	190	134	--	1,140	7.3
Dec. 17-19.....	25.7	8.6		26	8.3	73		70		8.4	134	.2	2.0		a295	.40	20.5	99	42	3.2	578	7.2
Dec. 20-30.....	4.1	8.0		48	12	139		77		10	280	.3	2.0		a567	.77	6.28	170	106	4.6	1,060	7.1
Mar. 28-31, 1962..	1.1	6.0		84	24	308		102		18	620	.4	1.2		1,110	1.51	3.30	308	224	7.6	2,120	7.1
Apr. 4-5.....	13.6	--		--	--	--		103		15	295	--	--		--	--	--	181	96	--	1,140	7.5
Apr. 6.....	73.0	--		--	--	--		101		11	240	--	--		--	--	--	154	71	--	965	7.5
Apr. 7-8.....	61.0	--		--	--	--		68		17	630	--	--		--	--	--	250	194	--	2,100	7.3
Apr. 9-10.....	14.5	--		--	--	--		83		10	302	--	--		--	--	--	132	64	--	1,130	7.5
Apr. 11-19.....	2.1	7.4		74	26	320		84		13	640	--	3.8		1,130	--	6.41	292	222	8.1	2,170	7.0
Apr. 23-24.....	84.7	--		--	--	--		56		4.0	28	--	--		--	--	--	40	0	--	201	7.2
Apr. 25-28.....	156	--		--	--	--		67		4.8	40	--	--		--	--	--	54	0	--	255	7.3
Apr. 29-30.....	92.0	--		--	--	--		74		12	290	--	--		--	--	--	157	96	--	1,070	7.4

a Residue at 180° C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
May 1-7, 1962.....	5.0	11		50	15	171		97		14	328	0.5	0.5		a692	0.94	9.34	186	107	5.5	1,250	6.9
May 27.....	66.0	--		--	--	--		86		8.8	91	--	--		--	--	--	78	8	--	464	7.3
May 28-31.....	505	9.9		40	10	97		108		14	176	--	.2		a439	.60	599	141	52	3.6	771	6.8
June 1, 3-5.....	356	13		32	8.2	66		96		6.0	120	.4	2.5		295	.40	284	114	35	2.7	592	6.9
June 2.....	640	13		24	6.5	38		89		5.1	63	.4	2.5		196	.27	339	87	14	1.8	381	7.2
June 6.....	151	--		--	--	--		86		6.2	42	--	--		--	--	--	74	4	--	303	7.3
June 7-8.....	398	13		33	8.8	73		90		8.0	137	--	2.8		320	.44	344	118	44	2.9	637	7.0
June 9-10.....	966	13		22	6.5	39		74		5.6	70	--	22		194	.26	506	82	21	1.9	383	7.0
June 11-14.....	1,705	18		22	6.4	31		79		4.6	55	--	1.2		177	.24	815	81	16	1.5	336	6.6
June 15-21.....	90.1	21		28	7.8	43		102		6.4	73	--	22		231	.31	56.2	102	18	1.8	432	7.2
June 22-28.....	10.1	18		43	12	90		122		11	170	--	1.2		405	.55	11.0	157	57	3.1	795	7.1
June 29.....	201	--		--	--	--		79		6.0	56	--	--		--	--	--	80	15	--	339	7.4
June 30.....	918	--		--	--	--		51		4.2	10	--	--		76	.10	188	34	0	--	129	7.0
July 1.....	997	12		34	9.6	103		86		9.4	188	.4	1.2		400	.54	1,080	124	54	4.0	756	7.4
July 2-10, 16-17..	56.7	13		34	8.8	83		106		9.2	144	.4	1.8		a347	.47	53.1	121	34	3.3	664	6.8
July 18-20.....	5.3	11		19	5.6	36		90		10	44	--	1.8		171	.23	2.45	70	0	1.9	312	7.0
July 21-23.....	54.7	11		32	9.0	93		101		9.0	159	--	1.8		365	.50	53.9	117	34	3.7	712	7.3
July 24-26.....	30.7	9.5		22	6.3	53		86		7.0	82	--	2.2		a224	.30	18.6	81	10	2.6	433	6.8
July 27.....	94.0	--		--	--	--		80		6.8	21	--	--		--	--	--	48	0	--	203	7.5
July 28.....	248	10		44	12	172		85		18	314	--	2.0		614	.84	411	160	90	5.9	1,190	7.4
July 29-31.....	57.0	11		22	6.0	46		87		8.2	70	--	2.0		208	.28	32.0	80	8	2.2	382	7.8
Aug. 1-10.....	4.6	13		24	6.9	73		97		10	110	.5	1.8		a287	.39	3.56	88	9	3.4	542	6.9
Sept. 1.....	28.0	--		--	--	--		101		8.8	90	--	--		--	--	--	81	0	--	464	7.7
Sept. 2.....	273	--		--	--	--		126		26	550	--	--		--	--	--	263	160	--	1,940	7.7
Sept. 3-6.....	287	10		31	8.7	86		101		8.8	145	.4	2.8		a364	.50	282	114	30	3.5	652	7.6
Sept. 7-12.....	1,810	12		16	4.7	29		72		3.4	41	--	1.8		143	.19	699	59	0	1.6	256	7.0
Sept. 13-17.....	61.0	17		23	6.8	34		103		3.8	50	--	1.2		a202	.27	33.3	85	1	1.6	332	7.4
Sept. 18.....	505	12		14	4.0	15		60		3.2	20	--	4.2		102	.14	139	51	2	.9	177	7.2
Sept. 19-28.....	133	11		32	9.2	83		72		8.0	163	--	2.2		343	.47	123	118	59	3.3	666	7.0
Sept. 29-30.....	39.5	--		--	--	--		81		13	155	--	--		--	--	--	110	44	--	617	7.5
Weighted average	105	13		23	6.6	52		79		6.1	89	--	3.2		234	0.32	66.3	87	21	2.2	436	6.9
Time-weighted average.....	--	11		35	10	107		85		8.8	198	--	3.0		419	--	--	128	59	3.6	796	7.1
Tons per day....	--	3.7		6.5	1.9	15		22		1.7	25	--	0.9		--	--	--	--	--	--	--	--

a Residue at 180°C.

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

LOCATION (revised).--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 September 1962 (discontinued).
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,870 ppm Nov. 8-11; minimum, 45 ppm Sept. 6-7.
Hardness: Maximum, 399 ppm Nov. 8-11; minimum, 24 ppm Sept. 6-7.
Specific conductance: Maximum daily, 4,370 micromhos Nov. 10; minimum daily, 67 micromhos Sept. 6, 7.
EXTREMES, 1959-62.--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. 1, 31, Nov. 1, Feb. 7-28, Mar. 1-31, Apr. 1-3, May 15-27, July 15, Aug. 15-31, Sept. 1.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 2-9, 1961....	21.0	10		18	4.9	33		78		5.6	46	0.3	2.0		158	0.21	8.96	65	1	1.8	299	7.0
Oct. 10-20.....	39.3	9.6		14	2.9	22		67		6.4	22	.4	1.8		112	.15	11.9	47	0	1.4	204	6.5
Oct. 21-30.....	.2	9.5		18	4.5	24		90		5.8	24	.4	.8		131	.18	.07	63	0	1.3	247	6.3
Nov. 2.....	28.0	13		19	5.8	26		100		3.6	28	.7	1.2		146	.20	11.0	71	0	1.3	255	6.7
Nov. 3-5.....	126	9.4		24	8.0	57		74		5.6	105	.3	2.0		247	.34	84.0	93	32	2.6	495	6.5
Nov. 6-7.....	40.0	8.3		38	16	254		60		11	460	.5	2.8		821	1.12	88.7	161	112	8.7	1,600	6.4
Nov. 8-11.....	8.5	8.4		112	29	564		64		17	1,100	.6	4.0		1,870	2.54	42.9	399	346	12	3,590	6.8
Nov. 12-15.....	4.5	10		66	21	325		84		10	620	.4	3.0		1,100	1.50	13.4	251	182	8.8	2,130	6.6
Nov. 16.....	79.0	7.6		19	6.1	50		78		6.8	76	.3	2.2		206	.28	43.9	72	9	2.6	391	7.0
Nov. 17.....	67.0	11		60	19	253		72		10	500	.4	1.8		890	1.21	161	228	168	7.3	1,720	6.9
Nov. 18-21.....	43.2	8.6		20	5.8	53		74		7.2	84	.4	2.2		217	.30	25.3	74	13	2.7	419	6.8
Nov. 22-26.....	864	7.3		15	4.0	29		56		4.8	45	.3	1.2		135	.18	315	54	8	1.7	257	6.5
Nov. 27-30.....	51.8	9.0		21	5.9	48		69		7.2	80	.6	2.0		208	.28	29.1	77	20	2.4	398	6.7
Dec. 1-14.....	103	9.2		24	6.3	50		76		7.4	87	.2	1.2		222	.30	61.7	86	24	2.3	435	7.0
Dec. 15.....	22.0	--		--	--	--		62		12	418	--	--		--	--	--	219	168	--	1,460	7.0
Dec. 16-24.....	45.1	9.9		24	7.2	52		80		9.2	89	.3	1.2		232	.32	28.3	90	24	2.4	447	7.2
Dec. 25-31.....	2.9	9.8		40	11	91		102		15	172	.2	1.0		390	.53	3.05	145	62	3.3	747	7.2
Jan. 1-15, 1962...	.6	9.6		47	15	97		126		19	188	.3	.8		a482	.66	.78	179	76	3.2	850	7.3
Jan. 16-31.....	.4	9.2		60	19	119		160		40	222	.3	.8		a589	.80	.64	228	96	3.4	1,020	7.3
Feb. 1-6.....	.2	5.8		63	18	123		176		25	232	.3	1.2		555	.75	.30	231	87	3.5	1,060	7.6
Apr. 4-6, 8-23....	16.0	10		46	14	152		112		22	275	--	1.5		576	.78	24.9	172	80	5.0	1,120	6.8

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 7, 1962.....	181	14		26	7.1	70		90		20	108	--	--		289	0.39	141	94	20	3.1	544	7.3
Apr. 24-26, 28-29.	314	11		18	5.4	48		110		9.6	50	--	1.2		197	.27	167	67	0	2.5	358	7.2
Apr. 27.....	339	13		12	2.7	18		59		5.4	18	--	--		98	.13	89.7	41	0	1.2	167	6.9
Apr. 30.....	126	13		38	11	127		80		15	238	--	--		481	.65	164	140	74	4.7	941	7.1
May 1-14.....	9.7	12		41	13	117		111		18	212	0.4	1.5		a504	.69	13.2	156	65	4.1	895	6.7
May 28-29.....	450	--		--	--	--		117		8.2	111	--	--		--	--	--	108	12	--	542	6.5
May 30-31.....	411	--		--	--	--		102		8.4	174	--	--		--	--	--	137	54	--	746	6.7
June 1.....	205	--		--	--	--		126		8.8	134	--	--		--	--	--	132	28	--	664	7.3
June 2-7.....	456	12		26	7.2	49		84		8.0	86	.4	1.3		231	.31	284	94	26	2.2	442	7.1
June 8-13.....	1,670	12		16	5.1	26		64		6.4	40	--	1.2		138	.19	622	61	8	1.4	257	6.5
June 14-22.....	448	14		23	6.8	32		84		8.8	54	--	1.7		181	.25	219	85	16	1.5	344	6.7
June 23-29.....	37.8	15		30	8.4	46		112		8.6	76	--	1.6		241	.33	24.6	109	18	1.9	455	6.7
June 30-July 1....	2,575	--		--	--	--		30		2.6	22	--	--		--	--	--	26	1	--	140	6.4
July 2-14.....	102	14		42	12	102		119		10	188	.3	1.8		a438	.60	121	154	57	3.6	828	6.9
July 16-20.....	14.4	9.8		18	6.0	36		71		6.6	58	--	1.8		a175	.24	6.80	70	11	1.9	326	6.6
July 21-24.....	92.0	11		29	9.2	67		82		8.4	127	--	2.5		a320	.44	79.5	110	44	2.8	578	6.7
July 25.....	28.0	--		--	--	--		82		14	565	--	--		--	--	--	264	197	--	1,960	6.9
July 26-27.....	139	--		--	--	--		88		6.2	86	--	--		--	--	--	83	11	--	451	6.9
July 28.....	452	--		--	--	--		55		3.0	12	--	--		--	--	--	39	0	--	144	6.5
July 29.....	216	--		--	--	--		95		17	392	--	--		--	--	--	200	122	--	1,490	7.1
July 30-31.....	81.5	--		--	--	--		92		7.4	104	--	--		--	--	--	81	6	--	524	6.8
Aug. 1-7.....	14.7	12		22	6.7	43		94		9.6	62	.3	1.8		a206	.28	8.18	82	5	2.1	377	7.0
Aug. 8-14.....	.8	12		35	10	60		133		11	97	--	1.2		a303	.41	.65	128	20	2.3	556	7.1
Sept. 3, 5.....	456	--		--	--	--		67		6.0	64	--	--		--	--	--	65	10	--	328	7.3
Sept. 2, 4, 8-13..	1,903	12		13	4.4	21		59		3.2	30	.3	1.5		114	.16	586	51	2	1.3	204	7.2
Sept. 6-7.....	1,900	15		5.0	2.9	2.6		30		.4	3.0	--	1.0		45	.06	231	24	0	.2	67	7.0
Sept. 14-21.....	154	13		22	6.1	27		89		4.6	42	--	1.8		160	.22	66.5	80	7	1.3	296	6.9
Sept. 22-30.....	98.9	11		32	8.9	73		82		7.6	141	--	1.5		315	.43	84.1	116	50	2.9	609	7.0
Weighted average	164	12		17	5.4	34		66		5.5	54	--	1.4		168	0.23	74.4	65	12	1.6	302	6.7
Time-weighted average.....	--	11		33	9.8	83		96		12	149	--	1.5		358	--	--	123	45	3.0	665	6.8
Tons per day....	--	5.3		7.5	2.4	15		29		2.4	24	--	0.6		--	--	--	--	--	--	--	--

a Residue at 180°C.

7-3160. RED RIVER NEAR GAINESVILLE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 0.2 miles 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 1962.
Water temperatures: October 1952 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 3,880 ppm Apr. 18-22; minimum, 221 ppm Sept. 2.
Hardness: Maximum, 1,120 ppm Apr. 18-22; minimum, 125 ppm Sept. 6-7.
Specific conductance: Maximum daily, 6,720 micromhos Apr. 21; minimum daily, 259 micromhos Sept. 6.
Water temperatures: Maximum, 90°F Aug. 10; minimum, freezing point Jan. 11, 12, 21, 22.
EXTREMES, 1944-46, 1952-62.--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, 9,890 micromhos Apr. 11, 1953; minimum daily, 176 micromhos Nov. 4, 1958.
Water temperatures (1952-62): Maximum, 95°F July 13, 1954; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples for period May 1944 to April 1946 available in the district office at Austin, Texas. Records of specific conductance of daily samples for period October 1952 to September 1962 available in district office at Oklahoma City, Okla.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 1, 1961	884	--	--	132	46	380	--	156	0	262	670	--	--	0.70	1,680	2.28	4,010	520	392	7.2	2,660	7.8
Oct. 2	1,280	--	--	88	26	244	--	164	0	100	370	--	--	.63	1,100	1.50	3,800	325	190	5.9	1,760	8.0
Oct. 3-5	912	--	--	122	35	342	--	148	0	272	560	--	--	.82	1,500	2.04	3,690	450	328	7.0	2,370	8.1
Oct. 6-7	600	--	--	96	31	223	--	136	0	208	370	--	--	.98	1,100	1.50	1,780	365	254	5.1	1,740	7.9
Oct. 8-9	400	--	--	137	43	325	--	176	0	295	550	--	--	.70	1,500	2.12	1,630	520	376	6.2	2,420	8.2
Oct. 10	1,410	--	--	78	27	180	--	106	0	152	320	--	--	--	910	1.24	3,460	305	218	4.5	1,490	7.7
Oct. 11	1,760	--	--	48	14	75	--	104	0	46	148	--	--	--	455	.62	2,162	178	93	2.5	731	7.7
Oct. 12-20	1,022	10	0.00	106	33	278	--	144	0	220	465	0.3	1.4	.28	1,290	1.75	3,560	400	282	6.0	2,080	8.2
Oct. 21-25	387	--	--	117	34	278	--	174	0	220	470	--	--	.75	1,350	1.84	1,410	430	288	5.8	2,110	8.1
Oct. 26-27	280	--	--	148	45	420	--	174	0	285	730	--	--	.65	1,880	2.56	526	555	412	7.8	2,990	7.9
Oct. 28-31	257	--	--	156	59	512	--	178	0	355	870	--	--	.77	2,190	2.98	1,520	630	484	8.9	3,440	7.9
Nov. 1-6	1,680	--	--	172	66	567	--	178	0	430	950	--	--	.77	2,330	3.17	10,570	700	554	9.3	3,720	8.0
Nov. 7	5,530	--	--	170	36	437	--	160	0	400	690	--	--	.69	1,860	2.53	27,770	570	439	8.0	3,070	8.0
Nov. 8-13	1,917	--	--	116	27	320	--	128	0	260	510	--	--	.54	1,350	1.84	6,990	400	295	7.0	2,260	8.0
Nov. 14-21	1,174	--	--	156	42	414	--	160	0	355	680	--	--	.76	1,790	2.43	5,670	560	429	7.6	2,900	8.1
Nov. 22-28	4,801	--	--	79	30	192	--	124	0	156	335	--	--	.43	918	1.25	11,900	320	218	4.7	1,540	8.1
Nov. 29-30	1,410	--	--	124	40	337	--	148	6	262	570	--	--	.33	1,540	2.09	5,860	475	344	6.7	2,480	8.4
Dec. 1	1,020	--	--	70	18	149	--	114	0	133	242	--	--	.26	738	1.00	2,030	250	156	4.1	1,220	8.2
Dec. 2-7	762	--	--	212	42	607	--	212	0	472	960	--	--	.34	2,540	3.45	5,230	700	526	10	4,000	8.2
Dec. 8-21	1,754	--	--	134	40	380	--	184	0	330	590	--	--	.46	1,620	2.20	7,670	500	349	7.4	2,680	8.2
Dec. 22-25	1,085	--	--	194	60	595	--	240	0	474	945	--	--	.32	2,520	3.43	7,380	730	534	9.6	3,990	8.2
Dec. 26-31	700	--	--	240	63	700	--	254	0	570	1,120	--	--	.38	3,040	4.13	5,750	860	652	10	4,620	8.2
Jan. 1-10, 1962	514	12	.00	230	77	688	--	268	0	536	1,140	0.3	--	.35	2,970	4.04	4,120	890	670	10	4,640	8.0
Jan. 11	340	--	--	102	40	298	--	114	0	292	475	--	--	.18	1,430	1.94	1,310	420	326	6.3	2,280	8.2
Jan. 12-20	551	--	--	236	73	636	--	268	0	563	1,040	--	--	.52	2,970	4.04	4,420	890	670	9.3	4,470	8.0

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
Jan. 21-22, 1962--	418	--	--	200	83	564	--	190	0	561	940	--	--	0.43	2,670	3.63	3,010	840	684	8.5	4,080	8.2
Jan. 23-31--------	506	--	--	276	61	713	--	252	8	609	1,160	--	--	.44	3,200	4.35	4,370	940	720	10	4,760	8.3
Feb. 1-4----------	896	--	--	268	90	827	--	240	6	739	1,320	--	--	.56	3,600	4.98	8,850	1,040	834	11	5,370	8.4
Feb. 5-10---------	720	--	--	224	71	650	--	230	4	591	1,030	--	--	.50	2,900	3.94	5,640	850	655	9.7	4,330	8.3
Feb. 11-21--------	592	--	--	182	65	632	--	184	0	512	1,000	--	--	.37	2,640	3.59	4,220	720	569	10	4,040	8.2
Feb. 22-28--------	591	--	--	160	68	503	--	170	2	441	830	--	--	.43	2,240	3.05	3,570	680	537	8.4	3,450	8.3
Mar. 1-10---------	520	--	--	180	66	484	--	224	8	415	810	--	--	.33	2,260	3.07	3,170	720	523	7.8	3,650	8.4
Mar. 11-20--------	357	3.6	0.00	204	85	723	--	156	4	580	1,200	0.4	--	.54	3,070	4.18	2,960	860	726	11	4,830	8.3
Mar. 21-26--------	489	--	--	212	83	696	--	168	0	545	1,190	--	--	.65	2,950	4.01	3,890	870	732	10	4,770	8.0
Mar. 27-29--------	464	--	--	176	78	628	--	134	0	500	1,060	--	--	.44	2,510	3.62	3,330	760	650	9.9	4,330	7.6
Mar. 30-31--------	512	--	--	134	50	398	--	148	6	330	660	--	--	.26	1,820	2.48	2,520	540	408	7.5	2,930	8.4
Apr. 1-10---------	518	7.4	.00	178	62	544	6.8	190	0	390	940	.3	1.3	--	2,330	3.17	3,260	700	544	8.9	3,760	8.0
Apr. 11-----------	655	--	--	202	84	642	--	140	12	388	1,210	--	--	.37	2,770	3.77	4,900	850	716	9.6	4,480	8.4
Apr. 12-14--------	461	--	--	152	78	527	--	144	0	359	960	--	--	.40	2,250	3.06	2,800	700	582	8.7	3,740	7.5
Apr. 15-----------	398	--	--	46	11	26	--	104	12	54	40	--	--	.30	320	.44	344	160	55	.9	561	8.5
Apr. 16-17--------	352	--	--	192	80	725	--	160	0	541	1,200	--	--	.48	2,920	3.97	2,780	810	679	11	4,710	7.9
Apr. 18-22--------	311	--	--	252	120	923	--	184	0	718	1,580	--	--	.57	3,880	5.28	3,260	1,120	969	12	6,180	7.9
Apr. 23-25--------	617	--	--	154	50	457	--	192	0	340	760	--	--	.50	1,900	2.58	3,170	590	432	8.2	3,200	7.9
Apr. 26-----------	675	--	--	65	8.8	62	--	172	0	68	85	--	--	.06	374	.52	703	198	57	1.9	629	8.0
Apr. 27-30--------	4,300	--	--	91	31	192	--	184	0	142	335	--	--	.46	934	1.27	10,840	355	204	4.4	1,620	7.8
May 1-2-----------	7,325	--	--	192	42	401	--	150	0	491	630	--	--	.69	2,000	2.72	39,560	650	527	6.8	2,960	7.7
May 3-7-----------	2,782	--	--	242	36	639	--	176	6	607	960	--	--	.30	2,750	3.74	20,660	750	596	10	4,070	8.4
May 8-11----------	2,142	--	--	111	21	233	--	136	0	242	360	--	--	.18	1,140	1.55	6,590	364	252	5.3	1,810	7.7
May 12-14---------	677	--	--	186	31	398	--	164	6	420	620	--	--	.31	1,740	2.58	3,470	590	446	7.1	2,870	8.4
May 15-20---------	450	18	.00	232	71	576	8.8	176	6	570	990	.5	1.9	--	2,720	3.70	3,300	870	716	8.5	4,140	8.3
May 21-26---------	487	--	--	246	82	719	--	170	0	653	1,200	--	--	.50	3,190	4.34	4,190	950	810	10	4,860	7.9
May 27-29---------	907	--	--	150	48	404	--	146	2	338	690	--	--	.54	1,850	2.52	4,530	570	447	7.4	2,910	8.3
May 30-31---------	4,365	--	--	102	26	230	--	148	0	222	360	--	--	.28	1,130	1.54	13,320	360	238	5.3	1,770	7.8
June 1-2----------	5,450	--	--	56	12	93	--	130	0	91	135	--	--	.14	477	.65	7,020	190	84	2.9	792	8.2
June 3-8----------	10,220	--	--	64	14	116	--	136	0	107	174	--	--	.20	580	.79	16,000	216	104	3.4	957	7.6
June 9-10---------	21,500	--	--	102	19	190	--	120	0	220	298	--	--	.14	965	1.31	56,020	334	236	4.5	1,550	8.2
June 11-18--------	27,580	--	--	77	15	135	--	126	0	156	200	--	--	.30	678	.92	50,490	255	152	3.7	1,140	8.2
June 19-----------	14,900	--	--	101	21	164	--	132	0	227	250	--	--	.02	896	1.22	36,050	340	232	3.9	1,410	8.2
June 20-----------	12,300	--	--	168	34	305	--	118	0	445	470	--	--	.14	1,580	2.15	52,470	560	464	5.6	2,400	8.1
June 21-----------	24,100	--	--	116	23	198	--	122	0	282	302	--	--	--	1,080	1.47	70,280	385	285	4.4	1,660	8.0

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
June 22-30, 1962--	6,264	--	--	202	42	475	--	146	0	495	760	--	--	--	2,250	3.06	38,050	675	556	7.9	3,440	8.2
July 1----------	7,630	--	--	192	44	454	--	142	0	520	700	--	--	--	2,130	2.90	43,880	660	544	7.7	3,240	8.1
July 2-5----------	5,535	--	--	75	18	183	--	122	0	149	285	--	--	--	832	1.13	12,430	260	160	4.9	1,390	7.7
July 6-8----------	1,583	--	--	133	36	351	--	158	0	310	560	--	--	--	1,590	2.16	6,800	480	350	7.0	2,510	8.0
July 9-15---------	895	18	0.00	196	54	592	--	128	0	512	960	0.4	4.2	--	2,480	3.37	5,990	710	605	9.7	3,990	7.6
July 16----------	1,170	--	--	101	25	266	--	154	0	220	410	--	--	--	1,210	1.65	3,820	355	229	6.1	1,950	7.4
July 17-20--------	753	--	--	172	57	523	--	156	0	415	880	--	--	--	2,300	3.13	4,680	665	537	8.8	3,620	7.6
July 21-23--------	1,620	--	--	206	60	597	--	174	0	485	1,000	--	--	--	2,680	3.64	11,720	760	618	9.4	4,100	8.2
July 24-28--------	1,458	--	--	107	32	277	--	152	0	220	460	--	--	--	1,300	1.77	5,120	400	276	6.0	2,090	8.2
July 29-31--------	5,397	--	--	204	37	569	--	132	0	500	900	--	--	--	2,370	3.22	34,540	660	552	9.6	3,740	8.1
Aug. 1-5----------	3,752	--	--	153	32	367	--	122	0	365	590	--	--	--	1,730	2.35	17,530	515	415	7.0	2,720	8.2
Aug. 6----------	5,120	--	--	292	51	833	--	90	0	770	1,330	--	--	--	3,610	4.91	49,900	940	866	12	5,450	8.0
Aug. 7-10---------	2,850	--	--	244	37	545	--	132	0	600	860	--	--	--	2,560	3.48	19,700	760	652	8.6	3,860	8.2
Aug. 11-20--------	1,147	--	--	236	10	407	--	138	0	480	640	--	--	--	1,960	2.67	6,070	630	517	7.1	3,000	7.8
Aug. 21-24--------	543	--	--	149	46	447	--	60	0	448	720	--	--	--	1,960	2.67	2,870	560	511	8.2	3,080	7.2
Aug. 25-31--------	403	--	--	188	56	582	--	72	0	530	960	--	--	--	2,560	3.48	2,790	700	641	9.6	3,960	7.0
Sept. 1----------	559	--	--	148	43	433	--	108	0	395	700	--	--	--	1,910	2.60	2,880	545	456	8.1	2,980	7.8
Sept. 2----------	835	--	--	46	3.6	21	--	140	0	31	21	--	--	--	221	.30	498	130	16	.8	294	7.8
Sept. 3----------	1,860	--	--	158	42	408	--	134	0	355	690	--	--	--	1,840	2.50	9,240	565	455	7.5	2,960	8.0
Sept. 4-5---------	2,375	--	--	58	18	111	--	108	0	100	191	--	--	--	574	.78	3,680	220	132	3.3	981	7.9
Sept. 6-7---------	2,635	--	--	42	4.9	22	--	134	0	35	18	--	--	--	240	.33	1,710	125	15	.8	330	8.0
Sept. 8-13--------	5,822	--	--	59	14	111	--	120	0	83	185	--	--	--	579	.79	9,100	205	106	3.4	961	8.0
Sept. 14-16-------	3,117	--	--	78	18	185	--	124	0	148	295	--	--	--	864	1.18	7,270	270	168	4.9	1,420	8.0
Sept. 17-20-------	1,056	--	--	110	27	283	--	152	0	225	455	--	--	--	1,310	1.78	3,740	385	260	6.3	2,070	8.2
Sept. 21----------	4,460	--	--	170	45	445	--	156	0	375	750	--	--	--	2,020	2.75	24,320	610	482	7.8	3,180	8.1
Sept. 22-27-------	4,697	--	--	148	28	290	--	114	0	385	440	--	--	--	1,440	1.96	18,260	485	392	5.7	2,220	7.4
Sept. 28-30-------	4,657	--	--	140	27	206	--	112	0	350	320	--	--	--	1,200	1.63	15,090	460	368	4.2	1,810	8.0
Weighted average	2,591	--	--	124	29	287	--	140	0	283	456	--	--	--	1,340	1.82	9,370	429	314	6.0	2,120	--

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

LOCATION (revised).--At gaging station immediately below Denison Dam, 1.7 miles upstream from Sand Creek, and 4 miles northwest of Denison, Grayson County.
DRAINAGE AREA.--39,719 square miles, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1962.
Water temperatures: October 1945 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,320 ppm Oct. 1-31; minimum, 1,060 ppm Sept. 1-30.
Hardness: Maximum, 454 ppm Oct. 1-31; minimum, 373 ppm Sept. 1-30.
Specific conductance: Maximum daily, 2,250 micromhos Oct. 3; minimum daily, 1,710 micromhos June 1.
EXTREMES, 1944-62.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 464 ppm Oct. 21-31, 1945.
Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946.
Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-31, 1961...	4,814	9.9		121	37	297		130		316	470	0.4	0.5		1,320	1.80	17,160	454	348	6.1	2,220	7.2
Nov. 1-30.....	4,541	7.9		117	34	302		131		316	460	.3	3.0		1,300	1.77	15,940	432	324	6.3	2,190	7.2
Dec. 1-31.....	4,277	8.6		116	34	294		129		301	460	.4	.5		1,280	1.74	14,780	430	324	6.2	2,130	7.5
Jan. 1-31, 1962...	3,004	8.1		113	34	270		134		290	422	.4	.5		1,200	1.63	9,730	422	312	5.7	2,040	7.7
Feb. 1-28.....	1,837	8.7		112	34	257		135		290	400	.4	.8		1,170	1.59	5,800	420	309	5.4	1,980	7.6
Mar. 1-31.....	1,248	8.5		112	33	252		143		286	388	.3	.8		1,150	1.56	3,880	415	298	5.4	1,940	7.7
Apr. 1-30.....	1,999	7.4		109	32	249		142		272	385	.3	.8		1,130	1.54	6,100	404	287	5.4	1,900	7.5
May 1-31.....	1,225	8.8		111	32	244		144		272	380	--	1.0		1,120	1.52	3,700	408	290	5.2	1,900	6.9
June 1-30.....	18,840	7.8		110	36	225		132		260	378	--	1.5		1,080	1.47	54,940	422	314	4.8	1,900	7.0
July 1-31.....	4,523	11		109	35	249		144		274	392	.4	1.0		1,140	1.55	13,920	416	298	5.3	1,950	7.4
Aug. 1-31.....	4,338	11		108	32	237		151		254	372	.4	2.8		1,090	1.48	12,770	401	278	5.1	1,910	7.6
Sept. 1-30.....	3,772	11		100	30	238		139		256	360	.4	1.2		1,060	1.44	10,800	373	259	5.4	1,800	7.3
Weighted average	4,527	8.9		111	34	253		136		277	403	0.4	1.4		1,150	1.56	14,100	420	308	5.4	1,980	7.2
Time-weighted average.....	--	9.1		112	34	260		138		282	406	0.4	1.2		1,170	--	--	416	303	5.5	1,990	7.3
Tons per day....	--	109		1,361	422	3,090		1,660		3,390	4,920	5.0	17		14,100	--	--	--	--	--	--	--

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
7-2978. PRAIRIE DOG TOWN FORK RED RIVER ABOVE PALO DURO PARK NEAR CANYON																						
Dec. 1, 1961	6.57	38		185	42	133		197	668	42	3.1	0.0		a1,210	1.65		634	472	31	2.3	1,550	7.3
7-2979. PRAIRIE DOG TOWN FORK RED RIVER BELOW PALO DURO PARK NEAR CANYON																						
Dec. 1, 1961	0.27	42		448	82	213		125	1,660	58	2.4	0.0		a2,570	3.50		1,460	1,350	24	2.4	2,800	7.3
ESTELLINE SPRINGS AT ESTELLINE																						
May 30, 1962	5.0	14		1,420	266	15,700		88	4,030	24,500				a46,000	64.6		4,640	4,560	88	100	57,900	7.2
BUCK CREEK NEAR QUAIL																						
Mar. 14, 1962				162	117	74		200	770	56	0.2	0.1		1,340			885	721	15	1.1	1,600	8.0
BUCK CREEK AT FARM ROAD 338 NEAR WELLINGTON																						
Mar. 14, 1962				230	118	84		204	930	75		2.3		1,670			1,060	893	15	1.1	1,950	7.9
7-2995.5. BUCK CREEK NEAR WELLINGTON																						
Aug. 2, 1962		16		184	44	46		167	522	42	0.5	0.1		982	1.34		640	503	14	0.8	1,250	6.7
7-2996. NORTH GROESBECK CREEK NEAR NORTH GROESBECK																						
Oct. 3, 1961	1.90					522		188	1,960	780							2,160	2,010	34		5,100	7.4
7-2996.3. SOUTH GROESBECK CREEK NEAR GOODLET																						
June 7, 1962	6.25	26		32	4.4	12		98	32	4.0	0.2	4.1		a163	0.22		98	18	20	0.5	230	7.4
7-2996.5. SOUTH GROESBECK CREEK NEAR ACME																						
Oct. 3, 1961	4.36					198		172	1,750	240							1,870	1,730	19		3,340	7.3
7-2998.5. SALT FORK RED RIVER NEAR CLARENDON																						
Oct. 24 to Dec. 26, 1961				54	19	49		180	96	48	0.8	1.7		388			212	64	33	1.5	615	8.2
Dec. 27, 1961 to Jan. 8, 1962, Jan. 13 to Feb. 21						56		168	102	56	0.8	1.7		435			204	66	37	1.7	652	8.2
Feb. 23 to June 5						53		148	105	59	--	3.1	0.09	415			200	79	37	1.6	637	8.3
Aug. 16	1.46	30		52	18	74		176	99	81	1.1	.2		a442	0.60		204	60	44	2.2	729	7.5

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
SALT FORK RED RIVER ABOVE WHITEFISH CREEK NEAR HEDLEY																						
Apr. 12, 1962----------						127		178	310	145	0.7	1.6		923			400	254	41	2.8	1,300	8.3
WHITEFISH CREEK NEAR ALANREED																						
June 12, 1962----------						9.0		202	11	4.4	0.4	4.5		223			168	2	10	0.3	373	8.4
WHITEFISH CREEK NEAR McLEAN																						
June 15, 1962----------						66		158	332	70		0.6		784			430	300	25	1.4	1,050	8.2
WHITEFISH CREEK AT MOUTH NEAR HEDLEY																						
Apr. 12, 1962----------						307		124	1,360	440				3,030			1,470	1,370	31	3.5	3,590	8.1
7-3014.1 SWEETWATER CREEK NEAR KELTON																						
Aug. 8, 1962----------	11.9	28		104	21	61		267	202	32	0.7	1.8		598	0.81		346	127	28	1.4	860	7.0
ELM CREEK ABOVE CONFLUENCE WITH WOLF CREEK NEAR LUTIE																						
Feb. 21, 1962----------	b10			472	66	78		156	1,320	82		3.0		2,250			1,450	1,320	10	0.9	2,390	7.9
WOLF CREEK AT MOUTH NEAR LUTIE																						
Feb. 21, 1962----------	b5			596	96	57		164	1,710	60	0.6	5.2		2,780			1,880	1,750	6	0.6	2,770	8.0
ELM CREEK BELOW WOLF CREEK NEAR LUTIE																						
Feb. 21, 1962----------	b16			528	81	59		144	1,490	74	0.6	3.9		2,450			1,650	1,530	7	0.6	2,560	7.8
7-3033. ELM CREEK NEAR SHAMROCK																						
Feb. 21, 1962----------	b4			194	28	73		274	370	103	0.5	3.6		998			600	376	21	1.3	1,380	7.9
Aug. 8----------	3.04	25		166	27	93		224	380	102	0.5	4.5		930	1.26		525	342	28	1.8	1,280	7.0
ROARING SPRINGS AT ROARING SPRINGS BELOW SWIMMING POOL																						
Aug. 9, 1962----------	1.28	34		81	28	75		317	75	79	1.3	32		a561	0.76		317	57	34	1.8	900	7.4

b Field estimate.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
NORTH BUFFALO CREEK NEAR IOWA PARK																						
Nov. 3, 1961	0.15	7.9		160	50	722		67	57	1,460	0.3	0.0		a2,490	3.39		604	550	72	13	4,660	6.3
June 19, 1962	309	7.3		20	6.0	32		54	8.4	64	.2	1.5		a166	.23		75	30	49	1.6	324	6.0
June 19	167	9.6		21	6.0	30		68	9.8	52	.3	1.5		a163	.22		77	21	45	1.5	309	6.0
Sept. 19	2.13	12		20	6.0	27		91	12	31	.3	.8		163	.22		75	0	44	1.4	271	6.2
SANDERS CREEK 4 MILES SOUTHWEST OF CHICOTA																						
Nov. 29, 1961	3.92	7.5		30	2.4	8.1	3.4	90	22	5.5	0.3	1.0		a124	0.17		85	11	17	0.4	218	6.3
Feb. 6, 1962	9.12	14		73	6.3	29		178	82	28	.2	.0		334	.45		208	62	23	.9	515	7.0
Apr. 22	b1.4	13		84	7.7	42		201	104	42	.3	.0		398	.54		241	76	28	1.2	591	7.9
May 25	.47	11		97	7.6	38		254	93	36	.3	.0		422	.57		274	66	23	1.0	679	7.1
7-3355. RED RIVER AT ARTHUR CITY																						
Nov. 1, 1961	c2,160			114	51	222		d176	258	400		2.0		1,220			495	350	49	4.3	1,980	8.3
Dec. 13	c16,300			42	10	69		86	75	106		.1		374			148	78	50	2.5	605	8.0
Jan. 4, 1962	c3,030			81	34	188		e134	192	310		1.1		980			340	230	55	4.4	1,550	8.3
Feb. 2	c4,900			98	26	198		144	218	310		.6		1,020			352	234	55	4.6	1,580	8.1
Mar. 1	c4,820			62	18	105		120	128	160		.2		608			228	130	50	3.0	979	8.2
Apr. 2	c14,900			36	6.8	33		108	43	38		2.3		253			118	30	38	1.3	372	8.0
May 2	c7,450			50	10	45		144	60	59		1.3		351			166	48	37	1.5	540	8.1
June 19	c31,400			109	30	237		138	262	372		.2		1,180			395	282	57	5.2	1,850	8.0
Aug. 15	c4,380			105	32	210		158	238	335		1.0		1,100			395	266	54	4.6	1,730	8.2
Sept. 11	c11,800			36	44	30		108	32	35		1.1		226			108	20	37	1.2	355	8.0
BIG PINE CREEK 2.8 MILES NORTHWEST OF MANCHESTER																						
Apr. 21, 1962	23.9	9.6		20	4.4	18		42	47	17	0.2	0.0		150	0.20		68	34	37	0.9	218	6.8
May 25	2.02	13		23	5.3	20		70	36	20	.2	.0		158	.21		79	22	36	1.0	255	6.7
7-3368.5. RED RIVER NEAR NEW BOSTON																						
Oct. 11, 1961				101	30	203		120	225	342		1.0		996			375	276	54	4.6	1,660	7.9
Oct. 17				79	22	176		108	185	275		1.0		834			288	200	57	4.5	1,380	7.8
Nov. 1				115	32	232		f168	205	385		12		1,180			420	282	54	4.7	1,900	8.3
Dec. 6				88	32	187		122	200	318		.8		1,000			350	250	54	4.4	1,580	8.0
Jan. 4, 1962				65	27	163		d142	178	265		1.0		884			322	206	52	4.0	1,400	8.4
Feb. 2				58	13	98		100	110	150		.7		544			196	114	52	3.0	857	8.0
Mar. 2				24	5.8	38		76	33	49		.4		166			84	22	50	1.8	277	7.8
Apr. 3				28	3.9	23		84	28	26		2.6		198			86	17	37	1.1	280	7.8
May 2				26	10	27		100	37	32		.8		238			108	26	35	1.1	355	7.8
June 19				111	31	237		136	255	385		.0		1,220			405	294	56	5.1	1,830	7.8
Aug. 14				101	31	210		150	238	330		.7		1,110			380	257	55	4.7	1,730	8.1
Sept. 11				31	5.5	23		102	28	25		1.4		195			100	16	33	1.0	296	7.9

a Calculated from determined constituents.
b Field estimate.
c Mean daily discharge.
d Includes the equivalent of 6 parts per million of carbonate (CO_3).
e Includes the equivalent of 2 parts per million of carbonate (CO_3).
f Includes the equivalent of 8 parts per million of carbonate (CO_3).

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

Chemical analyses, in parts per millioa, water year October 1961 to September 1962--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
7-3369.5. BARKMAN CREEK NEAR LEARY																						
Oct. 3, 1961	0.61	11		7.5	2.2	13		33	6.0	12	1.2	2.8		a72	0.10		28	1	50	1.1	143	6.0
Nov. 30	4.39	11		4.5	1.5	14		25	8.8	12	.2	.8		a65	.09		17	0	64	1.5	118	5.8
Mar. 16, 1962	18.2	8.3		3.5	1.1	8.0	0.7	16	7.2	7.5	.1	.0		a44	.06		13	0	55	1.0	73	5.8
May 26	.48	9.8		8.0	2.4	13		44	2.8	14	.1	.0		a72	.10		30	0	49	1.0	131	6.7
July 7	.47	9.1		8.0	2.4	12		40	4.4	12	.2	.5		a69	.09		30	0	46	1.0	127	6.6
July 31	1.63	8.9		6.0	1.4	14		33	11	8.0	.6	.5		a66	.09		21	0	60	1.3	129	5.8
Sept. 18	.90	12	0.03	7.2	1.8	13	2.6	36	6.8	10	2.0	.2		a74	.10		25	0	50	1.1	129	6.3

a Calculated from determined constituents.

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 1962.
Water temperatures: October 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 529 ppm Nov. 11-21; minimum, 84 ppm June 28-30.
Hardness: Maximum, 218 ppm Apr. 6-25; minimum, 47 ppm June 28-30.
Specific conductance: Maximum daily, 897 micromhos Nov. 11, 14; minimum daily, 122 micromhos June 28.
Water temperatures: Maximum, 97°F Aug. 10; minimum, 38°F Jan. 23.
EXTREMES, 1958-62.--Dissolved solids: Maximum, 1,120 ppm Nov. 1, 1959; minimum, 68 ppm June 24-25, 1961.
Hardness: Maximum, 340 ppm Feb. 1-5, 1961; minimum, 42 ppm June 24-25, 1961.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 1, 1959; minimum daily, 92 micromhos Dec. 11, 1960.
Water temperatures: Maximum, 97°F Aug. 6, 1960, Aug. 10, 1962; minimum, 38°F Jan. 23, 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-15, 1961...	2.0	12		46	5.1	26		169		29	16	0.5	0.8		218	0.30	1.18	136	0	1.0	376	7.6
Oct. 16-31.....	.2	12		54	6.4	41		198		45	27	.6	1.0		a303	.41	.16	161	0	1.4	484	7.5
Nov. 1-10.....	2.9	12		53	6.6	74		237		57	45	.6	1.0		a382	.52	2.99	159	0	2.6	626	7.0
Nov. 11-21.....	.4	9.4		54	6.7	127		240		110	88	.6	1.5		a529	.72	.57	162	0	4.3	877	6.9
Nov. 22-25.....	1,811	8.3		21	2.4	14		73		17	8.2	.5	3.8		111	.15	543	62	2	.8	198	6.6
Nov. 26-30.....	56.4	11		31	3.4	17		103		24	11	.5	2.2		151	.21	23.0	91	7	.8	262	6.7
Dec. 1-8.....	6.1	12		41	4.7	26		146		30	17	.6	2.2		206	.28	3.39	122	2	1.0	344	7.6
Dec. 9.....	1,050	--		--	--	--		99		20	12	--	--		--	--	--	86	--	--	253	6.9
Dec. 10-11.....	3,735	9.1		--	--	11		70		13	4.0	.6	2.5		--	--	--	56	0	.6	158	7.7
Dec. 12-16.....	583	9.2		26	2.0	18		88		22	9.5	.4	2.5		133	.18	209	73	1	.9	224	7.2
Dec. 17-19.....	1,743	12		--	--	13		93		17	6.0	.6	2.5		--	--	--	77	8	.6	206	7.7
Dec. 20-31.....	39.2	12		48	5.2	27		167		34	18	.4	2.2		a250	.34	26.5	141	4	1.0	389	7.5
Jan. 15-19, 1962..	270	9.9		36	3.2	19		110		33	13	.4	1.5		170	.23	124	103	13	.8	298	6.6
Jan. 20-24.....	77.6	9.6		42	3.8	28		122		41	26	.3	1.8		212	.29	44.4	120	20	1.1	369	6.8
Jan. 25-31.....	721	11		36	2.8	17		113		26	10	.4	3.2		162	.22	315	101	9	.7	278	6.8
Feb. 1-6.....	22.7	14		53	5.4	30		176		38	22	.4	3.5		a254	.35	15.6	154	10	1.0	421	7.0
Feb. 7-22.....	12.6	11		74	7.4	52		244		64	41	.4	2.0		a378	.51	12.9	215	15	1.5	621	7.4

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 23-Mar. 2, 1962	663	11		33	2.6	20		104		26	14	0.5	3.8		162	0.22	290	93	8	0.9	271	7.2
Mar. 3-13	35.2	11		55	6.1	34		177		50	26	.3	3.0		a298	.41	28.3	162	17	1.2	464	7.3
Mar. 14-25	29.0	8.4		52	6.6	40		180		52	28	.3	1.2		a305	.41	23.9	157	9	1.4	475	7.1
Mar. 26-28	95.3	--		--	--	--		103		40	22	--	--		--	--	--	104	20	--	329	7.3
Mar. 29-30	15.5	--		--	--	--		196		83	60	--	--		--	--	--	204	44	--	654	7.8
Mar. 31	1,430	--		--	--	--		67		14	6.0	--	--		--	--	--	62	7	--	174	7.0
Apr. 1-5	1,158	13		38	4.0	17		124		25	12	.4	4.5		175	.24	547	111	10	.7	295	7.1
Apr. 6-25	23.0	12		72	9.2	47		233		66	41	--	2.2		a390	.53	24.2	218	26	1.4	613	7.1
Apr. 26-30	1,340	13		37	3.6	20		110		28	14	--	13		183	.25	662	107	17	.8	307	6.7
May 1	944	--		--	--	--		140		31	12	--	--		--	--	--	122	7	--	334	7.8
May 2-3	1,124	--		--	--	--		130		16	7.2	--	--		--	--	--	104	0	--	262	7.8
May 4-10	26.9	16		53	4.9	22		183		25	14	.4	3.0		a245	.33	17.8	152	2	.8	378	7.3
May 11-20	1.6	16		72	7.2	33		259		36	21	--	1.2		a332	.45	1.43	209	0	1.0	524	7.3
May 21-29	.7	14		72	7.7	38		261		39	27	--	.8		a344	.47	.65	211	0	1.1	550	7.3
May 30-June 6	126	17		35	3.3	28		118		28	22	.6	3.8		196	.27	66.7	101	4	1.2	322	8.0
June 7	92	--		--	--	--		123		22	150	--	--		--	--	--	127	26	--	749	7.5
June 8-18	235	15		34	2.9	17		112		21	9.8	--	7.1		162	.22	103	97	5	.7	267	7.0
June 19-25	214	7.7		30	2.6	15	3.3	111		16	8.0	--	.2		138	.19	79.7	86	0	.7	241	--
June 26-27	1,174	--		--	--	--		69		15	5.5	--	--		--	--	--	54	0	--	171	7.3
June 28-30	3,603	14		17	1.1	8.2		61		8.2	2.8	--	2.8		84	.11	817	47	0	.5	124	7.2
July 1-2	3,075	--		--	--	--		84		10	3.5	--	--		--	--	--	63	0	--	164	7.2
July 3-7	61.8	--		--	--	--		108		16	5.5	--	--		--	--	--	87	0	--	232	7.1
July 8-16	13.6	15		45	4.6	19		158		22	13	.3	1.5		a211	.29	7.75	131	2	.7	323	6.7
July 17-19	890	5.9		20	2.2	11		43	14	16	5.5	--	.0		96	.13	231	59	0	.6	165	8.7
July 20-31	67.8	14		35	3.6	15		122		22	7.5	--	1.0		a172	.23	31.5	102	2	.6	269	6.7
Aug. 1-2	19.7	--		--	--	--		127		25	14	--	--		--	--	--	102	0	--	290	7.6
Aug. 3	734	--		--	--	--		80		19	5.0	--	--		--	--	--	65	0	--	182	7.6
Aug. 4-31	33.7	15		44	3.9	23		155		27	14	.4	.5		a205	.28	18.7	126	0	.9	338	7.4
Sept. 1-15	2,308	16		25	3.0	12		90		15	6.2	.4	1.8		123	.17	766	75	10	.6	197	6.9
Sept. 16-30	5.2	17		50	4.9	20		170		24	16	.4	.8		a230	.31	3.23	145	6	.7	356	7.6
Weighted average	331	13		27	2.8	14		93		18	8.1	--	3.2		134	0.18	120	79	6	0.7	220	7.0
Time-weighted average	--	13		47	5.0	31		164		36	22	--	2.1		246	--	--	135	6	1.1	400	7.1
Tons per day	--	12		24	2.5	13		83		16	7.3	--	2.9		--	--	--	--	--	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN SULPHUR RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
CANEY CREEK RESERVOIR NEAR REDWATER																						
Apr. 1962----------		4.7	0.38	2.2	1.2	3.6		9	6.2	3.0	0.1	0.0		25	0.03		10	3	43	0.5	43	5.6
7-3441. CANEY CREEK NEAR REDWATER																						
Sept. 18, 1962---------	0.57	22	0.03	9.0	2.9	9.4	1.9	45	5.4	10	0.2	0.0		83	0.11		34	0	36	0.7	114	6.3

MISCELLANEOUS ANALYSES OF STREAMS IN CYPRESS CREEK BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
7-3460.2. KELLY CREEK NEAR MARIETTA																						
Sept. 18, 1962---------	0.39	29	0.01	6.2	2.5	4.9	2.8	2	28	6.0	0.1	0.0		81	0.11		26	24	27	0.4	93	5.4
7-3460.4. HUGHES CREEK NEAR AVINGER																						
Sept. 18, 1962---------	7.99	22	0.02	2.5	2.0	5.3	2.3	15	6.4	7.2	0.1	0.0		55	0.07		14	2	40	0.6	62	5.8
7-3460.6. MOCCASIN CREEK NEAR HARLETON																						
Sept. 19, 1962---------	0.56	34	0.02	4.5	2.2	7.3	3.7	10	17	10	0.2	0.2		84	0.11		20	12	39	0.7	95	5.7
7-3460.8. PREWITT CREEK NEAR KARNACK																						
Sept. 19, 1962---------	0.49	18	0.04	3.0	1.9	3.3	1.2	13	4.8	5.5	0.1	0.0		44	0.06		15	5	30	0.4	48	6.2
7-3463.2. BLACK BAYOU NEAR ATLANTA																						
Sept. 18, 1962---------	4.90	19	0.05	4.2	1.8	31	2.9	53	3.4	27	0.2	4.0		120	0.16		18	0	76	3.2	189	6.2
CADDO LAKE NEAR MARSHALL																						
June 14, 1962----------		17	0.20	5.5	2.2	21		12	11	33	0.1	1.0		97	0.13		23	13	67	1.9	156	5.8

8-220. SABINE RIVER NEAR TATUM, TEX.

LOCATION (revised).--At gaging station at bridge on State Highway 43, 5.2 miles upstream from Potter Creek, 5.1 miles northeast of Tatum, Rusk County, 5.6 miles downstream from Cherokee Bayou, and at mile 339.
DRAINAGE AREA.--3,493 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1952 to September 1962.
Water temperatures: February 1952 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 395 ppm July 16-26; minimum, 65 ppm Nov. 23.
Hardness: Maximum, 68 ppm Apr. 21-25, July 16-26; minimum, 15 ppm Nov. 23.
Specific conductance: Maximum daily, 930 micromhos July 24; minimum daily, 104 micromhos Nov. 23.
Water temperatures: Maximum, 89°F July 14, 15, Aug. 12; minimum, 35°F Jan. 12, 13.
EXTREMES, 1952-62.--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 micromhos Oct. 25, 1954, Aug. 31, 1956; minimum daily, 98 micromhos Apr. 29, 1957.
Water temperatures: 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-15, 1961...	471	15		12	4.7	73		26		19	118	--	1.2		a283	0.38	360	49	28	4.5	489	6.5
Oct. 16-31.....	207	16		14	5.6	109		32		20	175	--	1.0		a380	.52	212	58	52	6.2	688	6.5
Nov. 1-10.....	321	19		12	5.2	88		32		17	140	--	1.5		299	.41	259	51	25	5.4	553	7.3
Nov. 11-22.....	497	18		12	5.0	74		28		18	120	--	1.8		a284	.39	381	50	28	4.6	496	6.8
Nov. 23.....	4,970	--		--	--	--		12		8.4	18	--	--		65	.09	872	15	5	--	104	6.4
Nov. 24-28.....	4,602	11		6.5	2.9	31		13		13	50	--	1.5		122	.17	1,520	28	18	2.5	216	6.2
Nov. 29-30.....	2,575	14		12	4.8	71		16		26	116	--	.8		253	.34	1,760	50	37	4.4	468	6.5
Dec. 1-10.....	1,811	14		9.5	4.0	43		17		22	68	0.2	.8		170	.23	831	40	26	3.0	313	6.7
Dec. 11-18.....	4,665	13		9.5	3.9	37		13		22	60	.2	.8		152	.21	1,910	40	29	2.5	285	6.0
Dec. 19-22.....	6,532	10		7.2	3.0	23		10		17	38	.2	.8		104	.14	1,830	30	22	1.8	189	5.8
Dec. 23-31.....	4,477	14		10	4.7	36		13		29	57	.2	.8		158	.21	1,910	44	34	2.4	287	5.9
Jan. 1-25, 1962...	1,990	18		13	6.0	55		12		37	90	.2	.5		226	.31	1,210	57	47	3.2	412	5.9
Jan. 26.....	3,960	--		--	--	--		10		29	68	--	1.5		--	--	--	44	36	--	321	5.6
Jan. 27-31.....	6,978	12		8.0	4.6	29		11		22	49	.2	.8		131	.18	2,470	39	30	2.0	240	5.8
Feb. 1-10.....	3,192	16		13	5.7	45		15		38	72	--	1.0		198	.27	1,710	56	44	2.6	359	6.4
Feb. 11-22.....	1,840	18		14	6.3	60		16		38	97	--	1.0		a254	.35	1,260	61	48	3.3	441	6.3
Feb. 23-28.....	4,552	13		12	5.1	33		13		33	55	--	.8		158	.21	1,940	51	40	2.0	291	6.2
Mar. 1-10.....	4,542	14		11	4.5	32		18		30	49	--	.8		150	.20	1,840	46	31	2.1	269	5.7

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 11-20, 1962..	3,508	14		12	5.3	42		18		36	64	--	0.8		183	0.25	1,730	52	37	2.5	327	5.8
Mar. 21-31.....	2,022	17		14	6.1	49		19		37	80	--	.8		213	.29	1,160	60	44	2.7	381	5.8
Apr. 1-10.....	1,546	14		16	6.6	53		22		42	85	0.1	.2		228	.31	952	67	49	2.8	417	6.4
Apr. 11-20.....	1,355	16		14	6.4	50		21		36	82	--	.8		215	.29	787	61	44	2.8	396	6.2
Apr. 21-25.....	1,376	15		16	6.8	61		26		38	98	--	.8		249	.34	925	68	47	3.2	457	6.1
Apr. 26-30.....	5,726	11		8.8	3.8	31		14		21	50	.1	.8		134	.18	2,070	38	26	2.2	243	6.0
May 1-13.....	5,836	9.9		12	4.8	26		28		24	41	.2	.2		132	.18	2,080	50	27	1.6	241	6.7
May 14-18.....	1,794	15		15	5.6	38		41		22	61	--	1.2		178	.24	862	60	27	2.1	327	6.4
May 19-31.....	461	19		14	6.0	59		36		25	94	--	1.0		236	.32	294	60	30	3.3	431	6.5
June 1-10.....	504	10		13	5.6	58		32		21	94	.2	.2		a230	.31	313	56	29	3.4	415	6.2
June 11-20.....	532	13		12	5.2	51		28		21	84	--	.0		a212	.29	305	51	28	3.1	375	6.0
June 21-30.....	475	13		14	6.0	69		30		23	114	--	1.0		a274	.37	351	60	35	3.9	487	6.1
July 1-2.....	965	--		--	--	--		32		29	151	--	--		--	--	--	64	38	--	614	7.2
July 3-15.....	621	10		11	5.0	57		31		21	88	.2	.2		207	.28	347	48	23	3.6	397	6.3
July 16-26.....	168	16		16	6.7	120		46		24	188	--	1.2		395	.54	179	68	30	6.3	735	6.3
July 27-31.....	356	14		12	5.3	82		38		20	125	--	1.8		279	.38	268	52	21	4.9	523	6.2
Aug. 1-4.....	727	12		12	4.6	63		24		24	100	.3	.2		a243	.33	477	49	29	3.9	440	6.3
Aug. 5-13.....	411	11		10	3.7	39		31		21	55	--	1.0		a176	.21	195	40	15	2.7	286	6.3
Aug. 14-20.....	97.4	8.7		12	5.5	58		48		18	85	--	.5		a216	.29	56.8	53	13	3.5	406	6.5
Aug. 21-31.....	82.7	10		15	5.9	94		61		26	134	--	.2		315	.43	70.3	62	12	5.2	599	6.7
Sept. 1-9.....	162	7.5		16	6.4	119		56		25	178	.3	1.0		381	.52	167	66	20	6.4	725	6.2
Sept. 10-15.....	1,043	9.0		12	4.0	61		22		23	96	--	.8		a231	.31	651	46	28	3.9	410	6.1
Sept. 16-26.....	887	12		9.5	3.6	25		30		15	36	--	1.2		117	.16	280	38	14	1.8	207	6.0
Sept. 27-30.....	182	15		14	5.1	58		44		30	81	--	1.5		a232	.32	114	56	20	3.4	407	6.3
Weighted average	1,802	14		11	4.9	41		19		28	66	--	0.8		177	0.24	859	48	33	2.6	320	6.0
Time-weighted average.....	--	14		12	5.3	59		27		26	93	--	0.8		229	--	--	53	32	3.5	416	6.2
Tons per day....	--	66		55	24	201		91		134	322	--	3.7		--	--	--	--	--	--	--	--

a Residue at 180°C.

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 bridge, 4.5 miles downstream from Cypress Creek, and at mile 40.
DRAINAGE AREA.--9,329 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 261 ppm July 11-16; minimum, 51 ppm Nov. 21-24, Dec. 11-23.
Hardness: Maximum, 60 ppm July 11-16; minimum, 13 ppm Nov. 21-24.
Specific conductance: Maximum daily, 482 micromhos Sept. 24; minimum daily, 72 micromhos Dec. 11-13.
Water temperatures: Maximum, 97°F Aug. 14; minimum, 39°F Jan. 11.
EXTREMES, 1945-46, 1947-62.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 32 ppm Sept. 23-26, 28-30, 1958.
Hardness: Maximum, 65 ppm Dec. 21-22, 1954; minimum, 8 ppm May 20-24, 1953.
Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 33 micromhos May 22, 1953.
Water temperatures (1947-62): 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-9, 1961....	2,808	16		7.5	2.8	24		28		9.8	34	--	0.5		109	0.15	826	30	7	1.9	183	6.5
Oct. 10.....	3,170	17		--	--	45		30		14	66	--	.2		--	--	--	35	10	3.3	301	6.9
Oct. 11-20.....	2,315	17		9.0	3.5	27		34		11	40	--	.5		125	.17	781	37	9	1.9	220	6.5
Oct. 21-31.....	1,531	18		9.2	3.3	31		34		10	46	--	.5		a148	.20	612	36	8	2.2	235	6.3
Nov. 1-10.....	1,837	17		7.8	3.0	30		30		10	43	0.5	1.0		127	.17	630	32	8	2.3	214	6.5
Nov. 11-20.....	6,438	11		4.0	1.7	17		12		6.4	25	--	1.0		72	.10	1,250	17	7	1.8	118	6.1
Nov. 21-24.....	5,285	9.8		3.5	1.1	10		10		4.4	16	--	.8		51	.07	728	13	5	1.2	84	6.0
Nov. 25-30.....	8,977	12		5.5	2.1	23		14		12	34	--	1.0		97	.13	2,350	22	10	2.1	164	6.1
Dec. 1-7.....	8,534	18		7.0	2.8	26		14		13	42	--	.4		116	.16	2,670	29	18	2.1	219	6.5
Dec. 8-10.....	6,100	10		6.8	1.5	24		20		9.2	34	--	.8		96	.13	1,580	23	6	2.2	131	6.3
Dec. 11-23.....	25,040	11		3.5	1.2	9.4		8		8.0	13	--	.5		51	.07	3,450	14	7	1.1	75	5.7
Dec. 24-31.....	30,190	10		5.5	1.4	11		10		11	16	--	.8		61	.08	4,970	20	12	1.1	101	5.8
Jan. 1, 1962.....	25,600	--		--	--	--		12		8.0	13	--	--		--	--	--	15	5	--	86	6.9
Jan. 2-3.....	22,450	--		--	--	--		20		11	20	--	--		--	--	--	25	6	--	135	6.7
Jan. 4-8.....	16,000	7.4		3.5	1.8	10		8		8.4	14	.2	4.2		54	.07	2,330	16	10	1.1	90	6.4
Jan. 9.....	13,300	--		--	--	--		21		14	22	--	--		--	--	--	22	5	--	140	6.4
Jan. 10-20.....	9,819	14		7.8	3.6	24		17		20	36	--	.8		114	.16	3,020	34	20	1.8	196	6.5
Jan. 21-31.....	15,300	12		7.0	3.2	20		14		19	29	--	.8		98	.13	4,050	30	19	1.6	170	6.3

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 1-22, 1962...	12,160	13		7.0	3.1	24		17		19	34	--	0.2		108	0.15	3,550	30	16	1.9	188	6.2
Feb. 23-24.....	7,110	19		9.4	5.0	39		24		28	56	--	1.0		169	.23	3,240	44	24	2.6	295	6.6
Feb. 25-28.....	8,735	13		8.5	3.3	29		20		22	40	--	1.2		127	.17	3,000	34	18	2.2	216	6.3
Mar. 1-10.....	10,410	12		9.0	4.2	28		18		25	42	0.1	1.2		130	.18	3,650	40	25	1.9	231	6.0
Mar. 11-20.....	10,290	12		9.2	4.1	27		19		25	40	--	1.8		128	.17	3,560	40	24	1.9	226	6.1
Mar. 21-31.....	7,653	13		10	4.5	32		26		27	44	--	1.0		144	.20	2,980	44	22	2.1	255	6.8
Apr. 1-7.....	4,900	14		11	4.8	35		25		26	53	.1	1.2		a168	.23	2,220	47	26	2.2	279	6.6
Apr. 8-10.....	4,707	--		--	--	--		20		19	33	--	--		--	--	--	32	16	--	183	6.4
Apr. 11-14.....	4,912	15		10	4.6	32		30		23	45	--	1.8		146	.20	1,940	44	20	2.1	257	5.8
Apr. 15.....	6,920	--		--	--	--		30		26	61	--	--		--	--	--	48	24	--	336	6.6
Apr. 16-29.....	6,466	15		10	4.8	32		29		23	46	--	1.5		a159	.22	2,780	44	20	2.1	260	6.5
Apr. 30.....	8,520	--		--	--	--		20		14	30	--	--		--	--	--	26	10	--	166	6.5
May 1-5.....	12,770	8.7		4.5	1.8	14		12		11	18	.2	.8		65	.09	2,240	18	8	1.4	107	5.8
May 6-20.....	15,420	15		11	4.5	27		42		16	38	--	.8		133	.18	5,540	46	12	1.7	232	6.3
May 21-31.....	3,565	16		11	4.7	29		44		16	41	--	.8		140	.19	1,350	47	11	1.8	244	6.2
June 1-5.....	3,566	14		8.5	3.1	29		28		13	42	.2	1.2		a126	.17	1,210	34	11	2.2	216	7.0
June 6-12.....	7,209	9.0		5.8	2.6	20		19		12	28	--	.2		87	.12	1,690	25	10	1.7	152	6.9
June 13-18.....	5,520	9.0		5.2	2.2	13		16		8.4	20	--	.8		67	.09	999	22	9	1.2	115	6.4
June 19-30.....	3,820	9.9		6.8	2.6	20		24		9.2	30	--	.2		91	.12	939	28	8	1.6	163	6.2
July 1-10.....	2,828	12		8.0	3.5	33		29		13	48	.3	.2		a145	.20	1,110	34	10	2.5	223	6.5
July 11-16.....	2,228	14		14	5.9	63		34		23	103	--	.2		a261	.35	1,570	60	32	3.5	422	6.1
July 17-31.....	1,563	16		8.5	3.8	36		35		12	52	--	.2		a155	.21	654	36	8	2.6	242	6.5
Aug. 1-8.....	1,555	16		7.0	3.3	27		34		10	36	.1	.5		a118	.16	495	31	3	2.1	188	6.2
Aug. 9-24.....	1,392	14		10	4.6	54		44		14	78	.5	--		a198	.27	744	44	8	3.5	358	6.3
Aug. 25-31.....	1,001	14		8.0	3.4	39		33		11	56	--	.8		a152	.21	411	34	7	2.9	257	6.2
Sept. 1-10.....	1,496	13		6.5	2.5	30		28		10	40	.2	.8		117	.16	473	26	4	2.6	199	6.0
Sept. 11-20.....	1,960	11		6.8	2.9	36		34		11	47	--	.8		132	.18	699	29	1	2.9	234	6.4
Sept. 21-30.....	2,106	8.8		9.0	3.5	46		27		18	68	--	.5		a179	.24	1,020	37	15	3.3	308	6.1
Weighted average	7,500	12		7.1	3.0	22		20		15	32	--	0.9		103	0.14	2,090	30	14	1.7	175	6.1
Time-weighted average.....	--	13		7.9	3.3	28		25		15	41	--	0.8		124	--	--	33	13	2.1	211	6.2
Tons per day....	--	250		144	60	446		399		308	641	--	18		--	--	--	--	--	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN THE SABINE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
GREENVILLE RESERVOIR NO. 2 AT GREENVILLE																						
Nov. 28, 1961		3.9		38	3.7	19		138	19	12	0.5	0.0		a175	0.24		110	0	27	0.8	295	7.2
Feb. 5, 1962		2.9		35	3.7	18		128	21	9.6	.4	.0		154	.21		102	0	27	.8	285	7.1
8-0174. LAKE TAWAKONI NEAR WILLS POINT																						
Dec. 5, 1961		2.9		29	3.7	11		108	12	6.0	0.3	0.2		118	0.16		88	0	21	0.5	220	7.0
Jan. 12, 1962		2.4		28	3.6	9.3	4.5	108	12	6.0	.3	.5		120	.16		85	0	18	.4	219	7.0
Jan. 17		2.1		28	4.1	12		106	12	9.0	.3	.0		120	.16		87	0	23	.6	218	7.0
Apr. 16		1.2		29	3.7	14		114	12	7.0	.3	.8		a134	.18		88	0	25	.6	229	7.2
July 12		.6		30	3.9	10		110	12	7.2	.3	.0		a128	.17		91	1	20	.5	224	7.1
8-0190. LAKE FORK CREEK NEAR QUITMAN																						
Dec. 5, 1961	43.2	20		31	13	101		20	78	179	0.2	0.0		a471	0.64		131	114	63	3.8	787	6.1
Jan. 11, 1962	85	20		37	18	103		19	127	172	.2	.2		a495	.67		166	151	57	3.5	842	6.1
Jan. 17	480	13		25	11	60		18	80	99	.2	.2		297	.40		108	93	55	2.5	534	6.0
Feb. 11	69.7	21		43	20	115		24	133	200	.2	.0		544	.74		190	170	57	3.6	952	6.3
Mar. 13	1,800	10		19	7.5	52		13	46	94	.2	.0		235	.32		78	68	59	2.6	442	6.2
Apr. 17	52.1	14		42	19	119		50	121	194	.3	.0		534	.73		183	142	59	3.8	950	7.4
May 22	16.8	14		32	14	84		63	74	135	.3	.1		384	.52		138	86	57	3.1	679	7.5
July 11	8.04	14		26	10	58		54	44	101	.2	.0		a302	.41		106	62	55	2.4	527	6.0
Aug. 3	47.3	11		15	5.9	31		44	23	49	.3	.2		157	.21		62	26	53	1.7	283	6.1
Sept. 20	23.0	11		19	6.5	38		49	29	60	.2	.2		a194	.26		74	34	52	1.9	336	6.8
8-0195. BIG SANDY CREEK NEAR BIG SANDY																						
Dec. 4, 1961	131	16		9.0	4.3	31		7	27	52	0.2	0.2		143	0.19		40	34	63	2.1	252	6.1
Jan. 11, 1962	194	18		12	5.4	35		5	45	54	.1	.2		172	.23		52	48	59	2.1	296	5.8
Jan. 17	200	18		10	5.2	43		4	35	70	.1	.2		184	.25		46	43	67	2.8	330	5.5
Feb. 10	142	17		10	5.3	36		5	35	59	.1	.0		164	.22		47	43	62	2.3	291	5.4
Mar. 13	458	12		8.0	3.7	30		7	26	47	.1	.0		130	.18		35	29	65	2.2	231	5.6
Apr. 17	114	15		9.5	4.6	34		18	27	51	.2	.1		a162	.22		43	28	63	2.3	250	6.9
July 11	36.0	15		6.2	2.8	21		15	8.4	36	.1	.2		97	.13		27	15	63	1.8	165	5.9
Aug. 3	40.8	16		5.0	2.4	18		14	8.8	28	.1	.1		85	.12		22	11	63	1.7	133	6.1
Sept. 20	29.0	15		6.2	2.6	19		8	16	30	.1	.8		94	.13		26	20	61	1.6	150	6.1

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
LAKE GLADEWATER NEAR GLADEWATER																						
Dec. 4, 1961		16		4.8	2.4	12		14	7.4	20	0.1	0.2		70	0.10		22	10	54	1.1	113	6.0
Feb. 10, 1962		16		3.0	2.1	9.6	1.6	6	9.6	15	.1	.2		60	.08		16	11	53	1.0	93	5.5
WILDS CREEK NEAR LAIRD HILL																						
Dec. 3, 1961	7.25	30		5.0	3.0	6.8	1.8	20	12	8.5	0.1	0.2		77	0.10		25	8	35	0.6	94	6.1
Jan. 17, 1962	15.2	26		4.8	2.8	6.3	1.2	15	13	10	.1	.0		71	.10		24	11	35	.6	85	6.3
Feb. 10	9.75	28		4.8	2.5	6.4	1.5	16	11	7.2	.1	.2		70	.10		22	9	36	.6	82	6.0
Apr. 18	7.28	29		4.5	2.4	6.6	1.7	15	11	10	.1	.1		72	.10		21	9	38	.6	78	7.7
CHEROKEE BAYOU NEAR OAK HILL																						
Dec. 3, 1961	22.3	19		16	4.4	50		8	7.2	108	0.2	0.2		209	0.28		58	51	65	2.9	392	6.0
Jan. 17, 1962	57	17		10	3.7	30		7	13	60	.1	.2		137	.19		40	34	62	2.1	252	5.7
Feb. 9	38.6	17		14	3.7	38		7	8.8	83	.2	.2		168	.23		50	44	62	2.3	315	5.9
Apr. 18	24.4	17		17	4.1	47		13	7.2	102	.1	.1		200	.27		59	49	64	2.7	365	6.4
8-0215. LAKE CHEROKEE NEAR LONGVIEW																						
Dec. 3, 1961		11		4.5	3.0	14		14	9.6	23	0.2	0.2		72	0.10		24	12	57	1.2	122	6.1
Jan. 8, 1962		12		5.2	2.4	13		8	13	22	.1	.2		72	.10		23	16	56	1.2	120	6.1
Jan. 17		13		5.0	2.5	12		8	12	21	.1	.2		70	.10		23	16	54	1.1	115	5.7
8-0220.5. EIGHT MILE CREEK NEAR TATUM																						
Nov. 28, 1961	49.5	17		9.0	4.6	19		23	22	28	0.2	1.8		113	0.15		41	22	50	1.3	183	6.0
Jan. 17, 1962	--	8.9		4.5	2.6	8.9	2.3	12	12	15	.1	.8		61	.08		22	12	44	.8	100	5.6
May 29	7.91	18		13	5.3	33		48	23	38	.5	11		166	.23		54	15	57	2.0	282	6.8
July 4	6.76	19		12	4.0	24		42	18	26	.4	8.4		133	.18		46	12	52	1.5	223	6.1
8-0220.8. MARTIN CREEK NEAR BECKVILLE																						
Nov. 28, 1961	278	11		5.2	4.1	13		16	20	17	0.2	0.1		79	0.11		30	17	49	1.0	131	5.8
Jan. 17, 1962	b500	8.1		4.5	3.5	13		11	21	16	.2	.8		72	.10		26	17	53	1.1	126	5.8
May 29	24.6	16		6.0	4.5	14		30	13	18	.2	.2		87	.12		33	9	48	1.1	136	6.4
July 4	92.3	12		6.2	4.6	12		16	23	16	.2	.0		82	.11		34	21	43	.9	147	5.7

b Field estimate.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0221.5. SIX MILE CREEK NEAR CARTHAGE																						
Nov. 28, 1961----------	7.41	15		20	8.8	69		44	37	114	0.3	0.2		286	0.39		86	50	64	3.2	522	6.3
8-0222. MURVAUL LAKE NEAR GARY																						
Dec. 3, 1961----------		5.1		7.8	6.5	21		37	22	27	0.2	0.5		108	0.15		46	16	50	1.3	196	6.3
Feb. 9, 1962----------		6.7		8.8	5.9	19		22	28	28	.2	.8		108	.15		46	28	47	1.2	197	6.4
8-0224. SOCAGEE CREEK NEAR CARTHAGE																						
May 29, 1962----------	1.41	16		22	9.0	104		42	8.4	195	0.2	0.8		376	0.51		92	58	71	4.7	755	6.8
July 4----------	3.40	11		16	5.0	52		32	6.4	99	.2	.0		206	.28		60	34	65	2.9	405	6.9
8-0232. TENAHA CREEK NEAR SHELBYVILLE																						
Nov. 29, 1961----------	25.3	16		8.5	6.9	24		25	40	27	0.2	0.1		135	0.18		50	29	51	1.5	217	6.2
Dec. 10----------	4,480	3.6		1.8	1.3	3.4	2.6	8	7.0	4.0	.2	.2		28	.04		10	3	36	.5	44	6.2
Dec. 11----------	1,110	4.7		2.5	1.8	4.3	2.4	10	9.6	5.0	.2	.2		36	.05		14	5	36	.5	58	5.8
Dec. 12----------	1,800	7.0		3.0	2.1	5.7	2.4	10	13	6.5	.2	.2		45	.06		16	8	39	.6	71	6.3
Jan. 16, 1962----------	320	9.4		4.5	3.7	15		10	28	15	.2	.8		82	.11		26	18	56	1.3	137	5.6
July 4----------	7.95	12		5.5	3.7	10		26	15	9.2	.1	1.2		70	.10		29	8	43	.8	118	5.8
Aug. 7----------	.74	12		9.2	6.0	23		54	26	18	.2	.2		122	.17		48	3	51	1.4	191	6.5
FLAT FORK CREEK NEAR CENTER																						
Nov. 29, 1961----------	54.8	14		12	8.8	36		39	46	46	0.2	0.2		182	0.25		66	34	55	1.9	317	6.4
Dec. 10----------	6,100	4.0		2.5	1.6	5.8	2.4	10	8.4	7.5	.2	.2		38	.05		13	5	44	.7	64	6.3
Dec. 12----------	1,400	7.4		3.5	2.0	7.2	2.1	11	11	9.5	.2	.5		48	.07		17	8	44	.8	79	6.1
Jan. 16, 1962----------	--	6.3		6.0	3.3	18		16	25	20	.2	.5		87	.12		28	15	58	1.5	152	5.8
8-0243. PATROON BAYOU NEAR MILAM																						
Nov. 29, 1961----------	23.1	16		10	7.3	20		30	42	21	0.2	0.0		132	0.18		55	30	44	1.2	207	6.2
May 30, 1962----------	42.0	9.6		5.2	3.5	10		20	19	9.5	.2	.0		67	.09		27	11	45	.8	108	6.3
8-0245. PALO GAUCHO BAYOU NEAR HEMPHILL																						
Nov. 29, 1961----------	43.6	17		7.8	3.7	5.3	1.9	28	12	9.0	0.1	0.0		71	0.10		35	12	24	0.4	99	6.2
Dec. 11----------	975	9.1		3.5	2.1	2.8	2.8	12	10	4.5	.1	.5		41	.06		17	8	23	.3	55	6.6
Jan. 16, 1962----------	242	14		6.0	3.0	5.1	1.8	14	15	9.0	.2	.8		62	.08		27	16	27	.4	89	5.8
May 30----------	67.4	14		6.5	2.9	5.3	1.9	25	9.2	7.8	.1	.8		60	.08		28	8	27	.4	89	6.0
July 6----------	15.7	16		6.5	2.9	4.6	1.5	25	8.8	6.7	.1	.0		59	.08		28	8	25	.4	84	6.0
Aug. 8----------	.69	16		10	4.5	10		52	8.0	10	.1	.2		85	.12		43	1	34	.7	128	6.5

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0252.5. HOUSEN BAYOU NEAR YELLOWPINE																						
Nov. 30, 1961	4.77	22		7.2	4.4	26		36	30	21	0.3	0.5		129	0.18		36	7	61	1.9	199	6.2
Jan. 16, 1962	b400	16		4.8	2.3	13		7	25	12	.3	.8		77	.10		21	16	57	1.2	116	5.5
May 31	14.9	25		8.0	3.7	23		43	20	20	.2	.5		121	.16		35	0	59	1.7	184	6.0
Aug. 8	.04	13		8.0	3.9	31		67	10	26	.3	.5		126	.17		36	0	65	2.2	206	6.4
8-0253. SANDY CREEK NEAR YELLOWPINE																						
Nov. 30, 1961	30.8	22		2.5	1.2	4.6	1.3	8	4.4	8.0	0.1	0.1		48	0.07		11	5	44	0.6	49	5.8
Jan. 16, 1962	246	15		3.0	1.0	5.8	1.4	4	12	7.0	.2	.2		48	.07		12	8	48	.7	63	5.3
May 31	33.5	13		2.0	1.1	4.5	1.4	8	5.6	5.6	.1	.5		38	.05		10	3	46	.6	48	5.5
Aug. 8	1.90	17		4.0	1.5	5.3	1.8	21	3.8	6.0	.0	.5		50	.07		16	0	38	.6	61	6.1
8-0265. LITTLE COW CREEK BELOW McGRAW CREEK NEAR BURKEVILLE																						
Nov. 30, 1961	91.5	15		4.0	1.2	3.1	1.3	17	1.6	5.5	0.1	0.2		40	0.05		15	1	29	0.3	57	5.9
Jan. 16, 1962	158	13		6.0	.7	3.1	1.2	18	3.0	5.2	.1	.5		42	.06		18	3	26	.3	58	6.0
May 31	73.1	14		3.0	.8	2.9	1.6	11	2.8	4.9	.1	.1		35	.05		11	3	33	.4	43	5.6
July 6	54.6	17		3.5	1.0	2.9	1.5	13	2.0	5.6	.1	.0		40	.05		13	2	30	.3	44	6.1
8-0295. BIG COW CREEK NEAR NEWTON																						
Nov. 30, 1961	84.0	12		1.5	1.2	3.2	1.0	10	0.2	6.2	0.2	0.2		31	0.04		9	0	41	0.5	42	5.9
Jan. 16, 1962	204	11		4.0	.7	3.5	.8	9	2.8	7.2	.1	.5		35	.05		13	6	35	.4	52	5.6
July 11	41.9	13		2.2	.7	2.9	.8	8	.4	6.0	.1	.0		30	.04		8	2	40	.4	36	5.6
Aug. 9	31.7	12		2.2	.6	3.1	1.0	8	.8	5.5	.1	.8		30	.04		8	1	42	.5	34	5.9
8-0297.5 NICHOLS CREEK NEAR BUNA																						
Nov. 29, 1961	35.5	7.2		0.5	1.8	15		1	0.4	28	0.2	0.5		54	0.07		9	8	79	2.2	103	4.7
Jan. 15, 1962	70.3	8.0		1.5	1.1	16		1	3.0	28	.1	.5		58	.08		8	7	81	2.3	112	4.7
8-0300. CYPRESS CREEK NEAR BUNA																						
Nov. 29, 1961	19.9	6.1		0.5	1.3	5.9	0.7	3	3.0	10	0.1	0.5		29	0.04		7	4	63	1.0	52	5.0
Jan. 15, 1962	180	5.7		1.5	1.0	5.9	.8	1	4.6	11	.1	.5		31	.04		8	7	59	.9	55	4.8
Jan. 16	133	4.6		1.5	1.0	5.6	.5	2	4.6	9.8	.1	.2		29	.04		8	6	59	.9	55	5.0
July 9	.24	9.6		2.5	1.5	8.0	.4	12	2.0	12	.1	.8		43	.06		12	3	57	1.0	69	5.5

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 1962.
Water temperatures: October 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 165 ppm July 1-15; minimum, 68 ppm May 1-2.
Hardness: Maximum, 52 ppm Aug. 1-31; minimum, 22 ppm May 1-2.
Specific conductance: Maximum daily, 331 micromhos Aug. 2; minimum daily, 82 micromhos Nov. 23.
Water temperatures: Maximum, 89°F Aug. 7; minimum, 35°F Jan. 13.
EXTREMES, 1959-62.--Dissolved solids: Maximum, 304 ppm Oct. 2, 1960; minimum, 42 ppm June 19-20, 1961.
Hardness: Maximum, 61 ppm Oct. 2, 1960; minimum, 14 ppm June 19-20, 1961.
Specific conductance: Maximum daily, 508 micromhos Oct. 2, 1960; minimum daily, 56 micromhos June 20, 1961.
Water temperatures: Maximum, 89°F Aug. 7, 1962; minimum, 35°F Jan. 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-15, 1961...	241	18		8.5	4.3	29		32		15	42	0.2	0.8		134	0.18	87.2	39	13	2.0	230	6.8
Oct. 16-31.....	199	17		8.0	3.9	28		34		14	38	.2	.8		127	.17	68.2	36	8	2.0	215	6.7
Nov. 1-10.....	291	18		9.0	4.2	31		32		13	47	.2	.8		139	.19	109	40	14	2.1	242	6.5
Nov. 11-21.....	441	19		8.0	4.0	27		24		16	40	.2	1.0		a138	.19	164	36	17	2.0	217	6.3
Nov. 22-25.....	848	16		5.0	3.2	14		16		13	20	.2	.8		80	.11	183	26	13	1.2	128	6.1
Nov. 26-30.....	646	20		8.5	4.1	28		22		17	44	.2	.8		134	.18	234	38	20	2.0	229	6.3
Dec. 1-9.....	964	18		7.8	3.5	22		18		21	32	.1	.8		114	.16	297	34	19	1.6	191	6.7
Dec. 10-11.....	2,970	--		--	--	--		14		15	16	--	--		--	--	--	24	12	--	121	6.7
Dec. 12-17.....	2,038	19		8.2	4.3	22		18		22	33	.2	.8		118	.16	649	38	23	1.6	196	6.6
Dec. 18-19.....	3,500	--		--	--	--		18		15	13	--	--		--	--	--	24	11	--	121	6.8
Dec. 20-31.....	1,798	21		9.2	4.0	26		21		24	37	.2	.8		132	.18	641	39	22	1.8	220	6.8
Jan. 1-26, 1962...	1,161	17		8.2	4.1	22		16		22	34	.3	.8		116	.16	364	37	24	1.6	199	6.0
Jan. 27-28.....	3,855	--		5.8	3.0	--		13		--	16	.1	.8		--	--	--	27	16	--	118	6.3
Jan. 29-31.....	3,533	--		6.8	3.6	--		13		--	28	.2	.8		--	--	--	32	21	--	164	6.2
Feb. 1-15.....	2,060	16		9.0	4.1	24		17		27	34	.1	.8		123	.17	684	39	25	1.7	213	6.4
Feb. 16-24.....	1,521	17		10	4.5	25		20		28	36	.1	.2		131	.18	538	43	27	1.7	223	6.4
Feb. 25.....	2,300	--		--	--	--		17		21	25	--	--		--	--	--	33	19	--	167	6.7
Feb. 26-28.....	2,370	15		9.8	4.3	25		21		26	37	.1	.8		128	.17	819	42	25	1.7	228	6.4

a Residue at 180°C.

8-325. NECHES RIVER NEAR ALTO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 1-14, 1962...	2,387	14		10	5.3	25		22		29	38	0.1	0.0		132	0.18	851	47	29	1.6	232	6.3
Mar. 15-31.....	1,777	14		10	5.3	26		24		29	37	.1	.5		134	.18	643	47	27	1.6	230	5.8
Apr. 1-10.....	1,146	15		11	5.2	24		29		25	36	--	.8		131	.18	405	49	25	1.5	225	6.9
Apr. 11-23.....	944	14		10	5.2	25		30		23	36	.1	1.0		129	.18	329	46	22	1.6	225	6.5
Apr. 24-30.....	2,156	12		7.8	4.1	18		22		19	26	--	1.2		99	.13	576	36	18	1.3	170	6.5
May 1-2.....	5,385	--		--	--	--		16		12	16	--	--		68	.09	989	22	9	--	109	6.6
May 3-6.....	4,698	12		7.2	3.4	16		20		15	24	.2	.5		88	.12	1,120	32	16	1.2	147	6.0
May 7-19.....	2,416	15		11	5.2	24		37		21	34	--	.8		129	.18	841	49	19	1.5	226	6.1
May 20-31.....	806	16		11	5.1	23		37		19	33	--	1.0		126	.17	274	48	18	1.4	220	6.1
June 1-13.....	920	17		11	4.9	26		36		17	39	.2	.5		134	.18	333	48	18	1.6	228	6.4
June 14-15.....	2,770	--		--	--	--		27		11	18	--	--		--	--	--	27	5	--	128	6.7
June 16-20.....	1,534	21		9.5	4.6	23		32		16	34	.2	.8		125	.17	518	43	16	1.5	204	6.8
June 21-30.....	866	22		11	4.8	24		42		15	34	.2	1.5		134	.18	313	47	13	1.5	218	6.4
July 1-15.....	686	19		11	4.6	35		33		14	56	.2	1.2		a165	.22	306	46	19	2.2	280	6.6
July 16-31.....	217	18		11	4.7	30		40		12	47	--	1.2		a146	.20	85.5	47	14	1.9	256	6.7
Aug. 1-31.....	214	18		12	5.3	32		50		16	45	.1	.8		a160	.22	92.4	52	11	1.9	262	6.3
Sept. 1-5.....	151	14		11	4.9	23		46		12	33	.3	1.2		122	.17	49.7	48	10	1.4	215	6.7
Sept. 6-11.....	470	15		6.8	3.7	18		22		16	25	--	1.0		96	.13	122	32	14	1.4	160	6.6
Sept. 12-30.....	292	17		11	5.1	26		38		16	40	--	.8		135	.18	106	48	17	1.6	230	6.5
Weighted average	1,139	16		9.0	4.4	23		24		21	33	--	0.7		121	0.16	371	41	21	1.6	205	6.3
Time-weighted average.....	--	17		9.6	4.6	25		30		19	37	--	0.8		130	--	--	43	18	1.7	220	6.3
Tons per day....	--	50		28	14	70		75		65	103	--	2.2		--	--	--	--	--	--	--	--

a Residue at 180°C.

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 1962.
Water temperatures: October 1954 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 209 ppm Sept. 1-8; minimum, 38 ppm May 1-8.
Hardness: Maximum, 60 ppm July 14-21; minimum, 11 ppm Dec. 10-12.
Specific conductance: Maximum daily, 402 micromhos Sept. 1; minimum daily, 38 micromhos May 2.
Water temperatures: Maximum, 86°F July 16; minimum, freezing point Jan. 11, 12.
EXTREMES, 1954-62.--Dissolved solids: Maximum, 412 ppm Nov. 4-18, 26-30, 1954; minimum, 36 ppm Oct. 16-18, 1957.
Hardness: Maximum, 76 ppm Nov. 4-18, 26-30, 1954; minimum, 11 ppm Oct. 16-18, 1957, Dec. 10-12, 1962.
Specific conductance: Maximum daily, 895 micromhos Nov. 10, 1954; 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 1961 to September 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 (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	Noncarbonate			
Oct. 1-10, 1961...	374	19		6.5	4.1	22	--	24		16	30	0.2	0.8		a122	0.17	123	33	13	1.7	184	6.8
Oct. 11-17.....	296	19		7.0	4.0	24	--	26		16	33	.2	.5		a123	.17	98.3	34	13	1.8	189	6.5
Oct. 18-24.....	216	17		8.8	4.9	41	--	26		13	68	.2	.8		a177	.24	103	42	21	2.8	304	6.3
Oct. 25-31.....	163	20		7.0	4.0	22	--	33		12	29	.2	.5		a116	.16	51.1	34	7	1.6	178	6.6
Nov. 1-12.....	224	19		6.5	4.1	22	--	34		11	29	--	.8		109	.15	65.9	33	5	1.7	182	7.1
Nov. 13-20.....	534	21		6.2	3.6	20	--	22		17	26	--	.5		a111	.15	160	30	12	1.6	164	6.6
Nov. 21-30.....	1,060	20		5.8	3.7	21	--	14		19	31	--	.8		108	.15	309	30	18	1.7	184	6.1
Dec. 1-8.....	1,434	14		6.5	3.6	27	--	16		19	40	.1	.2		118	.16	457	31	18	2.1	207	6.5
Dec. 9.....	2,840	--		--	--	--	--	14		12	15	--	--		--	--	--	18	--	--	102	6.6
Dec. 10-12.....	3,540	8.2		2.8	1.0	5.2	2.6	16		5.0	5.8	.4	.8		40	.04	382	11	0	.7	60	7.0
Dec. 13-22.....	4,035	14		4.0	2.0	6.5	2.3	16		8.8	8.5	.2	.8		55	.07	599	18	5	.7	79	6.0
Dec. 23-31.....	4,476	16		5.5	3.2	13	--	15		16	18	--	.8		80	.11	967	27	15	1.1	128	5.9
Jan. 1-15, 1962...	1,743	19		7.2	4.1	16	--	16		22	23	.1	.5		100	.14	471	35	22	1.2	164	5.9
Jan. 16-18.....	2,030	14		5.0	2.6	8.4	--	14		12	12	.1	.5		62	.08	340	23	12	.8	100	6.0
Jan. 19-26.....	2,046	17		7.0	3.4	11	--	18		16	16	.1	.5		80	.11	442	31	17	.9	128	5.9
Jan. 27-31.....	3,582	12		4.2	2.6	6.9	1.9	17		9.8	9.0	.2	.8		55	.07	532	21	7	.7	85	5.9
Feb. 1-8.....	5,249	--		--	--	--	--	18		21	22	--	--		--	--	--	30	15	--	151	6.7
Feb. 9-13.....	2,600	15		6.2	3.5	14	--	22		14	19	.1	.5		83	.11	583	30	12	1.1	129	6.3
Feb. 14-28.....	1,512	16		7.5	4.3	17	--	24		22	22	.1	.5		101	.14	412	36	17	1.2	162	6.4
Mar. 1-12.....	2,352	15		6.0	4.2	13	--	22		15	18	.1	.2		82	.11	521	32	14	1.0	132	6.7
Mar. 13-16.....	1,980	13		6.0	4.0	10	--	24		13	14	.2	.2		72	.10	385	31	12	.8	116	6.5

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 17-23, 1962..	1,890	13		6.8	4.6	14	--	22		19	20	0.1	0.2		89	0.12	454	36	18	1.0	147	6.2
Mar. 24-31.....	1,256	12		8.8	5.4	23	--	22		27	33	--	.5		121	.16	410	44	26	1.5	213	5.9
Apr. 1-11.....	882	13		9.5	5.6	25	--	26		27	36	.2	.2		130	.18	310	47	25	1.6	222	6.5
Apr. 12-15.....	1,270	12		7.0	4.3	18	--	24		19	24	--	.2		96	.13	329	35	16	1.3	159	6.7
Apr. 16-25.....	994	14		9.5	5.7	26	--	27		27	38	--	.5		134	.18	360	47	25	1.6	232	6.4
Apr. 26-27.....	1,500	--		--	--	--	--	23		14	20	--	--		--	--	308	30	12	--	134	6.6
Apr. 28-30.....	2,120	12		4.5	2.1	6.3	1.9	19		7.8	8.2	--	1.0		53	.07	303	20	4	.6	81	6.1
May 1-8.....	5,321	7.2		3.3	1.9	4.3	1.9	11		6.8	7.8	.1	.0		38	.05	546	16	7	.5	60	8.2
May 9-16.....	3,210	12		6.8	4.4	13	--	24		13	22	--	.0		83	.11	719	35	15	1.0	145	6.0
May 17-31.....	481	16		8.2	5.2	24	--	30		18	36	--	.2		123	.17	160	42	17	1.6	208	6.5
June 1-10.....	664	17		8.0	4.7	24	--	20		25	34	.1	.8		124	.17	222	39	23	1.7	206	6.0
June 11-15.....	706	8.3		9.0	5.5	40	--	21		23	64	.2	.0		160	.22	305	45	28	2.6	303	6.9
June 16-19.....	1,048	12		13	4.0	18	--	40		22	22	.2	.2		111	.15	314	49	16	1.1	158	7.3
June 20-24.....	1,596	13		5.5	3.2	11	--	18		14	15	.1	.2		71	.10	306	27	12	.9	113	6.5
June 25-30.....	935	14		8.5	5.0	24	--	26		21	36	.2	.2		122	.17	308	42	20	1.6	210	6.6
July 1-13.....	639	18		8.0	5.0	27	--	27		22	38	.3	.8		132	.18	228	40	18	1.9	216	6.4
July 14-21.....	171	18		14	6.0	46	--	42		20	73	--	1.0		199	.27	91.9	60	25	2.6	333	7.1
July 22-31.....	222	18		8.0	5.0	27	--	29		22	37	--	.2		a141	.19	84.5	40	17	1.9	217	5.9
Aug. 1-10.....	739	17		7.5	3.4	29	--	12		27	40	.1	.2		a140	.19	279	33	23	2.2	213	6.2
Aug. 11-21.....	122	22		9.5	4.5	30	--	33		24	38	--	1.0		a156	.21	51.4	42	15	2.0	228	6.3
Aug. 22-31.....	111	18		9.5	4.5	49	--	32		18	74	--	.0		a199	.27	59.6	42	16	3.3	329	7.9
Sept. 1-8.....	85.5	14		10	5.6	56	--	33		15	90	.2	.2		a209	.28	48.2	48	21	3.5	376	5.9
Sept. 9-10.....	276	21		7.0	3.2	19	--	28		14	24	--	.2		102	.14	76.0	31	8	1.5	149	6.3
Sept. 11-20.....	402	17		7.2	3.6	21	--	8		32	27	--	.0		a113	.15	123	33	26	1.6	175	5.8
Sept. 21-30.....	127	19		7.8	4.3	29	--	20		25	40	--	.5		a136	.18	46.6	37	21	2.1	216	5.9
Weighted average	1,372	14		6.2	3.6	15	--	19		16	21	--	0.5		87	0.12	322	30	14	1.1	142	6.2
Time-weighted average.....	--	16		7.4	4.2	22	--	23		19	32	--	0.5		115	--	--	36	17	1.6	188	6.2
Tons per day....	--	53		23	13	55	--	71		60	78	--	1.7		--	--	--	--	--	--	--	--

a Residue at 180°C.

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 bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek, and at mile 55.
DRAINAGE AREA.--7,952 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 161 ppm Aug. 1-31; minimum, 56 ppm Dec. 20-26.
Hardness: Maximum, 50 ppm Apr. 1-20; minimum, 16 ppm Dec. 20-26.
Specific conductance: Maximum daily, 277 micromhos Jan. 11; minimum daily, 87 micromhos Dec. 21.
Water temperatures: Maximum, 90°F July 31, Aug. 1, 7-10; minimum, 39°F Jan. 13.
EXTREMES, 1947-62.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 35 ppm Sept. 21-22, 24, 1958.
Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 14 ppm May 3-15, Oct. 27-31, 1957, Sept. 21-22, 24, 1958, Jan. 11-20, 1961.
Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 44 micromhos Sept. 22, 1958.
Water temperatures: Minimum, 37°F Jan. 30, 31, 1948, Jan. 31, 1949.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-8, 1961....	1,771	16		7.8	2.6	17		24		16	21	0.2	0.8		93	0.13	445	30	10	1.3	154	6.6
Oct. 9-20.....	1,248	18		9.0	3.0	24		27		17	33	.2	.8		118	.16	398	35	13	1.8	198	6.6
Oct. 21-31.....	872	18		9.2	3.1	25		31		17	33	.2	.8		121	.16	285	36	10	1.8	202	6.5
Nov. 1-13.....	1,176	15		10	3.0	27		35		17	34	.3	1.0		124	.17	394	38	9	1.9	207	6.5
Nov. 14-19.....	2,118	12		6.5	1.8	16		18		11	22	.2	.8		79	.11	452	24	8	1.4	127	6.2
Nov. 20-30.....	2,777	19		8.8	2.7	20		34		14	23	.2	1.0		106	.14	795	33	5	1.5	187	6.9
Dec. 1-10.....	2,420	14		7.8	2.7	28		35		15	33	.2	1.0		119	.16	778	30	2	2.2	196	7.6
Dec. 11-17.....	8,257	12		6.5	2.6	24		22		17	30	.2	.8		104	.14	2,320	26	8	2.0	168	7.1
Dec. 18-19.....	15,150	8.4		--	--	15		14		12	18	.3	.8		--	--	--	18	6	1.5	111	7.1
Dec. 20-26.....	20,510	8.3		3.5	2.0	11		12		12	12	.2	.8		56	.08	3,100	16	6	1.2	91	6.7
Dec. 27-31.....	15,760	9.6		5.0	2.2	13		13		17	15	.2	.5		68	.09	2,890	22	11	1.2	113	6.6
Jan. 1-10, 1962...	10,900	13		6.8	2.6	17		10		20	24	.2	.5		89	.12	2,620	28	20	1.4	148	5.7
Jan. 11-20.....	6,413	15		8.5	3.4	25		14		25	36	.2	.2		120	.16	2,080	35	24	1.8	203	5.9
Jan. 21-31.....	9,253	15		8.8	3.3	20		13		27	28	.2	.5		109	.15	2,720	36	25	1.4	183	5.8
Feb. 1-10.....	10,350	14		8.0	3.1	20		13		28	25	.0	.8		105	.14	2,930	33	22	1.5	171	6.2

8-410. NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 11-20, 1962..	10,010	12		7.8	3.3	20		13		25	28	0.1	0.8		103	0.14	2,780	33	22	1.5	177	6.2
Feb. 21-28.....	5,716	15		9.2	3.8	24		18		28	33	.1	.2		122	.17	1,880	38	24	1.7	204	6.4
Mar. 1-10.....	7,012	14		10	4.4	25		22		31	33	.1	.8		129	.18	2,440	43	25	1.7	216	6.7
Mar. 11-20.....	6,731	13		10	4.0	27		20		31	35	.1	.8		131	.18	2,380	42	25	1.8	221	6.4
Mar. 21-31.....	5,542	12		10	4.7	28		22		34	36	.1	.8		137	.19	2,050	44	26	1.8	231	6.6
Apr. 1-10.....	3,357	11		11	5.3	28		28		31	39	.2	.2		140	.19	1,370	50	26	1.7	240	6.2
Apr. 11-20.....	3,975	12		11	5.3	27		30		29	38	--	.2		138	.19	1,480	50	25	1.7	242	6.0
Apr. 21-30.....	4,375	11		10	4.8	26		29		27	34	--	.5		127	.17	1,500	44	20	1.7	223	6.0
May 1-5.....	13,150	11		9.5	3.6	22		24		23	30	.2	.5		112	.15	3,980	38	19	1.6	193	5.9
May 6-18.....	19,520	10		6.5	2.4	13		18		15	16	--	.8		73	.10	3,850	26	11	1.1	118	5.7
May 19-31.....	5,332	14		10	3.8	21		32		17	30	--	1.0		113	.15	1,630	40	14	1.4	192	5.9
June 1-4.....	2,975	14		9.4	4.0	22		34		16	29	.2	1.0		113	.15	908	40	12	1.5	189	6.8
June 5-7.....	4,433	9.6		6.6	2.5	16		22		12	22	--	1.0		81	.11	969	27	9	1.3	136	6.1
June 8-15.....	3,962	12		9.5	3.8	21		34		15	29	--	1.2		108	.15	1,160	39	11	1.5	186	6.2
June 16-30.....	3,910	13		9.5	3.3	21		32		15	28	--	1.0		107	.15	1,130	37	11	1.5	185	6.3
July 1-15.....	2,533	16		8.5	3.9	23		18	7	18	29	.2	.2		115	.16	786	37	10	1.6	186	8.6
July 16-31.....	1,353	15		10	4.2	24		37		18	32	--	.2		121	.16	442	42	12	1.6	208	6.6
Aug. 1-31.....	1,216	19		10	4.5	34		42		19	44	.2	.8		a161	.22	529	44	9	2.2	251	6.2
Sept. 1-30.....	498	18		11	4.7	30		44		17	41	.2	.5		a148	.20	199	47	11	1.9	240	6.5
Weighted average	5,174	13		7.9	3.3	20		20		21	26	--	0.7		102	0.14	1,430	33	16	1.5	171	6.1
Time-weighted average.....	--	14		9.0	3.7	23		27		20	32	--	0.7		119	--	--	38	15	1.7	197	6.2
Tons per day....	--	175		111	46	275		283		292	368	--	9.6		--	--	--	--	--	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN NECHES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
FLAT CREEK AT FARM ROAD 607 NEAR ATHENS																						
Nov. 14, 1961	11.2	23		3.5	2.7	16		15	12	20	0.2	0.5		85	0.12		20	8	63	1.6	117	5.8
May 2, 1962	27.6	17		6.0	3.1	12		19	12	17	.2	1.2		78	.11		28	12	48	1.0	125	6.5
June 5	8.88	21		6.0	2.5	11		19	13	14	.1	1.0		78	.11		25	10	49	1.0	109	6.8
July 11	1.66	21		6.0	2.7	12		28	8.0	14	.1	.5		78	.11		26	3	50	1.0	109	6.9
CANEY CREEK AT STATE HIGHWAY 94 NEAR GROVETON																						
Nov. 21, 1961	a0.1	16		68	19	184		40	308	208	0.2	1.2		b856	1.16		248	214	62	5.1	1,350	6.3
8-0345. MUD CREEK NEAR JACKSONVILLE																						
Nov. 14, 1961	64.8	21		4.5	3.9	24		22	14	32	0.2	0.2		111	0.15		27	9	65	2.0	172	6.0
Dec. 14	638	15		7.2	4.0	15		9	30	20	.2	.0		95	.13		34	27	49	1.1	155	6.3
Apr. 3, 1962	182	19		11	6.9	19		17	45	25	.2	.8		b144	.20		56	42	43	1.1	218	6.1
May 3	1,660	9.3		6.5	3.3	7.9	2.6	16	18	12	.2	.5		68	.09		30	17	34	.6	110	6.3
July 11	31.8	26		12	6.6	23		26	49	25	.2	.0		b165	.22		57	36	47	1.3	232	6.7
Sept. 18	27.3	23		14	4.3	19		38	23	27	.1	.8		130	.18		53	22	44	1.1	201	6.6
8-0365. ANGELINA RIVER NEAR ALTO																						
Nov. 15, 1961	519	12		4.5	3.6	19		14	20	24	0.2	0.2		90	0.12		26	15	61	1.6	149	5.7
Jan. 25, 1962	1,640	11		10	5.5	30		10	41	44	.2	.0		147	.20		48	39	58	1.9	264	6.0
Feb. 16	895	11		8.2	5.1	23		17	31	31	.2	.2		b120	.16		41	28	54	1.6	203	6.1
Apr. 5	745	11		10	6.3	32		20	34	48	.2	.2		b162	.22		51	34	58	1.9	276	6.2
May 10	2,280	12		8.5	4.6	19		24	20	29	.2	.0		105	.14		40	20	51	1.3	190	5.9
June 12	487	16		8.8	4.5	37		26	21	55	.1	.0		b166	.23		40	19	67	2.5	268	6.6
July 17	106	16		9.2	5.2	32		34	20	46	.2	.5		146	.20		44	16	61	2.1	255	6.5
Aug. 21	92.3	14		11	5.5	55		33	16	89	.2	.0		207	.28		50	23	71	3.4	391	6.4
Sept. 25	79.6	18		8.2	4.4	33		28	17	49	.2	.5		144	.20		39	16	65	2.3	251	6.4

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

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.--8,162 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1962.
Water temperatures: October 1954 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 658 ppm Oct. 16-31, Nov. 11-21; minimum, 122 ppm July 28-31.
Hardness: Maximum, 200 ppm Mar. 11-20, May 7-8; minimum, 64 ppm July 28-31.
Specific conductance: Maximum daily, 1,230 micromhos Nov. 20; minimum daily, 200 micromhos July 30.
Water temperatures: Maximum, 86°F on several days during summer months; minimum, 35°F Jan. 10.
EXTREMES, 1954-62.--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 daily, 200 micromhos July 30, 1962.
Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956, Dec. 23, 1958, Jan. 3, 1959, Jan. 28, 29, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-5, 1961....	709	11		52	4.7	97		157		98	66	--	20		450	0.61	861	149	20	3.5	709	7.2
Oct. 6-10.....	414	13		55	5.3	125		160		140	90	--	35		591	.80	661	159	28	4.3	931	6.7
Oct. 11-15.....	945	12		52	4.4	69		157		81	51	--	16		391	.53	998	148	19	2.5	615	7.3
Oct. 16-31.....	285	14		58	6.2	150		211		142	110	--	26		658	.89	506	170	0	5.0	1,050	6.8
Nov. 1-10.....	391	14		52	5.8	129		172		141	83	--	36		577	.78	609	154	12	4.5	901	6.6
Nov. 11-21.....	300	14		53	6.5	150		174		151	104	--	47		658	.89	533	158	16	5.2	1,040	6.6
Nov. 22-30.....	1,267	10		55	4.4	54		156		75	38	--	17		354	.48	1,210	155	27	1.9	563	6.6
Dec. 1-8.....	482	12		62	5.8	105		181		119	79	--	28		a490	.66	638	178	30	3.4	845	7.4
Dec. 9-27.....	1,492	10		58	4.6	49		162		73	36	--	12		353	.48	1,420	164	30	1.7	539	7.5
Dec. 28-31.....	602	9.8		70	5.8	73		187		105	54	--	23		470	.64	764	198	46	2.3	726	7.4
Jan. 1-15, 1962...	541	10		66	5.5	85		179		108	65	--	26		483	.66	706	187	40	2.7	768	7.2
Jan. 16-31.....	736	8.5		66	5.1	69		177		92	54	--	24		439	.60	872	186	40	2.2	690	7.6
Feb. 1-20.....	616	8.5		64	6.1	88		180		114	64	--	25		496	.67	825	184	37	2.8	773	7.7
Feb. 21-28.....	1,491	7.9		62	5.0	51		172		73	41	--	14		368	.50	1,480	175	34	1.7	580	7.8
Mar. 1-10.....	1,090	10		63	5.0	64		183		91	47	--	7.6		a378	.51	1,110	178	28	2.1	646	7.3

a Calculated from determined constituents.

8-625. TRINITY RIVER NEAR ROSSER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
Mar. 11-20, 1962..	465	12		69	6.8	132		203		154	90	--	42		655	0.89	822	200	34	4.1	977	7.0
Mar. 21-31.....	529	12		66	5.6	111		190		134	79	--	28		a529	.72	756	188	32	3.5	878	6.9
Apr. 1-5.....	995	11		63	5.1	78		179		102	56	0.7	17		435	.59	1,170	178	32	2.5	697	7.4
Apr. 6-17.....	1,663	8.3		61	4.1	44		167		68	33	--	12		320	.44	1,440	169	32	1.5	521	6.8
Apr. 18-20.....	815	--		--	--	--		206		114	73	--	--		--	--	--	198	29	--	843	7.9
Apr. 21-30.....	3,829	9.6		59	4.0	32		154		65	24	--	7.9		291	.40	3,010	164	37	1.1	470	7.3
May 1-6.....	3,470	17		62	3.8	29		174		52	22	.5	5.4		296	.40	2,770	170	28	1.0	458	7.4
May 7-8.....	1,330	16		73	4.5	43		200		72	34	--	10		a350	.48	1,260	200	36	1.3	571	7.8
May 9-23.....	1,647	11		70	4.4	37		201		62	28	--	6.9		338	.46	1,500	192	28	1.2	540	7.3
May 24-31.....	504	13		62	5.8	118		190		125	93	--	23		559	.76	761	178	23	3.8	916	6.5
June 1-10.....	777	13		56	5.0	91		169		97	70	.7	21		455	.62	955	160	22	3.1	745	7.4
June 11-25.....	922	11		55	4.6	64		162		73	52	--	15		367	.50	914	156	23	2.2	609	7.8
June 26-30.....	1,976	9.6		49	4.0	48		142		55	45	--	8.0		299	.41	1,600	139	22	1.8	500	7.8
July 1-4.....	3,555	13		46	3.9	35		143		46	26	.5	5.1		252	.34	2,420	131	14	1.3	418	7.1
July 5-15.....	1,221	12		54	4.6	45		159		56	40	--	8.1		306	.42	1,010	154	23	1.6	511	7.1
July 16-27.....	691	15		50	6.0	118		171		110	94	--	25		515	.70	961	150	10	4.2	858	7.0
July 28-31.....	16,000	7.0		21	2.7	18		74		25	12	--	.0		a122	.17	5,270	64	3	1.0	210	8.2
Aug. 1-8.....	5,840	--		48	3.9	31		149		40	24	.5	5.0		238	.32	3,750	136	14	1.2	403	7.5
Aug. 9-31.....	659	14		56	4.6	85		178		89	66	--	14		a417	.57	742	158	12	2.9	705	7.2
Sept. 1-7.....	1,163	13		52	5.3	89		167		94	65	.8	19		420	.57	1,320	152	14	3.1	702	7.0
Sept. 8-30.....	10,500	8.1		44	4.6	23		135		28	26	--	2.5		205	.28	5,810	129	18	.9	358	7.3
Weighted average	1,903	9.6		50	4.5	42		148		55	35	--	8.4		287	0.39	1,470	142	21	1.5	474	7.3
Time-weighted average.....	--	11		58	5.1	77		171		91	58	--	18		421	--	--	165	25	2.6	681	7.1
Tons per day....	--	50		255	23	218		759		281	180	--	43		--	--	--	---	---	--	--	--

a Calculated from determined constituents.

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 (revised).--963 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.
Water temperatures: September 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 570 ppm Apr. 13; minimum, 114 ppm June 30.
Hardness: Maximum, 272 ppm Jan. 21-31; minimum, 66 ppm June 30.
Specific conductance: Maximum daily, 938 micromhos Apr. 13; minimum daily, 180 micromhos Sept. 8.
Water temperatures: Maximum, 91°F July 24, Aug. 9, 13; minimum, freezing point Jan. 11.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 14-31, Sept. 1-6.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 1, 1961.....	15.0	--		--	--	49		131		127	28	0.8	1.8		--	--	--	176	68	1.6	542	7.8
Oct. 2-4.....	151	9.6		42	2.3	27		118		51	14	.6	1.2		a206	0.28	84.0	114	18	1.1	334	7.5
Oct. 5-14.....	126	11		61	3.4	35		145		87	20	.7	2.8		320	.44	109	166	47	1.2	472	7.2
Oct. 15-31.....	22.0	9.2		70	3.9	31		179		76	21	.6	2.5		315	.43	18.7	190	44	1.0	492	7.6
Nov. 1-10.....	46.4	14		72	4.2	42		204		73	29	.7	2.0		362	.49	45.4	197	30	1.3	568	7.5
Nov. 11-21.....	40.1	10		70	4.2	40		169		89	32	.6	1.2		344	.47	37.2	192	54	1.3	529	7.1
Nov. 22-25.....	4,025	11		38	2.3	19		101		38	14	.5	2.8		191	.26	2,080	104	22	.8	295	7.0
Nov. 26-30.....	323	13		64	3.4	20		164		55	15	.6	4.2		271	.37	236	174	39	.7	423	7.4
Dec. 1-8.....	157	11		70	4.0	25		193		55	18	.5	3.5		283	.38	120	191	33	.8	464	7.6
Dec. 9-11.....	2,518	10		46	3.0	20		121		47	14	.5	3.0		a204	.28	1,390	127	28	.8	347	7.6
Dec. 12-19.....	735	12		67	3.8	24		174		58	20	.4	4.5		281	.38	558	183	40	.8	455	7.7
Dec. 20-31.....	253	12		84	3.9	25		223		62	20	.4	4.8		a322	.44	220	226	43	.9	520	7.7
Jan. 1-10, 1962...	152	8.4		86	3.9	32		228		67	27	.4	5.7		342	.47	140	230	44	.9	559	7.6
Jan. 11-20.....	122	8.4		98	4.7	40		246		96	31	.4	6.8		408	.55	134	264	62	1.1	648	7.7
Jan. 21-31.....	135	6.5		100	5.3	49		239		112	42	.5	5.3		a439	.60	160	272	76	1.3	710	7.6
Feb. 1-14, 16-17..	91.8	3.5		90	5.1	42		215		104	34	.4	3.5		409	.56	101	246	70	1.2	632	7.5
Feb. 15.....	168	--		--	--	--		149		47	23	--	--		--	--	--	147	25	--	413	7.0
Feb. 18-28.....	350	9.9		69	4.7	41		169		86	34	.5	2.8		355	.48	335	192	53	1.3	541	7.2

a Calculated from determined constituents.

8-645. CHAMBERS CREEK NEAR CORSICANA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
Mar. 1-15, 1962...	123	8.4		88	5.3	47		223		101	38	0.4	1.0		412	0.56	137	242	59	1.3	648	7.6
Mar. 16-31.....	68.4	4.0		87	5.8	55		222		112	43	.5	1.2		427	.58	78.9	241	59	1.5	680	7.6
Apr. 1-12.....	55.8	5.4		83	6.3	60		220		110	46	.6	2.5		441	.60	66.4	233	52	1.7	677	7.3
Apr. 13.....	52.0	--		--	--	--		248		143	91	--	--		570	.78	80.0	210	8	--	938	7.3
Apr. 14-26.....	64.5	5.9		88	6.4	62		222		117	54	--	1.2		464	.63	80.8	246	64	1.7	730	7.6
Apr. 27.....	1,040	--		--	--	--		104		30	190	--	--		--	--	--	136	51	--	838	7.5
Apr. 28.....	2,100	--		--	--	--		132		47	17	--	--		--	--	--	130	22	--	370	7.6
Apr. 29-30.....	1,032	--		--	--	--		136		122	24	--	--		--	--	--	202	90	--	533	7.7
May 1-2.....	1,365	16		50	3.1	22		132		47	16	.5	6.6		a226	.31	833	138	29	.8	361	7.4
May 3-20.....	79.7	8.4		74	4.3	30		188		71	26	--	2.5		a308	.42	66.3	202	48	.9	515	7.1
May 21-31.....	60.6	11		61	4.0	34		169		58	30	--	1.8		a283	.38	46.3	169	30	1.1	474	7.3
June 1-9.....	139	11		55	3.5	35		152		46	36	.5	3.8		288	.39	108	152	27	1.2	459	7.2
June 10.....	2,340	--		--	--	--		106		39	9.0	--	--		--	--	--	102	15	--	274	7.2
June 11-18.....	525	11		58	3.4	23		135		66	18	--	4.2		267	.36	378	159	48	.8	420	7.1
June 19.....	120	--		--	--	--		137		28	9.5	--	--		--	--	--	128	16	--	313	7.5
June 20-29.....	98.1	9.6		58	3.8	37		160		63	30	--	1.5		308	.42	81.6	160	29	1.3	484	7.1
June 30.....	1,070	--		--	--	--		86		8.0	12	--	--		114	.16	329	66	0	--	194	7.2
July 1-4.....	330	15		51	3.2	26		123		66	17	.6	2.0		250	.34	223	140	40	1.0	380	7.2
July 5-31.....	12.4	13		65	3.9	35		168		70	30	--	1.2		309	.42	10.3	178	40	1.1	493	7.4
Aug. 1-13.....	1.1	12		80	5.0	63		217		80	66	.6	.8		421	.57	1.25	220	42	1.8	693	7.2
Sept. 7-9.....	462	19		31	1.9	12		97		17	8.0	--	2.2		a139	.19	173	85	6	.6	220	7.4
Sept. 10-14.....	523	13		56	2.8	18		127		64	13	--	2.5		232	.32	328	151	47	.6	382	7.4
Sept. 15-30.....	17.4	--		62	3.1	--		--		47	20	--	.0		--	--	--	167	--	--	427	--
Weighted average	215	11		58	3.4	28		148		60	23	--	3.3		268	0.36	156	157	38	0.9	429	7.3
Time-weighted average.....	--	9.7		72	4.3	38		186		78	31	--	2.6		337	--	--	197	46	1.2	538	7.4
Tons per day....	--	6.4		34	2.0	16		86		35	13	--	1.9		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 1962.
Water temperatures: April 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 7,450 ppm Sept. 1-7; minimum, 180 ppm Nov. 23-27.
Hardness: Maximum, 314 ppm Sept. 1-7; minimum, 98 ppm July 1-3.
Specific conductance: Maximum daily, 13,800 micromhos Sept. 3; minimum daily, 260 micromhos Nov. 25.
Water temperatures: Maximum, 95°F Aug. 9; minimum, 37°F Jan. 12.
EXTREMES, 1956-62.--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.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-2, 1961....		--		--	--	--		--		--	--	--	--		--	--		--	--	--	5,940	--
Oct. 5-6.....		--		--	--	--		--		--	--	--	--		--	--		--	--	--	600	--
Oct. 10-11.....		11		64	6.6	447		205		66	650	0.6	2.8		1,350	1.84		186	18	14	2,470	8.1
Oct. 12-14.....		12		67	4.4	83		142		113	90	.7	4.2		444	.60		185	68	2.7	741	7.8
Oct. 15-21.....		13		65	5.5	274		175		85	385	.7	3.8		918	1.25		184	41	8.8	1,650	7.8
Oct. 22-31.....		11		77	9.3	691		262		85	1,010	.7	3.0		2,020	2.75		230	16	20	3,640	8.0
Nov. 4.....		--		--	--	--		338		62	1,720	--	--		--	--		284	7	--	5,710	8.2
Nov. 5-7.....		11		64	7.0	355		203		68	510	.7	2.2		1,120	1.52		188	22	11	2,070	8.0
Nov. 12-14.....		10		83	10	636		291		59	940	.7	2.8		1,880	2.56		248	10	18	3,450	8.1
Nov. 15-19.....		10		59	5.8	232		170		71	325	.6	2.8		a817	1.11		171	32	7.7	1,450	7.8
Nov. 20-21.....		11		57	7.0	428		190		51	630	.6	3.0		1,280	1.74		171	16	14	2,410	7.8
Nov. 23-27.....		11		36	2.7	19		115		24	14	.4	2.2		a180	.24		101	7	.8	282	7.6
Nov. 28-29.....		13		55	3.9	37		153		44	42	.5	2.8		a289	.39		153	28	1.3	466	7.7
Dec. 22-30.....		12		86	5.6	104		238		75	132	.6	3.8		a547	.74		238	42	2.9	900	7.3
Jan. 1-20, 1962...		10		94	6.4	158		256		79	215	.4	8.5		a701	.95		261	51	4.3	1,220	7.8
Jan. 21-26.....		8.8		106	7.8	238		274		112	330	.4	8.7		a955	1.30		296	72	6.0	1,660	7.9
Jan. 27-31.....		--		--	--	--		236		107	188	--	--		--	--		263	70	--	1,150	7.7
Feb. 1-2.....		--		--	--	--		247		124	175	--	--		--	--		280	78	--	1,150	8.1

[a] Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 5-15, 1962...		5.4		94	7.8	253		247		103	355	0.5	4.8		a972	1.32		266	64	6.8	1,670	8.0
Feb. 17-20.....		10		50	4.6	58		143		55	64	.5	3.2		a336	.46		144	27	2.1	540	7.8
Mar. 17.....		--		--	--	--		220		87	210	--	--		--	--		234	54	--	1,150	7.7
Mar. 19-29.....		6.3		94	9.0	253		256		110	350	.7	1.8		a990	1.35		272	62	6.7	1,680	7.6
Mar. 31.....		--		--	--	--		265		106	485	--	--		--	--		267	50	--	2,090	7.8
Apr. 1-10.....		5.7		80	10	372		227		110	530	.5	.8		1,220	1.66		240	54	10	2,190	7.6
Apr. 13-14.....		--		--	--	--		239		112	325	--	--		--	--		246	50	--	1,610	7.9
Apr. 16-18.....		--		--	--	--		284		106	630	--	--		--	--		265	32	--	2,510	8.0
Apr. 20-25.....		9.9		96	11	533		282		107	780	--	1.5		1,680	2.28		284	54	14	3,010	7.7
Apr. 26.....		--		--	--	--		163		59	212	--	--		--	--		164	30	--	1,060	7.8
Apr. 27.....		--		--	--	--		144		54	72	--	--		--	--		143	25	--	569	7.8
Apr. 28-30.....		13		48	3.2	30		130		45	28	--	7.1		238	.32		133	26	1.1	399	7.3
May 1-3.....		17		52	3.7	28		133		55	25	.5	3.8		250	.34		145	36	1.0	406	7.4
May 4.....		--		--	--	--		133		69	45	--	--		--	--		156	47	--	497	7.8
June 20.....		--		--	--	--		212		79	672	--	--		--	--		212	38	--	2,520	7.9
June 21.....		--		--	--	--		189		75	380	--	--		--	--		201	46	--	1,630	7.9
June 24-27.....		12		74	7.0	274		208		70	400	--	2.0		a942	1.28		214	43	8.1	1,700	7.9
June 28-30.....		12		42	3.5	53		119		41	66	--	2.5		a285	.39		119	22	2.1	487	6.9
July 1-3.....		13		35	2.7	39		105		31	44	.4	2.0		a222	.30		98	12	1.7	373	6.9
July 4-5.....		12		49	4.0	90		126		62	117	--	1.5		398	.54		139	36	3.3	702	7.6
July 9-14.....		12		72	6.8	329		206		72	480	--	1.0		1,070	1.46		208	38	9.9	1,950	7.4
July 16.....		--		--	--	--		246		76	810	--	--		--	--		258	56	--	3,020	7.9
Aug. 6-31.....		5.5		91	19	1,740		322		80	2,650	--	.2		4,740	6.45		305	41	43	8,300	7.8
Sept. 1-7.....		--		--	--	--		352		67	4,290	--	--		7,450	--		314	26	--	12,600	7.3
Sept. 10-12.....		10		48	2.5	38		110		71	32	.6	2.2		258	.35		130	40	1.4	421	7.6
Sept. 13-16.....		11		54	3.2	91		134		64	119	--	2.0		410	.56		148	38	3.2	717	7.3
Sept. 18-20.....		--		--	--	--		167		54	372	--	--		--	--		172	35	--	1,550	7.0
Sept. 23-25.....		--		--	--	--		199		46	660	--	--		--	--		190	27	--	2,450	7.1
Sept. 27-28.....		--		--	--	--		230		42	1,010	--	--		--	--		226	38	--	3,520	7.2
Sept. 29-30.....		--		--	--	--		243		44	1,120	--	--		--	--		226	27	--	3,840	8.1

a Residue at 180°C.

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION (revised).--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 bridge, 3.7 miles downstream from Big Creek, and at mile 94.
DRAINAGE AREA.--17,192 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1962.
Water temperatures: February 1950 to September 1951, April 1953 to January 1959, March 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 631 ppm June 11-12; minimum, 141 ppm Dec. 19-23.
Hardness: Maximum, 194 ppm Aug. 1-3; minimum, 66 ppm Dec. 19-23.
Specific conductance: Maximum daily, 1,310 micromhos June 11; minimum daily, 235 micromhos Dec. 20.
Water temperatures: Maximum, 91°F on several days during July and August; minimum, 42°F Jan. 18.
EXTREMES, 1945-50, 1953-62.--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, 1961-62): 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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-9, 1961....	1,625	17		42	4.9	65		124		42	85	--	2.0		338	0.46	1,480	125	24	2.5	555	7.6
Oct. 10-20.....	1,474	15		52	6.2	118		156		62	153	--	4.0		512	.70	2,040	155	27	4.1	854	7.7
Oct. 21-31.....	998	15		54	5.9	103		164		65	125	--	5.0		485	.66	1,310	159	24	3.6	794	7.6
Nov. 1-12.....	1,176	15		51	5.9	112		147		59	148	0.5	4.0		490	.67	1,560	152	31	4.0	835	7.4
Nov. 13-16.....	1,735	13		36	4.2	83		97		39	117	.4	2.8		366	.50	1,710	108	28	3.5	626	7.2
Nov. 17-30.....	3,067	17		46	6.1	123		132		65	159	.5	6.7		507	.69	4,200	140	32	4.5	869	7.1
Dec. 1-17.....	6,955	14		42	4.4	40		116		42	49	--	3.5		a252	.34	4,730	123	28	1.6	446	7.4
Dec. 18.....	18,000	--		--	--	--		96		35	36	--	--		--	--	--	104	25	--	366	7.4
Dec. 19-23.....	16,860	11		23	1.9	22		58		25	26	--	3.0		a141	.19	6,420	66	18	1.2	246	6.8
Dec. 24-31.....	6,984	--		--	--	--		93		35	46	--	--		--	--	--	101	25	--	387	7.4
Jan. 1-23, 1962...	3,539	15		46	6.6	75		104		65	105	.3	5.3		394	.54	3,760	142	57	2.7	663	7.4
Jan. 24-27.....	6,870	14		42	5.4	65		97		59	86	.3	5.4		344	.47	6,380	127	48	2.5	578	7.2
Jan. 28-31.....	16,400	16		22	3.2	31		54		32	39	.2	2.2		a173	.24	7,660	68	24	1.6	296	7.3
Feb. 1-3.....	7,640	--		--	--	--		67		23	60	--	--		--	--	--	92	37	--	411	6.9
Feb. 4-15.....	3,462	16		43	6.4	64		103		62	86	--	3.1		344	.47	3,220	134	50	2.4	581	7.1
Feb. 16-24.....	4,017	15		48	6.8	81		120		68	106	--	5.3		398	.54	4,320	148	50	2.9	680	7.1
Feb. 25-28.....	5,515	15		40	5.4	59		98		57	75	--	4.3		318	.43	4,740	122	42	2.3	530	7.1
Mar. 1-10.....	5,637	14		46	6.0	54		115		63	66	.4	3.8		a310	.42	4,720	140	46	2.0	532	6.9

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (Residue at 180°C)			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	Noncarbonate			
Mar. 11-20, 1962..	3,717	14		47	6.6	66		116		63	88	0.3	3.0		a345	0.47	3,460	144	50	2.4	603	7.3
Mar. 21-31.....	1,992	13		48	7.2	67		117		61	95	.3	1.2		a351	.48	1,890	150	54	2.4	623	7.0
Apr. 1-17.....	2,147	16		57	7.7	104		144		84	132	.5	7.2		488	.66	2,830	174	56	3.4	828	7.2
Apr. 18-27.....	3,617	13		46	5.0	53		120		54	66	--	5.2		315	.43	3,080	136	37	2.0	523	7.4
Apr. 28-30.....	13,067	16		35	3.6	34		88		35	47	--	2.5		a216	.29	7,620	102	30	1.5	372	7.4
May 1.....	17,600	--		--	--	--		103		50	79	--	--		--	--	--	113	28	--	543	7.5
May 2-9.....	19,412	11		37	3.6	26		103		35	27	.4	3.9		212	.29	11,110	108	23	1.1	334	7.2
May 10-14.....	6,442	14		44	4.2	33		122		36	42	--	2.4		254	.35	4,420	128	28	1.3	414	7.2
May 15-17.....	3,153	--		--	--	--		144		43	66	--	--		--	--	--	151	33	--	534	7.3
May 18-31.....	2,641	14		65	5.7	65		187		58	78	--	3.2		403	.55	2,870	186	32	2.1	657	7.6
June 1-10.....	1,907	14		62	6.2	72		178		50	96	.4	1.5		406	.55	2,090	180	34	2.3	693	7.1
June 11-12.....	1,650	19		61	7.2	162		170		64	230	--	3.5		a631	.86	2,810	182	42	5.2	1,130	7.6
June 13-16.....	4,190	17		50	7.2	99		139		64	132	--	4.8		460	.63	5,200	154	40	3.5	796	7.3
June 17-26.....	3,447	17		43	4.3	47		125		41	56	--	3.8		286	.39	2,660	125	22	1.8	475	7.1
June 27-30.....	1,755	13		53	5.3	82		148		53	109	--	3.8		402	.55	1,900	154	32	2.9	700	7.2
July 1-8.....	5,350	18		42	5.1	76		121		48	98	.5	4.6		362	.49	5,230	126	27	2.9	626	7.3
July 9-17.....	2,640	19		43	4.5	43		132		36	50	--	4.0		280	.38	2,000	126	18	1.7	458	7.2
July 18-31.....	958	17		58	5.7	76		179		46	98	--	1.8		404	.55	1,040	168	22	2.5	697	7.2
Aug. 1-3.....	2,427	25		68	6.0	106		200		61	137	.6	1.8		513	.70	3,360	194	30	3.3	865	7.9
Aug. 4-15.....	7,757	15		44	3.6	31		136		35	30	--	3.2		235	.32	4,920	125	14	1.2	392	7.2
Aug. 16-31.....	1,017	13		58	5.2	65		178		41	84	--	1.5		358	.49	983	166	20	2.2	633	7.2
Sept. 1-10.....	1,180	14		56	5.8	101		169		50	135	.5	2.0		450	.61	1,430	164	25	3.4	796	7.2
Sept. 11-14.....	5,268	15		48	4.5	115		140		58	148	--	5.4		468	.64	6,660	138	24	4.3	820	7.2
Sept. 15-30.....	10,180	12		44	4.4	31		136		30	36	--	2.5		227	.31	6,240	128	16	1.2	391	7.4
Weighted average	4,469	14		42	4.8	53		116		45	66	--	3.6		295	0.40	3,560	126	30	2.0	503	7.2
Time-weighted average.....	--	15		48	5.5	69		133		52	89	--	3.7		359	--	--	142	33	2.5	613	7.2
Tons per day....	--	170		512	58	634		1,410		547	802	--	43		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 719 ppm Oct. 11-16; minimum, 184 ppm Jan. 25-31.
Hardness: Maximum, 194 ppm May 21-31; minimum, 74 ppm Jan. 25-31.
Specific conductance: Maximum daily, 1,210 micromhos Oct. 12, 15; minimum daily, 244 micromhos Dec. 16.
EXTREMES, 1949-62.--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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-10, 1961...		17		44	4.9	54		138		35	69	--	1.2		316	0.43		130	17	2.1	517	7.6
Oct. 11-16.....		15		62	6.9	178		189		77	235	--	4.2		719	.98		183	28	5.7	1,200	7.6
Oct. 17-31.....		11		56	6.2	99		177		54	124	--	4.7		a442	.60		165	20	3.3	797	7.1
Dec. 1-31.....		14		34	2.8	32		95		32	38	--	2.2		a202	.27		96	18	1.4	348	6.8
Jan. 1, 1962.....		--		--	--	--		120		57	96	--	--		--	--		146	48	--	618	7.4
Jan. 2-8.....		15		44	4.8	48		117		43	64	--	4.2		295	.40		130	34	1.8	487	7.4
Jan. 10-22.....		17		45	5.6	66		110		55	91	--	4.2		356	.48		136	46	2.5	586	7.0
Jan. 23-24.....		16		45	4.7	50		122		50	60	--	5.7		a291	.40		132	32	1.9	487	7.1
Jan. 25-31.....		11		25	2.7	34		56		38	41	--	3.8		a184	.25		74	28	1.7	310	6.6
Feb. 1-16.....		13		42	6.1	56		100		53	79	--	4.8		a303	.41		130	48	2.1	535	7.2
Feb. 17-25.....		12		48	6.2	84		125		54	119	--	3.0		418	.57		146	43	3.0	706	7.0
Feb. 26-28.....		--		--	--	--		85		47	76	--	--		--	--		110	40	--	499	7.0
Mar. 1-10.....		13		50	6.2	60		126		67	73	0.3	4.2		356	.48		150	47	2.1	573	7.1
Mar. 11-20.....		13		52	6.7	68		128		64	92	.3	2.8		392	.53		157	52	2.4	642	7.1
Mar. 21-29.....		13		49	6.6	58		124		53	82	.3	1.8		a325	.44		150	48	2.1	570	7.1
Mar. 30.....		--		--	--	--		145		65	114	--	--		--	--		167	48	--	726	7.3
Apr. 1-10.....		15		56	7.2	102		162		83	120	.4	2.0		470	.64		169	36	3.4	810	7.0
Apr. 11-26.....		13		50	5.4	55		134		57	66	--	6.0		325	.44		147	37	2.0	553	7.0
Apr. 27-30.....		12		34	3.2	37		84		35	50	--	2.8		234	.32		98	29	1.6	376	6.6
May 1-10.....		15		34	3.3	33		91		32	42	.4	3.1		223	.30		98	24	1.4	358	7.4
May 11-20.....		17		45	4.5	37		127		34	50	--	1.6		263	.36		131	27	1.4	437	7.5
May 21-31.....		15		68	5.8	55		192		55	68	--	2.4		370	.50		194	36	1.7	663	7.6
June 1-16.....		13		57	5.7	70		165		49	92	.4	1.8		379	.52		166	30	2.4	663	7.1
June 17-30.....		16		46	4.5	45		135		39	55	--	3.2		279	.38		133	23	1.7	483	7.1
July 1-16.....		7.8		44	4.5	58		114	9	39	74	.4	.8		306	.42		128	35	2.2	549	8.4
July 17-30.....		14		62	5.5	67		184		40	91	--	1.2		380	.52		177	26	2.2	676	7.1
Aug. 1-13.....		14		40	3.9	28		128		31	28	.4	.0		225	.31		116	11	1.1	372	6.7
Aug. 14-31.....		11		58	5.4	57		176		38	76	--	.0		350	.48		166	22	1.9	610	6.8
Sept. 1-11.....		13		60	5.7	92		177		46	126	.5	1.2		437	.59		173	28	3.0	762	7.1
Sept. 12-30.....		10		45	4.4	29		135		32	34	--	3.2		229	.31		130	20	1.1	392	7.0
Time-weighted average.....		13		48	5.1	58		134		46	75	--	2.6		325	0.44		--	--	2.1	558	7.0

a Calculated from determined constituents.

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 August 1962.
EXTREMES, October 1961 to August 1962.--Dissolved solids: Maximum, 878 ppm Aug. 1-4; minimum, 134 ppm Nov. 3-18.
Hardness: Maximum, 242 ppm Aug. 1-4; minimum, 52 ppm Nov. 3-18.
Specific conductance: Maximum daily, 1,900 micromhos Aug. 4; minimum daily, 172 micromhos Nov. 5.
EXTREMES, 1949-62.--Dissolved solids: Maximum, 11,300 ppm Oct. 14-29, 1956; minimum, 77 ppm Apr. 29, May 1-2, 1957.
Hardness: Maximum, 2,460 ppm Oct. 14-29, 1956; minimum, 34 ppm Apr. 29, May 1-2, 1957.
Specific conductance: Maximum daily, 18,000 micromhos Oct. 15, 17, 1956; minimum daily, 101 micromhos Apr. 29, 1957.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-11, 1961...		21		34	5.4	56		124		18	76	--	0.5		276	0.38		107	5	2.4	476	7.5
Oct. 12-18.....		15		38	5.4	54		133		23	72	--	.8		278	.38		117	8	2.2	494	7.5
Oct. 21-25.....		13		47	6.0	65		146		39	87	--	.5		a330	.45		142	22	2.4	657	7.6
Oct. 28-31.....		12		59	7.9	138		179		58	192	--	.8		575	.78		180	33	4.5	1,030	7.5
Nov. 2.....		--		--	--	--		178		68	235	--	--		--	--		190	44	--	1,170	7.6
Nov. 3-18.....		13		17	2.4	22		50		18	28	--	.8		134	.18		52	11	1.3	213	6.8
Dec. 10-15.....		17		44	6.0	80		121		44	114	--	2.8		383	.52		134	36	3.0	661	7.2
Dec. 16.....		--		--	--	--		121		24	81	--	--		--	--		133	34	--	506	7.3
Dec. 17-20.....		14		22	3.0	20		56		15	34	--	.8		a137	.19		67	21	1.1	240	6.8
Dec. 22-29.....		16		26	3.4	29		75		18	44	--	.8		a174	.24		79	17	1.4	309	7.0
Jan. 2, 1962.....		--		--	--	--		77		18	45	--	--		--	--		82	19	--	308	7.1
Jan. 9-22.....		13		37	4.5	39		97		22	66	--	.8		a230	.33		111	31	1.6	416	7.3
Jan. 23.....		--		--	--	--		104		37	148	--	--		--	--		132	47	--	709	7.2
Jan. 24-31.....		13		42	5.0	47		108		25	80	--	.5		a266	.36		125	37	1.8	486	7.4
Feb. 1-15.....		14		44	5.8	55		111		39	86	--	1.0		a300	.41		134	43	2.1	551	7.4
Feb. 16-28.....		14		47	6.4	60		120		46	90	--	.8		348	.47		144	46	2.2	580	7.3
Mar. 1-31.....		15		52	6.9	69		135		51	102	--	1.2		396	.54		158	48	2.4	643	6.8
Apr. 1-30.....		18		55	8.2	88		147		65	121	0.4	3.5		458	.62		170	50	2.9	754	7.7
May 1-27.....		24		44	5.6	40		130		36	52	.4	2.0		290	.39		133	26	1.5	449	7.5
May 28-31.....		22		56	11	105		170		47	158	--	1.5		a484	.66		184	45	3.4	844	7.8
June 1-2.....		39		56	8.2	82		177		48	109	.5	1.0		a431	.59		173	28	2.7	706	8.1
June 3-16.....		21		25	3.3	30		85		18	36	--	1.2		a176	.24		76	6	1.5	283	7.4
June 17-21.....		17		51	5.9	97		146		59	127	--	3.5		443	.60		151	32	3.4	764	7.6
June 22-July 5....		22		39	4.4	46		120		36	56	--	2.0		a264	.36		115	17	1.9	446	7.7
July 6-9.....		--		--	--	--		136		47	108	--	--		--	--		136	24	--	664	7.6
July 10-23.....		20		45	4.9	64		142		40	78	.5	2.8		333	.45		132	16	2.4	556	7.8
July 24-31.....		17		51	10	131		150		54	192	--	2.8		534	.73		168	45	4.4	961	7.8
Aug. 1-4.....		19		61	22	234		137		83	390	.5	1.5		a878	1.19		242	130	6.5	1,630	7.5
Aug. 5-7.....		23		68	7.7	93		208		46	130	--	1.2		474	.64		201	30	2.9	832	7.5
Aug. 8-19.....		29		46	5.1	38		152		32	41	--	2.0		278	.38		136	11	1.4	439	7.5

a Calculated from determined constituents.

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 1962.
EXTREMES, 1949-56.--Dissolved solids: Maximum, 18,400 ppm Aug. 1-13, 1956; minimum 140 ppm Apr. 12-19, 1955.
Hardness: Maximum, 3,550 ppm Oct. 21-31, 1952; minimum, 45 ppm Apr. 12-19, 1955.
Specific conductance: Maximum daily, 33,700 micromhos Sept. 26, 1956; minimum daily, 199 micromhos Apr. 15, 1955.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 2, 1961		--		--	--	--		118	0	--	292	--	--		--	--		178	82	--	1,240	7.8
Oct. 9		--		--	--	--		108	0	--	452	--	--		--	--		219	130	--	1,750	7.7
Oct. 16		--		--	--	--		119	0	--	840	--	--		--	--		338	240	--	2,960	7.6
Oct. 21		--		--	--	--		178	0	--	288	--	--		--	--		183	37	--	1,150	8.0
Oct. 30		--		--	--	--		169	0	--	520	--	--		--	--		277	138	--	2,070	7.9
Nov. 1		--		--	--	--		182	0	--	220	--	--		--	--		200	51	--	1,150	7.8
Nov. 13		--		--	--	--		162	0	--	187	--	--		--	--		171	38	--	971	7.9
Nov. 20		--		--	--	--		66	0	--	164	--	--		--	--		97	43	--	706	7.3
Nov. 27		--		--	--	--		115	0	--	158	--	--		--	--		125	31	--	797	7.4
Dec. 4		--		--	--	--		124	0	--	47	--	--		--	--		118	16	--	426	7.5
Dec. 18		--		--	--	--		103	0	--	89	--	--		--	--		118	34	--	561	7.5
Dec. 27		--		--	--	--		77	0	--	106	--	--		--	--		94	31	--	530	7.3
Jan. 1, 1962		--		--	--	--		51	0	--	161	--	--		--	--		88	46	--	668	7.0
Jan. 8		--		--	--	--		118	0	--	76	--	--		--	--		133	36	--	522	7.6
Jan. 15		--		--	--	--		87	0	--	74	--	--		--	--		101	30	--	466	7.3
Jan. 22		--		--	--	--		111	0	--	125	--	--		--	--		142	51	--	709	7.3
Jan. 29		--		--	--	--		108	0	--	87	--	--		--	--		144	56	--	615	7.4
Feb. 5		--		--	--	--		72	0	58	65	--	--		--	--		129	70	--	510	7.5
Feb. 12		--		--	--	--		101	0	44	88	--	--		--	--		93	10	--	591	7.4
Feb. 19		--		--	--	--		117	0	62	110	--	--		--	--		144	48	--	668	7.4
Feb. 26		--		--	--	--		131	0	57	162	--	--		--	--		153	46	--	880	7.5
Mar. 5, 12, 18, 26		12		49	7.3	67		123	0	59	94	--	2.8		379	0.52		152	52	2.4	625	7.5
Apr. 2		--		--	--	--		147	0	--	114	--	--		--	--		174	54	--	721	7.7
Apr. 4		--		--	--	--		151	0	--	330	--	--		--	--		244	120	--	1,450	7.7
Apr. 6		--		--	--	--		153	0	--	130	--	--		--	--		182	56	--	796	7.7

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
Apr. 9, 11, 1962..		--		--	--	--		161	0	--	275	--	--		--	--		232	100	--	1,310	7.7
Apr. 13, 16, 18, 20, 23, 25.....		21		57	7.3	95		153	0	83	116	--	5.1		468	0.64		172	46	3.2	797	7.4
Apr. 27, 30.....		--		--	--	--		102	0	--	50	--	--		--	--		112	28	--	409	7.6
May 2, 4, 7, 9,11, 14, 16, 18, 21..		17		40	4.3	38		111	0	35	49	0.4	2.0		256	.35		118	27	1.5	417	7.6
May 25, 28, 30....		18		68	7.4	87		189	0	64	118	--	1.4		a457	.62		200	45	2.7	793	7.7
June 1, 6, 8, 11, 13, 15, 18.....		13		55	6.3	86		157	0	71	104	.5	.5		416	.57		163	34	2.9	685	7.2
June 20, 22, 25, 27, 29.....		17		44	4.7	55		128	0	45	68	--	2.7		a299	.41		130	24	2.1	526	7.1
July 2,4,6,9,11, 13,16,18,20,23..		17		50	4.8	71		136	0	49	93	.5	4.0		a356	.48		144	33	2.6	625	7.2
July 25.....		--		--	--	--		150	0	71	275	--	--		--	--		203	80	--	1,270	7.9
July 27, 30.....		--		--	--	--		150	0	97	488	--	--		--	--		266	143	--	1,960	7.9
Aug. 1, 3.....		--		--	--	--		145	0	--	620	--	--		--	--		308	189	--	2,390	7.6
Aug. 6.....		--		--	--	--		197	0	--	170	--	--		--	--		193	32	--	979	8.0
Aug. 8, 10, 13, 15 17, 20, 22.....		19		46	4.3	39		136	0	38	44	.4	3.2		272	.37		132	21	1.5	442	6.9
Aug. 24, 27.....		--		--	--	--		166	0	--	147	--	--		--	--		177	41	--	848	7.7
Aug. 29.....		--		--	--	--		132	0	--	1,450	--	--		--	--		570	462	--	5,030	7.7
Aug. 31.....		--		--	--	--		174	1	--	222	--	--		--	--		205	61	--	1,110	8.3
Sept. 3, 5.....		--		--	--	--		188	0	82	295	--	--		--	--		244	90	--	1,370	8.0
Sept. 7.....		--		--	--	--		132	0	316	2,400	--	--		--	--		870	762	--	7,550	7.5
Sept. 10,12,14,17.		18		54	8.3	150		160	0	78	198	.4	1.5		a587	.80		168	38	5.0	982	7.1
Sept. 19, 21, 24, 26, 28.....		14		44	4.4	36		136	0	33	42	--	1.0		246	.33		128	16	1.4	403	7.5

a Calculated from determined constituents.

8-0674. 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 1962.

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1961 to September 1962

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 2, 1961	1,260	288	1,180	270	1,130	255	1,040	225
Oct. 9	1,770	450	1,780	450	1,770	450	1,760	450
Oct. 16	3,240	900	3,090	860	1,940	520	3,240	880
Oct. 23	1,170	238	1,180	240	1,170	240	2,000	490
Oct. 30	--	--	9,640	3,080	9,970	3,200	9,880	3,120
Nov. 6	1,170	218	1,170	220	1,180	225	1,200	230
Nov. 13	1,060	208	1,290	278	3,610	1,000	2,310	600
Nov. 20	729	166	715	167	716	167	718	167
Nov. 27	814	158	822	158	848	165	832	162
Dec. 4	431	45	424	45	412	45	419	46
Dec. 18	568	86	566	87	564	86	565	86
Dec. 27	524	102	525	102	529	102	527	102
Jan. 2, 1962	663	159	669	160	667	159	669	159
Jan. 8	--	--	526	73	527	73	523	74
Jan. 15	468	73	467	72	467	73	466	73
Jan. 22	708	123	709	124	729	128	1,290	270
Jan. 29	617	86	611	85	616	85	612	86
Feb. 5	414	63	412	63	413	62	412	63
Feb. 12	581	91	582	91	586	92	580	90
Feb. 19	660	110	659	110	663	110	661	110
Feb. 26	879	160	878	162	894	162	12,400	4,180
Mar. 5	621	106	621	104	623	103	621	103
Mar. 12	564	76	563	74	566	73	3,690	1,060
Mar. 18	642	96	654	96	3,230	880	5,440	1,650
Mar. 26	629	92	600	90	600	91	601	91
Apr. 2	712	115	726	118	719	117	731	120
Apr. 4	1,790	440	1,890	470	2,980	820	12,400	4,190
Apr. 6	829	135	803	135	823	138	960	178
Apr. 9	1,430	315	1,400	305	1,190	245	1,260	262
Apr. 11	1,040	195	1,010	188	2,710	730	3,930	1,120
Apr. 13	896	150	896	150	896	150	901	150
Apr. 16	896	142	894	140	894	140	892	138
Apr. 18	857	125	855	122	853	122	857	122
Apr. 20	839	120	834	120	840	115	836	115
Apr. 23	630	80	629	80	626	80	632	81
Apr. 25	621	85	626	86	608	82	599	80
Apr. 27	433	56	432	55	431	55	430	54
Apr. 30	379	44	378	46	379	45	378	45
May 2	392	60	386	59	387	59	385	59
May 4	305	31	304	32	305	31	309	32
May 7	343	35	344	37	344	35	343	36
May 9	363	33	362	33	362	35	362	32
May 11	384	36	368	33	368	32	368	33
May 14	414	47	407	47	407	47	409	47
May 16	429	52	428	52	428	53	431	52
May 18	470	60	496	69	472	61	466	60
May 21	570	80	559	79	562	77	547	77
May 25	687	93	684	93	668	92	685	93
May 28	723	97	716	96	748	105	833	129
May 30	954	162	1,010	180	1,030	185	1,910	460
June 1	743	103	822	126	2,590	670	5,460	1,630
June 6	611	102	610	104	618	106	615	105
June 8	553	78	547	79	518	81	516	82
June 11	620	87	618	87	633	90	641	90
June 13	693	106	692	107	683	105	686	105
June 15	768	134	768	134	761	132	842	152
June 18	697	109	693	107	701	111	705	111
June 20	503	70	505	69	509	71	505	70
June 22	509	64	509	66	509	66	513	66
June 25	492	60	490	59	524	66	2,990	850
June 27	509	67	723	129	1,230	275	2,990	830
June 29	560	78	630	100	1,610	410	2,830	780
July 2	639	93	634	91	625	90	628	88
July 4	732	113	730	113	733	113	738	116
July 6	655	101	648	99	641	100	646	99
July 9	583	90	582	90	574	89	584	90
July 11	613	88	610	88	607	88	608	89
July 13	549	74	548	74	553	75	549	73
July 16	519	66	609	91	537	69	709	118
July 18	574	77	593	86	618	87	1,540	355
July 20	591	80	576	76	585	81	988	198
July 23	680	100	791	130	922	172	1,250	272
July 25	1,450	328	2,570	670	4,580	1,310	6,030	1,800
July 27	3,330	910	3,570	1,000	4,040	1,140	4,530	1,280
July 30	2,340	620	2,230	550	2,600	680	2,580	680

8-0674. 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 1961 to September 1962--Continued

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Aug. 1, 1962	2,070	510	2,460	650	2,680	730	3,190	890
Aug. 3	2,530	670	3,520	990	2,770	750	2,890	800
Aug. 6	988	165	974	165	954	160	935	160
Aug. 8	310	21	310	21	313	21	1,200	268
Aug. 10	339	21	325	20	329	22	335	22
Aug. 13	417	36	418	36	416	34	413	39
Aug. 15	448	39	448	40	446	39	451	40
Aug. 17	483	52	482	52	494	54	3,640	1,030
Aug. 20	564	65	529	61	529	62	1,250	270
Aug. 22	673	100	1,060	215	1,600	380	4,410	1,290
Aug. 24	1,450	338	1,750	425	2,110	550	3,070	850
Aug. 27	994	182	2,340	610	2,910	800	3,110	850
Aug. 29	4,970	1,450	5,570	1,700	5,970	1,850	10,000	3,280
Aug. 31	1,230	248	6,780	2,120	8,620	2,780	9,940	3,280
Sept. 3	4,160	1,200	6,530	1,950	8,560	2,750	11,900	4,040
Sept. 5	1,600	330	6,880	2,050	8,180	2,600	11,700	3,970
Sept. 7	9,360	3,080	9,880	3,250	10,400	3,500	11,000	3,740
Sept. 10	1,720	378	7,810	2,480	9,520	3,120	12,400	4,290
Sept. 12	899	147	890	152	8,650	2,800	10,500	3,500
Sept. 14	756	121	736	130	781	141	10,900	3,680
Sept. 17	983	175	919	183	958	193	8,540	2,750
Sept. 19	444	28	431	28	484	56	14,400	5,100
Sept. 21	389	32	428	41	432	45	13,400	4,690
Sept. 24	393	34	389	32	448	40	14,400	5,030
Sept. 26	505	44	424	42	446	50	13,200	4,560
Sept. 28	463	42	416	48	440	41	13,400	4,660

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0428. WEST FORK TRINITY RIVER NEAR JACKSBORO																						
June 13, 1962----------	1,840	11		13	2.9	12		47	5.8	18	0.3	0.2		a86	0.12		44	6	37	0.8	148	6.2
LAKE WORTH AT FORT WORTH																						
Feb. 27, 1962----------		5.8	0.00	44	8.4	20	4.5	153	20	32	0.3	0.0	0.08	228	0.31		144	19	22	0.7	387	7.6
8-0465. BENBROOK RESERVOIR NEAR BENBROOK																						
Feb. 27, 1962----------		4.6	0.00	45	6.1	15	4.4	143	26	20	0.4	0.0	0.15	209	0.28		137	20	19	0.6	348	7.4
8-0502. TRINITY RIVER SUBWATERSHED 6-0 NEAR MUENSTER																						
Oct. 31, 1961----------		7.3		54	3.6	42		122	34	73	0.4	2.8		294	0.40		150	50	38	1.5	502	7.2
June 13, 1962----------		8.2		54	2.6	26		150	23	39	.3	.2		237	.32		145	23	28	.9	404	6.9
Aug. 3----------		7.8		31	2.4	25		80	18	38	.4	4.0		a166	.23		87	22	39	1.2	286	7.4
8-0503. ELM FORK TRINITY RIVER NEAR MUENSTER																						
Oct. 31, 1961----------	0.45	7.5		368	31	432		226	34	1,250	0.4	0.0		a2,230	3.03		1,050	860	47	5.8	4,170	7.0
June 13, 1962----------	23.9	9.8		88	5.1	39		199	19	100	.3	.0		a359	.49		240	78	26	1.1	675	7.0
8-0505. ELM FORK TRINITY RIVER NEAR SANGER																						
Oct. 31, 1961----------	2.9	5.5		59	5.5	68		212	31	77	0.5	0.8		379	0.52		170	0	46	2.3	646	7.3
Nov. 6----------	2.29	3.5		62	6.2	81		253	32	80	.4	.5		400	.54		180	0	49	2.6	702	7.4
Dec. 14----------	28.7	8.0		90	7.7	88		194	32	179	.3	1.2		551	.75		256	97	43	2.4	925	7.8
Mar. 30, 1962----------	7.14	3.9		82	8.1	147		305	60	170	.4	3.8		640	.87		238	0	57	4.1	1,110	7.6
June 14----------	89.2	10		52	3.7	28		148	18	45	.3	1.2		244	.33		145	24	29	1.0	420	7.0
July 17----------	19.9	8.3		73	5.8	85		203	30	136	.3	1.2		a440	.60		206	40	47	2.6	811	6.8
Sept. 12----------	357	9.4		57	4.0	26		164	16	45	.3	.2		a239	.33		159	24	26	.9	430	6.5
8-0510. ISLE du BOIS CREEK NEAR PILOT POINT																						
Nov. 9, 1961----------	0.03	10		38	6.5	20		116	41	18	0.4	0.2		208	0.28		122	26	26	0.8	329	7.0
Dec. 14----------	24.5	9.0		22	3.4	20		60	28	22	.4	3.5		a138	.19		69	20	39	1.0	238	7.2
Apr. 26, 1962----------	195	14		27	4.2	21		76	32	21	.4	6.0		a163	.22		85	22	35	1.0	274	6.9
June 14----------	53.2	8.7		15	2.9	9.7	3.4	45	16	13	.4	1.8		a93	.13		49	12	28	.6	156	6.7
July 17----------	.43	9.9		68	13	72		213	65	96	.4	.0		430	.58		223	48	41	2.1	753	7.0
Sept. 11----------	105	11		35	6.0	26		83	37	43	.3	.0		214	.29		112	44	33	1.1	347	6.9

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0527. LITTLE ELM CREEK NEAR AUBREY																						
June 14, 1962	12.8	11		56	4.0	14		120	74	7.0	0.4	0.8		a226	0.31		156	58	16	0.5	374	7.1
Sept. 7	1,200	9.5		46	2.9	11		112	50	3.5	.4	.2		183	.25		127	35	16	.4	287	6.6
Sept. 8	2,010	11		38	2.6	12		106	36	4.0	.2	.0		a156	.21		106	19	19	.5	252	6.4
Sept. 11	26.2	12		66	4.3	14		152	76	6.2	.4	.2		a254	.35		182	58	15	.5	403	6.8
8-0528. GARZA-LITTLE ELM RESERVOIR NEAR LEWISVILLE																						
Mar. 22, 1962		2.1	0.06	53	6.2	39	4.4	139	44	64	0.4	0.5	0.11	291	0.40		158	44	34	1.3	515	7.5
8-0605. LAVON RESERVOIR NEAR LAVON																						
Oct. 24, 1961		4.7		46	3.9	17		128	43	12	0.5	0.8		204	0.28		131	26	22	0.6	335	6.9
May 31, 1962		.7		56	4.1	14		154	42	12	.4	.0		218	.30		157	30	17	.5	374	6.6
WAXAHACHIE CREEK NEAR BARDWELL																						
Oct. 30, 1961	6.34	10		72	2.7	27		226	29	20	0.6	5.2		288	0.39		191	6	24	0.9	476	7.5
Oct. 31	7.45	9.3		67	2.6	27		212	28	20	.7	3.8		278	.38		178	4	25	.9	452	7.2
Dec. 2	39.1	9.1		74	2.3	14		217	24	12	.5	5.0		255	.35		194	16	14	.4	427	7.1
Jan. 17, 1962	36.1	6.0		85	2.3	16		241	29	15	.4	8.1		282	.38		222	24	13	.5	485	7.2
Jan. 18	b30	5.6		89	2.7	18		255	29	18	.5	6.7		302	.41		233	24	14	.5	502	7.2
Feb. 12	22.4	4.2		85	2.7	23		256	30	18	.5	4.2		298	.41		223	13	18	.7	504	7.3
Mar. 16	19.7	6.3		92	2.9	24		264	34	24	.5	7.7		336	.46		242	25	18	.7	552	6.9
May 3	48.7	8.2		64	2.6	14		187	27	12	.4	3.0		232	.32		170	17	16	.5	367	7.4
June 1	9.61	8.9		58	22	18		172	21	18	.5	4.5		231	.31		154	13	20	.6	388	6.5
July 11	4.53	9.0		67	3.0	17		195	26	18	.6	3.2		a240	.33		180	20	17	.6	435	7.4
Aug. 14	.47	8.6		66	2.8	38		226	31	28	.8	.5		300	.41		176	0	32	1.2	483	6.8
Sept. 26	7.52	11		72	2.8	34		234	32	24	.7	4.5		314	.43		191	0	28	1.1	498	6.8
8-0652. UPPER KEECHI CREEK NEAR OAKWOOD																						
June 4, 1962	16.4	19		21	9.1	28		21	67	44	0.2	0.8		a199	0.27		90	73	40	1.3	343	6.8
July 13	2.26	17		20	9.4	28		38	53	44	.3	.0		a191	.31		89	57	41	1.3	338	7.0
BIG ELKHART CREEK 11 MILES WEST OF GRAPELAND																						
July 11, 1962	14.0	17		8.2	3.2	40		24	3.4	68	0.1	1.2		a153	0.21		34	14	72	3.0	281	6.7

a Calculated from determined constituents.
b Field estimate.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
BEDIAS CREEK 9 MILES SOUTHEAST OF MADISONVILLE																						
July 9, 1962----------	1.79	12		18	5.6	26		60	32	29	0.2	0.2		a153	0.21		68	19	45	1.4	264	6.8
GAIL CREEK 3 MILES EAST OF LOVELADY																						
July 13, 1962----------	0.31	12		28	9.0	48		59	64	67	0.2	0.2		a257	0.35		107	58	49	2.0	450	6.9
8-0662. LONG KING CREEK NEAR LIVINGSTON																						
June 11, 1962----------	4.54	22		53	3.5	27		151	12	48	0.2	0.0		264	0.36		147	23	28	1.0	411	6.9
Sept. 25----------	1.25	22		57	4.0	34		154	13	65	.2	.2		298	.41		159	32	32	1.2	477	7.0

a Calculated from determined constituents.

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 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 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 323 ppm Mar. 16-31; minimum, 117 ppm Jan. 28-31.
Hardness: Maximum, 172 ppm Feb. 17-28; minimum, 62 ppm Jan. 28-31.
Specific conductance: Maximum daily, 617 micromhos Mar. 21; minimum daily, 185 micromhos June 4.
Water temperatures: Maximum, 91°F July 29; minimum, 46°F Jan. 20.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-15, 1961...	73.7	24		36	4.0	32		106		6.8	55	0.2	4.0		214	0.29	42.6	106	19	1.4	368	7.5
Oct. 16-31.....	39.1	24		35	3.9	31		108		5.8	54	.2	.5		207	.28	21.9	103	15	1.3	361	7.6
Nov. 1-12.....	52.1	26		38	4.4	32		109		5.8	62	.2	.2		a236	.32	33.2	113	24	1.3	386	7.3
Nov. 13-24.....	190	22		38	4.0	30		102		8.6	59	.3	.8		a234	.32	120	111	28	1.2	373	7.2
Nov. 25-30.....	117	23		52	4.7	35		128		12	75	.2	2.5		267	.36	84.3	149	44	1.2	472	7.4
Dec. 1-17.....	97.7	25		43	4.1	35		115		9.6	67	.2	.2		a265	.36	69.9	124	30	1.4	419	7.4
Dec. 18-25.....	746	18		31	2.1	22		79		9.0	41	.2	1.0		163	.22	328	86	21	1.0	284	6.8
Dec. 26-31.....	158	23		39	3.3	29		106		8.8	54	.2	.5		210	.29	89.6	111	24	1.2	361	7.2
Jan. 1-13, 1962...	177	24		48	5.9	32		125		12	69	.3	.8		a255	.35	122	144	42	1.2	454	6.9
Jan. 14-22.....	185	23		52	5.6	38		122		15	84	.3	.8		279	.38	139	153	53	1.3	499	7.2
Jan. 23-27.....	393	22		51	5.3	41		118		16	87	.3	.5		281	.38	298	149	52	1.5	502	7.1
Jan. 28-31.....	2,245	--		--	--	--		52		9.0	25	--	.5		117	.16	709	62	19	--	199	6.2
Feb. 1-7.....	406	20		39	3.4	26		101		11	52	.2	1.0		203	.28	223	111	29	1.1	354	6.8
Feb. 8-16.....	203	23		52	4.7	36		131		13	74	.2	1.2		268	.36	147	149	42	1.3	478	7.1
Feb. 17-28.....	229	23		60	5.3	44		136		16	96	.3	2.8		314	.43	194	172	60	1.5	558	7.3
Mar. 1-15.....	158	24		55	5.1	44		132		14	93	.2	.0		300	.41	128	158	50	1.5	533	6.9
Mar. 16-31.....	123	24		59	5.4	49		143		14	101	.3	.5		323	.44	107	169	52	1.6	571	7.0
Apr. 1-15.....	75.4	24		57	5.0	46		144		11	94	.2	.0		308	.42	62.7	162	44	1.6	547	7.2
Apr. 16-26.....	114	20		54	4.8	43		136		10	88	--	.5		287	.39	883	154	42	1.5	523	6.8
Apr. 27-30.....	920	11		34	3.4	22		84		9.6	47	--	.8		169	.23	420	99	30	1.0	311	6.6
May 1-5.....	642	19		32	3.0	23		84		8.8	44	.3	1.2		172	.23	298	92	23	1.0	297	6.6
May 6-31.....	61.2	25		40	4.0	38		120		8.8	64	--	1.0		240	.33	39.7	116	18	1.5	406	6.8
June 1-10.....	164	19		31	3.8	30		92		7.2	52	.2	1.0		189	.26	83.7	93	18	1.4	327	7.2
June 11-20.....	53.8	21		36	4.4	31		110		6.2	56	--	.5		209	.28	30.4	108	18	1.3	367	7.5
June 21-30.....	61.9	17		34	3.9	28		104		5.2	50	--	.0		189	.26	31.6	101	16	1.2	337	7.3
July 1-15.....	39.9	24		33	3.8	34		107		6.4	55	.3	.2		a220	.30	23.7	98	10	1.5	361	7.8
July 16-31.....	18.5	28		27	3.7	38		88		5.2	62	--	.8		a220	.30	11.0	83	10	1.8	358	6.6
Aug. 1-31.....	18.3	26		24	3.8	39		84		4.8	61	.1	.0		a205	.28	10.1	76	7	1.9	346	7.7
Sept. 1-30.....	47.7	20		27	3.2	33		80		8.4	54	.2	.8		a201	.27	25.9	80	15	1.6	316	7.0
Weighted average	157	21		38	3.9	29		99		10	58	--	0.9		213	0.29	90.0	112	30	1.3	370	6.7
Time-weighted average.....	--	23		40	4.2	35		109		9.1	66	--	0.8		237	--	--	116	27	1.5	405	7.0
Tons per day....	--	8.9		16	1.7	12		42		4.3	25	--	0.4		--	--	--	--	--	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
WEST FORK SAN JACINTO RIVER AT STATE HIGHWAY 105 NEAR CONROE																						
Nov. 17, 1961	58.1	20		52	4.9	32	140	10	66	0.3	0.2		254	0.35		150	35	32	1.1	456	6.8
Apr. 2, 1962	32.6	23		81	6.2	50	208	17	104	.3	.0		384	.52		228	57	32	1.4	650	7.6
June 18	14.2	25		71	5.4	36	200	6.8	75	.3	.0		318	.43		199	35	28	1.1	567	7.0
July 27	1.73	23		68	5.4	36	209	6.6	64	.3	.2		306	.42		192	20	29	1.1	532	7.1
8-0700. EAST FORK SAN JACINTO RIVER NEAR CLEVELAND																						
Nov. 15, 1961	124	9.7		12	3.3	42	22	5.4	78	0.2	0.2		162	0.22		44	25	68	2.8	311	6.1
Jan. 15, 1962	86.5	12		27	4.3	40	54	7.6	85	.2	.0		203	.28		85	41	51	1.9	378	6.6
June 20	24.8	8.5		16	2.5	32	34	3.2	63	.2	.2		143	.19		50	22	58	2.0	279	6.3
July 25	14.2	12		17	3.2	48	30	2.4	93	.2	.0		191	.26		56	31	65	2.8	367	6.5
Sept. 18	20.5	13		18	2.9	23	44	6.0	46	.1	.2		131	.18		57	21	47	1.3	232	6.3

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 1962.
Water temperatures: November 1949 to November 1951, October 1956 to September 1962.
Sediment records: November 1949 to September 1951.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 6,000 ppm Dec. 16-31; minimum, 851 ppm July 18.
Hardness: Maximum, 2,580 ppm Apr. 1-26; minimum, 282 ppm June 14-20.
Specific conductance: Maximum daily, 8,880 micromhos Jan. 9; minimum daily, 1,010 micromhos Sept. 7.
Water temperatures: Maximum, 96°F July 22; minimum, freezing point Jan. 9, 10, 12, 22.
EXTREMES, 1948-51, 1956-62.--Dissolved solids: Maximum, 6,450 ppm May 1-16, 1961; minimum, 636 ppm Oct. 22-28, 1957.
Hardness: Maximum, 2,700 ppm May 1-16, 1961; minimum, 193 ppm Oct. 22-28, 1957.
Specific conductance: Maximum daily, 10,400 micromhos Feb. 25, 1958; minimum daily, 735 micromhos Oct. 24, 1957.
Water temperatures (1949-51, 1956-62): Maximum, 97°F Aug. 14, 1961; minimum, freezing point on several days during winter months.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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			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	Noncarbonate			
Oct. 1-5, 1961....	12.0	13		560	98	876		89		1,550	1,430	--	0.5		4,570	6.22	148	1,800	1,730	8.9	6,520	7.6
Oct. 6-9.....	21.8	12		275	45	500		97		800	740	--	.5		2,420	3.29	142	871	792	7.4	3,700	7.6
Oct. 10.....	47.0	--		--	--	--		114		1,150	1,350	--	--		--	--	--	1,260	1,170	--	5,930	7.7
Oct. 11-14.....	23.7	14		352	46	368		84		968	560	--	.8		2,350	3.20	150	1,070	998	4.9	3,410	7.6
Oct. 15-Nov. 1....	2.8	15		660	114	805		96		1,780	1,370	--	.5		4,790	6.51	36.2	2,120	2,040	7.6	6,570	7.5
Nov. 2-9.....	202	15		212	29	305		124		622	395	--	5.3		1,640	2.23	894	648	547	5.2	2,490	7.5
Nov. 10-19.....	19.3	15		410	66	823		86		1,170	1,270	--	3.5		3,800	5.17	198	1,290	1,220	10	5,690	7.2
Nov. 20-30.....	55.1	14		395	57	681		98		1,120	1,030	--	1.8		3,350	4.56	498	1,220	1,140	8.4	4,940	7.4
Dec. 1-15.....	12.4	13		570	102	1,180		145		1,550	1,900	--	3.0		5,390	7.33	180	1,840	1,720	12	7,810	7.4
Dec. 16-31.....	5.9	13		655	116	1,290		163		1,760	2,090	--	--		6,000	8.16	95.6	2,110	1,980	12	8,520	7.4
Jan. 1-15, 1962...	3.2	13		670	127	1,180		112		1,860	1,940	0.4	.5		5,850	7.96	50.5	2,190	2,100	11	8,070	7.2
Jan. 16-31.....	2.7	11		660	126	1,230		112		1,820	2,020	.4	--		5,920	8.05	43.2	2,160	2,070	12	8,300	7.4
Feb. 1-12.....	1.2	11		745	128	1,120		127		1,970	1,890	--	.4		5,930	8.06	19.2	2,390	2,280	10	8,020	7.2
Feb. 13-28.....	.4	11		760	134	962		142		1,970	1,680	--	.4		5,590	7.60	6.04	2,450	2,330	8.4	7,430	7.4
Mar. 1-31.....	1.1	12		785	133	964		133		2,010	1,700	.5	.5		5,670	7.71	16.8	2,510	2,400	8.4	7,480	7.7
Apr. 1-26.....	1.2	15		790	147	965		108		2,020	1,760	--	.5		5,750	7.82	18.6	2,580	2,490	8.3	7,720	7.4
Apr. 27.....	43.0	--		--	--	--		90		1,030	450	--	--		--	--	--	1,180	1,110	--	3,140	7.7
Apr. 28-30.....	8.0	--		620	88	--		93		1,680	1,250	--	--		--	--	--	1,910	1,830	--	6,010	7.8

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
May 1-6, 1962.....	1.4	18		800	138	882		128		2,090	1,560	--	0.5		5,550	7.55	21.0	2,560	2,460	7.6	7,260	7.4
May 7.....	53.0	--		--	--	--		98		820	240	--	--		--	--	--	940	860	--	2,190	7.0
May 8-9.....	12.5	--		510	60	546		90		1,390	840	--	.2		--	--	--	1,520	1,450	6.1	4,510	7.8
May 10-31.....	1.5	15		800	140	838		128		2,060	1,520	--	.5		5,440	7.40	22.0	2,570	2,470	7.2	7,150	7.2
June 1-7.....	34.4	13		585	76	445		99		1,400	850	--	2.8		3,420	4.65	318	1,770	1,690	4.6	4,680	7.0
June 8-13.....	150	17		250	22	150		124		640	190	0.7	2.2		1,330	1.81	539	714	613	2.4	1,910	7.7
June 14-20.....	788	17		90	14	171		153		262	180	--	1.2		874	1.19	1,860	282	156	4.4	1,340	7.4
June 21-23.....	35.3	--		--	--	--		119		668	610	--	--		--	--	--	930	832	--	3,240	7.3
June 24-28.....	7.1	19		442	65	827		114		1,190	1,300	--	2.5		3,900	5.30	74.8	1,370	1,280	9.7	5,760	7.1
June 29-30.....	26.0	--		--	--	--		95		924	830	--	--		--	--	--	1,140	1,060	--	4,120	7.5
July 1-10.....	18.6	18		585	191	769		95		1,580	1,200	--	.5		4,390	5.97	220	1,740	1,670	8.0	5,710	7.3
July 11-17.....	.2	16		790	133	860		79		1,930	1,640	--	2.0		5,410	7.36	2.92	2,520	2,450	7.4	7,520	7.0
July 18.....	464	--		--	--	--		66		490	62	--	--		a851	1.16	1,070	578	524	--	1,230	7.4
July 19-21.....	61.8	11		392	30	239		70		932	420	--	2.5		2,060	2.80	344	1,100	1,040	3.1	3,030	6.8
July 22-27.....	.8	12		622	76	599		98		1,500	1,080	--	1.5		3,940	5.36	8.51	1,860	1,780	6.0	5,590	7.0
July 28-Aug. 9....	189	16		152	26	233		134		484	265	1.4	2.5		1,250	1.70	638	486	376	4.6	1,990	7.3
Aug. 10.....	13.0	--		--	--	--		104		804	612	--	--		--	--	--	790	705	--	3,340	7.4
Aug. 11-Sept. 1...	1.0	18		740	126	827		96		1,820	1,550	--	3.0		5,130	6.98	13.9	2,360	2,290	7.4	6,820	7.4
Sept. 2-10.....	3,940	15		136	16	141		111		404	138	.7	3.8		941	1.28	10,000	406	314	3.0	1,340	7.5
Sept. 11-13, 17...	433	12		210	21	212		100		588	265	--	3.8		1,360	1.85	1,590	610	528	3.7	1,960	7.5
Sept. 14-16.....	123	--		--	--	--		115		732	560	--	--		--	--	--	765	671	--	3,090	7.5
Sept. 18-21.....	792	22		125	15	122		94		334	150	--	2.8		861	1.17	1,840	374	296	2.7	1,250	7.6
Sept. 22-23.....	154	15		192	25	285		110		544	385	--	3.2		1,500	2.04	624	582	492	5.1	2,270	7.5
Sept. 24-30.....	62.7	13		320	45	594		116		928	860	--	1.5		2,820	--	--	984	888	--	4,180	7.1
Weighted average	173	16		157	20	186		115		455	217	--	3.3		1,140	1.55	532	475	380	3.5	1,650	7.5
Time-weighted average.....	--	14		576	100	789		116		1,520	1,330	--	1.5		4,390	--	--	1,830	1,740	8.0	6,040	7.3
Tons per day....	--	7.5		73	9.3	87		54		213	101	--	1.5		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

8-812. CROTON CREEK NEAR JAYTON, TEX.

LOCATION (revised).--At gaging station in Stonewall County, 460 feet upstream from county road, 1.5 miles upstream from mouth, and 8 miles northeast of Jayton, Kent County.
DRAINAGE AREA.--310 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May 1959 to September 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Hardness: Maximum, 4,580 ppm Apr. 7-8; minimum, 1,660 ppm Sept. 2-4, 6-7.
Specific conductance: Maximum daily, 45,300 micromhos Apr. 7; minimum daily, 3,160 micromhos Sept. 4.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 3-8, 10-31, Nov. 10-13, 26-30, Dec. 1-4, 20-31, Jan. 1-31, Feb. 1-28, Mar. 1-31, Apr. 1-4, 9-25, May 1-31, June 4, 23-24, July 1-17, 31, Aug. 8-30.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Mean discharge	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[a] (gm/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 1-5, 1961.	28.2	--		--	--		837		86	1,770	1,260	--			--	--	--	1,870	1,800	--	6,300	7.1	--
Nov. 6-9.....	.2	--		--	--		3,130		--	2,040	5,060	--			--	--	--	2,540	--	--	16,500	--	1.007
Nov. 14-17.....	1.8	--		--	--		9,810		--	3,220	15,400	--			--	--	--	3,820	--	--	39,500	--	1.021
Nov. 18-25.....	.2	--		--	--		6,800		--	2,720	11,000	--			--	--	--	3,650	--	--	30,800	--	1.015
Dec. 5-10.....	.3	16		1,050	242		6,340		102	2,950	10,100	0.5	0.8		20,700	28.5	16.8	3,620	3,530	46	28,100	7.3	1.013
Dec. 11-19.....	.2	16		1,140	268		7,920		134	3,420	12,400	.5			25,200	34.9	13.6	3,950	3,840	55	33,600	7.4	1.017
Apr. 5-6, 1962.	2.0	--		--	--		8,550		104	3,140	13,700	--			--	--	--	4,080	4,000	--	35,300	7.6	1.019
Apr. 7-8.....	.4	--		--	--		11,900		101	3,480	19,000	--			--	--	--	4,580	4,500	--	45,300	7.4	1.026
Apr. 26-27.....	13.8	--		--	--		5,320		77	2,170	8,310	--			--	--	--	2,470	2,410	--	23,600	7.4	1.011
Apr. 28-29.....	30.5	--		--	--		1,560		108	1,700	2,410	--			--	--	--	1,860	1,770	--	9,250	7.6	--
Apr. 30.....	1.0	--		--	--		3,370		93	2,570	5,360	--			--	--	--	2,980	2,900	--	17,300	7.3	1.008
June 1-3.....	25.6	--		--	--		1,330		118	1,900	2,070	--			--	--	--	2,110	2,010	--	8,520	8.0	--
June 5-11.....	117	--		--	--		843		88	1,850	1,280	--			--	--	--	1,970	1,900	--	6,320	6.9	--
June 12.....	622	--		--	--		339		94	1,650	470	--			--	--	--	1,720	1,640	--	3,820	7.7	--
June 13-17.....	25.0	--		--	--		2,240		102	2,330	3,580	--			--	--	--	2,690	2,610	--	12,000	7.7	1.005
June 18-20.....	1.1	--		--	--		4,080		114	2,730	6,540	--			--	--	--	3,290	3,200	--	20,100	7.6	1.009
June 21-22.....	1.0	--		--	--		5,680		111	3,130	9,190	--			--	--	--	3,970	3,880	--	26,100	7.6	1.012
June 25-28.....	24.6	--		--	--		750		74	1,910	1,100	--			--	--	--	1,970	1,910	--	5,900	7.4	--
June 29-30.....	0.8	--		--	--		1,980		94	2,220	3,130	--			--	--	--	2,500	2,420	--	11,500	7.8	1.005
July 18-23.....	42.2	--		--	--		835		69	1,900	1,270	--			--	--	--	2,010	1,950	--	6,530	7.3	--
July 24-30.....	9.2	--		--	--		2,600		84	2,360	4,100	--			--	--	--	2,660	2,590	--	14,700	6.7	1.006
Aug. 1.....	3.3	--		--	--		3,710		--	2,680	5,950	--			--	--	--	3,170	--	28	18,900	--	1.009
Aug. 2-7.....	33.9	--		--	--		798		92	1,720	1,190	--			--	--	--	1,810	1,730	8.1	6,030	8.0	--
Aug. 31.....	5.6	--		--	--		1,480		70	1,480	2,400	--			--	--	--	1,770	1,710	15	9,000	7.8	--
Sept. 1, 5, 8-9	49.4	--		--	--		1,530		60	1,720	2,450	--			--	--	--	1,960	1,910	15	9,110	7.7	--
Sept. 2-4, 7...	248	--		--	--		232		54	1,590	330	--			--	--	--	1,660	1,620	2.5	3,340	7.9	--
Sept. 6.....	287	--		--	--		808		59	1,610	1,200	--			--	--	--	1,660	1,610	8.6	5,810	7.3	--
Sept. 10-16....	6.3	--		--	--		3,730		--	2,680	5,950	--			--	--	--	3,130	--	29	17,900	--	1.008
Sept. 17.....	537	--		--	--		501		62	1,620	760	--			--	--	--	1,720	1,670	5.3	4,580	7.5	--
Sept. 18.....	68.0	--		--	--		1,120		63	1,880	1,750	--			--	--	--	2,040	1,990	11	7,440	7.5	--
Sept. 19-30....	7.1	--		--	--		3,740		--	2,540	5,980	--			--	--	--	3,000	--	30	17,800	--	1.008
Weighted average.....	13.0	--		--	--		854		75	1,770	1,310	--			--	--	--	1,890	1,790	--	6,160	--	--
Time-weighted average....	--	--		--	--		3,430		90	2,380	5,710	--			--	--	--	2,770	--	--	17,300	--	--
Tons per day.	--	--		--	--		30		3	62	46	--			--	--	--	--	--	--	--	--	--

a Values expressed in ppm should be multiplied by density, where given, when computing loads.

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 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (g/ml at 20°C)
																Calcium, magnesium	Noncarbonate				
Oct. 11, 1961	0.9							47,600			3,380	75,400				6,310		261	119,000		1.094
Nov. 8.....	.8							80,100			3,430	127,000				8,620		375	152,000		1.160
Dec. 4.....	1.0							82,700			3,360	131,000				8,400		--	150,000		1.166
Jan. 10, 1962	.7							88,400			3,450	140,000				8,830		--	153,000		1.178
Feb. 5.....	1.0							95,000			2,070	151,000				8,560		--	152,000		1.191
Mar. 6.....	.8							96,700			3,060	153,000				8,790		--	154,000		1.194
Apr. 13.....	1.0							93,900			2,920	149,000				9,080		428	133,000		1.190
May 8.....	.8							99,200			2,520	158,000				9,730		437	136,000		1.202
June 15.....	.7							51,500			3,390	82,100				7,440		259	110,000		1.102
July 10.....	.3							98,900			2,600	158,000				10,500		420	134,000		1.202
Aug. 8.....	.5							75,800			3,840	121,000				9,790		333	127,000		1.154
Sept. 14.....	.8							86,200			3,800	137,000				9,870		378	129,000		1.175

a Values expressed in ppm should be multiplied by the density, where given, in computing loads.

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 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] at 20°C
																Calcium, magnesium	Noncarbonate				
Oct. 11, 1961	0.2							36,100			4,330	56,800				6,150		200	103,000		1.073
Nov. 8.....	.2							36,700			4,450	57,800				6,340		200	104,000		1.073
Dec. 4.....	.2							33,200			4,210	52,200				5,920		--	94,400		1.065
Jan. 10, 1962	.1							46,600			4,410	73,300				6,680		--	117,000		1.092
Feb. 5.....	.1							35,300			4,570	55,500				6,310		--	97,400		1.070
Mar. 6.....	.1							39,100			4,570	61,500				6,490		--	103,000		1.078
Apr. 13.....	.1							--			4,430	58,700				--		--	92,700		1.073
May 8.....	.1							42,100			4,760	66,400				7,100		217	99,400		1.084
June 15.....	b.1							--			4,670	53,900				--		--	88,800		1.067
July 10.....	b.1							55,400			5,360	87,300				8,370		263	113,000		1.111
Aug. 8.....	.2							47,100			4,590	74,500				7,540		236	104,000		1.094
Sept. 14.....	.1							35,500			4,580	56,100				6,660		189	89,900		1.073

a Values expressed in ppm should be multiplied by the density, where given, in computing loads.
b Field estimate.

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

LOCATION (revised).--At gaging station 0.1 mile downstream from Haystack Creek, 2.2 miles downstream from Salt Flat Creek, 8 miles upstream from Salt Fork Brazos River, and 20 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--69 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	Density[a] at 20°C
																Calcium, magnesium	Noncarbonate			
Oct. 11, 1961	0.9							49,700			3,520	78,300				6,170		275	115,000	1.086
Nov. 1.....	--							11,800			1,760	18,700				2,480		103	45,400	1.023
Nov. 8.....	.8							69,400			3,650	110,000				8,170		334	144,000	1.138
Dec. 4.....	1.4							74,500			3,580	118,000				8,190		358	148,000	1.148
Jan. 10, 1962	.7							84,600			3,630	134,000				8,890		390	149,000	1.158
Feb. 5.....	.8							77,700			3,850	123,000				8,640		--	146,000	1.157
Mar. 6.....	.9							88,600			3,600	140,000				8,680		--	150,000	1.175
Apr. 13.....	1.0							87,000			3,740	138,000				9,420		390	131,000	1.120
Apr. 26.....	--							--			1,220	5,020				--		--	15,400	1.006
May 8.....	1.0							93,100			3,100	148,000				9,580		413	134,000	1.190
June 15.....	.8							49,600			3,390	79,200				7,380		251	108,000	1.098
July 10.....	.3							99,100			2,690	158,000				10,300		424	135,000	1.202
Aug. 1.....	--							3,330			1,160	5,350				1,510		37	15,700	1.005
Aug. 8.....	.4							52,400			4,030	83,800				8,510		247	110,000	1.104
Sept. 14.....	.4							66,000			3,930	105,000				8,700		308	121,000	1.132
Sept. 17.....	450							2,090			1,450	3,310				1,630		23	11,200	1.004

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

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 1962.
Water temperatures: October 1948 to September 1951, October 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 69,300 ppm Apr. 1-7; minimum, 2,230 ppm June 9-10.
Hardness: Maximum, 5,210 ppm May 16-26; minimum, 485 ppm July 28.
Specific conductance: Maximum daily, 103,000 micromhos Apr. 6; minimum daily, 3,690 micromhos June 9.
Water temperatures: Maximum, 96°F July 13; minimum, freezing point Dec. 12, Jan. 13, 19, 20, 27.
EXTREMES, 1948-51, 1956-62.--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.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-2, 1961....	40.4	8.3		594	86	5,020		95		1,300	8,030	--	--	15,100	20.7	1,650	1,840	1,760	51	22,400	7.7	1.009
Oct. 3-8.....	4.0	3.1		954	227	13,400		102		2,290	21,200	--	--	38,100	51.8	411	3,310	3,230	101	49,700	7.3	1.027
Oct. 9-14.....	33.7	8.5		661	133	7,070		96		1,630	11,000	--	--	20,500	28.1	1,870	2,200	2,120	64	29,800	7.0	1.014
Oct. 15-31.....	.6	9.2		1,230	234	13,000		144		2,960	20,600	--	--	38,100	53.2	61.7	4,030	3,910	89	49,200	7.4	1.027
Nov. 1-12.....	78.9	18		486	136	4,080		135		1,370	6,450	--	--	12,600	17.3	2,680	1,770	1,660	42	19,300	7.5	1.008
Nov. 13-30.....	15.5	14		823	238	10,600		166		2,230	16,700	--	--	30,700	42.6	1,280	3,030	2,900	84	41,800	7.3	1.021
Dec. 1-31.....	8.9	16		897	292	12,800		171		2,400	20,300	0.8	--	36,800	51.3	884	3,440	3,300	95	48,100	7.5	1.026
Jan. 1-31, 1962...	5.5	14		971	308	15,300		165		2,500	24,300	.9	--	43,500	60.9	646	3,690	3,550	110	54,500	7.4	1.030
Feb. 1-28.....	3.4	8.0		1,040	339	16,700		145		2,610	26,600	--	--	47,400	66.5	435	3,990	3,870	115	59,300	7.1	1.032
Mar. 1-31.....	2.8	9.7		1,160	380	20,200		137		2,960	32,000	--	--	56,800	80.3	429	4,460	4,340	132	67,500	6.9	1.040
Apr. 1-7.....	7.0	13		1,240	403	25,000		122		3,030	39,600	--	--	69,300	98.9	1,310	4,750	4,650	158	71,900	7.2	1.049
Apr. 8-26.....	2.0	14		1,260	339	16,200		97		3,340	25,700	--	--	46,900	65.9	253	4,540	4,460	104	56,600	7.4	1.033
Apr. 27.....	693	--		--	--	--		100		1,890	11,700	--	--	--	--	--	2,210	2,130	--	30,800	7.5	1.014
Apr. 28-30.....	75.3	16		597	72	28,060		81		1,560	4,480	--	--	9,620	13.1	1,960	1,790	1,720	29	14,400	7.7	1.005
May 1-8.....	9.6	--		--	--	--		102		2,340	9,090	--	--	--	--	--	3,050	2,970	--	25,200	7.0	1.012

a Values expressed in ppm should be multiplied by density, where given, when computing loads.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
May 9-15, 1962....	5.1	9.4		1,060	280	13,000		94		2,510	20,800	--	--	37,700	52.6	519	3,800	3,720	92	47,900	7.0	1.026
May 16-26.....	.6	10		1,540	333	17,400		130		3,540	27,800	--	--	50,700	71.4	82.1	5,210	5,110	105	59,700	7.4	1.035
May 27-June 1.....	17.3	17		1,230	337	23,300		76		2,770	37,000	--	--	64,700	92.0	3,020	4,460	4,390	152	76,300	7.1	1.046
June 2-6.....	24.5	15		869	136	6,640		85		2,190	10,500	--	--	20,400	28.1	1,350	2,730	2,660	55	28,000	7.3	1.013
June 7-8.....	350	--		--	--	--		153		1,540	4,950	--	--	--	--	--	1,760	1,630	--	15,700	7.5	1.006
June 9-10.....	977	--		--	--	--		84		594	810	--	--	2,230	3.03	5,880	710	641	--	3,690	7.6	--
June 11-15.....	305	22		425	47	1,180		97		1,090	1,850	--	6.0	4,670	6.35	3,850	1,250	1,170	15	7,220	7.5	--
June 16-20.....	44.2	21		636	132	3,280		113		1,730	5,220	--	--	11,100	15.2	1,320	2,130	2,040	31	16,500	7.6	1.006
June 21-30.....	30.0	15		889	173	5,750		99		2,420	9,090	--	--	18,400	25.3	1,490	2,930	2,850	46	25,800	7.2	1.012
July 1-8.....	6.6	11		855	198	6,080		102		2,340	9,680	--	--	19,200	26.4	342	2,950	2,860	49	28,100	7.3	1.012
July 9-17.....	.5	12		1,320	311	13,500		107		3,410	21,400	--	--	40,000	55.9	54.0	4,570	4,480	87	53,600	7.2	1.028
July 18-25.....	44.6	15		735	105	3,420		85		1,950	5,390	--	--	11,700	16.0	1,410	2,270	2,200	31	17,700	7.2	1.007
July 26-27, 29-31.	203	20		191	41	1,500		135		526	2,300	--	--	4,640	6.31	2,540	645	534	26	7,980	7.3	--
July 28.....	560	--		--	--	--		172		466	1,240	--	--	--	--	--	485	344	--	4,860	7.6	--
Aug. 1-9.....	184	16		308	58	1,770		113		881	2,720	--	--	5,810	7.90	2,890	1,010	914	24	9,330	7.3	--
Aug. 10-17.....	3.2	13		707	183	5,390		105		1,930	8,610	--	--	16,900	23.2	146	2,520	2,430	47	24,500	7.5	1.011
Aug. 18-31.....	.7	12		1,460	376	15,900		162		3,670	25,400	--	--	46,900	65.9	88.6	5,190	5,060	96	57,000	7.3	1.033
Sept. 1-2.....	78.5	--		--	--	--		80		1,360	18,100	--	--	--	--	--	2,350	1,280	--	38,300	7.3	1.021
Sept. 3-9.....	1,053	12		390	39	1,060		98		1,060	1,600	--	1.0	4,210	5.73	11,970	1,130	1,050	14	6,300	7.4	--
Sept. 10-13.....	170	--		--	--	--		143		876	3,300	--	--	--	--	--	1,140	1,020	--	10,400	7.2	--
Sept. 14-17.....	411	19		547	103	3,610		134		1,410	5,720	--	--	11,500	15.6	12,760	1,790	1,680	37	16,500	7.7	1.006
Sept. 18-20.....	208	17		365	44	1,280		88		924	2,020	--	--	4,690	6.38	2,630	1,090	1,020	17	7,260	7.7	--
Sept. 21-23.....	86.3	--		--	--	--		131		1,090	4,280	--	--	--	--	--	1,390	1,280	--	12,900	7.9	1.004
Sept. 24-30.....	58.7	--		--	--	--		131		1,920	10,500	--	--	--	--	--	2,530	2,420	--	26,600	7.6	1.013
Weighted average	63.2	16		449	78	2,860		111		1,200	4,490	--	--	9,150	12.4	1,560	1,440	1,340	28	13,000	7.4	--
Time-weighted average.....	--	13		931	246	11,630		130		2,380	18,500	--	--	33,700	--	--	3,330	3,220	86	42,700	7.3	--
Tons per day....	--	2.7		77	13	490		19		206	769	--	--	--	--	--	--	--	--	--	--	--

a Values expressed in ppm should be multiplied by density, where given, when computing loads.

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 1962.
Water temperatures: August 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 16,700 ppm Apr. 15-23; minimum, 946 ppm Sept. 8.
Hardness: Maximum, 2,630 ppm Apr. 15-23; minimum, 350 ppm Sept. 2-3.
Specific conductance: Maximum daily, 28,600 micromhos Apr. 16; minimum daily, 1,400 micromhos Sept. 8.
Water temperatures: Maximum, 98°F July 25.
EXTREMES, 1959-62.--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; minimum, 33°F Mar. 4, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow May 25-26, Aug. 26-30.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Mean discharge	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[a] (gm/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-10, 1961	83.3	14		270	48		675		100	758	1,040	--	0.8		2,850	3.88	641	871	789	9.9	4,500	7.4	--
Oct. 11-20.....	53.6	9.6		458	95		2,270		110	1,310	3,560	--	--		7,760	10.6	1,120	1,530	1,440	25	12,200	7.3	1.004
Oct. 21-31.....	12.5	10		498	115		2,160		125	1,540	3,340	--	--		7,720	10.5	261	1,720	1,610	23	11,800	7.4	1.004
Nov. 1.....	54.0	--		--	--		--		120	916	1,720	--	--		--	--	--	1,080	982	--	6,680	7.7	--
Nov. 2-8.....	434	--		--	--		--		96	460	600	--	--		--	--	--	525	446	--	2,860	7.6	--
Nov. 9-10.....	149	--		--	--		--		108	892	1,290	--	--		--	--	--	945	856	--	5,420	7.6	--
Nov. 11-17.....	101	12		298	64		1,240		144	848	1,910	--	3.5		4,450	6.05	1,210	1,010	888	17	7,140	7.8	--
Nov. 18-30.....	98.5	11		448	110		2,540		141	1,210	4,050	--	--		8,440	11.5	2,240	1,570	1,460	28	13,300	7.6	1.005
Dec. 1-16.....	56.6	16		478	115		2,490		118	1,450	3,880	0.7	--		8,490	11.6	1,300	1,670	1,570	26	12,900	7.3	1.004
Dec. 17-31.....	47.3	14		547	152		3,270		139	1,480	5,270	.7	--		10,800	14.8	1,380	1,990	1,880	32	16,600	7.3	1.006
Jan. 1-31, 1962	28.5	14		537	158		3,030		159	1,710	4,720	.7	--		10,300	14.1	793	1,990	1,860	30	15,100	7.5	1.006
Feb. 1-28.....	16.1	5.0		556	172		3,320		144	1,830	5,160	.8	--		11,100	15.2	483	2,090	1,980	32	16,400	7.4	1.007
Mar. 1-31.....	12.4	7.7		577	181		3,110		156	1,880	4,870	--	--		10,700	14.6	358	2,180	2,060	29	15,700	7.5	1.006
Apr. 1-8.....	14.3	8.8		527	162		2,850		131	1,800	4,400	--	--		9,810	13.4	379	1,980	1,870	28	14,300	7.1	1.006
Apr. 9.....	30.0	--		--	--		--		120	1,130	2,280	--	--		--	--	- --	1,270	1,170	--	8,200	7.4	--

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

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Mean discharge	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[a] (gm/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 10-14,1962	20.2	5.7		626	179		3,290		109	2,000	5,160	--	--		11,300	15.5	616	2,300	2,210	30	16,100	7.4	1.007
Apr. 15-23.....	6.8	7.6		678	229		5,240		142	2,240	8,210	--	--		16,700	23.0	307	2,630	2,520	44	23,300	7.2	1.011
Apr. 24-26.....	20.3	--		--	--		--		137	1,620	4,100	--	--		--	--	--	1,820	1,710	--	13,500	7.5	1.005
Apr. 27-28.....	156	--		--	--		--		164	770	1,580	--	--		--	--	--	920	786	--	6,080	8.0	--
Apr. 29-30.....	506	--		--	--		--		133	1,390	3,860	--	--		--	--	--	1,700	1,590	--	12,500	7.7	1.005
May 1-13.....	34.4	11		624	119		2,920		106	1,660	4,670	--	--		10,100	13.8	938	2,050	1,960	28	15,300	7.4	1.006
May 14-24.....	3.2	10		653	173		3,150		115	2,060	4,920	--	--		11,000	15.1	95.0	2,340	2,250	28	16,200	7.3	1.007
May 27-28.....	213	--		--	--		--		115	1,360	2,500	--	--		--	--	--	1,500	1,410	--	9,380	7.7	--
May 29-31.....	163	13		268	40		690		87	722	1,070	--	1.5		2,850	3.88	1,250	833	762	10	4,620	7.2	--
June 1-6, 8....	193	12		200	32		552		88	496	880	--	2.2		2,220	3.02	1,160	630	558	9.5	3,750	7.3	--
June 7, 9.....	2,100	--		--	--		--		124	724	2,350	--	--		--	--	--	1,030	928	--	8,120	7.5	--
June 10-15.....	2,417	16		270	30		444		93	684	690	--	2.5		2,180	2.96	14,230	797	721	6.8	3,430	7.4	--
June 16-23.....	559	16		195	28		426		119	504	640	--	2.5		1,870	2.54	2,820	602	504	1.5	3,070	7.3	--
June 24-30.....	78.3	15		375	69		1,490		118	968	2,380	--	--		5,360	7.29	1,130	1,220	1,120	18	8,620	7.5	--
July 1.....	94	--		--	--		--		97	538	1,170	--	--		--	--	--	630	550	--	4,550	7.3	--
July 2-3.....	153	--		--	--		--		110	1,810	4,900	--	--		--	--	--	2,260	2,170	--	16,200	7.5	1.006
July 4-7.....	50.8	12		490	81		1,520		98	1,360	2,380	--	--		5,890	8.01	808	1,560	1,480	17	9,110	7.2	--
July 8-19.....	11.9	12		627	133		2,480		105	1,810	3,930	--	--		9,040	12.4	290	2,110	2,030	23	13,700	7.3	1.005
July 20.....	14.0	--		--	--		--		110	464	910	--	--		--	--	--	535	445	--	3,850	7.6	--
July 21-28.....	60.8	11		518	91		2,330		86	1,470	3,640	--	--		8,100	11.1	1,330	1,670	1,600	25	12,600	6.9	1.004
July 29-31.....	711	23		240	39		862		125	696	1,280	--	1.5		3,200	4.35	6,140	760	657	14	5,190	7.7	--
Aug. 1, 3-4....	573	16		228	34		665		114	636	990	--	3.2		2,630	3.58	4,070	709	616	11	4,330	7.7	--
Aug. 2.....	335	--		--	--		--		123	584	2,980	--	--		--	--	--	770	669	--	9,790	7.5	--
Aug. 5.....	450	--		--	--		--		99	849	4,180	--	--		--	--	--	1,150	1,070	--	13,300	7.2	1.004
Aug. 6-15.....	139	23		285	49		941		114	850	1,400	--	5.5		3,610	4.91	1,350	912	819	14	5,760	7.7	--
Aug. 16-25.....	6.7	16		456	102		2,050		118	1,420	3,140	--	--		7,240	9.89	131	1,560	1,460	23	11,000	7.5	1.004
Aug. 31-Sept. 1	52.5	--		--	--		--		97	636	980	--	--		--	--	--	700	620	--	4,080	7.5	--
Sept. 2-3.....	325	--		--	--		--		103	292	365	--	--		--	--	--	350	165	--	1,790	7.7	--
Sept. 4-5.....	944	--		--	--		--		142	1,040	2,350	--	--		--	--	--	1,270	1,150	--	8,290	7.6	--
Sept. 6-7.....	12,980	--		--	--		--		100	576	590	--	--		--	--	--	630	548	--	2,960	7.4	--
Sept. 8.....	14,600	--		--	--		--		86	404	180	--	--		946	1.29	37,290	415	344	--	1,400	7.3	--
Sept. 9-13.....	1,966	14		152	18		290		97	400	415	0.4	2.0		1,340	1.82	7,110	453	374	5.9	2,140	7.2	--
Sept. 14-19....	1,192	15		256	33		717		108	676	1,090	--	3.0		2,840	3.86	9,140	774	686	11	4,510	7.2	--
Sept. 20-24....	919	12		242	30		518		91	636	790	--	2.0		2,280	3.10	5,660	728	653	8.3	3,520	7.3	--
Sept. 25-30....	306	--		--	--		--		127	904	1,930	--	--		--	--	--	990	886	--	7,040	7.3	--
Weighted average.....	308	14		241	38		691		103	659	1,060	--	--		2,750	3.74	2,290	759	674	10	4,320	7.4	--
Time-weighted average....	--	12		454	112		2,230		125	1,370	3,490	--	--		7,740	--	--	1,600	1,490	24	11,600	7.4	--
Tons per day.	--	12		200	32		575		86	548	881	--	--		--	--	--	--	--	--	--	--	--

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

8-861. HUBBARD CREEK NEAR ALBANY, TEX.

LOCATION.--At gaging station, 300 feet upstream from bridge on State Farm Highway 601, 1.1 miles downstream from Deep Creek, 3.3 miles upstream from North Prong Hubbard Creek, and 8.1 miles southeast of Albany, Shackelford County.
DRAINAGE AREA.--461 square miles.
RECORDS AVAILABLE.--Chemical analyses: February to September 1962.
Water temperatures: February to September 1962.
EXTREMES, February to September 1962.--Dissolved solids: Maximum, 2,310 ppm Apr. 5-6; minimum, 182 ppm Sept. 8-25.
Hardness: Maximum, 842 ppm Apr. 5-6; minimum, 106 ppm Sept. 8-25.
Specific conductance: Maximum daily, 4,410 micromhos Apr. 6; minimum daily, 262 micromhos Sept. 8.
Water temperatures: Maximum, 92°F Aug. 4.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 7, 12, 28-31, Apr. 1-2, May 2-31, June 27-29, July 10-19, 24-25, Aug. 7-31, Sept. 1-4, 26-30.

Chemical analyses, in parts per million, February to September 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 (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	Noncarbonate			
Feb. 1-28, 1962...	0.7	4.9		132	45	278		136		110	632	0.3	0.8		1,270	1.73	2.40	514	403	5.3	2,350	7.4
Mar. 1-10.....	a.5	5.6		142	47	302		149		120	675	.2	.2		1,360	1.85	1.84	544	422	5.6	2,500	7.4
Mar. 11-20.....	a.7	5.2		146	48	313		147		128	700	.3	.2		1,410	1.92	2.66	562	442	5.7	2,570	7.5
Mar. 21-27.....	1.6	3.4		158	49	336		151		112	770	.2	.2		1,510	2.05	6.52	596	472	6.0	2,790	7.4
Apr. 3-4.....	1.6	4.3		158	54	342		127		119	800	.3	1.8		1,540	2.09	6.65	616	512	6.0	2,790	7.2
Apr. 5-6.....	76.0	6.7		209	78	539		107		222	1,200	--	3.5		2,310	3.14	474	842	755	8.1	4,030	7.4
Apr. 7-30.....	4.2	5.3		150	56	270		127		122	680	--	1.0		1,350	1.84	15.3	604	500	4.8	2,460	7.3
May 1.....	.7	4.5		180	71	326		116		137	860	--	.0		1,640	2.23	3.1	741	646	5.7	3,040	7.8
June 1-7.....	29.5	7.3		139	52	289		113		146	668	.4	1.8		1,360	1.85	108	561	468	5.3	2,470	7.6
June 8-9.....	223	--		--	--	--		99		36	186	--	--		--	--	--	198	117	--	844	7.5
June 10-30.....	a130	12		46	10	40		114		22	89	--	1.8		277	.38	97.2	156	62	1.4	517	6.9
July 1-23.....	a9.2	12		40	8.8	39		94		22	83	.4	2.2		253	.34	6.28	136	59	1.5	474	7.1
July 26.....	1,150	--		--	--	--		94		28	122	--	--		--	--	--	150	73	--	613	7.8
July 27-31.....	126	11		35	7.8	26		103		22	48	--	1.5		202	.27	68.7	119	35	1.0	370	6.8
Aug. 1-6.....	3.3	12		39	9.6	35		116		29	61	.4	.8		244	.33	2.17	137	42	1.3	438	7.3
Sept. 5-6.....	142	12		39	8.2	38		104		23	72	.4	1.0		245	.33	93.9	131	46	1.4	452	7.4
Sept. 7.....	715	--		--	--	--		128		82	304	--	--		--	--	--	256	151	--	1,300	7.4
Sept. 8-25.....	58.4	12		32	6.3	24		97		15	43	.2	1.2		182	.25	28.7	106	26	1.0	326	7.3
Weighted average	32.0	11		54	13	75		108		37	158	--	1.6		403	0.55	34.8	188	100	2.4	740	7.1
Time-weighted average.....	--	8.0		96	31	175		120		76	405	--	1.2		861	--	--	368	269	3.5	1,560	7.2
Tons per day....	--	1.0		4.5	1.2	5.6		9.3		3.2	14	--	0.1		--	--	--	--	--	--	--	--

a Includes days of less than 0.05 cfs discharge.

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 to September 1962.
Water temperatures: February to September 1962.
EXTREMES, February to September 1962.--Dissolved solids: Maximum, 3,660 ppm May 1-31; minimum, 397 ppm June 10.
Hardness: Maximum, 1,620 ppm Mar. 21-23; minimum, 200 ppm June 10.
Specific conductance: Maximum daily, 7,020 micromhos Mar. 21; minimum daily, 769 micromhos June 10.
Water temperatures: Maximum, 96°F Aug. 11.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow May 22-27, 30, Aug. 23-31.

Chemical analyses, in parts per million, February to September 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 (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	Noncarbonate			
Feb. 1-28, 1962...	1.8	4.8		325	110	617		100		118	1,700	0.4	1.5		2,930	3.98	14.2	1,260	1,180	7.5	5,220	7.2
Mar. 1-11.....	1.6	4.3		348	118	623		98		124	1,770	.3	1.5		3,040	4.13	13.1	1,350	1,270	7.4	5,480	7.5
Mar. 12-20.....	3.5	4.8		352	123	622		85		120	1,800	.3	1.5		3,070	4.18	29.0	1,380	1,310	7.3	5,560	7.6
Mar. 21-23.....	4.5	7.0		430	132	713		123		99	2,100	.2	--		3,540	4.81	43.0	1,620	1,510	7.7	6,380	7.2
Mar. 24-31.....	1.1	4.2		358	110	610		109		93	1,760	.3	.5		2,990	4.07	8.88	1,350	1,260	7.2	5,410	7.6
Apr. 1-6.....	6.5	4.9		328	103	584		91		91	1,660	--	.5		2,820	3.84	49.5	1,240	1,170	7.2	5,150	7.2
Apr. 7-13.....	2.7	5.0		240	71	425		118		65	1,170	--	.5		2,030	2.76	14.8	891	794	6.2	3,790	7.3
Apr. 14-26.....	1.5	5.4		280	91	505		112		85	1,410	--	.5		2,430	3.30	9.84	1,070	981	6.7	4,480	7.1
Apr. 27-30.....	5.0	--		--	--	--		101		92	2,050	--	--		--	--	--	1,490	1,410	--	6,210	7.4
May 1-31.....	a.4	9.2		415	138	763		76		120	2,180	--	--		3,660	4.98	3.95	1,600	1,540	8.3	6,490	6.8
June 1-9.....	11.0	12		350	104	636		98		128	1,750	--	3.0		3,030	4.12	90.0	1,300	1,220	7.7	5,460	7.3
June 10.....	2,420	--		--	--	--		129		24	156	--	--		397	.54	2,590	200	94	--	769	7.6
June 11-12.....	74.0	--		78	18	--		151		27	242	--	--		--	--	--	268	145	--	1,080	7.9
June 13-19.....	18.1	11		167	43	303		142		45	770	.3	2.2		1,410	1.92	68.9	594	477	5.4	2,660	7.7
June 20-30.....	13.2	11		225	66	414		132		69	1,100	--	3.0		1,950	2.65	69.5	833	725	6.3	3,650	7.2
July 1-4.....	6.1	--		--	--	--		100		25	355	--	--		--	--	--	304	222	--	1,380	7.3
July 5-25.....	.7	13		176	51	303		128		69	795	.3	2.0		1,470	2.00	2.78	649	544	5.2	2,840	7.5
July 26.....	143	--		--	--	--		90		43	750	--	--		--	--	--	600	526	--	2,610	7.5
July 27-31.....	5.2	11		117	30	211		110		30	530	--	2.8		986	1.34	13.8	416	326	4.5	1,950	7.2
Aug. 1-22.....	.4	13		182	58	357		123		68	920	--	.0		1,660	2.26	1.79	692	592	5.9	3,140	7.2
Sept. 1-4.....	9.1	16		259	81	474		126		79	1,290	--	5.5		2,270	3.09	55.8	979	876	6.6	4,130	7.7
Sept. 5, 8.....	86.0	15		71	17	103		104		17	258	.3	4.2		536	.73	124	247	162	2.9	1,030	7.7
Sept. 6-7, 9.....	213	19		101	22	187		119		19	445	--	4.8		857	1.17	493	342	245	4.4	1,620	7.7
Sept. 10-18.....	6.5	15		205	53	382		161		54	970	--	3.8		1,760	2.39	30.9	730	598	6.2	3,230	7.5
Sept. 19-30.....	2.4	14		276	83	522		157		81	1,380	--	7.0		2,440	3.32	15.8	1,030	902	7.0	4,440	7.5
Weighted average	17.8	12		106	27	169		124		34	430	--	2.6		846	1.15	40.7	376	274	3.8	1,590	7.6
Time-weighted average.....	--	9.4		276	87	504		112		88	1,390	--	2.1		2,450	--	--	1,050	957	6.8	4,390	7.2
Tons per day....	--	0.7		8.0	2.2	15		6		1.6	21	--	0.2		--	--	--	--	--	--	--	--

a Includes days of less than 0.05 cfs discharge.

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 to September 1962.
Water temperatures: February to September 1962.
EXTREMES, February to September 1962.--Dissolved solids: Maximum, 6,730 ppm Apr. 1-2; minimum, 142 ppm June 12-14, Sept. 5-10.
Hardness: Maximum, 2,550 ppm Apr. 1-2; minimum, 74 ppm June 12-14.
Specific conductance: Maximum daily, 13,300 micromhos Apr. 6; minimum daily, 239 micromhos Sept. 8.
Water temperatures: Maximum, 89°F July 21.
REMARKS.--Records of specific conductance of daily samples available in district officer at Austin, Tex. No flow Feb. 1-28, Mar. 1-19, 22-29, Apr. 3, 9-21, May 3-30, June 4-5, 21-29, July 6-15, 22-25, Aug. 5-31, Sept. 24-30.

Chemical analyses, in parts per million, February to September 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 (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	Noncarbonate			
Mar. 20-21, 1962..	0.4	4.2		362	106	856		92	0	290	2,000	0.4	--		3,660	4.98	3.95	1,340	1,260	10	6,290	7.0
Mar. 30-31.....	.6	--		--	--	--		76	0	298	2,220	--	--		--	--	--	1,460	1,400	--	6,860	6.9
Apr. 1-2.....	.6	--		--	--	--		29	0	59	4,180	--	--		6,730	9.19	10.9	2,550	2,530	--	11,900	7.1
Apr. 4-5.....	2.1	--		--	--	--		62	0	160	1,920	--	--		--	--	--	1,040	989	--	5,970	7.8
Apr. 6-8.....	.4	--		--	--	--		66	0	202	2,740	--	--		--	--	--	1,520	1,470	--	8,060	6.5
Apr. 22-25.....	15.7	--		--	--	--		106	0	43	1,480	--	--		--	--	--	870	783	--	4,570	7.7
Apr. 26.....	.7	--		--	--	--		124	0	26	218	--	--		--	--	--	208	106	--	991	7.6
Apr. 27-28.....	15.0	--		--	--	--		134	0	30	272	--	--		--	--	--	228	118	--	1,150	7.8
Apr. 29-30.....	3.6	--		--	--	--		146	0	40	990	--	--		--	--	--	620	500	--	3,290	7.8
May 1-2.....	.2	5.8		185	43	450		128	0	42	1,040	--	0.5		1,830	2.49	.99	638	534	7.7	3,440	7.7
May 31-June 3.....	10.6	6.8		44	6.7	97		77	0	15	188	.5	4.0		400	.54	11.4	138	74	3.6	787	6.5
June 6.....	6.5	--		--	--	--		91	0	30	420	--	--		--	--	--	276	202	--	1,560	7.5
June 7-9.....	189	6.0		46	6.4	52		117	0	21	96	--	.2		286	.39	146	142	46	1.9	548	8.2
June 10-11.....	777	13		42	5.3	31		112	0	15	60	--	2.5		224	.30	470	127	35	1.2	413	6.7
June 12-14.....	229	8.7		23	4.1	22		56	6	11	43	--	.0		142	.19	87.8	74	33	1.1	327	8.5
June 15-20.....	1.2	11		66	12	100		106	0	31	220	--	2.2		494	.67	1.60	214	127	3.0	954	6.9
June 30-July 5....	21.6	13		48	7.8	67		103	0	24	132	.5	.2		a370	.50	21.6	152	68	2.4	655	7.7
July 16-21.....	39.3	8.4		34	4.5	26		86	0	21	46	--	2.0		184	.25	19.5	103	33	1.1	342	6.9
July 26.....	672	--		--	--	--		116	0	14	235	--	--		--	--	--	204	109	--	949	7.5
July 27-28.....	303	--		--	--	--		88	0	12	46	--	--		--	--	--	92	20	--	309	7.6
July 29-31.....	5.3	10		42	6.5	49		92	0	22	98	--	.8		273	.37	3.91	132	56	1.9	526	7.0
Aug. 1-4.....	.4	14		--	--	--		89	0	36	175	--	--		--	--	--	172	99	--	780	6.9
Sept. 1-4.....	8.7	--		--	--	--		66	0	18	74	--	--		--	--	--	98	44	--	393	7.3
Sept. 5-10.....	434	10		29	3.5	17		89	0	10	27	.2	1.5		142	.19	166	87	14	.8	253	7.2
Sept. 11-20.....	5.0	13		46	7.8	66		96	0	20	134	.3	1.2		335	.46	4.52	147	68	2.4	630	7.1
Sept. 21-23.....	.2	--		--	--	--		112	0	39	245	--	--		--	--	--	230	138	--	1,030	7.6
Weighted average	31.2	10		39	5.8	42		96	0	14	83	--	--		243	0.33	31.2	121	42	1.7	453	7.1
Time-weighted average.....	--	--		--	--	--		93	0	47	553	--	--		--	--	--	385	309	--	1,860	7.1
Tons per day....	--	0.8		3.3	.5	3.5		22	0	3.3	19	--	--		--	--	--	--	--	--	--	--

a Residue at 180°C.

8-865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 183, 1 mile downstream from Hubbard Creek Dam, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.
DRAINAGE AREA.--1,087 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1955 to September 1962.
Water temperatures: April 1955 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 2,440 ppm May 1-31; minimum, 208 ppm Sept. 5-30.
Hardness: Maximum, 998 ppm May 1-31; minimum, 112 ppm Sept. 5-30.
Specific conductance: Maximum daily, 5,040 micromhos Nov. 21; minimum daily, 224 micromhos Sept. 6.
EXTREMES, 1955-62.--Dissolved solids: Maximum, 5,350 ppm July 1-5, 1960; minimum, 112 ppm June 15, 1961.
Hardness: Maximum, 1,820 ppm July 1-5, 1960; minimum, 72 ppm Feb. 6-8, 1957.
Specific conductance: Maximum daily, 9,270 micromhos July 4, 1960; minimum daily, 121 micromhos Apr. 27, 1957.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 22, May 23-27. Storage in Hubbard Creek Reservoir began on Sept. 5, 1962. Reservoir contained about 9,400 acre-feet of water on Sept. 30, 1962.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-13, 1961...	24.4	14		90	19	133		149		39	302	0.3	3.2		674	0.92	44.4	302	180	3.3	1,250	7.9
Oct. 14-Nov. 1....	7.1	14		160	38	272		156		54	680	.3	3.2		1,300	1.77	24.9	556	428	5.0	2,430	7.6
Nov. 2.....	102	14		108	26	198		86		47	485	--	3.4		923	1.26	254	376	306	4.4	1,780	7.2
Nov. 3-4.....	126	7.9		76	12	154		77		26	340	.4	3.5		658	.89	224	239	176	4.3	1,270	7.2
Nov. 5-21.....	12.0	10		225	46	500		137		52	1,180	.3	6.5		2,090	2.84	67.7	750	638	8.0	3,920	7.4
Nov. 22.....	668	8.2		110	26	227		96		43	532	--	1.5		995	1.35	1,790	382	303	5.0	1,940	7.4
Nov. 23-30.....	168	7.5		92	23	182		94		41	425	.3	.0		817	1.11	371	324	247	4.4	1,600	7.5
Dec. 1-31.....	10.4	16		110	28	190		133		68	440	.3	2.2		920	1.25	25.8	390	280	4.2	1,770	7.4
Jan. 1-31, 1962...	6.9	9.1		151	40	269		143		86	650	.3	1.8		1,280	1.74	23.8	541	424	5.0	2,410	7.5
Feb. 1-28.....	1.6	5.7		181	48	310		172		116	750	.3	1.0		1,500	2.04	6.48	649	508	5.3	2,730	7.6
Mar. 1-31.....	a2.2	7.9		202	54	372		150		136	900	.2	1.2		1,750	2.38	10.4	726	603	6.0	3,170	7.5
Apr. 1-30.....	10.3	6.4		232	71	468		106		150	1,160	--	11		2,150	2.92	59.8	871	784	6.9	3,850	7.0
May 1-31.....	a.8	7.1		265	82	522		150		264	1,230	--	.5		2,440	3.32	5.27	998	786	7.2	4,290	6.8
June 1-7.....	39.9	8.8		225	60	458		128		128	1,110	--	1.5		2,050	2.79	221	808	704	7.0	3,750	7.1
June 8-9.....	391	11		100	24	182		101		52	428	.4	2.2		850	1.16	897	348	265	4.2	1,640	7.5
June 10-20.....	1,061	12		46	7.3	44		113		16	92	--	1.5		275	.37	788	145	52	1.6	513	7.3
June 21-30.....	10.9	13		68	12	75		135		31	168	--	3.8		437	.59	12.9	219	108	2.2	815	7.7
July 1.....	726	13		76	16	132		88		34	306	--	3.8		624	.85	1,220	256	184	3.6	1,250	7.7
July 2-16.....	18.8	12		99	21	146		134		50	345	.4	2.2		742	1.01	37.7	334	224	3.5	1,430	7.3
July 17.....	142	10		116	28	247		116		32	575	--	2.6		1,070	1.46	410	404	310	5.3	2,040	7.3
July 18-25.....	6.6	9.3		52	7.2	42		119		36	80	--	2.8		b314	.43	5.60	159	62	1.4	536	7.0
July 26.....	191	9.6		68	14	111		106		32	245	--	2.8		534	.73	275	227	140	3.2	1,020	7.3
July 27.....	2,700	--		--	--	--		95		22	156	--	--		--	--	--	170	92	--	717	6.9
July 28-31.....	292	--		--	--	--		100		16	76	--	--		--	--	--	124	42	--	445	7.3
Aug. 1-12.....	78.8	14		47	7.7	49		110		19	102	.3	1.2		294	.40	62.6	149	59	1.7	555	7.0
Aug. 13-31.....	.9	16		116	21	111		171		159	220	.4	.8		728	.99	1.77	376	236	2.5	1,260	7.2
Sept. 1-4.....	1.8	13		145	30	135		162		288	245	.0	1.5		b992	1.35	4.82	486	352	2.7	1,520	7.2
Sept. 5-30.....	74.3	13		37	4.8	30		89		18	59	.3	1.8		208	.28	41.7	112	39	1.2	373	7.1
Weighted average	68.5	11		64	13	91		108		27	207	--	--		469	0.64	86.7	213	124	2.7	885	7.2
Time-weighted average.....	--	11		146	37	258		135		97	614	--	2.7		1,250	--	--	519	401	4.6	2,260	7.2
Tons per day....	--	2.1		12	2.5	18		20		5.1	38	--	--		--	--	--	--	--	--	--	--

a Includes days of less than 0.05 cfs discharge.
b Residue at 180°C.

8-873. CLEAR FORK BRAZOS RIVER AT ELIASVILLE, TEX.

LOCATION.--At gaging station at bridge on Farm Road 1974 at Eliasville, Young County.
DRAINAGE AREA.--5,721 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 3,020 ppm June 1-5; minimum, 250 ppm June 14-16.
Hardness: Maximum, 1,290 ppm June 1-5; minimum, 131 ppm Sept. 8-13.
Specific conductance: Maximum daily, 5,350 micromhos June 3; minimum daily, 300 micromhos Sept. 10.
Water temperatures: Maximum, 86°F on several days during July and August; minimum, 33°F Jan. 12.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow May 24-31.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-4, 1961....	334	11		69	22	90		166	0	97	156	0.3	1.0		528	0.72	476	262	126	2.4	940	7.5
Oct. 5-8.....	140	11		81	20	179		100	0	39	388	.3	2.8		770	1.05	291	284	202	4.6	1,480	7.0
Oct. 9-17.....	67.7	11		54	14	75		114	0	46	150	.3	1.8		408	.55	74.6	192	98	2.4	766	7.2
Oct. 18-31.....	41.0	9.6		94	29	144		177	0	137	268	.4	.8		770	1.05	85.2	354	209	3.3	1,360	7.5
Nov. 1-2.....	402	13		86	32	136		160	0	170	235	.4	.8		752	1.02	816	346	215	3.2	1,300	7.7
Nov. 3-8.....	174	8.4		128	37	278		106	0	146	592	.4	1.2		1,240	1.69	583	472	384	5.6	2,280	7.3
Nov. 9-20.....	85.3	7.9		107	33	191		127	0	200	358	.3	.8		a1,040	1.41	240	402	298	4.1	1,700	7.6
Nov. 21-22.....	1,725	8.2		100	27	227		93	0	97	478	.3	2.5		986	1.34	4,590	360	284	5.2	1,850	7.4
Nov. 23-24.....	1,030	11		72	16	129		92	0	54	278	.3	2.2		608	.83	1,690	246	170	3.6	1,160	7.6
Nov. 25-27.....	898	11		134	55	258		161	0	378	420	.4	1.8		1,340	1.82	3,250	560	428	4.7	2,190	7.9
Nov. 28-30.....	210	10		195	84	400		203	0	620	625	.5	6.6		2,040	2.77	1,160	832	666	6.0	3,200	7.9
Dec. 1-10.....	90.8	8.8		139	56	282		150	0	396	460	.3	5.6		1,420	1.93	348	578	454	5.1	2,320	7.6
Dec. 11-20.....	71.6	7.5		118	47	245		134	0	226	475	.3	4.2		1,190	1.62	230	488	378	4.8	2,090	7.4
Dec. 21-31.....	50.2	6.9		130	43	229		142	0	222	460	.3	2.8		1,160	1.58	157	502	385	4.4	2,060	7.2
Jan. 1-31, 1962...	42.5	5.8		126	36	203		156	0	174	420	.3	.5		1,040	1.41	119	462	334	4.1	1,870	7.5
Feb. 1-15.....	34.1	5.8		156	53	282		193	0	300	530	.3	.8		1,420	1.83	131	607	449	5.0	2,410	7.6
Feb. 16-28.....	29.3	3.6		180	69	358		190	0	460	620	.4	.8		1,780	2.42	141	733	578	5.8	2,900	7.5
Mar. 1-15.....	23.5	3.8		185	82	345		180	0	504	620	.3	2.0		1,830	2.49	116	799	652	5.3	2,950	7.4
Mar. 16-31.....	85.7	4.0		199	87	378		164	0	598	650	.4	1.8		2,000	2.72	463	854	720	5.6	3,170	7.4
Apr. 1-15.....	77.3	4.8		239	103	494		147	0	620	940	--	1.2		2,470	3.36	516	1,020	900	6.7	3,970	7.0

a Residue at 180°C.

8-873. CLEAR FORK BRAZOS RIVER AT ELIASVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 16-30, 1962..	62.6	4.0		241	94	514		130	0	522	1,030	--	2.0		2,470	3.36	417	988	882	7.1	4,060	7.0
May 1-23.....	30.0	6.3		220	104	488		164	0	688	840	--	2.2		2,430	3.30	197	977	842	6.8	3,840	7.4
June 1-5.....	390	2.2		255	159	576		134	0	912	1,050	--	1.5		3,020	4.11	3,180	1,290	1,180	7.0	4,810	7.6
June 6-8.....	181	9.1		193	94	388		160	0	650	640	--	3.2		2,060	2.80	1,010	868	737	5.7	3,270	7.9
June 9.....	1,480	--		--	--	--		118	0	48	382	--	--		--	--	--	332	236	--	1,500	7.8
June 10.....	11,300	--		--	--	--		42	9	49	137	--	--		--	--	--	137	88	--	715	8.7
June 11.....	12,100	--		--	--	--		103	0	62	112	--	--		--	--	--	178	94	--	669	7.7
June 12-13.....	8,200	20		53	9.5	50		121	0	52	87	--	4.8		336	.46	7,440	171	72	1.7	583	7.8
June 14-16.....	9,630	15		44	7.8	28		109	0	40	48	0.3	3.2		a250	.34	6,500	142	53	1.0	423	7.1
June 17-20.....	1,190	18		62	13	46		151	0	66	81	--	2.2		362	.49	1,160	208	84	1.4	639	7.8
June 21-26.....	331	8.9		70	22	80		152	0	113	139	--	.0		508	.69	454	265	140	2.1	965	7.7
June 27-30.....	194	3.5		74	33	131		87	0	186	240	--	1.2		a751	1.02	393	320	248	3.2	1,420	7.6
July 1-15.....	185	13		114	38	160		175	0	194	312	.3	2.2		a1,000	1.36	500	441	298	3.3	1,630	7.4
July 16-26.....	213	11		130	55	193		189	0	297	358	--	2.2		1,140	1.55	656	550	396	3.6	1,950	7.4
July 27-29.....	2,433	9.8		56	11	68		110	0	44	138	--	2.2		383	.52	2,520	184	94	2.2	729	7.1
July 30.....	1,420	--		--	--	--		156	0	415	305	--	--		--	--	--	545	417	--	1,960	7.7
July 31.....	720	--		--	--	--		150	0	256	220	--	--		--	--	--	350	227	--	1,410	7.7
Aug. 1-3.....	794	--		--	--	--		109	0	89	109	--	--		--	--	--	187	98	--	711	7.2
Aug. 4-7.....	180	12		40	8.9	44		96	0	40	77	.3	1.8		a292	.40	142	136	58	1.6	492	7.3
Aug. 8-22.....	32.9	12		57	16	65		123	0	79	117	--	.8		a439	.60	39.0	208	107	2.0	734	7.3
Aug. 23-31.....	2.9	10		70	18	94		140	0	93	170	--	.5		a556	.76	4.35	248	134	2.6	946	7.2
Sept. 1-7.....	1,169	11		56	14	83		111	0	72	149	.3	1.5		a466	.63	1,470	197	106	2.6	800	7.0
Sept. 8-13.....	9,552	13		40	7.5	38		105	0	36	63	--	1.8		a274	.37	7,070	131	45	1.4	446	7.0
Sept. 14-30.....	570	12		70	22	74		180	0	91	129	--	1.5		a535	.73	823	265	118	2.0	851	7.5
Weighted average	540	13		63	18	86		116	--	95	156	--	2.5		505	0.68	736	230	135	2.1	860	7.2
Time-weighted average.....	--	8.2		132	50	242		151	--	293	447	--	1.7		1,260	--	--	536	413	4.3	2,090	7.3
Tons per day....	--	19		92	26	125		169	--	139	227	--	3.6		--	--	--	--	--	--	--	--

a Residue at 180°C.

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 1962.
Water temperatures: October 1949 to September 1955.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,540 ppm Aug. 1-31; minimum, 764 ppm Sept. 21-30.
Hardness: Maximum, 496 ppm July 1-25, 28-31; minimum, 250 ppm Sept. 21-30.
Specific conductance: Maximum daily, 2,810 micromhos Dec. 3, 4; minimum daily, 1,140 micromhos Sept. 30.
EXTREMES, 1942-62.--Dissolved solids: Maximum, 3,770 ppm Feb. 18-20, 1961; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.
Hardness: Maximum, 928 ppm Feb. 18-20, 1961; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.
Specific conductance: Maximum daily, 6,110 micromhos Feb. 20, 1961; minimum daily, 494 micromhos May 4, 1957.
Water temperatures (1949-55): Maximum, 76°F Sept. 27-30, 1950; minimum, 45°F on several days in February 1951.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge 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 1961 to September 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			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	Noncarbonate			
Oct. 1-31, 1961...	523	12		145	23	363		120		370	540	--	1.8		1,510	2.05	2,130	456	358	7.4	2,500	7.0
Nov. 1-30.....	193	11		143	23	340		105		354	520	0.5	1.5		1,440	1.96	750	452	366	7.0	2,410	7.5
Dec. 1-31.....	380	12		150	22	364		112		356	560	.5	2.8		1,520	2.07	1,560	464	372	--	2,540	7.3
Jan. 1-31, 1962...	438	10		143	26	337		113		352	522	.5	.5		1,450	1.97	1,710	464	372	6.8	2,440	7.5
Feb. 1-28.....	339	10		150	24	362		118		356	560	.4	.5		1,520	2.07	1,390	472	376	7.2	2,560	7.4
Mar. 1-31.....	347	11		145	27	359		120		356	555	.3	.0		1,510	2.05	1,410	473	374	7.2	2,520	7.4
Apr. 1-30.....	136	12		147	26	350		120		358	540	.4	.8		1,490	2.03	547	474	376	7.0	2,480	7.8
May 1-31.....	58.0	11		146	26	345		117		348	540	--	.8		1,470	2.00	230	472	376	6.9	2,420	7.1
June 1-30.....	2,185	11		147	29	335		119		340	540	.4	.2		1,460	1.99	8,610	486	389	6.6	2,470	7.0
July 1-25, 28-31..	1,565	10		151	29	354		120		360	560	.4	1.5		1,520	2.07	6,420	496	398	6.9	2,640	7.2
July 26-27.....	8,225	--		--	--	--		102		228	360	--	--		--	--	--	334	250	--	1,760	7.5
Aug. 1-31.....	1,376	11		147	30	365		122		348	580	.5	3.0		1,540	2.09	5,720	490	390	7.2	2,590	7.4
Sept. 1-10.....	9,511	12		134	27	336		118		316	530	.4	1.2		1,410	1.92	36,210	446	349	6.9	2,340	7.3
Sept. 11-20.....	5,813	12		98	18	240		103		224	370	--	1.2		1,010	1.37	15,850	318	234	5.9	1,720	7.1
Sept. 21-30.....	1,868	12		77	14	162		93		176	242	--	1.2		764	1.04	3,850	250	174	4.5	1,250	7.3
Weighted average	1,138	11		133	25	319		115		313	500	--	1.3		1,360	1.85	4,170	434	341	6.7	2,290	7.2
Time-weighted average.....	--	11		143	25	343		116		344	532	--	1.2		1,460	--	--	461	366	6.9	2,440	7.3
Tons per day....	--	35		407	78	979		352		961	1,540	--	3.9		--	--	--	--	--	--	--	--

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 1962.
Water temperatures: October 1947 to May 1948, October 1948 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,430 ppm Oct. 1-31; minimum, 830 ppm Aug. 5-31.
Hardness: Maximum, 438 ppm Oct. 1-31; minimum, 278 ppm Aug. 5-31.
Specific conductance: Maximum daily, 2,440 micromhos Oct. 10-12, 14, 16; minimum daily, 1,160 micromhos Aug. 24.
Water temperatures: Maximum, 85°F July 15.
EXTREMES, 1947-62.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.
Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.
Specific conductance: Maximum daily, 2,660 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.
Water temperatures: Maximum, 92°F July 21, 28, 29, 1957; minimum, freezing point Jan. 28, 29, 1948.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents. 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 1961 to September 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			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	Noncarbonate			
Oct. 1-31, 1961...	1,786	10		136	24	343		110		320	538	0.4	0.5		1,430	1.94	6,900	438	348	7.1	2,410	7.2
Nov. 1-30.....	726	7.8		129	18	336		113		312	500	.4	2.8		1,360	1.85	2,670	396	304	7.3	2,290	7.5
Dec. 1-31.....	802	10		122	20	288		120		282	440	--	1.0		1,220	1.66	2,640	387	288	6.4	2,100	7.3
Jan. 1-31, 1962...	530	9.6		119	20	280		122		262	435	.4	.5		1,190	1.62	1,700	380	280	6.2	2,010	7.7
Feb. 1-28.....	610	10		118	18	265		128		250	410	.4	.5		1,130	1.54	1,860	368	264	6.0	1,940	7.5
Mar. 1-31.....	514	11		115	20	252		136		248	388	.3	.2		1,100	1.50	1,530	370	258	5.7	1,870	7.8
Apr. 1-30.....	569	10		117	19	250		135		244	388	.3	.8		1,100	1.50	1,690	370	260	5.6	1,880	7.8
May 1-31.....	518	8.9		116	20	249		134		238	392	.4	1.5		1,090	1.48	1,520	372	262	5.6	1,870	7.2
June 1-30.....	1,987	11		110	20	240		118		235	380	.4	.2		1,050	1.43	5,630	357	260	5.5	1,820	7.0
July 1-31.....	1,738	9.2		108	20	227		126		230	355	.4	1.8		1,010	1.37	4,740	352	248	5.3	1,810	7.0
Aug. 1-4.....	10,650	10		105	20	236		115		231	368	.5	3.0		1,030	1.40	29,620	344	250	5.5	1,780	7.2
Aug. 5-31.....	2,876	11		85	16	179		110		176	278	--	4.0		830	1.13	6,450	278	188	4.7	1,400	7.3
Sept. 1-30.....	7,190	9.4		91	18	198		109		195	310	--	1.8		913	1.24	17,720	301	212	5.0	1,520	7.6
Weighted average	1,737	9.9		104	19	234		115		227	364	--	1.7		1,030	1.40	4,840	339	244	5.5	1,750	7.3
Time-weighted average.....	--	9.8		114	20	260		122		250	402	--	1.3		--	--	--	365	265	5.9	1,910	7.3
Tons per day....	--	46		489	89	1,100		541		1,070	1,710	--	8.2		--	--	--	--	--	--	--	--

8-1040. LAMPASAS RIVER AT YOUNGSPORT, TEX.

LOCATION.--At county road bridge, 0.5 mile west of Youngsport, Bell County, 1 mile upstream from gaging station, and 3.0 miles downstream from Rock Creek.
DRAINAGE AREA.--1,242 square miles, at gaging station.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.
Water temperatures: September 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 767 ppm Sept. 1-7; minimum, 156 ppm June 27.
Hardness: Maximum, 301 ppm Sept. 1-7; minimum, 110 ppm June 27.
Specific conductance: Maximum daily, 1,500 micromhos Sept. 7; minimum daily, 278 micromhos June 27.
Water temperatures: Maximum, 95°F Aug. 8, 10, 11; minimum, freezing point Jan. 12.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-9, 1961....	75.1	13		42	26	90		196		23	156	0.4	2.8		a450	0.61	91.2	212	52	2.7	826	7.7
Oct. 10-13.....	777	17		40	13	27		163		16	42	.4	2.0		237	.32	497	153	20	1.0	417	7.7
Oct. 14-20.....	99.3	14		49	21	58		211		23	95	.4	3.2		368	.50	98.1	209	36	1.7	661	7.8
Oct. 21-31.....	60.5	11		56	28	89		236		26	158	.4	2.8		487	.66	79.6	254	61	2.4	889	7.8
Nov. 1-10.....	63.9	9.4		48	30	99		220		27	175	.3	2.8		a520	.71	89.7	244	63	2.8	948	7.4
Nov. 11-21.....	192	7.9		49	30	101		223		27	178	.3	3.5		a512	.70	265	246	64	2.8	954	7.6
Nov. 22-25.....	838	7.7		40	15	27		174		20	38	.3	3.0		237	.32	536	162	19	.9	431	7.6
Nov. 26-30.....	74.6	9.4		57	21	56		235		26	90	.3	3.0		a382	.52	76.9	228	36	1.6	677	7.7
Dec. 1-9.....	46.7	5.5		47	28	75		214		28	132	.4	3.5		a441	.60	55.6	232	57	2.1	802	7.6
Dec. 10-20.....	87.5	10		52	29	73		238		30	126	.4	4.0		a452	.61	107	249	54	2.0	824	7.6
Dec. 21-31.....	77.7	9.6		52	32	76		238		33	137	.4	3.0		a473	.64	99.2	261	66	2.0	856	7.5
Jan. 1-31, 1962...	68.4	4.1		56	32	90		246		34	160	.3	4.8		502	.68	92.7	271	70	2.4	934	7.6
Feb. 1-14.....	52.6	5.0		40	35	83		201		32	158	.3	3.5		a474	.64	67.3	244	80	2.3	891	7.7
Feb. 15-28.....	82.7	6.7		52	29	77		232		28	138	.4	2.5		a473	.64	106	249	59	2.1	852	7.8
Mar. 1-15.....	83.7	7.9		44	31	86		199		33	160	.2	.2		460	.63	104	238	74	2.4	873	7.4
Mar. 16-31.....	77.7	5.3		45	32	97		210		32	176	.3	.2		491	.67	103	244	72	2.7	931	7.4
Apr. 1-9.....	96.7	6.4		51	29	93		216		28	170	.3	1.0		485	.66	127	246	70	2.6	895	7.6
Apr. 10-23.....	28.1	6.6		50	26	60		226		27	106	--	1.0		388	.53	29.4	232	47	1.7	731	7.2

a Residue at 180°C.

8-1040. LAMPASAS RIVER AT YOUNGSPORT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 24-26, 1962..	81.0	--		--	--	--		--		26	188	--	--		--	--	--	--	--	--	1,010	7.8
Apr. 27-28.....	432	--		--	--	--		212		19	55	--	--		--	--	--	201	28	--	535	7.8
Apr. 29-30.....	194	--		--	--	--		--		23	97	--	--		--	--	--	--	--	--	696	7.8
May 1-10.....	86.5	8.5		39	21	44		189		23	70	0.5	0.8		a311	0.42	72.6	184	29	1.4	543	7.6
May 11-20.....	34.7	11		40	23	60		190		22	103	--	.8		a375	.51	35.1	194	39	1.9	648	7.6
May 21-31.....	156	12		47	23	74		195		19	136	--	.8		408	.61	172	212	52	2.2	748	7.6
June 1-8.....	78.6	14		48	20	57		190		18	107	.3	1.2		358	.49	76.0	202	47	1.7	674	7.1
June 9-10.....	1,348	23		36	11	15		137		14	27	--	3.2		196	.27	713	135	23	.6	324	7.7
June 11-19.....	74.7	14		48	17	36		188		19	66	--	1.8		294	.40	59.3	190	36	1.1	537	6.9
June 20-26.....	30.9	14		49	22	51		201		18	99	--	1.0		353	.48	29.5	213	48	1.5	659	7.3
June 27.....	263	--		--	--	--		120		8.4	23	--	--		156	.21	111	110	12	--	278	7.5
June 28-30.....	116	13		55	19	55		196		15	111	--	1.0		365	.50	114	215	54	1.6	683	7.4
July 1-15.....	64.0	15		37	18	51		168		16	86	.3	1.0		307	.42	53.0	166	29	1.7	568	7.6
July 16-31.....	11.4	15		42	23	64		190		19	114	.4	.8		a392	.53	12.1	200	44	2.0	693	7.6
Aug. 1-15.....	6.7	18		44	29	95		179		19	190	.4	1.0		a495	.67	8.95	230	83	2.7	925	7.9
Aug. 16-31.....	7.8	16		52	34	140		185		18	285	--	3.2		a671	.91	14.1	270	118	3.7	1,210	7.9
Sept. 1-7.....	7.8	15		58	38	178		176		18	370	.4	2.2		767	1.04	16.2	301	157	4.5	1,450	7.7
Sept. 8-9.....	2,228	--		--	--	--		170		10	26	--	--		--	--	--	164	25	--	358	7.3
Sept. 10-30.....	25.9	13		51	21	75		184		18	146	--	1.0		a437	.59	30.6	214	62	2.2	760	7.5
Weighted average	102	11		45	22	55		194		22	98	--	2.1		354	0.48	97.5	202	43	1.8	646	7.5
Time-weighted average.....	--	10		48	27	79		206		25	144	--	2.1		444	--	--	229	60	2.2	814	7.5
Tons per day....	--	3.1		12	6.0	15		53		6.0	27	--	0.6		--	--	--	--	--	--	--	--

a Residue at 180°C.

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 bridge, and 2 miles southeast of Cameron, Milam County.
DRAINAGE AREA.--7,000 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1962.
Water temperatures: October 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 401 ppm Jan. 16-31; minimum, 201 ppm June 27-30.
Hardness: Maximum, 261 ppm Jan. 16-31; minimum, 129 ppm Sept. 8-13.
Specific conductance: Maximum daily, 833 micromhos Nov. 26; minimum daily, 298 micromhos June 6.
Water temperatures: Maximum, 90°F on many days during July and August; minimum, 39°F Jan. 12, 13.
EXTREMES, 1959-62.--Dissolved solids: Maximum, 607 ppm Sept. 29, 1960; minimum, 130 ppm June 25-26, 1960.
Hardness: Maximum, 273 ppm June 1-24, 1960; minimum, 92 ppm June 25-26, 1960.
Specific conductance: Maximum daily, 1,000 micromhos Sept. 29, 1960; minimum daily, 191 micromhos June 26, 1960.
Water temperatures: Maximum, 90°F on many days during July and August 1962; minimum, 39°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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-10, 1961...	722	10		62	15	32		222		37	42	0.4	7.4		346	0.47	674	216	34	0.9	556	7.6
Oct. 11-20.....	2,123	9.7		52	14	29		189		31	42	.4	4.5		a276	.38	1,580	187	32	.9	498	7.3
Oct. 21-31.....	2,423	9.6		55	9.7	29		186		34	34	.5	3.8		291	.40	1,900	177	25	.9	466	7.4
Nov. 1-10.....	750	12		68	14	35		232		37	48	.4	6.1		341	.46	691	227	37	1.0	579	7.0
Nov. 11-26.....	826	12		65	13	43		226		36	56	.3	6.6		344	.47	767	216	30	1.3	589	7.1
Nov. 27-30.....	1,692	9.8		52	11	23		180		28	33	.3	2.5		252	.34	1,150	175	28	.8	440	7.2
Dec. 1-10.....	1,161	11		60	13	26		203		34	38	.3	4.2		a286	.39	897	203	36	.8	506	7.4
Dec. 11-20.....	1,536	12		65	12	32		202		41	47	.4	6.3		a315	.43	1,310	212	46	1.0	550	7.7
Dec. 21-31.....	1,090	12		66	14	29		224		37	41	.4	5.3		a315	.43	927	222	38	.8	550	7.7
Jan. 1-15, 1962...	694	8.7		71	15	32		237		40	47	.4	7.3		a338	.46	633	238	44	.9	594	7.8
Jan. 16-31.....	608	7.3		80	15	47		261		52	61	.4	10		a401	.55	658	261	47	1.3	693	7.8
Feb. 1-15.....	544	6.6		72	16	42		246		46	57	.4	8.1		a369	.50	542	246	44	1.2	635	7.8
Feb. 16-17.....	1,320	--		--	--	--		172		34	39	--	--		--	--	--	171	30	--	471	7.7
Feb. 18-28.....	582	12		68	13	41		226		44	53	.4	7.6		a350	.48	550	223	38	1.2	595	7.9
Mar. 1-10.....	572	11		54	17	36		194		41	52	.3	7.3		336	.46	519	204	46	1.1	557	7.5

a Calculated from determined constituents.

8-1065. LITTLE RIVER AT CAMERON, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (Residue at 180°C)			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	Noncarbonate			
Mar. 11-20, 1962..	426	9.5		63	17	48		218		53	64	0.4	8.5		391	0.53	450	227	48	1.4	647	7.5
Mar. 21-31.....	388	7.6		61	19	52		226		48	71	.4	7.8		400	.54	419	230	45	1.5	665	7.4
Apr. 1-10.....	703	12		66	14	45		200		53	67	.4	6.2		388	.53	736	222	58	1.3	622	7.3
Apr. 11-20.....	634	13		66	14	40		217		41	60	--	5.5		359	.49	615	222	44	1.2	594	7.7
Apr. 21-30.....	1,406	12		60	12	34		192		40	50	--	4.9		323	.44	1,230	199	42	1.0	532	7.2
May 1-15.....	689	14		58	12	33		187		39	41	.4	4.2		a290	.39	539	184	31	1.1	485	7.5
May 16-31.....	449	13		45	16	40		177		42	51	--	5.6		a300	.41	364	178	34	1.3	543	7.8
June 1-10.....	2,170	16		47	6.4	20		141		31	27	.4	1.2		232	.32	1,360	144	28	.7	378	7.2
June 11-20.....	1,002	16		52	9.3	26		171		30	36	--	3.8		266	.36	720	168	28	.9	434	7.6
June 21-26.....	661	13		56	13	27		199		34	36	--	3.5		290	.39	518	193	30	.8	484	7.7
June 27-30.....	2,070	16		44	5.0	19		139		24	22	--	2.8		a201	.27	1,120	130	16	.7	336	7.8
July 1-5.....	1,285	15		47	6.8	18		147		22	26	.5	4.5		a212	.29	736	145	25	.6	369	6.9
July 6-26.....	392	14		48	15	30		177		40	41	--	2.8		a278	.38	294	181	36	1.0	495	7.3
July 27-31.....	105	13		59	19	42		235		47	50	--	4.2		379	.52	107	225	32	1.2	620	6.8
Aug. 1-31.....	73.1	14		43	19	57		202		54	59	.4	4.2		a350	.48	69.1	186	20	1.8	604	7.9
Sept. 1-7.....	168	15		36	18	51		158		56	58	.4	3.5		a316	.43	143	164	34	1.7	535	7.3
Sept. 8-13.....	1,313	12		40	7.0	22		126		26	32	--	2.5		a204	.28	723	129	25	.8	353	7.2
Sept. 14-30.....	1,370	11		56	13	31		198		37	41	--	2.2		294	.40	1,090	193	30	1.0	495	7.5
Weighted average	854	12		58	12	32		195		37	43	--	4.8		302	0.41	697	194	34	1.0	513	7.4
Time-weighted average.....	--	12		58	14	37		202		41	48	--	5.3		321	--	--	201	35	1.1	547	7.4
Tons per day....	--	27		133	28	74		449		85	100	--	11		--	--	--	—	--	--	--	--

a Calculated from determined constituents.

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 1962.
Water temperatures: August 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 952 ppm June 18-27; minimum, 234 ppm June 12-15.
Hardness: Maximum, 338 ppm Jan. 7-16; minimum, 121 ppm June 12-15.
Specific conductance: Maximum daily, 1,720 micromhos Nov. 4, 5; minimum daily, 319 micromhos June 12.
Water temperatures: Maximum, 89°F June 24, 25, July 5; minimum, 41°F Mar. 1.
EXTREMES, August 1961 to September 1962.--Dissolved solids: Maximum, 952 ppm June 18-27, 1962; minimum, 234 ppm June 12-15, 1962.
Hardness: Maximum, 338 ppm Jan. 7-16, 1962; minimum, 121 ppm June 12-15, 1962.
Specific conductance: Maximum daily, 1,760 micromhos Sept. 10, 1961; minimum daily, 319 micromhos June 12, 1962.
Water temperatures: Maximum, 89°F Sept. 3, 8, 1961, June 24, 25, July 5, 1962; minimum, 41°F Mar. 1, 1962.
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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-10, 1961...	3,260	13		96	19	173		170	0	170	265	--	3.5		866	1.18	7,620	318	178	4.2	1,420	7.7
Oct. 11-18.....	8,575	13		96	18	187		144	0	182	290	--	3.5		903	1.23	20,900	314	196	4.6	1,480	7.3
Oct. 19-31.....	4,432	12		72	14	94		163	0	98	145	--	1.8		535	.73	6,400	237	104	2.7	906	7.7
Nov. 1-10.....	1,925	11		95	16	149		177	0	154	225	0.4	3.8		778	1.06	4,040	303	158	3.7	1,290	7.6
Nov. 11-19.....	1,894	11		95	18	137		209	0	139	205	.4	4.0		732	1.00	3,740	311	140	3.4	1,220	7.7
Nov. 20-26.....	5,967	9.1		58	8.6	46		157	0	58	61	.4	3.5		335	.46	5,400	180	52	1.5	569	7.5
Nov. 27-30.....	3,778	10		76	14	102		162	0	106	158	.4	2.5		579	.79	5,910	247	114	2.8	959	7.4
Dec. 1-9.....	2,662	11		75	13	87		180	0	95	128	.4	3.0		511	.69	3,670	240	93	2.4	864	7.8
Dec. 10-19.....	5,532	11		86	11	142		154	0	137	210	.4	4.0		a677	.92	10,110	260	134	3.8	1,110	7.7
Dec. 20-31.....	3,185	12		78	11	68		200	0	82	94	.5	4.5		449	.61	3,860	240	76	1.9	767	7.8
Jan. 1-6, 1962....	2,238	11		88	15	102		208	0	115	149	.3	3.0		637	.87	3,850	281	110	2.6	1,000	7.6
Jan. 7-16.....	1,915	8.8		106	18	191		181	0	218	265	.3	3.8		929	1.26	4,800	338	190	4.5	1,480	7.5
Jan. 17-23.....	1,686	8.4		99	16	139		206	0	144	208	.4	2.2		a718	.98	3,270	313	144	3.4	1,250	7.5
Jan. 24-31.....	2,430	9.6		70	13	77		168	0	96	109	.2	4.0		a462	.63	3,030	228	90	2.2	826	7.6
Feb. 1-15.....	1,453	6.2		80	16	106		194	0	118	150	.3	1.0		575	.78	2,260	266	106	2.8	1,010	7.7

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
Feb. 16-28, 1962..	2,338	8.0		87	13	122		174	0	132	180	0.4	1.5		632	0.86	3,990	270	128	3.2	1,110	7.7
Mar. 1-16.....	1,529	10		88	17	115		202	0	134	165	.3	2.0		684	.93	2,820	290	124	2.9	1,070	7.8
Mar. 17-31.....	1,404	5.9		86	19	153		174	0	170	215	.3	1.0		774	1.05	2,930	292	150	3.9	1,260	7.5
Apr. 1-9.....	1,719	5.3		78	19	125		178	0	127	188	.3	1.2		647	.88	3,000	272	126	3.3	1,110	7.5
Apr. 10-14.....	1,384	9.6		86	17	144		157	0	156	218	--	.0		739	1.01	2,760	284	156	3.7	1,260	7.2
Apr. 15-28.....	1,924	8.9		82	16	121		175	0	128	180	--	2.2		664	.90	3,450	270	127	3.2	1,100	7.1
Apr. 29-30.....	8,280	15		62	9.4	76		131	0	87	112	--	3.0		428	--	--	193	86	--	748	7.7
May 1-12.....	3,081	15		70	10	70		170	0	86	96	.5	3.0		460	.63	3,830	216	76	2.1	741	6.9
May 13-31.....	1,170	10		84	17	152		166	0	153	222	--	1.2		767	1.04	2,420	280	144	4.0	1,240	7.1
June 1-11.....	5,675	23		56	7.5	60		136	0	68	81	.5	3.5		368	.50	5,640	170	59	2.0	629	7.6
June 12-15.....	6,002	--		--	--	--		128	0	56	22	--	--		a234	.32	3,790	121	16	--	345	8.1
June 16-17.....	5,420	--		--	--	--		136	2	90	128	--	--		--	--	--	197	82	--	822	8.3
June 18-27.....	4,563	17		97	19	197		131	0	193	310	--	2.5		952	1.29	11,730	320	212	4.8	1,590	7.6
June 28-30.....	7,287	--		--	--	--		152	0	84	106	--	--		--	--	--	200	76	--	761	7.4
July 1-10.....	3,330	17		58	9.1	71		132	0	80	101	.4	2.2		424	.58	3,810	182	74	2.3	707	7.4
July 11-31.....	1,367	13		80	17	137		151	0	143	208	--	2.0		a674	.92	2,490	270	146	3.6	1,200	7.2
Aug. 1-Sept. 9....	4,028	11		82	17	167		142	0	162	248	.4	.8		790	1.07	8,590	274	158	4.4	1,300	7.7
Sept. 10-11.....	14,800	15		59	9.1	95		118	0	98	135	--	2.8		a472	.64	18,860	184	88	3.0	794	7.9
Sept. 12-30.....	11,460	11		87	16	177		124	0	170	275	--	.5		836	1.14	25,870	283	182	4.6	1,360	7.6
Weighted average	3,538	12		80	14	131		152	--	134	196	--	2.2		669	0.90	6,390	258	134	3.6	1,110	7.5
Time-weighted average.....	--	11		81	15	128		164	--	134	189	--	2.2		666	--	--	265	131	3.4	1,110	7.5
Tons per day....	--	115		762	138	1,250		1,450	--	1,280	1,870	--	21		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 bridge, 2 miles south of Somerville, Burleson County, and 5 miles upstream from Davidson Creek.
DRAINAGE AREA.--990 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.
Water temperatures:: September 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 884 ppm Apr. 1-15; minimum, 111 ppm June 29-30.
Hardness: Maximum, 422 ppm Apr. 16-26; minimum, 44 ppm June 29-30.
Specific conductance: Maximum daily, 1,380 micromhos Apr. 14; minimum daily, 132 micromhos Sept. 28.
EXTREMES, September 1961 to September 1962.--Dissolved solids: Maximum, 884 ppm Apr. 1-15, 1962; minimum, 43 ppm Sept. 13-14, 1961.
Hardness: Maximum, 422 ppm Apr. 16-26, 1962; minimum, 18 ppm Sept. 13-14, 1961.
Specific conductance: Maximum daily, 1,380 micromhos Apr. 14, 1962; minimum daily, 53 micromhos Sept. 13, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 5-31, Sept. 1-7.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-10, 1961...	41.0	25		74	19	71		116		169	102	0.5	0.5		a562	0.76	62.2	262	168	1.9	845	7.0
Oct. 11-20.....	37.7	25		82	22	83		116		199	122	.5	.5		a639	.87	65.0	295	200	2.1	962	7.0
Oct. 21-31.....	38.1	27		88	21	88		119		210	127	.5	.2		a672	.91	69.1	306	208	2.2	994	7.0
Nov. 1-6.....	219	22		--	--	--		59		66	49	.3	--		--	--	--	114	--	--	401	6.9
Nov. 7-12.....	92.0	25		62	16	50		86		120	94	.3	.5		410	.56	102	220	150	1.5	716	7.0
Nov. 13-16.....	1,336	14		18	2.0	16		54		24	13	.2	.8		115	.16	415	53	9	1.0	158	7.1
Nov. 17.....	404	20		--	--	--		75		60	50	.2	--		--	--	--	116	--	--	380	7.2
Nov. 18-30.....	122	22		55	12	50		102		109	69	.2	.5		368	.50	121	186	103	1.6	617	7.2
Dec. 1-13, 26-31..	57.3	--		--	--	--		124		196	124	--	--		--	--	--	294	192	--	946	7.4
Dec. 14-25.....	397	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--
Jan. 1-25, 1962...	44.5	25		114	25	120		136		284	170	.4	.2		806	1.10	96.8	388	276	2.7	1,240	6.9
Jan. 26.....	230	--		--	--	--		40		79	57	--	--		--	--	--	113	80	--	429	6.3
Jan. 27-28.....	1,545	20		18	3.7	22		33		39	27	.3	.8		147	.20	613	60	33	1.2	231	6.5
Jan. 29-31.....	552	17		40	11	48		54		105	66	.3	1.8		316	.43	471	145	100	1.7	513	6.4
Feb. 1-23.....	69.5	24		101	24	104		118		249	156	.4	.8		717	.98	134	350	254	2.4	1,140	7.5
Feb. 24-28.....	172	20		73	18	85		81		193	122	.3	1.2		552	.75	256	256	190	2.3	891	6.9
Mar. 1-10.....	71.8	20		98	26	107		111		252	162	.4	.8		721	.98	140	352	260	2.5	1,140	7.3
Mar. 11-20.....	121	20		96	24	103		105		244	156	.4	.2		a763	1.04	249	338	252	2.4	1,110	7.2

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 21-31, 1962..	48.0	18		108	29	117		116		280	181	0.4	0.2		a873	1.19	113	389	294	2.6	1,260	7.3
Apr. 1-15.....	43.9	21		116	30	118		129		280	192	.4	.5		a884	1.20	105	413	308	2.5	1,310	7.1
Apr. 16-26.....	25.4	20		118	31	116		125		280	198	--	1.0		825	1.12	56.6	422	320	2.5	1,340	7.0
Apr. 27-28.....	168	--		--	--	--		97		239	172	--	--		--	--	--	350	270	--	1,150	7.4
Apr. 29-30.....	343	21		60	15	67		66		147	105	--	1.2		448	.61	415	211	157	2.0	741	7.2
May 1-10.....	310	19		43	12	48		68		94	75	.4	1.8		326	.44	273	157	102	1.7	557	6.7
May 11-19.....	22.2	21		68	18	73		102		149	116	--	1.5		494	.67	29.6	244	160	2.0	835	6.9
May 20-June 1.....	10.3	19		91	25	99		121		210	161	--	1.0		666	.91	18.5	330	231	2.4	1,110	7.4
June 2-3.....	82.0	--		--	--	--		73		154	105	--	--		--	--	--	219	159	--	774	7.5
June 4-10.....	225	15		34	9.8	38		53		81	56	--	1.2		261	.35	159	125	82	1.5	456	6.9
June 11-14.....	264	16		27	7.5	27		56		51	40	--	1.2		198	.27	141	98	52	1.2	338	6.9
June 15-27.....	30.8	18		50	15	49		85		108	78	--	1.2		361	.49	30.0	186	117	1.6	624	7.2
June 28.....	160	--		--	--	--		47		57	40	--	--		--	--	--	86	48	--	338	7.3
June 29-30.....	561	--		--	--	--		32		26	19	--	--		111	.15	168	44	18	--	176	6.8
July 1-7.....	609	16		20	5.0	22		48		37	28	.4	1.0		153	.21	252	70	31	1.1	253	6.5
July 8-12.....	51.2	19		40	11	38		85		74	58	--	.2		282	.38	39.0	145	75	1.4	482	7.3
July 13-31.....	3.9	19		57	16	64		121		105	98	--	.2		419	.57	4.41	208	109	1.9	720	7.7
Aug. 1-4.....	.2	21		72	20	84		146		125	137	.3	1.2		532	.72	.29	262	142	2.3	913	6.9
Sept. 8.....	31	--		--	--	--		17		175	63	--	--		--	--	--	191	177	--	590	6.9
Sept. 9-18.....	373	15		18	4.7	23		38		46	23	.4	1.5		151	.21	152	64	33	1.2	241	6.8
Sept. 19-25.....	15.8	17		34	9.4	34		51		90	43	--	1.2		254	.35	10.8	124	82	1.3	407	6.7
Sept. 26-30.....	445	14		15	2.6	18		36		29	19	--	.8		116	.16	139	48	19	1.1	182	6.7
Weighted average	131	18		43	11	46		67		98	65	--	0.9		319	0.43	113	150	96	1.6	508	6.8
Time-weighted average.....	--	20		72	18	75		100		170	114	--	0.7		532	--	--	256	175	2.0	844	7.0
Tons per day....	--	6.4		15	3.5	16		23		33	22	--	0.3		--	--	--	--	--	--	--	--

a Residue at 180°C.

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.--1,439 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1962.
Water temperatures: October 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,810 ppm Dec. 1-4; minimum, 132 ppm June 30.
Hardness: Maximum, 243 ppm Dec. 1-4; minimum, 52 ppm June 30.
Specific conductance: Maximum daily, 3,880 micromhos Dec. 2; minimum daily, 252 micromhos Nov. 23.
Water temperatures: Maximum, 87°F June 30; minimum, 33°F Jan. 13.
EXTREMES, 1958-62.--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, 89 micromhos Nov. 22, 1960.
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.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-9, 1961....	128	16		38	9.4	147		84		35	246	0.4	0.8		a556	0.76	192	134	64	5.5	991	7.2
Oct. 10-12.....	59.0	15		42	11	259		70		32	440	.4	.8		a906	1.23	144	150	92	9.2	1,570	6.9
Oct. 13-31.....	52.6	17		33	9.2	119		72		42	196	.3	.2		a465	.63	66.0	120	62	4.7	840	7.1
Nov. 1-3.....	75.0	21		40	11	127		102		47	204	--	2.5		a518	.70	105	145	62	4.6	926	7.3
Nov. 4-22.....	97.5	20		27	8.3	52		64		46	81	--	1.2		266	.36	70.0	102	49	2.2	479	7.0
Nov. 23-26.....	313	17		18	5.2	38		44		31	56	--	1.0		188	.26	159	66	30	2.0	328	6.9
Nov. 27-28.....	602	18		38	9.6	69		95		43	115	--	.8		340	.46	553	134	56	2.6	685	7.5
Nov. 29-30.....	556	17		64	13	376		127		21	640	--	3.0		1,200	1.63	1,800	213	109	11	2,300	7.4
Dec. 1-4.....	124	12		71	16	606		115		24	1,020	--	2.2		1,810	2.46	606	243	149	17	3,370	7.0
Dec. 5-7.....	104	--		--	--	--		103		32	460	--	--		--	--	252	155	70	--	1,740	7.7
Dec. 8-9.....	281	--		--	--	--		74		59	175	--	--		--	--	--	127	66	--	827	7.3
Dec. 10-17.....	1,266	18		15	5.0	46		36		26	71	--	.8		200	.27	684	58	28	2.6	365	6.7
Dec. 18-25.....	1,827	16		15	4.6	43		37		26	65	--	1.0		189	.26	932	56	26	2.5	340	6.6
Dec. 26-31.....	283	18		30	8.6	80		74		40	128	--	1.5		a364	.50	278	110	50	3.3	636	6.9
Jan. 1-26, 1962...	170	15		36	12	66		66		68	111	--	.8		a348	.47	160	140	86	2.4	617	7.1
Jan. 27.....	1,470	--		--	--	--		34		28	41	--	--		--	--	--	60	32	--	266	7.0
Jan. 28.....	1,490	--		--	--	--		36		54	72	--	--		--	--	--	92	62	--	427	6.8
Jan. 29-31.....	2,800	9.4		16	4.2	33		32		33	48	--	.8		160	.22	1,210	57	31	1.9	288	6.4
Feb. 1-3.....	1,237	11		20	5.1	32		40		36	49	--	1.0		174	.24	581	71	38	1.7	322	6.9
Feb. 4-11.....	231	14		33	11	54		62		63	91	--	.8		297	.40	185	128	77	2.1	543	7.2
Feb. 12-23.....	224	14		42	14	73		76		79	125	--	.8		385	.52	233	162	100	2.5	705	7.4

a Residue at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 24-28, 1962..	693	9.9		34	9.0	52		74		51	86	--	0.8		279	0.38	522	122	61	2.0	518	7.2
Mar. 1-10.....	292	16		46	13	149		84		70	248	--	.5		a640	.87	505	168	100	5.0	1,080	7.1
Mar. 11-20.....	234	13		48	14	116		94		78	192	--	.2		507	.69	320	178	100	3.8	929	7.2
Mar. 21-31.....	105	15		48	13	90		94		85	144	--	.5		442	.60	125	174	96	3.0	789	7.2
Apr. 1-15.....	85.1	18		50	15	85		90		94	140	0.3	1.0		447	.61	103	186	112	2.7	790	7.1
Apr. 16-17.....	194	--		--	--	--		109		94	205	--	--		--	--	--	218	128	--	1,020	7.6
Apr. 18-25.....	101	16		43	13	78		85		70	130	--	4.2		396	.54	108	161	92	2.7	724	7.1
Apr. 26-30.....	977	12		30	8.8	50		60		54	81	--	1.0		267	.36	704	111	62	2.1	486	7.0
May 1-2.....	1,700	--		--	--	--		54		30	52	--	--		--	--	--	73	29	--	326	7.1
May 3-4.....	2,540	--		--	--	--		77		23	150	--	--		--	--	--	111	48	--	667	7.1
May 5-7.....	1,796	15		43	9.4	163		88		27	282	.2	1.0		584	.79	2,830	146	74	5.9	1,120	6.8
May 8-10.....	251	12		38	8.9	122		92		33	203	--	.8		463	.63	314	132	56	4.6	883	7.3
May 11-20.....	72.7	17		42	11	97		100		51	159	--	1.2		a467	.64	91.7	150	68	3.4	780	7.2
May 21-31.....	40.9	17		44	12	91		99		65	148	--	.5		426	.58	47.0	160	78	3.1	786	7.0
June 1-5.....	178	18		36	11	64		70		65	105	.3	1.2		334	.45	161	135	78	2.4	603	7.3
June 6.....	267	--		--	--	--		100		77	308	--	--		--	--	--	234	152	--	1,330	7.3
June 7-14.....	633	12		32	7.4	66		91		30	105	--	1.5		299	.41	511	110	36	2.7	561	7.0
June 15-17.....	863	12		37	7.6	154		92		21	255	--	2.2		a574	.78	1,340	124	48	6.0	1,010	7.5
June 18-29.....	97.3	12		30	6.8	74		90		26	115	--	.5		308	.42	80.9	103	29	3.2	582	6.9
June 30.....	209	--		--	--	--		46		18	34	--	--		132	.18	74.5	52	14	--	254	6.8
July 1-3.....	286	14		18	4.6	42		46		26	63	.4	1.2		192	.26	148	64	26	2.3	355	6.7
July 4.....	390	--		--	--	--		98		37	575	--	--		--	--	--	213	132	--	2,110	7.5
July 5-7.....	159	14		34	6.6	88		110		24	133	--	1.2		355	.48	152	112	22	3.6	667	7.1
July 8-31.....	19.0	16		36	7.9	64		120		32	92	--	.2		307	.42	15.7	122	24	2.5	562	7.2
Aug. 1-31.....	3.0	15		42	11	74		136		42	110	.4	.5		362	.49	2.94	150	38	2.6	657	7.2
Sept. 1-15.....	6.6	14		42	10	75		129		42	112	.4	.8		a364	.50	6.50	146	40	2.7	631	7.5
Sept. 16-30.....	12.1	15		34	8.4	60		86		54	87	--	.8		a312	.42	10.2	119	49	2.4	529	7.0
Weighted average	289	14		29	7.8	76		63		40	125	--	1.0		328	0.45	256	104	53	3.1	600	6.8
Time-weighted average.....	--	15		37	10	91		87		50	146	--	0.9		400	--	--	134	62	3.2	722	7.1
Tons per day....	--	11		23	6.1	60		49		31	97	--	0.8		--	--	--	--	--	--	--	--

a Residue at 180°C.

8-1140. BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad bridge, and at mile 93.
DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1962.
Water temperatures: November 1950 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,010 ppm Aug. 1-10; minimum, 210 ppm June 18-21, 23.
Hardness: Maximum, 334 ppm Aug. 1-10; minimum, 124 ppm June 18-21, 23.
Specific conductance: Maximum daily, 1,860 micromhos Aug. 8; minimum daily, 348 micromhos June 19.
Water temperatures: Maximum, 84°F on several days in July; minimum, 40°F Jan. 9-12.
EXTREMES, 1945-62.--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 (1950-62): Maximum, 91°F Aug. 5, 1951; minimum, 39°F Jan. 4, 1959.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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			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	Noncarbonate			
Oct. 1-13, 1961...	3,642	16		80	14	140		166		126	208	0.4	0.8		725	0.99	7,130	257	121	3.8	1,150	7.4
Oct. 14-17.....	10,420	15		47	7.4	45		141		44	57	.4	3.8		a289	.39	8,130	148	32	1.6	507	7.6
Oct. 18-24.....	7,759	18		96	16	187		145		178	288	.4	1.2		a856	1.16	17,930	306	186	4.7	1,460	7.6
Oct. 25-31.....	5,920	14		68	13	82		180		78	121	.4	1.2		511	.69	8,170	223	76	2.4	822	7.7
Nov. 1-10.....	4,459	12		66	10	82		169		78	114	.4	2.0		460	.63	5,540	206	67	2.5	777	7.2
Nov. 11-20.....	6,876	14		63	8.9	82		160		77	112	.3	1.5		447	.61	8,300	194	62	2.6	760	7.2
Nov. 21-30.....	7,209	12		59	7.5	66		159		71	82	.3	1.5		a377	.51	7,340	178	48	2.2	628	7.2
Dec. 1-10.....	4,542	13		73	12	80		186		75	122	.3	1.8		a468	.64	5,740	232	79	2.3	828	7.6
Dec. 11-20.....	7,611	12		70	12	84		166		83	128	.3	2.5		506	.69	10,400	224	88	2.4	835	7.5
Dec. 21-31.....	7,965	14		53	8.6	61		124		66	91	.3	2.0		a357	.49	7,680	168	66	2.0	639	7.3
Jan. 1-15, 1962...	3,403	10		80	14	85		208		86	128	--	2.0		517	.70	4,750	257	86	2.3	885	7.4
Jan. 16-27.....	2,958	11		89	15	111		216		116	160	--	2.0		a610	.83	4,870	284	106	2.9	1,040	7.5
Jan. 28-29.....	9,665	16		62	9.3	54		165		57	80	--	2.8		a362	.49	9,450	193	58	1.7	627	7.4
Jan. 30-31.....	9,015	15		48	6.8	53		116		61	73	--	2.2		a316	.43	7,690	148	53	1.9	543	7.2
Feb. 1-11.....	5,253	12		50	8.4	53		125		60	76	.3	1.5		340	.46	4,820	160	57	1.8	566	7.0

a Calculated from determined constituents.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Feb. 12-18, 1962..	2,821	9.4		67	12	72		181		80	99	0.3	0.5		440	0.60	3,350	216	68	2.1	750	7.0
Feb. 19-28.....	3,198	7.9		78	14	101		184		109	146	.4	1.0		559	.76	4,830	252	101	2.8	961	7.3
Mar. 1-15.....	2,741	12		75	14	98		176		109	141	--	.2		a536	.73	3,970	244	100	2.7	925	7.3
Mar. 16-31.....	2,064	12		81	16	122		198		123	172	--	.2		a623	.85	3,470	268	106	3.2	1,030	7.3
Apr. 1-15.....	1,914	8.1		84	18	112		198		119	170	.4	.8		641	.87	3,310	284	121	2.9	1,080	7.0
Apr. 16-30.....	1,882	7.1		73	16	103		164		114	155	--	.8		582	.79	2,960	248	114	2.8	985	7.0
May 1-2, 8.....	6,740	16		72	12	96		151		105	142	.4	2.8		534	.73	9,720	229	106	2.8	896	7.4
May 3-7, 9-13.....	4,991	16		55	8.6	54		129		67	79	--	3.5		366	.50	4,930	172	67	1.8	597	7.0
May 14-31.....	1,369	14		79	16	110		193		99	170	--	.5		629	.86	2,320	263	105	2.9	1,020	7.2
June 1-4.....	1,384	15		87	20	140		214		132	205	.4	1.8		750	1.02	2,800	300	124	3.5	1,230	7.5
June 5.....	3,850	--		--	--	--		109		126	178	--	--		--	--	--	204	114	--	1,090	7.8
June 6-12.....	5,399	12		48	7.6	46		124		57	62	--	3.2		a297	.40	4,330	152	50	1.6	529	7.5
June 13-17.....	8,550	12		58	7.9	57		127		72	84	--	3.0		383	.52	8,840	177	73	1.9	630	7.6
June 18-21, 23....	5,284	7.9		41	5.2	27		118		38	32	--	1.2		a210	.29	3,000	124	28	1.1	377	7.9
June 22.....	5,620	--		--	--	--		134		79	112	--	--		--	--	--	192	82	--	741	7.6
June 24-30.....	4,500	10		94	16	175		133		169	280	--	1.0		a810	1.10	9,840	300	192	4.4	1,430	7.4
July 1.....	5,760	16		75	13	123		136		130	185	--	.0		a609	.83	9,470	240	129	3.5	1,080	7.6
July 2-13.....	5,335	15		50	7.8	68		125		71	89	.4	1.2		391	.53	5,630	157	54	2.4	625	7.0
July 14-31.....	1,180	15		76	16	111		190		110	160	.4	.5		a582	.79	1,850	256	100	3.0	1,010	7.0
Aug. 1-10.....	6,728	16		104	18	230		130		224	348	.5	1.0		1,010	1.37	18,350	334	227	5.5	1,740	7.5
Aug. 11-31.....	3,333	12		89	17	184		135		181	278	--	.8		869	1.18	7,820	292	182	4.7	1,440	7.1
Sept. 1-13, 15-30.	7,168	13		84	16	163		144		158	245	.4	.8		770	1.05	14,900	276	158	4.3	1,300	7.3
Sept. 14.....	17,200	--		--	--	--		128		72	77	--	--		--	--	--	157	52	--	603	7.6
Weighted average	4,508	13		71	12	106		153		106	156	--	1.5		551	0.75	6,710	229	103	3.0	941	7.3
Time-weighted average.....	--	12		74	13	108		163		109	160	--	1.3		571	--	--	239	105	3.0	970	7.2
Tons per day....	--	158		867	150	1,290		1,870		1,300	1,890	--	18		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 to September 1962.
EXTREMES, January to September 1962.--Specific conductance: Maximum daily, 3,050 micromhos May 29; minimum daily, 363 micromhos June 18.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, January to September 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			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	Noncarbonate			
Jan. 16-17, 19, 21-27, 1962		12		94	16	115		227		114	172	0.3	2.5		659	0.90		300	114	2.9	1,100	7.3
Feb. 2-12		13		49	8.2	52		122		59	74	.3	2.2		330	.45		156	56	1.8	552	7.2
Mar. 16-31		8.4		83	16	118		209		114	168	.3	.8		660	.90		273	102	3.1	1,050	7.6
Apr. 16-30		6.4		72	17	115		178		116	165	--	1.2		631	.86		250	104	3.2	1,010	7.8
May 2		15		89	12	583		138		133	910	.4	4.2		1,810	2.46		272	158	15	3,290	7.5
May 4-14		18		58	9.3	60		134		73	87	.4	4.2		394	.54		183	73	1.9	649	7.2
June 1-4		22		69	21	136		194		99	205	.4	1.8		662	.90		258	100	3.7	1,140	7.5
July 26-31		15		74	19	115		220		88	170	--	.0		628	.85		262	82	3.1	1,060	--
Aug. 1-4		18		63	21	127		203		100	175	.4	.8		a605	.82		244	77	3.5	1,080	7.4
Sept. 1-30		11		82	16	149		143		144	230	.3	3.2		741	1.01		270	154	3.9	1,210	7.2

a Calculated from determined constituents.

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 to September 1962.
EXTREMES, January to September 1962.--Specific conductance: Maximum daily, 16,300 micromhos Aug. 3; minimum daily, 364 micromhos June 19.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, January to September 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			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	Noncarbonate			
Jan. 16-27, 1962..		9.5		85	15	104		218		102	151	0.3	2.5		578	0.79		274	95	2.7	991	7.7
Feb. 2-12.....		12		48	8.1	52		120		60	73	.3	2.0		328	.45		154	55	1.8	546	7.4
Mar. 16-31.....		8.4		80	16	105		204		109	150	.3	.5		595	.81		266	98	2.8	985	7.6
Apr. 16-30.....		5.0		76	17	118		183		120	170	--	.8		647	.88		260	110	3.2	1,040	7.8
May 3.....		26		82	12	410		148		128	628	.4	4.9		1,360	1.85		254	132	11	2,430	7.6
May 31.....		15		40	32	521		368		62	705	.9	2.0		1,560	2.12		232	0	15	2,830	7.4
June 1-4.....		17		107	108	963		194		260	1,680	.5	4.5		3,240	4.41		711	552	16	5,650	7.6
July 26-27, 30-31.		12		159	313	2,700		172		721	4,730	--	--		8,720	11.9		1,680	1,540	29	12,500	6.9
Aug. 1-3.....		16		164	328	2,970		186		748	5,170	--	--		9,490	13.0		1,760	1,610	31	15,300	7.4
Sept. 1, 3-7,10-14 17-21, 24-28....		11		83	16	163		146		158	242	.4	.8		765	1.04		273	154	4.3	1,270	7.5

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0808. WHITE RIVER NEAR CROSBYTON																						
Nov. 6, 1961	1.60	34		33	33	59		321	45	20	3.1	0.0		385	0.52		218	0	37	1.7	622	7.7
Aug. 9, 1962	.61	35		35	32	68		350	40	20	3.6	.0		406	.55		219	0	40	2.0	659	7.2
8-0810.5. SHORT CROTON CREEK AT MOUTH NEAR JAYTON																						
Nov. 7, 1961	0.01								3,480	17,300											41,700	
Dec. 5	.02								3,310	17,000											42,500	
Aug. 9, 1962	a .05								3,580	16,400											39,800	
Sept. 13	a .12								3,610	15,700											38,500	
8-0811. CROTON CREEK BELOW SHORT CROTON CREEK NEAR JAYTON																						
Nov. 7, 1961	0.25					--			2,430	4,620							--		--	--	15,500	
Dec. 5	.24					--			3,360	13,000							--		--	--	34,900	
Mar. 7, 1962	a .02					9,060			4,410	13,700							4,220		82	--	36,700	
Apr. 12	a .01					--			4,730	22,200							--		--	--	50,400	
June 14	12.8					952		87	1,980	1,480							2,150	2,080	49	8.9	7,430	7.6
Aug. 9	a .25					--			2,990	7,330							--		--	--	21,400	
Sept. 13	1.76					4,210			2,770	6,740							3,230		74	32	20,200	
SALT FORK BRAZOS RIVER NEAR PEACOCK																						
Feb. 11, 1962	a2							136		11,100							2,800	2,690			29,800	7.0
8-0827. MILLERS CREEK NEAR SEYMOUR																						
June 15, 1962	6.2	17		38	6.0	13		142	14	11	0.3	1.0		b176	0.24		120	3	19	0.5	295	6.7
Sept. 14	7.10	16		68	17	39		184	98	50	.3	.8		379	.52		240	88	26	1.1	618	6.8
8-0860.5. DEEP CREEK AT MORAN																						
Dec. 10, 1961	a0.8	3.6		143	43	290		157	137	630	0.3	4.2		1,330	1.81		534	406	54	5.3	2,460	7.2
Jan. 26, 1962	a .5	--		--	--	--		--	--	1,650	--	--		--	--		--	--	--	--	5,840	--
Aug. 2	a1	7.5		45	10	46		132	28	81	.3	.0		283	.41		154	46	39	1.6	519	6.8
COOK CREEK NEAR ALBANY																						
Dec. 10, 1961	a0.5	4.3		1,070	225	2,590		121	152	6,360				10,500	14.4		3,600	3,500	61	19	17,000	7.1
Jan. 26, 1962	a .2	--		--	--	--		--	--	5,860				--	--		--	--	--	--	15,700	--
Aug. 1	a .01	8.6		748	185	1,980		115	75	4,790				7,840	10.7		2,630	2,530	62	17	12,900	6.5

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

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0861.5. NORTH FORK HUBBARD CREEK NEAR ALBANY																						
Dec. 10, 1961	a1.5	2.6		428	113	741	156	66	2,090				3,520	4.79		1,530	1,400	51	8.2	6,480	7.2
Jan. 25, 1962	.55	--		--	--	--	--	--	2,750				--	--		--	--	--	--	8,200	--
Aug. 1	a1	9.7		248	70	504	116	43	1,320		0.2		2,250	3.06		907	812	55	7.3	4,250	6.8
BATTLE CREEK AT MOUTH NEAR BRECKENRIDGE																						
Dec. 10, 1961	a0.01	5.2		240	36	616	172	54	1,340		0.0		2,380	3.24		747	606	64	9.8	4,430	7.0
Jan. 25, 1962	a .002	--		--	--	--	--	--	980		--		--	--		--	--	--	--	3,430	--
Aug. 1	a .1	7.9		52	7.3	92	100	25	178	0.4	.2		412	.56		160	78	56	3.2	809	6.7
8-0880. BRAZOS RIVER NEAR SOUTH BEND																						
June 12, 1962	11,000	12		107	13	107	200	159	158	0.3	0.0		b712	0.97		320	156	42	2.6	1,120	6.8
LAKE GRAHAM NEAR GRAHAM																						
June 20, 1962		2.7		47	7.4	59	115	8.8	122	0.4	0.0		304	0.41		148	54	46	2.1	612	6.6
BRAZOS RIVER AT BUNGER ROAD NEAR GRAHAM																						
June 20, 1962		11		144	19	164	165	292	250	0.5	2.2		b1,030	1.40		438	302	45	3.4	1,620	7.1
KEECHI CREEK RESERVOIR NEAR GRAFORD																						
Oct. 30, 1961		7.7		42	6.0	15	149	12	19	0.5	0.0		175	0.24		129	7	20	0.6	323	7.1
Nov. 6		--		--	--	--	154	--	21	--	--		--	--		130	4	--	--	330	7.1
Jan. 4, 1962		--		--	--	--	181	--	25	--	--		--	--		158	10	--	--	395	6.7
Feb. 7		--		--	--	--	212	--	30	--	--		--	--		184	10	--	--	441	7.2
Apr. 10	c	4.3		50	8.1	28	183	24	30	.4	.2		b236	.32		158	8	28	1.0	402	7.1
June 14		7.5		28	3.8	14	82	17	22	.3	.2		133	.18		86	18	27	.7	239	6.8
8-0905. PALO PINTO CREEK NEAR SANTO																						
Dec. 7, 1961	0.23	4.3		43	10	28	132	49	35	0.3	0.0		b236	0.32		148	40	29	1.0	415	7.5
Mar. 23, 1962	.07	3.1		66	15	47	230	73	44	.3	.0		b376	.51		226	38	31	1.4	617	7.5
May 2	1.75	3.0		94	24	121	158	139	226	.3	2.0		b763	1.04		333	204	44	2.9	1,190	7.6
June 6	.08	5.0		43	8.2	44	99	43	78	.3	1.0		272	.37		141	60	41	1.6	485	7.0
June 10	4,300	9.6		42	4.7	14	131	17	18	.3	2.8		172	.23		124	17	19	.5	295	7.3
Aug. 9	12.5	--		--	--	--	208	--	52	--	--		--	--		206	36	--	--	563	6.8

a Field estimate.
b Residue on evaporation at 180°C.
c Outflow 0.11 cfs.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0905. PALO PINTO CREEK NEAR SANTO--Continued																						
Sept. 2, 1962	85	--		--	--	--		117	--	75	--	--		--	--		149	53	--	--	503	6.7
Sept. 4	22	7.5		37	4.6	27		105	12	50	0.1	0.5		191	.26		111	25	34	1.1	358	6.6
Sept. 7	1,100	7.7		36	3.9	15		98	17	28	.0	1.0		157	.21		106	26	23	.6	289	6.7
Sept. 8	6,500	7.2		34	2.6	7.2	3.0	110	6.2	13	.0	1.0		128	.17		96	5	14	.3	219	7.0
Sept. 10	640	8.4		42	5.1	15		133	14	24	.1	.2		174	.24		126	17	20	.6	317	6.9
Sept. 19	30.6	8.5		48	6.6	29		142	27	46	.2	.8		236	.32		147	31	30	1.0	421	6.6
Sept. 22	.01	--		--	--	--		191	56	--	--	--		--	--		186	30	--	--	539	7.1
LAKE MINERAL WELLS NEAR MINERAL WELLS																						
May 9, 1962		3.6	0.06	36	7.8	11		128	22	12	0.3	0.8		167	0.23		122	17	17	0.4	280	6.9
NORTH PALUXY CREEK AT MORGAN MILL																						
Oct. 30, 1961	a1	13		78	40	40		356	91	41	0.6	0.0		b486	0.66		359	68	19	0.9	801	7.5
8-0915. PALUXY CREEK AT GLEN ROSE																						
Dec. 5, 1961	41.6	10		45	22	24		206	45	27	0.3	0.0		b274	0.37		203	34	20	0.7	475	7.4
Jan. 10, 1962	56.8	9.0		39	26	22		200	47	28	.2	.2		b269	.37		204	40	19	.7	482	7.5
Mar. 20	27.2	9.4		31	27	26		176	52	32	.3	.2		265	.36		188	44	23	.8	465	7.5
May 3	27.1	10		53	22	23		213	47	34	.4	.0		b322	.44		222	48	18	.7	514	7.3
June 5	10.4	16		39	26	23		198	43	32	.3	.0		b276	.38		204	42	19	.7	484	7.3
July 11	5.18	14		40	20	20		196	30	23	.4	.0		b248	.34		182	21	19	.6	430	7.0
Sept. 10	27	9.4		31	11	16		143	20	12	.4	.5		170	.23		123	5	22	.6	286	7.3
Sept. 18	5.55	10		37	16	18		179	26	16	.4	.0		211	.29		158	11	20	.6	365	7.1
8-0920. NOLANDS RIVER AT BLUM																						
Jan. 8, 1962	28.3	1.3		42	7.6	54		188	47	32	0.4	6.0		282	0.38		136	0	46	2.0	487	7.7
Feb. 12	19.0	1.0		77	8.4	60		297	56	36	.6	4.0		b398	.54		226	0	37	1.7	667	7.6
Mar. 19	17.9	.8		70	7.7	73		296	61	39	.6	3.2		401	.55		206	0	44	2.2	682	7.6
Apr. 24	14.4	10		66	6.9	77		297	53	41	.7	2.2		b414	.56		193	0	46	2.4	666	7.1
June 4	4.58	11		42	5.1	122		320	58	47	.7	.5		b453	.62		126	0	68	4.7	757	6.9
July 9	9.22	9.4		55	6.0	46		228	33	28	.5	.0		b302	.41		162	0	38	1.6	506	6.8
Sept. 17	3.99	7.3		40	3.6	35		172	26	16	--	.0		b230	.31		115	0	40	1.4	362	6.8

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

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0935. AQUILLA CREEK NEAR AQUILLA																						
Dec. 4, 1961	35.0	9.9		93	6.8	58		187	173	34	0.6	5.4		b473	0.64		260	107	33	1.6	727	7.5
Jan. 8, 1962	28.1	5.1		104	9.4	75		192	222	49	.5	4.0		b580	.79		298	140	35	1.9	876	7.0
Feb. 12	19.1	1.8		138	12	101		264	289	63	.7	4.8		b760	1.03		394	178	36	2.2	1,120	7.0
Mar. 19	17.0	--		--	--	--		176	--	68	.7	--		--	--		328	--	--	--	1,030	7.4
Apr. 24	28.6	8.6		135	15	139		295	321	85	.9	3.8		b903	1.23		398	156	43	3.0	1,260	7.6
June 4	3.53	8.7		108	9.1	72		199	210	54	.7	4.0		b583	.79		307	144	34	1.8	895	7.2
July 10	4.08	12		130	9.7	76		299	210	45	.8	2.0		b640	.87		364	120	31	1.7	966	7.0
8-0950. NORTH BOSQUE RIVER NEAR CLIFTON																						
Dec. 2, 1961	114	9.4		82	8.6	18		248	36	25	0.3	3.8		b319	0.43		240	37	14	0.5	533	7.1
Dec. 29	118	8.1		74	8.1	23		234	38	23	.4	4.1		b300	.41		218	26	19	.7	505	7.4
Jan. 31, 1962	82.4	4.9		79	8.8	21		241	38	26	.3	4.4		b304	.41		233	36	16	.6	526	7.1
Mar. 1	73.9	6.8		76	9.5	25		239	40	29	.4	2.8		308	.42		228	32	19	.7	536	7.2
Mar. 29	56.8	6.4		49	9.2	26		164	37	30	.3	1.5		b252	.34		160	26	26	.9	420	7.4
May 1	828	9.0		52	3.7	13		157	21	14	.3	2.2		b206	.28		145	16	16	.5	323	6.9
May 29	41.9	8.4		65	7.4	18		209	26	21	.4	2.2		b252	.34		193	21	17	.6	444	6.9
June 29	44.1	8.0		57	6.1	13		174	20	21	.4	2.0		214	.29		167	25	14	.4	390	6.7
Aug. 29	4.12	14		68	7.2	24		228	22	26	.4	4.8		278	.38		199	12	21	.7	462	7.0
Sept. 10	150	8.6		34	4.5	5.6	4.3	120	11	6.0	.3	1.2		b138	.19		103	5	10	.2	228	7.1
8-0953. MIDDLE BOSQUE RIVER NEAR McGREGOR																						
Dec. 1, 1961	96.0	8.9		70	2.8	8.7	1.1	199	19	12	0.3	8.6		229	0.31		186	23	9	0.3	398	7.0
Dec. 28	60.2	6.5		63	2.5	12		176	21	13	.4	9.4		215	.29		168	23	13	.4	373	7.1
Jan. 31, 1962	28	5.1		70	2.6	12		198	22	14	.4	8.1		b235	.32		185	23	13	.4	404	7.2
Feb. 28	28.3	7.5		63	2.6	12		181	22	13	.4	4.8		214	.29		168	20	14	.4	375	7.2
Mar. 29	15	6.9		50	2.5	11		141	22	12	.3	2.2		b184	.25		135	20	14	.4	318	7.2
Apr. 30	16.1	7.5		55	2.5	10		158	19	13	.4	.8		b200	.27		148	18	13	.4	325	7.4
May 29	95	11		42	1.8	4.8	2.4	126	10	5.5	.3	1.5		b146	.20		112	9	8	.2	243	6.7
July 9	15.7	8.9		56	2.6	8.6	1.6	169	16	10	.3	.0		187	.25		150	12	11	.3	331	6.9
July 31	.5	14		44	2.5	12		132	19	12	.3	.0		169	.23		120	12	18	.5	281	7.1
Aug. 29	.06	11		38	2.3	16		107	27	15	.4	.0		163	.22		104	17	24	.7	275	6.9

b Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-0956. BOSQUE RIVER NEAR WACO																						
Jan. 18, 1962	720	5.7		67	5.9	17		197	32	20	0.3	5.3		b258	0.35		191	30	16	0.5	432	7.3
Jan. 18	714	6.6		60	5.4	17		174	32	20	.3	5.8		b238	.32		172	29	18	.6	405	7.1
Feb. 21	62.4	3.4		62	6.3	24		182	46	23	.3	3.8		258	.35		181	31	23	.8	446	7.6
Mar. 29	73.7	--		--	--	--		127	--	24	.3	--		--	--		132	--	--	--	357	7.4
Apr. 30	104	4.6		58	6.7	19		172	34	24	.3	2.0		b251	.34		172	31	19	.6	417	7.0
June 7	60.7	7.5		53	5.5	19		164	32	19	.3	.5		b221	.30		155	20	21	.7	380	7.0
Aug. 15	2.28	13		65	6.7	43		188	53	52	.3	.0		325	.44		190	36	33	1.4	557	6.9
Sept. 19	7.54	10		54	4.4	17		159	36	14	.3	1.0		b226	.31		153	23	19	.6	360	7.1
8-0965. BRAZOS RIVER AT WACO																						
Mar. 30, 1962	478	6.8		108	14	160		181	182	235	0.3	4.2		b859	1.17		327	178	51	3.8	1,330	7.4
8-0995. LEON RIVER NEAR HASSE																						
Oct. 30, 1961	2.3	11		75	32	102		248	105	160	0.5	0.2		b656	0.89		318	116	41	2.5	1,060	7.5
Feb. 16, 1962	14.8	7.4		108	55	160		358	160	270	.6	1.5		938	1.28		496	202	41	3.1	1,620	7.4
May 1	16.1	8.6		96	48	148		301	130	265	.5	1.2		845	1.15		437	190	42	3.1	1,530	7.4
June 6	3.64	11		64	54	143		293	143	211	.9	3.2		b833	1.13		382	142	45	3.2	1,390	6.9
July 4	7.5	8.1		52	16	48		167	42	84	.4	.2		b358	.49		196	58	35	1.5	629	6.9
Aug. 9	14.9	9.9		84	15	91		212	43	177	.3	.0		524	.71		271	98	42	2.4	974	7.2
Sept. 9	7,300	7.3		21	2.5	5.9	5.0	74	4.2	12	.2	.2		94	.13		63	2	16	.3	158	6.9
Sept. 9	7,100	5.9		24	3.1	10		77	4.4	19	.1	.0		104	.14		73	10	23	.5	188	6.5
Sept. 19	94.0	12		94	19	81		258	66	147	.3	.0		546	.74		312	101	36	2.0	980	7.0
8-1005. LEON RIVER AT GATESVILLE																						
Oct. 10, 1961	15,400	7.2		22	1.5	1.7	2.2	74	1.8	1.5	0.3	1.8		76	0.10		61	0	5	0.1	135	7.5
8-1010. COWHOUSE CREEK AT PIDCOKE																						
Feb. 16, 1962	32							272		28							266	43			587	7.4
8-1020. BELTON RESERVOIR NEAR BELTON																						
Oct. 25, 1961		6.9		49	10	25		167	29	36		0.2		b241	0.33		163	26	25	0.9	423	7.0
Sept. 24, 1962		5.1	0.00	40	14	30		156	35	41	0.3	.0		b246	.33		157	30	29	1.0	444	7.6

b Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1025. LEON RIVER NEAR BELTON																						
May 31, 1962	32	7.0		62	11	22		215	29	28	0.3	2.0		267	0.36		200	24	19	0.7	475	7.0
June 8	103	5.2		52	12	26		185	34	34	.3	.8		255	.35		179	28	24	.8	449	7.3
June 22	440	3.4		52	11	26		178	32	36	.4	.5		249	.34		175	29	24	.9	447	7.4
July 11	225	4.4		49	13	23		171	33	36	.4	.5		243	.33		176	36	23	.8	456	6.8
Aug. 16	5.00	3.8		42	15	66		196	57	62	.5	1.2		348	.47		166	6	46	2.2	609	6.9
Sept. 5	6.48	6.8		53	13	24		189	31	35	.4	.5		b262	.36		186	31	22	.8	454	7.0
Sept. 17	3,200	7.0		51	13	27		186	30	38	.3	.8		b276	.38		181	28	24	.9	458	6.8
SOUTH ROCKY CREEK NEAR BRIGGS																						
May 10, 1962	a7	5.0		64	13	5.4	0.4	243	13	7.2	0.3	0.5		b236	0.32		213	14	5	0.2	409	7.2
NORTH SAN GABRIEL RIVER AT GEORGETOWN																						
Jan. 4, 1962	23.0	7.4		65	19	17		244	24	32	0.2	6.6		b302	0.41		240	40	13	0.5	520	7.3
Aug. 24	1.88	16		29	18	25		123	22	54	.3	.1		b237	.32		146	46	27	.9	392	7.5
Sept. 8	--	10		48	5.4	2.1	3.5	163	11	3.5	.2	3.5		167	.23		142	8	3	.1	284	7.0
SOUTH SAN GABRIEL RIVER AT GEORGETOWN																						
Jan. 4, 1962	16.6	5.1		57	15	17		211	26	23	0.2	9.1		b258	0.35		204	31	15	0.5	449	7.4
8-1050. SAN GABRIEL RIVER AT GEORGETOWN																						
Dec. 11, 1961	62.5	7.6		--	17	--		--	21	24	0.3	11		--	--		--	--	--	--	--	--
Jan. 4, 1962	53.9	7.0		70	18	14		256	23	26	.2	11		b297	.40		248	38	11	0.4	520	7.2
Jan. 17	43	7.5		68	18	14		249	23	26	.2	12		b298	.41		244	40	11	.4	523	7.0
Mar. 29	34	7.2		33	17	14		138	23	28	.2	7.0		197	.27		152	39	17	.5	357	7.5
May 1	89.3	7.6		53	13	12		199	18	18	.2	4.0		b240	.33		186	23	12	.4	396	7.5
June 11	50.5	11		58	14	11		219	18	17	.3	3.0		240	.33		202	23	10	.3	421	7.4
Aug. 17	8.08	12		78	19	15		297	17	26	.3	7.6		321	.44		272	29	11	.4	567	7.0
Sept. 21	11	9.1		76	18	13		286	18	22	.2	9.8		307	.42		264	29	10	.3	531	7.2

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

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

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

Date of collection	Discharge (cfs estimated)	Chloride (ppm)	Specific conductance (micromhos at 25°C)
BIG CREEK AT FARM ROAD 1994 NEAR GUY			
Jan. 17, 1962	--	138	977
Feb. 14	--	152	968
Mar. 14	--	150	949
Apr. 10	30	115	872
May 2	30	22	219
June 9	50	18	195
July 11	16	145	819
Aug. 7	--	202	1,150
Sept. 13	40	31	304
BIG CREEK AT FARM ROAD 762 NEAR GUY			
Jan. 17, 1962	--	172	1,120
Feb. 14	--	185	1,120
Mar. 14	--	180	1,050
Apr. 10	30	96	624
May 2	50	402	1,480
June 9	60	13	176
July 11	20	146	861
Aug. 7	--	198	1,200
Sept. 13	50	31	307
BIG CREEK AT COUNTY ROAD 9 MILES NORTHEAST OF GUY			
Jan. 17, 1962	--	305	1,440
Feb. 14	--	238	1,260
Mar. 14	--	215	1,170
Apr. 10	30	101	676
May 2	50	225	934
June 9	60	18	232
July 11	30	132	778
Aug. 7	--	185	1,050
Sept. 13	80	72	542
COW CREEK AT KITTY NASH RANCH ROAD 8 MILES NORTHEAST OF DAMON			
Jan. 17, 1962	--	202	1,080
Feb. 14	--	160	918
Mar. 14	--	358	1,590
Apr. 10	0.8	208	943
May 2	4.4	52	294
June 9	3.3	292	1,300
July 11	1.1	368	1,510
Aug. 7	--	480	1,870
Sept. 13	1.1	170	944
VARNER CREEK 2 MILES NORTH OF WEST COLUMBIA, ABOUT 3 MILES ABOVE MOUTH			
Jan. 17, 1962	--	41	265
Feb. 14	--	34	294
Mar. 14	--	28	265
Apr. 10	1.0	67	394
May 2	14	19	153
June 9	1.5	162	755
July 11	.6	68	472
Aug. 7	--	117	742
WEST COLUMBIA OIL FIELD WASTE DISCHARGE DITCH, ABOUT 2 MILES NORTH OF WEST COLUMBIA			
Feb. 14, 1962	--	34,700	70,800
Mar. 14	--	49,500	88,900
Apr. 10	0.02	15,200	35,500
May 2	1.5	1,420	4,420
June 9	.7	6,870	18,900
Aug. 7	--	3,780	11,000
VARNER CREEK AT STATE HIGHWAY 35 AT EAST COLUMBIA			
Jan. 17, 1962	--	670	2,460
Feb. 14	--	2,850	8,420
Mar. 14	--	640	2,350
Apr. 10	1.6	1,050	3,460
May 2	17	40	262
June 9	--	1,100	3,690
July 11	.2	174	835
Aug. 7	--	288	1,280
Sept. 13	.1	630	2,460

HUBBARD CREEK LOW FLOW INVESTIGATION

Water samples were collected for chemical analyses and discharge measurements were made on Hubbard Creek and its tributaries in Shackelford and Stephens Counties, from county road 2.5 miles north of Sedwick to gaging station 8-0865, Hubbard Creek near Breckenridge, Tex., a distance of 24 miles.

The objective was to delineate sources of salt-water pollution, and to determine if the stream channel in the reservoir area (dam under construction) was losing or gaining flow. A discussion of the results of the investigation are published in Texas Water Commission Bulletin 6411.

Chemical analyses, in parts per million, January 1962

Date	Stream	Location	Discharge (cfs)	Chloride (Cl)		Specific Conductance (micromhos at 25°C)
				ppm	Tons per day	
Jan. 26	Hubbard Creek	County road crossing 2.5 miles north of Sedwick	1.06	700	2.00	2,640
26	Deep Creek	3.0 miles above mouth	.32	730	.63	2,800
26	Hubbard Creek	At gage 8-861 near Albany	1.62	600	2.62	2,280
25	Salt Prong Hubbard Creek	8.3 miles above mouth	.74	560	1.12	2,240
25	North Fork Hubbard Creek	At gage 8-861.5	.55	2,750	4.08	8,200
25	Salt Prong Hubbard Creek	At gage 8-862 near Albany	1.62	1,650	7.22	5,250
25	Snailum Creek	0.2 mile above mouth	a.06	2,080	.34	6,380
25	Salt Prong Hubbard Creek	0.5 mile above mouth	1.58	1,540	6.57	4,970
26	Hubbard Creek	9.0 miles east of Albany	2.93	1,250	9.89	4,190
26	-----do.-----	12 miles east of Albany	3.13	1,280	10.8	4,300
25	Big Sandy Creek	0.2 mile above mouth of Battle Creek	.02	10,200	b .56	24,000
25	Battle Creek	0.2 mile above mouth	a.002	980	.00	3,430
25	Big Sandy Creek	At gage 8-863 near Breckenridge	.03	1,260	.10	4,470
25	Big Sandy Creek	County road crossing	a.002	1,520	.01	5,070
25	-----do.-----	U. S. Highway 180 bridge	a.002	129	.00	633
25	-----do.-----	1.6 miles above mouth	a.01	500	.01	1,930
26	Hubbard Creek	At gage 8-865 near Breckenridge	5.93	720	11.5	2,630

a Estimated.
b Density correction applied.

NAVASOTA RIVER LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on the Navasota River and its tributaries to delineate sources of salt-water pollution.

Chemical analyses, in parts per million, February 1962

Date	Sampling site	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	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 (micromhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate			
Feb. 13	Navasota River ½ mile above U.S. Highway 84, near Mexia	a0.3	--		--	--	--	450	--	105		--	--	--	--	514	145	--	1,590	7.3
20	----do.----------	18.0	--		--	--	--	110	--	18		--	--	--	--	111	21	--	312	6.5
13	Christmas Creek above Bistone Reservoir	a.15	--		--	--	--	231	--	62		--	--	--	--	283	94	--	803	7.1
13	Nigger Creek at U.S. Highway 84, near Mexia	a.03	--		--	--	--	297	--	32		--	--	--	--	416	172	--	1,180	7.3
13	Bistone Reservoir near Mexia	--	--		--	--	--	128	--	120		--	--	--	--	125	20	--	630	7.4
13	Jacks Creek ½ mile above mouth, near Mexia	a.5	7.0		180	40	1,360	257	46	2,350		--	4,110	5.59	5.55	614	403	24	7,350	8.0
20	----do.----------	1.4	9.1		36	7.6	125	85	17	215		2.0	454	.62	1.72	122	52	4.9	870	6.5
20	Plummers Creek at State Farm Road 39, near Mexia	a.1	--		--	--	--	253	--	38		--	--	--	--	213	6	--	566	6.9
14	Plummers Creek on county road, near Mexia	a3.0	7.3		130	29	670	b222	80	1,160		.8	2,190	2.98	17.7	444	262	14	3,970	8.7
19	----do.----------	3.2	5.6		232	33	946	110	42	1,870		1.5	3,180	4.32	27.5	714	622	15	5,730	6.5
14	Unnamed tributary to Navasota River near Groesbeck	a.2	--		--	--	--	c216	--	148		--	--	--	--	200	24	--	920	8.7
14	Pin Oak Creek near Groesbeck	a.5	--		--	--	--	316	--	222		--	--	--	--	384	125	--	1,490	7.1
14	Navasota River at State Highway 164, near Groesbeck	4.06	.7		95	16	252	247	64	412		.2	961	1.31	10.5	303	100	6.3	1,770	7.7
14	Faulkenberry Creek at State Farm Road 937, near Groesbeck	a.4	--		--	--	--	346	--	74		--	--	--	--	322	38	--	895	7.1
14	Montgomery Creek 1 mile above mouth, near Groesbeck	a.5	--		--	--	--	215	--	252		--	--	--	--	410	234	--	1,600	7.2
20	Turkey Creek at State Highway 164, near Groesbeck	a.8	--		--	--	--	62	--	116		--	--	--	--	192	141	--	745	6.6
14	Spring Creek at mouth, near Groesbeck	a.8	--		--	--	--	63	--	196		--	--	--	--	196	144	--	903	6.7
20	Unnamed tributary to Navasota River near Groesbeck	a.9	--		--	--	--	72	--	82		--	--	--	--	90	31	--	422	6.5
21	Unnamed tributary to Navasota River near Thornton	a.2	11		75	23	79	261	54	129		.0	d533	.72	.29	282	68	2.0	896	6.9
20	Big Creek 2 miles above mouth, near Groesbeck	a5	13		41	15	80	80	60	148		.2	396	.54	5.35	164	98	2.7	735	6.7

a Estimated.
b Includes 41 ppm CO_3 as HCO_3.
c Includes 30 ppm CO_3 as HCO_3.
d Residue at 180°C.

Chemical analyses, in parts per million, February 1962--Continued

Date	Sampling site	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	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 (micromhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate			
Feb. 21	Unnamed tributary to Navasota River near Marquez	a.4	--		--	--	--	156	--	104		--	--	--	--	162	34	--	634	6.7
21	Steele Creek near Marquez	7.3	14		74	26	106	135	131	195		0.2	d670	0.91	13.2	292	181	2.7	1,070	6.8
21	Navasota River near Easterly	350	6.9		51	10	82	151	38	129		.8	392	.53	370	168	44	2.7	729	6.9
21	Red Oak Slough near Easterly	a.9	--		--	--	--	5	--	31		--	--	--	--	37	33	--	208	5.9
21	Mineral Creek at State Farm Road 2096, near Easterly	7.8	--		--	--	--	42	--	134		--	--	--	--	251	216	--	916	6.2
21	Duck Creek at U.S. Highway 79, near Easterly	14.5	--		--	--	--	82	--	111		--	--	--	--	206	139	--	756	6.6
22	Camp Creek at State Farm Road 1940, near Easterly	3.4	--		--	--	--	45	--	62		--	--	--	--	92	55	--	377	6.3
22	Riess Creek 2 miles above Camp Creek Lake, near Easterly	a.4	--		--	--	--	32	--	116		--	--	--	--	126	100	--	579	6.2
22	Camp Creek Lake near Easterly	--	--		--	--	--	61	--	108		--	--	--	--	164	114	--	649	6.5
22	Little Cedar Creek near Edge	a.5	--		--	--	--	125	--	54		--	--	--	--	191	88	--	550	6.5
22	Old Cedar Creek at U.S. Highway 190, near Kurten	a.15	--		--	--	--	26	--	94		--	--	--	--	217	196	--	804	6.2
22	Big Cedar Creek at U.S. Highway 190, near Kurten	8.1	--		--	--	--	84	--	92		--	--	--	--	189	120	--	663	6.7
22	Sand Creek at U.S. Highway 190, near Kurten	a.3	--		--	--	--	31	--	114		--	--	--	--	171	146	--	685	6.2
22	Bowman Creek at State Farm Road 2038, near Kurten	a.2	--		--	--	--	64	--	20		--	--	--	--	63	11	--	212	6.3
22	Wickson Creek near Bryan	a.2	--		--	--	--	73	--	52		--	--	--	--	91	31	--	348	6.2
22	Carters Creek near College Station	4.9	--		--	--	--	232	--	64		--	--	--	--	69	0	--	731	6.8
22	Lick Creek near Millican	a.8	--		--	--	--	52	--	152		--	--	--	--	233	190	--	1,090	6.4
22	Peach Creek at State Highway 6, near Millican	a2.5	39		77	16	130	62	246	165		.0	d742	1.01	5.01	258	207	3.5	1,120	6.5
22	Mill Creek at State Highway 6, near Navasota	a.4	40		37	7.6	54	64	78	76		.0	324	.44	.35	124	71	2.1	515	6.3

a Estimated.
d Residue at 180°C.

8-1195. COLORADO RIVER NEAR IRA, TEX.

LOCATION.--At gaging station at bridge on State Highway 350, 3.8 miles downstream from Bluff Creek, 4 miles upstream from Willow Creek, and 4.5 miles southwest of Ira, Scurry County.
DRAINAGE AREA.--3,617 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1962.
Water temperatures: November 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 39,600 ppm Apr. 12-25; minimum, 246 ppm June 12.
Hardness: Maximum, 3,960 ppm Apr. 12-25; minimum, 92 ppm Aug. 31, Sept. 1, 5-14.
Specific conductance: Maximum daily, 58,400 micromhos Apr. 25; minimum daily, 305 micromhos Sept. 6.
Water temperatures: Maximum, 92°F Aug. 3; minimum, freezing point on several days during January.
EXTREMES, 1958-62.--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 several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 1, May 3-6, 14-25, 30, 31, June 1-6, 23-29, July 7-15, Aug. 7-30.

Chemical analyses, in parts per million, water year October 1961 to September 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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 2, 1961.....	6.1	4.2		192	47	1,980		43		512	3,120	--	--	5,880	8.00	96.8	672	638	33	9,880	7.0	--
Oct. 3-8.....	.3	6.0		537	176	7,050		97		1,730	11,000	--	--	20,500	28.3	16.6	2,060	1,980	68	29,500	7.3	1.014
Oct. 9-10.....	7.1	9.9		199	54	2,220		89		520	3,490	--	--	6,540	8.92	125	718	646	36	11,000	7.5	1.003
Oct. 11-24.....	.1	4.8		391	140	5,190		61		1,140	8,220	--	--	15,100	20.7	4.08	1,550	1,500	57	22,800	6.9	1.010
Oct. 25-31.....	.1	2.7		620	215	8,140		48		1,820	12,900	--	--	23,700	32.7	6.40	2,430	2,390	72	33,600	6.8	1.016
Nov. 1.....	46.0	--		--	--	--		52		2,570	18,300	--	--	--	--	--	3,360	3,320	--	44,700	6.9	1.023
Nov. 2-6.....	11.4	5.1		165	51	1,650		100		444	2,600	--	--	4,960	6.75	153	622	540	29	8,440	6.9	--
Nov. 7-21.....	.6	2.7		337	111	4,360		110		973	6,850	--	--	12,700	17.4	20.6	1,300	1,210	53	19,600	6.9	1.008
Nov. 22-30.....	3.7	3.2		224	78	2,610		120		625	4,110	--	--	7,710	10.5	77.0	880	782	38	12,700	6.8	1.004
Dec. 1-15.....	.5	5.6		357	147	4,770		165		1,070	7,530	--	--	14,000	19.2	18.9	1,500	1,360	53	21,700	7.3	1.009
Dec. 16-31.....	.3	6.2		494	187	6,390		180		1,440	10,100	--	--	18,700	25.7	15.1	2,000	1,850	62	27,800	7.5	1.012
Jan. 1-15, 1962...	.4	6.5		600	228	8,010		176		1,850	12,600	0.5	--	23,400	32.3	25.3	2,430	2,290	71	32,900	7.5	1.016
Jan. 16-31.....	.5	5.7		581	210	7,930		177		1,840	12,400	.4	--	23,100	31.9	31.2	2,310	2,170	72	32,200	7.4	1.015
Feb. 1-28.....	.3	4.3		687	276	9,830		140		2,290	15,400	--	--	28,600	39.6	23.2	2,850	2,730	80	39,100	7.3	1.019
Mar. 1-15.....	.3	3.7		764	305	10,800		147		2,560	16,900	--	--	31,400	43.6	25.4	3,160	3,040	84	40,700	7.4	1.021
Mar. 20.....	4.1	--		--	--	--		99		1,030	6,060	--	--	--	--	--	1,230	1,150	--	17,900	7.6	1.006
Mar. 16-19, 21-31.	.4	3.0		730	281	10,000		141		2,460	15,700	--	--	29,200	40.5	31.5	2,980	2,860	80	38,200	7.3	1.020
Apr. 1-4.....	.5	--		--	--	--		80	10	3,150	20,000	--	--	--	--	--	3,840	3,760	--	48,100	8.4	1.025

a Values expressed in ppm should be multiplied by the density when computing loads.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 5-11, 1962...	0.9	1.5		650	252	8,930		133		2,270	13,900	--	--	26,100	36.1	63.4	2,660	2,550	75	35,700	7.8	1.016
Apr. 12-25.....	.2	3.3		944	389	13,600		92		3,380	21,200	--	--	39,600	55.3	21.4	3,960	3,880	94	50,300	6.8	1.027
Apr. 26-30.....	13.2	7.0		303	118	3,140		95		993	4,930	--	--	9,540	13.0	340	1,240	1,160	39	16,400	7.1	1.005
May 1-2.....	.1	5.8		372	147	4,630		77		1,280	7,240	--	--	13,700	18.8	3.70	1,530	1,470	51	20,500	6.7	1.008
May 7-8.....	5.0	--		--	--	--		71		992	6,850	--	--	--	--	--	1,350	1,290	--	19,000	7.3	1.007
May 9-13.....	.6	5.8		655	262	8,560		71		2,270	13,400	--	--	25,200	34.8	40.8	2,710	2,650	71	33,400	6.5	1.016
May 26-29.....	1.2	3.5		500	174	6,510		62		1,470	10,300	--	--	19,000	26.1	61.6	1,960	1,910	64	26,500	6.3	1.011
June 7-8.....	226	--		--	--	--		149		68	195	--	--	--	--	--	160	38	--	1,010	7.1	--
June 9-11.....	65.3	12		62	12	368		102		107	570	0.4	4.0	1,190	1.62	210	204	120	11	2,140	7.7	--
June 12.....	131	--		--	--	--		105		23	74	--	--	246	.33	87.0	101	15	--	465	7.4	--
June 13, 15.....	30.5	--		--	--	--		107		135	960	--	--	--	--	--	272	184	--	3,410	7.5	--
June 14.....	33.0	--		--	--	--		104		39	173	--	--	--	--	--	128	43	--	825	7.5	--
June 16-18, 21-22.	16.0	13		186	50	1,660		95		366	2,700	--	--	5,020	6.83	217	670	592	28	8,560	6.8	--
June 19-20.....	6.2	17		97	27	805		83		190	1,300	--	4.5	2,480	3.37	41.5	353	285	19	4,420	7.5	--
June 30-July 6....	9.5	7.9		163	47	1,730		74		396	2,750	--	--	5,130	6.98	132	600	540	31	8,970	6.7	--
July 16, 18.....	1.4	--		--	--	--		64		106	622	.7	--	--	--	--	196	144	--	2,330	7.4	--
July 17, 19-25....	1.2	5.6		353	126	4,630		60		942	7,400	--	--	13,500	18.5	43.7	1,400	1,350	54	21,600	6.4	1.007
July 26-27.....	188	9.5		42	6.1	171		91		66	253	--	3.2	596	.81	303	130	56	6.5	1,250	7.6	--
July 28-29.....	4.8	10		92	21	818		90		190	1,290	--	3.0	2,470	3.36	32.0	316	242	20	4,480	7.4	--
July 30-31.....	.6	--		--	--	--		76		304	2,280	--	--	--	--	--	495	432	--	7,470	7.4	--
Aug. 1-6.....	.4	7.8		219	67	2,480		57		507	3,990	--	--	7,300	9.95	7.88	822	776	38	11,700	7.1	1.002
Aug. 31-Sept. 1, 5-14.....	786	8.8		28	5.4	75		148		46	59	.8	1.2	b300	.41	637	92	0	3.4	512	7.4	--
Sept. 2-3.....	21.0	12		47	10	290		86		79	450	--	3.2	933	1.27	52.9	158	88	10	1,700	7.4	--
Sept. 4.....	6.0	--		--	--	--		96		182	1,200	--	--	--	--	--	316	238	--	4,070	7.5	--
Sept. 15-23.....	364	6.2		28	7.3	81		160		51	64	--	1.0	318	.43	313	100	0	3.5	549	7.4	--
Sept. 24-30.....	70.6	6.8		38	9.2	207		163		79	260	--	1.0	b683	.93	130	133	0	7.8	1,230	7.0	--
Weighted average	41.1	8.2		40	10	220		146		80	292	--	--	725	0.98	80.5	140	45	4.9	1,170	7.3	--
Time-weighted average.....	--	5.5		447	169	5,970		122		1,420	9,380	--	--	17,500	--	--	1,810	1,710	56	24,500	7.0	--
Tons per day....	--	0.9		4.4	1.1	24		16		8.9	32	--	--	--	--	--	--	--	--	--	--	--

a Values expressed in ppm should be multiplied by the density when computing loads.
b Residue at 180°C.

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 bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.
DRAINAGE AREA.--4,082 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1954, November 1956 to September 1962.
Water temperatures: November 1952 to September 1954, November 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 16,900 ppm Apr. 5-26; minimum, 150 ppm Sept. 5-7.
Hardness: Maximum, 2,290 ppm Apr. 5-26; minimum, 81 ppm Sept. 5-7.
Specific conductance: Maximum daily, 26,100 micromhos Apr. 22-24; minimum daily, 270 micromhos Sept. 7.
Water temperatures: Maximum, 97°F Aug. 7; minimum, freezing point Jan. 10, 11, 19, 20, 22.
EXTREMES, 1946-54, 1956-62.--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 (1956-62): 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 Oct. 7, 8, 28-30, Feb. 24-28, Mar. 1, 5-13, May 5, 9-31, June 1-7, July 1, 14, 15, Aug. 9-24.

Chemical analyses, in parts per million, water year October 1961 to September 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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-3, 1961....	4.8	9.8		138	40	1,130		96		306	1,820	--	1.5	3,490	4.75	45.2	509	430	22	6,120	7.4	--
Oct. 4-31.....	b1.7	7.9		240	87	2,090		122		562	3,420	--	--	6,470	8.80	29.7	957	857	29	10,800	7.1	--
Nov. 1.....	64.0	--		--	--	--		101		488	2,850	--	--	--	--	--	765	682	--	9,200	7.5	--
Nov. 2.....	691	--		--	--	--		123		64	185	--	--	--	--	--	147	46	--	957	7.9	--
Nov. 3-15.....	9.8	8.8		130	38	1,050		122		312	1,650	--	.5	3,250	4.42	86.0	481	381	21	5,680	7.0	--
Nov. 16-30.....	14.8	8.0		164	50	1,310		134		378	2,100	--	--	4,080	5.55	163	614	504	23	6,950	7.3	--
Dec. 1-5.....	2.4	7.1		200	55	1,700		132		474	2,700	--	--	5,200	7.07	33.7	725	617	27	8,830	7.0	--
Dec. 6-18.....	4.1	8.5		279	97	2,500		158		604	4,090	--	--	7,660	10.4	84.8	1,100	966	33	12,800	7.4	1.003
Dec. 19-31.....	1.8	9.2		348	119	3,080		185		844	4,980	--	--	9,470	12.9	46.0	1,360	1,210	36	15,300	7.5	1.005
Jan. 1-31, 1962...	2.1	5.0		378	155	3,520		205		1,020	5,670	0.5	--	10,800	14.8	61.2	1,580	1,410	38	16,800	7.3	1.006
Feb. 1-15.....	1.8	4.5		398	161	3,640		199		1,100	5,860	--	--	11,300	15.5	54.9	1,660	1,490	39	17,300	7.5	1.006
Feb. 16-23.....	1.4	4.0		451	186	4,490		216		1,340	7,140	--	--	13,700	18.8	51.8	1,890	1,710	45	20,500	7.5	1.008
Mar. 2-4, 14-15...	.1	5.0		471	199	4,690		247		1,450	7,430	--	--	14,400	19.8	3.89	1,990	1,790	46	20,600	7.5	1.009
Mar. 16-31.....	3.0	4.2		481	215	4,840		201		1,480	7,730	--	--	14,800	20.3	120	2,080	1,920	46	21,100	7.1	1.009
Apr. 1-2.....	.4	--		--	--	--		157		1,570	8,270	--	--	--	--	--	2,210	2,080	--	22,800	7.7	1.010
Apr. 3-4.....	1.2	--		--	--	--		105		612	2,800	--	--	--	--	--	910	824	--	9,070	7.4	--
Apr. 5-26.....	1.9	4.8		514	246	5,550		117		1,650	8,900	--	--	16,900	23.2	86.7	2,290	2,200	50	24,100	7.1	1.011
Apr. 27-28.....	146	--		--	--	--		105		290	1,300	--	--	--	--	--	445	359	--	4,640	7.8	--

a Values expressed in ppm should be multiplied by the density when computing loads.
b Includes days of less than 0.05 cfs discharge.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 29-30, 1962..	13.6	--		--	--	--		100		430	1,950	--	--	--	--	--	580	498	--	6,480	7.7	--
May 1-8.....	1.0	4.1		205	85	1,940		77		624	3,100	--	--	6,000	8.16	16.2	861	798	29	9,860	7.2	--
June 8.....	631	--		--	--	--		131		265	515	--	--	--	--	--	330	222	--	2,470	7.5	--
June 9-11, 13.....	436	4.2		25	6.3	127		40	12	45	187	0.4	0.2	c432	.59	509	88	36	5.9	906	9.1	--
June 12, 14.....	740	--		--	--	--		116		16	62	--	--	--	--	--	109	14	--	432	7.2	--
June 15.....	148	--		--	--	--		126		52	308	--	--	--	--	--	87	0	--	1,290	7.5	--
June 16-17.....	46.5	--		--	--	--		128		107	680	--	--	--	--	--	268	163	--	2,550	7.4	--
June 18-19.....	54.0	--		--	--	--		150		180	1,200	--	--	--	--	--	410	287	--	4,170	7.6	--
June 20.....	51.0	--		--	--	--		74		77	490	--	--	--	--	--	164	104	--	1,890	7.4	--
June 21-30.....	4.5	7.2		135	41	1,240		99		304	1,980	--	1.5	3,760	5.11	45.7	506	424	24	6,490	6.9	--
July 2-13.....	3.3	7.8		225	80	2,140		90		507	3,500	--	--	6,500	8.85	57.9	890	816	31	11,100	7.0	1.001
July 16-18.....	14.2	--		--	--	--		76		404	2,600	--	--	--	--	--	695	632	--	8,550	6.8	--
July 19-24.....	2.2	--		--	--	--		72		486	3,280	--	--	--	--	--	820	761	--	10,600	6.5	--
July 25-26.....	2.3	8.4		154	48	1,360		72		334	2,220	--	--	4,160	5.66	25.8	582	522	24	7,370	7.5	--
July 27-31.....	89.4	8.1		60	15	483		79		128	750	--	6.0	1,490	2.03	360	211	146	14	2,780	6.7	--
Aug. 1-8.....	2.5	8.0		154	50	1,560		54		384	2,500	--	--	4,680	6.36	31.6	590	545	28	8,140	6.3	--
Aug. 25-31.....	9.3	6.0		132	36	1,330		56		346	2,100	--	--	3,980	5.41	99.9	478	432	2.6	7,030	--	--
Sept. 1-4.....	166	--		--	--	--		116		54	212	--	--	--	--	--	140	45	--	962	7.5	--
Sept. 5-7.....	3,607	--		--	--	--		92		18	27	--	--	150	.20	1,461	81	6	--	270	7.2	--
Sept. 8-12.....	1,253	6.8		34	8.0	109		170		63	104	.9	1.8	c414	.56	1,400	118	0	4.4	720	7.3	--
Sept. 13-15.....	523	13		49	13	207		184		84	272	--	4.2	c753	1.02	1,060	176	25	6.8	1,300	7.6	--
Sept. 16-18.....	890	16		42	8.2	97		156		60	111	--	2.5	c429	.58	1,030	138	10	3.6	716	7.6	--
Sept. 19-25.....	304	6.6		52	14	254		155		95	355	--	16	c886	1.20	727	187	60	8.1	1,570	6.4	--
Sept. 26-30.....	79.0	6.5		102	33	916		177		204	1,430	--	8.5	2,790	3.79	595	390	245	20	3,850	6.8	--
Weighted average	85.5	7.3		42	11	187		125		74	270	--	--	662	0.90	158	153	54	7.1	1,140	7.1	--
Time-weighted average.....	--	6.6		259	101	2,410		140		694	3,890	--	--	7,430	--	--	1,060	946	31	11,600	7.0	--
Tons per day....	--	1.7		9.7	2.5	43		29		17	62	--	--	--	--	--	--	--	--	--	--	--

a Values expressed in ppm should be multiplied by the density when computing loads.
c Residue at 180°C.

8-1238. BEALS CREEK NEAR WESTBROOK, TEX.

LOCATION.--At gaging station at bridge on State Highway 163, 1.5 miles downstream from Crystal Creek, 11 miles south of Westbrook, Mitchell County, and 12 miles upstream from mouth.
DRAINAGE AREA.--9,903 square miles, of which 8,930 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1962.
Water temperatures: November 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 6,340 ppm May 1-11; minimum, 216 ppm Sept. 1-2, 5-8.
Hardness: Maximum, 1,750 ppm Mar. 1-9; minimum, 102 ppm June 8.
Specific conductance: Maximum daily, 10,200 micromhos May 10; minimum daily, 269 micromhos Sept. 6.
Water temperatures: Maximum, 94°F July 21, 22; minimum, 33°F Jan. 10.
EXTREMES, 1958-62.--Dissolved solids: Maximum, 14,900 ppm May 5-21, 1960; minimum, 155 ppm Nov. 4, 1959.
Hardness: Maximum, 5,010 ppm May 5-21, 1960; minimum, 75 ppm Oct. 18-19, 1960.
Specific conductance: Maximum daily, 21,600 micromhos May 16, 1960; minimum daily, 242 micromhos Oct. 3, 1959.
Water temperatures: Maximum, 98°F July 28, 1960; minimum, 33°F Dec. 30, 31, 1958, Jan. 21, 1959, Jan. 28, 1961, Jan. 10, 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Oct. 18-29, May 12-31, June 1-7, 22-30, July 1-14, 31, Aug. 1-24, 29-31, Sept. 3, 4.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-2, 1961....	4.6	--		--	--	--		146		470	730	--	--		--	--	--	675	556	--	3,280	7.9
Oct. 3.....	71.0	--		--	--	--		197		1,170	1,900	--	--		--	--	--	1,620	1,460	--	7,470	7.9
Oct. 4-17.....	4.5	5.5		78	67	318		151		304	510	--	2.2		1,360	1.85	16.5	470	346	6.4	2,380	7.8
Oct. 30-31.....	22.5	--		--	--	--		89		404	670	--	--		--	--	--	580	507	--	2,960	7.7
Nov. 1.....	50.0	8.4		97	69	416		130		388	650	--	3.5		1,700	2.31	230	526	420	7.9	2,840	7.2
Nov. 2.....	560	9.2		70	41	250		136		226	380	--	3.2		1,050	1.43	1,590	343	232	5.9	1,780	7.3
Nov. 3.....	79.0	9.9		44	13	82		143		64	111	--	2.8		397	.54	84.7	164	46	2.8	717	7.4
Nov. 4.....	20.0	--		--	--	--		128		182	282	--	--		--	--	--	296	191	--	1,460	7.6
Nov. 5-21.....	3.1	6.6		110	84	447		131		456	710	--	9.7		1,890	2.57	15.8	620	512	7.8	3,160	7.3
Nov. 22-30.....	10.3	6.8		76	61	318		124		304	500	--	11		1,340	1.82	37.3	440	339	6.6	2,300	7.3
Dec. 1-10.....	1.7	3.0		120	110	507		200		504	820	0.8	10		2,170	2.95	10.0	752	588	8.1	3,670	7.7
Dec. 11-20.....	1.8	2.2		135	139	638		210		624	1,040	.9	4.5		2,690	3.66	13.1	908	736	9.2	4,390	7.9
Dec. 21-31.....	1.4	2.1		205	250	1,120		306		1,130	1,800	1.2	15		4,670	6.35	17.7	1,540	1,290	12	7,280	7.9
Jan. 1-31, 1962...	1.3	3.6		175	283	1,240		222		1,220	2,000	1.6	11		5,040	6.85	17.7	1,600	1,420	14	7,710	7.7
Feb. 1-28.....	1.0	3.4		178	264	1,270		210		1,250	2,000	--	--		5,070	6.90	13.7	1,530	1,360	14	7,630	7.7
Mar. 1-9.....	1.3	4.3		195	307	1,500		234		1,450	2,350	--	--		5,920	8.05	20.8	1,750	1,560	16	9,020	7.5
Mar. 10-19.....	1.5	3.8		175	270	1,390		283		1,460	2,000	--	1.0		5,440	7.40	22.0	1,550	1,320	15	7,980	7.5

8-1238. BEALS CREEK NEAR WESTBROOK, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 20, 1962.....	77.0	--		--	--	--		210		512	730	--	--		--	--	--	670	498	--	3,330	8.0
Mar. 21-23.....	13.0	7.6		52	25	175		114		140	262	0.6	3.0		a730	0.99	25.6	232	139	5.0	1,260	7.3
Mar. 24-31.....	1.4	4.3		77	44	314		160		228	485	.7	.5		1,230	1.67	4.65	373	242	7.1	2,090	7.8
Apr. 1-7.....	1.9	4.1		105	63	395		205		296	640	.8	.2		1,610	2.19	8.26	521	353	7.5	2,750	7.8
Apr. 8-30.....	1.0	5.1		190	296	1,430		217		1,440	2,220	--	--		5,690	7.74	15.4	1,690	1,510	15	8,550	7.5
May 1-11.....	.4	5.5		150	330	1,670		241		1,570	2,500	--	--		6,340	8.62	6.85	1,730	1,530	18	9,580	7.4
June 8.....	13.0	--		---	--	--		76		70	123	--	--		--	--	--	102	40	--	640	7.2
June 9, 11.....	12.5	13		90	83	521		227		418	760	1.0	5.0		2,000	2.72	67.5	566	380	9.5	3,350	7.1
June 10, 12.....	21.0	13		57	30	221		141		175	315	--	4.6		a923	1.26	52.3	266	150	5.9	1,560	7.0
June 13-14.....	112	13		46	11	70		151		60	86	--	7.0		367	.50	111	160	36	2.4	634	7.2
June 15-21.....	3.2	12		71	37	242		140		247	340	--	4.5		1,020	1.39	8.81	329	214	5.8	1,750	6.9
July 15-18.....	13.2	--		--	--	--		85		64	107	--	--		--	--	--	125	56	--	653	7.0
July 19.....	16.0	--		--	--	--		246		174	355	--	--		--	--	--	312	110	--	1,830	7.6
July 20-29.....	5.2	10		116	101	561		211		528	850	--	3.2		2,270	3.09	31.9	705	532	9.2	3,840	7.4
July 30.....	.2	9.9		115	110	603		238		536	920	--	.8		2,410	3.28	1.30	740	544	9.6	4,010	8.2
Aug. 25-28.....	12.6	8.4		43	16	151		101		69	243	.8	3.2		a626	.85	21.3	174	90	5.0	1,100	7.0
Sept. 1-2, 5-8....	1,545	10		30	7.3	37		104		32	45	.5	3.2		216	.29	901	105	20	1.6	376	7.0
Sept. 9.....	436	12		68	22	122		120		134	200	--	5.5		622	.85	732	260	162	3.3	1,070	7.6
Sept. 10-11.....	128	--		--	--	--		119		224	348	--	--		--	--	--	374	276	--	1,660	7.6
Sept. 12-16.....	58.2	--		--	--	--		134		682	1,050	--	--		--	--	--	945	835	--	4,330	7.6
Sept. 17.....	475	17		51	22	112		124		114	169	--	2.8		a574	.78	736	218	116	3.3	951	7.8
Sept. 18-20.....	323	--		--	--	--		108		294	530	--	--		--	--	--	456	368	--	2,300	7.5
Sept. 21-30.....	7.8	5.6		170	207	918		196		936	1,510	--	7.5		3,850	5.24	81.1	1,280	1,120	11	5,840	7.8
Weighted average	35.0	10		46	25	123		112		118	188	--	--		569	0.77	53.8	217	125	2.2	950	7.1
Time-weighted average.....	--	5.8		132	170	822		187		805	1,290	--	--		3,320	--	--	1,030	873	11	5,160	7.5
Tons per day....	--	0.9		4.3	2.4	12		11		11	18	--	--		--	--	--	--	--	--	--	--

a Residue at 180°C.

8-1239. COLORADO RIVER NEAR SILVER, TEX.

LOCATION (revised).--At gaging station at bridge on FM 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 1962.
Water temperatures: October 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 13,800 ppm Apr. 29; minimum, 228 ppm Sept. 5-9.
Hardness: Maximum, 2,190 ppm Apr. 29; minimum, 105 ppm Sept. 5-9.
Specific conductance: Maximum daily, 20,300 micromhos Apr. 29; minimum daily, 294 micromhos Sept. 5.
Water temperatures: Maximum, 88°F July 28, Aug. 2; minimum, freezing point on several days during January.
EXTREMES, 1956-62.--Dissolved solids: Maximum, 15,000 ppm May 1-18, 1961; minimum, 180 ppm June 1-4, 1957.
Hardness: Maximum, 2,870 ppm June 1-8, 1960; minimum, 93 ppm Apr. 29-30, 1957.
Specific conductance: Maximum daily, 24,200 micromhos May 17-18, 1961; minimum daily, 202 micromhos June 2, 1957.
Water temperatures: Maximum, 93°F July 23, 29, 1960; minimum, freezing point on several days during winter months.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Mar. 11-15, 19, Apr. 24-27, May 11-31, June 1-8, July 4-15, Aug. 8-31.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-11, 1961...	18.5	7.0		110	43	449		130		319	700	--	1.5		1,690	2.30	84.4	452	345	9.2	2,960	7.5
Oct. 12-17.....	7.2	5.5		182	83	695		124		600	1,120	--	1.5		2,750	3.74	53.5	796	694	11	4,520	7.2
Oct. 18-31.....	.8	6.2		305	143	1,540		133		1,030	2,500	--	--		5,590	7.60	12.1	1,350	1,240	18	8,900	7.7
Nov. 1-2.....	30.9	--		--	--	--		129		960	2,850	--	--		--	--	--	1,220	1,110	--	9,790	7.7
Nov. 3.....	897	7.5		59	13	218		142		90	328	--	3.5		832	1.13	2,020	200	84	6.7	1,440	7.9
Nov. 4.....	262	--		--	--	--		121		85	252	--	--		--	--	--	172	73	--	1,170	7.8
Nov. 5-8.....	49.0	7.8		70	19	368		108		152	570	--	1.8		1,240	1.69	164	252	164	10	2,240	7.5
Nov. 9-22.....	10.1	6.5		137	34	635		118		326	1,010	--	1.0		2,210	3.01	60.3	482	386	13	3,870	7.6
Nov. 23-24.....	96.0	7.3		107	32	474		101		288	740	--	1.5		1,700	2.31	441	398	316	10	2,950	7.7
Nov. 25-30.....	32.0	4.8		175	64	1,160		132		422	1,890	--	1.0		3,780	5.14	327	700	592	19	6,500	7.5
Dec. 1-5.....	8.7	14		200	76	1,100		156		494	1,820	--	1.5		3,780	5.14	88.8	812	684	17	6,470	7.4
Dec. 6-24.....	6.9	11		230	68	954		168		592	1,540	--	1.0		3,480	4.73	64.8	854	716	14	5,850	7.8
Dec. 25-31.....	5.1	15		258	79	1,130		172		696	1,820	--	1.0		4,080	5.55	56.2	968	828	16	6,630	7.6
Jan. 1-31, 1962...	3.3	5.8		305	84	1,310		148		836	2,100	.3	--		4,710	6.41	42.0	1,110	985	17	7,480	7.5
Feb. 1-28.....	1.6	4.8		380	119	1,630		135		1,080	2,650	--	--		5,930	8.06	25.6	1,440	1,330	19	9,110	7.6
Mar. 1-20.....	a2.9	5.3		428	135	1,760		116		1,180	2,920	--	--		6,490	8.83	50.8	1,620	1,530	19	10,000	7.2
Mar. 21.....	124	--		--	--	--		109		628	2,020	--	--		--	--	--	950	860	--	7,050	7.5
Mar. 22-31.....	12.6	6.0		147	91	744		97		588	1,180	--	3.0		2,810	3.82	95.6	742	662	12	4,660	6.7

a Includes days of less than 0.05 cfs discharge.

8-1239. COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 1-9, 1962....	5.8	5.3		199	92	863		91		698	1,380	--	3.5		3,290	4.47	51.5	875	800	13	5,390	6.9
Apr. 10-20.....	3.5	3.9		241	112	1,050		90		836	1,700	--	5.5		3,990	5.43	37.7	1,060	988	14	6,440	6.6
Apr. 21-28.....	a7.0	7.3		289	122	1,300		71		964	2,120	--	--		4,840	6.58	91.5	1,220	1,160	16	7,690	6.7
Apr. 29.....	93.0	--		--	--	--		139		1,510	7,090	--	--		13,800	18.9	3,470	2,190	2,080	--	20,300	7.1
Apr. 30.....	47.0	--		--	--	--		117		660	1,900	--	--		--	--	--	770	674	--	6,800	7.8
May 1-4.....	12.1	5.7		143	55	819		81		432	1,310	--	.5		2,810	3.82	91.8	583	516	15	4,840	7.3
May 5-10.....	1.5	5.3		288	93	1,910		67		788	3,100	--	--		6,220	8.46	25.2	1,100	1,050	25	10,200	6.6
June 9.....	468	8.0		120	63	783		171		356	1,240	--	2.0		2,660	3.62	3,360	558	418	14.4	4,530	8.0
June 10-14.....	587	12		60	11	193		149		154	230	.5	5.3		750	1.02	1,190	194	72	6.0	1,160	8.0
June 15-17.....	458	18		40	5.7	59		130		33	76	--	5.1		310	.42	383	124	17	2.3	531	8.0
June 18-21.....	40.5	17		72	14	269		130		121	415	--	5.4		b1,030	1.40	113	237	130	7.6	1,750	7.9
June 22-30.....	8.2	13		133	35	761		124		278	1,230	--	4.5		2,520	3.43	55.8	476	374	15	4,330	7.8
July 1-3, 16.....	2.5	7.5		175	51	1,060		53		446	1,730	--	2.0		3,500	4.76	23.6	646	603	18	6,120	6.5
July 17.....	248	14		39	7.5	37		106		48	48	0.4	4.1		264	.36	177	128	41	1.4	439	7.0
July 18.....	80.0	14		43	8.7	66		87		66	103	--	2.6		359	.49	77.5	144	72	2.4	632	7.2
July 19-20.....	52.0	9.4		114	30	686		83		456	960	--	2.8		2,300	3.13	323	408	340	15	3,640	6.8
July 21-25.....	6.6	10		67	18	287		84		183	428	--	2.5		1,040	1.41	185	241	172	8.0	1,890	7.0
July 26.....	582	11		47	10	111		97		80	166	--	2.4		475	.65	746	158	79	3.8	870	7.1
July 27.....	210	12		40	7.4	52		101		46	78	--	2.4		b304	.41	172	130	48	2.0	529	7.2
July 28.....	178	8.8		64	15	233		101		127	362	--	2.3		914	1.24	439	221	138	6.8	1,620	7.2
July 29.....	154	--		--	--	--		120		304	1,840	--	--		--	--	--	525	426	--	6,230	7.7
July 30-31.....	50.5	10		79	21	779		105		460	1,000	--	1.0		2,400	3.26	327	284	198	20	3,660	7.1
Aug. 1-3.....	46.9	12		72	20	423		92		178	650	.5	2.0		1,400	1.90	177	262	186	11	2,550	7.3
Aug. 4-7.....	15.8	--		--	--	--		86		95	262	--	--		--	--	--	173	102	--	1,210	7.2
Sept. 1-2.....	86.5	9.6		81	18	185		84		175	298	.4	6.3		867	1.18	202	276	207	4.8	1,440	7.2
Sept. 3.....	384	8.8		112	27	712		118		218	1,140	--	7.5		2,280	3.10	2,360	390	294	16	4,040	7.3
Sept. 4.....	182	7.4		36	6.4	101		114		46	136	--	4.0		c393	.53	193	116	23	4.1	737	7.8
Sept. 5-9.....	8,356	8.6		32	6.2	37		105		33	45	--	2.0		228	.31	5,140	105	19	1.6	392	7.2
Sept. 10-14.....	1,578	8.6		38	10	98		150		73	105	--	1.0		411	.56	1,750	136	13	3.7	728	7.6
Sept. 15-17.....	602	7.7		54	20	189		155		133	255	--	4.2		741	1.01	1,200	217	90	5.6	1,320	7.4
Sept. 18.....	1,840	11		50	20	153		122		118	222	--	4.6		c639	.87	3,170	208	108	4.6	1,110	7.5
Sept. 19-20.....	1,205	8.6		34	6.4	72		113		46	88	--	3.0		322	.44	1,050	112	19	3.0	566	7.4
Sept. 21-23.....	462	8.6		44	11	144		147		82	185	--	1.0		551	.75	687	155	34	5.0	974	7.4
Sept. 24-27.....	218	7.8		62	18	258		155		131	372	--	2.0		947	1.29	557	228	102	7.4	1,660	7.3
Sept. 28-30.....	109	7.9		83	27	391		159		194	590	--	3.0		1,370	1.86	403	318	188	9.5	2,430	7.4
Weighted average	190	9.0		43	11	201		118		75	162	--	--		486	0.66	249	152	56	3.1	827	7.3
Time-weighted average.....	--	7.7		213	73	1,020		124		609	1,570	--	--		3,520	--	--	831	730	14	5,680	7.2
Tons per day....	--	4.6		22	5.6	103		61		38	83	--	--		--	--	--	--	--	--	--	--

a Includes days of less than 0.05 cfs discharge.
b Residue at 180°C.
c Calculated from determined constituents.

8-1265. COLORADO RIVER AT BALLINGER, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 83 in Ballinger, Runnels County, 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 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 4,200 ppm May 1-31; minimum, 384 ppm Sept. 5-30.
Hardness: Maximum, 1,400 ppm May 1-31; minimum, 152 ppm Sept. 5-30.
Specific conductance: Maximum daily, 6,860 micromhos May 27; minimum daily, 556 micromhos Sept. 6.
Water temperatures: Maximum, 85°F July 22; minimum, 34°F Jan. 10, 13.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No flow Aug. 17-31, Sept. 1-4.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-9, 1961....	58.7	9.4		135	42	450		114		320	750	0.4	3.8		1,770	2.41	281	510	416	8.7	3,090	7.5
Oct. 10-11.....	278	--		--	--	--		106		83	157	--	--		--	--	--	155	68	--	844	7.4
Oct. 12-14.....	72.3	8.0		83	35	241		108		217	395	.4	3.0		1,040	1.41	203	351	262	5.6	1,830	7.6
Oct. 15-31.....	17.1	10		97	35	119		147		217	208	.3	5.8		a817	1.11	37.7	386	266	2.6	1,290	7.7
Nov. 1-4.....	94.5	8.4		144	44	158		168		349	265	.5	8.2		1,060	1.44	270	540	403	3.0	1,710	7.7
Nov. 5-9.....	159	7.9		122	45	589		111		310	960	.5	1.5		2,090	2.84	897	490	398	12	3,710	7.5
Nov. 10-30.....	56.5	7.6		94	28	183		145		198	295	.4	5.3		a952	1.29	145	350	230	4.2	1,550	7.7
Dec. 1-15.....	32.7	10		136	38	284		171		280	480	.6	3.0		1,320	1.80	117	496	356	5.5	2,290	7.5
Dec. 16-31.....	24.2	10		152	48	265		192		328	460	.6	2.8		1,360	1.85	88.9	576	419	4.8	2,300	7.4
Jan. 1-15, 1962...	14.5	6.8		151	56	229		165		380	400	.4	11		1,320	1.80	51.7	607	472	4.0	2,170	7.6
Jan. 16-31.....	13.8	5.2		180	58	271		192		446	458	.4	10		1,520	2.07	56.6	688	530	4.5	2,460	7.4
Feb. 1-14.....	10.4	6.6		181	68	334		156		514	560	.5	4.4		1,750	2.38	49.1	731	603	5.4	2,750	7.5
Feb. 15-28.....	8.4	7.2		219	76	331		200		580	570	.5	7.5		1,890	2.57	42.9	859	695	4.9	2,910	7.5
Mar. 1-15.....	6.4	6.5		218	92	333		151		654	590	.4	11		1,980	2.69	34.2	922	799	4.8	3,050	7.6
Mar. 16-24.....	9.9	8.3		215	92	350		149		644	620	.5	9.1		2,010	2.73	53.7	915	793	5.0	3,100	7.1
Mar. 25-31.....	20.5	5.5		270	95	573		108		802	980	.5	1.8		2,780	3.78	154	1,060	976	7.7	4,250	7.2
Apr. 1-15.....	12.6	6.5		255	82	485		113		732	830	--	4.0		2,450	3.33	83.3	974	881	6.7	3,810	7.2
Apr. 16-30.....	1.2	6.2		208	80	482		124		596	830	--	4.5		2,270	3.09	7.35	848	746	7.2	3,610	7.3

a Residue at 180°C.

8-1265, COLORADO RIVER AT BALLINGER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 1-31, 1962....	3.5	7.8		355	124	974		124		1,000	1,680	--	1.5		4,200	5.71	39.7	1,400	1,290	11	6,550	6.6
June 1-10.....	1.2	10		335	116	977		124		924	1,680	--	4.5		4,110	5.59	13.3	1,310	1,210	12	6,500	7.0
June 11-12.....	249	--		--	--	--		117		256	1,010	--	--		--	--	--	380	284	--	3,760	7.9
June 13-14.....	347	--		--	--	--		132		103	298	--	--		--	--	--	172	64	--	1,400	8.0
June 15-26.....	216	13		49	11	87		124		78	122	0.4	2.2		a456	.62	266	168	66	2.9	780	7.2
June 27-30.....	17.0	11		74	20	116		126		155	180	--	1.5		620	.84	28.5	267	164	3.1	1,110	7.6
July 1.....	158	--		--	--	--		142		184	190	--	--		--	--	--	300	184	--	1,260	7.7
July 2-10.....	24.7	11		58	15	104		107		110	162	.5	1.2		515	.70	34.3	206	118	3.2	956	7.0
July 11-21.....	36.5	14		70	23	137		129		149	215	--	2.5		674	.92	66.4	269	164	3.6	1,220	7.6
July 22-27.....	78.9	9.4		103	29	310		85		248	510	--	3.8		1,260	1.71	268	376	307	6.9	2,260	7.4
July 28-31.....	240	--		--	--	--		127		76	145	--	--		--	--	--	185	81	--	869	7.7
Aug. 1-16.....	24.0	15		60	17	96		122		120	142	.4	1.0		511	.69	33.1	220	120	2.8	876	7.4
Sept. 5-30[b].....	2,005	12		43	11	79		144		66	98	--	2.8		384	.52	2,080	152	34	2.8	668	--
Weighted average	c177	12		54	15	110		142		96	154	--	2.9		517	0.70	247	194	77	3.1	892	7.4
Time-weighted average.....	--	9.0		160	55	342		142		416	578	--	4.5		1,640	--	--	626	509	5.5	2,650	7.2
Tons per day....	--	5.7		26	7.2	53		68		46	74	--	1.4		--	--	--	--	--	--	--	--

a Residue at 180°C.

b Analysis for period Sept. 5-30 estimated from discharge and chemical quality records for Colorado River near Silver and near San Saba, and for Concho River, Pecan Bayou, and San Saba River.

c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1961 to September 1962.

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, 9.2 miles east of San Saba, San Saba County, and at mile 474.
DRAINAGE AREA.--30,600 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1947 to September 1962.
Water temperatures: September 1947 to September 1962.
Sediment records: December 1950 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 2,440 ppm June 24-27; minimum, 209 ppm Oct. 10-12.
Hardness: Maximum, 842 ppm June 24-27; minimum, 124 ppm Oct. 10-12.
Specific conductance: Maximum daily, 5,660 micromhos June 28; minimum daily, 329 micromhos Oct. 11.
Water temperatures: Maximum, 92°F July 15; minimum, 34°F Jan. 12.
Sediment concentrations: Maximum daily, 9,780 ppm Sept. 10; minimum daily, not determined.
Sediment loads: Maximum daily, 218,000 tons Sept. 10; minimum daily, 5.0 tons Sept. 3.
EXTREMES, 1947-62.--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.
Sediment concentrations (1950-62): Maximum daily, 10,500 ppm Oct. 20, 1956; minimum daily, no flow Aug. 27-31, 1954.
Sediment loads (1950-62): Maximum daily, 535,000 tons May 19, 1955; minimum daily, 0 tons Aug. 27-31, 1954.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-9, 1961....	375	16		54	25	61		209		52	102	--	1.5		440	0.60	446	238	66	1.7	734	7.7
Oct. 10-12.....	8,367	13		38	7.2	25		113		26	40	--	3.8		a209	.28	4,720	124	32	1.0	365	7.4
Oct. 13-31.....	596	17		58	19	51		206		43	83	--	3.8		402	.55	647	222	54	1.5	653	7.9
Nov. 1-15.....	349	12		66	21	82		216		68	128	--	1.5		506	.69	477	251	74	2.2	867	7.7
Nov. 16-30.....	443	11		71	28	69		212		92	120	--	3.5		534	.73	639	292	118	1.8	886	7.7
Dec. 1-10.....	384	12		90	35	168		218		151	280	--	4.6		898	1.22	931	368	190	3.8	1,480	7.6
Dec. 11-24.....	312	13		80	34	124		236		114	208	--	5.0		742	1.01	625	340	146	2.9	1,220	7.5
Dec. 25-31.....	266	8.8		76	34	90		239		98	158	--	4.2		618	.84	444	330	134	2.2	1,040	7.7
Jan. 1-31, 1962...	231	10		71	35	85		238		97	146	--	5.0		596	.81	372	321	126	2.1	997	7.6
Feb. 1-17.....	213	7.6		62	37	96		207		110	162	--	3.8		a580	.79	334	306	137	2.4	1,020	7.6
Feb. 18-28.....	189	8.0		60	34	88		218		98	140	--	3.0		a538	.73	275	290	111	2.2	947	7.5
Mar. 1-15.....	180	8.6		64	37	79		228		94	139	0.2	3.0		a537	.73	261	312	124	1.9	955	7.4
Mar. 16-31.....	167	8.9		68	38	86		240		102	147	.2	2.8		a571	.78	257	326	130	2.1	1,010	7.3
Apr. 1-20.....	195	11		65	36	82		227		98	139	.3	3.2		592	.81	312	310	124	2.0	974	7.5
Apr. 21-30.....	288	12		60	34	84		186		105	149	--	1.5		a536	.73	417	290	137	2.1	944	7.5

a Calculated from determined constituents.

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
May 1-15, 1962....	132	14		60	33	65		230		77	110	0.4	2.2		488	0.66	174	285	96	1.7	829	7.6
May 16-31.....	69.2	16		52	33	45		270		39	70	--	2.0		400	.54	74.7	265	44	1.2	690	7.7
June 1-2.....	74.5	--		--	--	--		230		43	76	--	--		--	--	--	250	62	--	671	8.2
June 3-10.....	359	12		70	32	110		199		107	190	.4	1.8		a621	.84	602	306	143	2.7	1,120	7.6
June 11-18.....	279	12		48	18	40		191		37	60	--	2.5		a312	.42	235	194	38	1.2	570	7.7
June 19-23.....	550	11		134	72	221		130		340	460	--	2.8		a1,300	1.77	1,930	630	524	3.8	2,290	7.4
June 24-27.....	160	11		202	82	564		162		500	1,000	--	4.0		a2,440	3.32	1,050	842	708	8.5	4,120	7.2
June 28-30.....	527	--		--	--	--		156		172	512	--	--		--	--	--	345	217	--	2,240	7.8
July 1-4.....	528	15		56	18	119		172		76	177	.4	1.2		597	.81	851	214	72	3.5	991	7.8
July 5-6.....	637	--		--	--	--		154		45	92	--	--		--	--	--	168	42	--	650	7.8
July 7-25.....	395	19		48	11	44		155		30	72	--	1.5		332	.45	354	165	38	1.5	541	7.7
July 26-31.....	1,102	16		60	16	66		140		74	118	--	1.0		a420	.57	1,250	216	101	2.0	761	7.7
Aug. 1-4.....	715	11		58	17	82		120		88	142	.3	.8		a458	.62	884	214	116	2.4	831	7.4
Aug. 5-25.....	330	13		45	11	42		136		32	73	--	1.0		307	.42	274	158	46	1.5	517	7.2
Aug. 26-Sept. 8...	79.4	17		36	25	42		216		22	58	.3	1.0		308	.42	66.0	193	16	1.3	538	7.7
Sept. 9.....	3,600	--		--	--	--		150		59	162	--	--		--	--	--	218	95	--	864	7.6
Sept. 10-22.....	3,559	10		41	8.7	60		141		52	68	--	2.8		313	.43	3,010	138	23	2.2	542	7.6
Sept. 23-30.....	909	11		53	16	123		150		94	172	--	1.5		550	.75	1,350	198	75	3.8	958	7.8
Weighted average	508	12		55	19	73		168		70	114	--	2.8		440	0.59	604	215	77	2.0	755	7.6
Time-weighted average.....	--	12		63	28	85		203		85	142	--	2.8		535	--	--	273	107	2.1	915	7.6
Tons per day....	--	17		75	26	100		230		95	157	--	3.9		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (residue at 180°C)			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	Noncarbonate			
May 1-15, 1962....	132	14		60	33	65		230		77	110	0.4	2.2		488	0.66	174	285	96	1.7	829	7.6
May 16-31.....	69.2	16		52	33	45		270		39	70	--	2.0		400	.54	74.7	265	44	1.2	690	7.7
June 1-2.....	74.5	--		--	--	--		230		43	76	--	--		--	--	--	250	62	--	671	8.2
June 3-10.....	359	12		70	32	110		199		107	190	.4	1.8		a621	.84	602	306	143	2.7	1,120	7.6
June 11-18.....	279	12		48	18	40		191		37	60	--	2.5		a312	.42	235	194	38	1.2	570	7.7
June 19-23.....	550	11		134	72	221		130		340	460	--	2.8		a1,300	1.77	1,930	630	524	3.8	2,290	7.4
June 24-27.....	160	11		202	82	564		162		500	1,000	--	4.0		a2,440	3.32	1,050	842	708	8.5	4,120	7.2
June 28-30.....	527	--		--	--	--		156		172	512	--	--		--	--	--	345	217	--	2,240	7.8
July 1-4.....	528	15		56	18	119		172		76	177	.4	1.2		597	.81	851	214	72	3.5	991	7.8
July 5-6.....	637	--		--	--	--		154		45	92	--	--		--	--	--	168	42	--	650	7.8
July 7-25.....	395	19		48	11	44		155		30	72	--	1.5		332	.45	354	165	38	1.5	541	7.7
July 26-31.....	1,102	16		60	16	66		140		74	118	--	1.0		a420	.57	1,250	216	101	2.0	761	7.7
Aug. 1-4.....	715	11		58	17	82		120		88	142	.3	.8		a458	.62	884	214	116	2.4	831	7.4
Aug. 5-25.....	330	13		45	11	42		136		32	73	--	1.0		307	.42	274	158	46	1.5	517	7.2
Aug. 26-Sept. 8...	79.4	17		36	25	42		216		22	58	.3	1.0		308	.42	66.0	193	16	1.3	538	7.7
Sept. 9.....	3,600	--		--	--	--		150		59	162	--	--		--	--	--	218	95	--	864	7.6
Sept. 10-22.....	3,559	10		41	8.7	60		141		52	68	--	2.8		313	.43	3,010	138	23	2.2	542	7.6
Sept. 23-30.....	909	11		53	16	123		150		94	172	--	1.5		550	.75	1,350	198	75	3.8	958	7.8
Weighted average	508	12		55	19	73		168		70	114	--	2.8		440	0.59	604	215	77	2.0	755	7.6
Time-weighted average.....	--	12		63	28	85		203		85	142	--	2.8		535	--	--	273	107	2.1	915	7.6
Tons per day....	--	17		75	26	100		230		95	157	--	3.9		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 330 ppm Mar. 1-31; minimum, 268 ppm Nov. 1-30.
Hardness: Maximum, 230 ppm Feb. 1-28; minimum, 172 ppm Nov. 1-30.
Specific conductance: Maximum daily, 622 micromhos Aug. 6; minimum daily, 453 micromhos Nov. 2.
Water temperatures: Maximum, 82°F Sept. 18, 19; minimum, 48°F Jan. 11-13, 23.
EXTREMES, 1947-62.--Dissolved solids: Maximum, 540 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.
Hardness: Maximum, 238 ppm Jan. 1-31, 1961; minimum, 120 ppm Oct. 8-31, 1959.
Specific conductance: Maximum daily, 622 micromhos Aug. 6, 1962; minimum daily, 243 micromhos Dec. 2, 1953.
Water temperatures: Maximum, 87°F on several days during summer months; minimum, 43°F Jan. 28, 1948, Feb. 4, 1949.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. 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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-31, 1961...	848	10		46	19	25	--	192		27	42	0.3	1.5		286	0.39	655	193	36	0.8	482	7.2
Nov. 1-30.....	2,895	11		39	18	34	--	172		29	51	.3	.5		a268	.36	2,090	172	30	1.1	464	7.2
Dec. 1-31.....	2,958	11		42	19	33	--	172		31	56	.3	.8		a278	.38	2,220	183	42	1.1	507	7.7
Jan. 1-31, 1962...	1,614	9.9		40	20	39	--	187		34	55	.3	1.2		294	.40	1,280	182	30	1.3	526	7.6
Feb. 1-28.....	241	11		56	22	27	--	228		33	46	.2	3.2		329	.45	214	230	43	.8	553	7.5
Mar. 1-31.....	175	9.5		48	18	37	--	193		37	54	.2	1.8		330	.45	156	194	36	1.2	540	7.5
Apr. 1-30.....	389	12		52	19	37	--	202		35	59	.3	1.2		326	.44	342	208	42	1.1	560	7.3
May 1-31.....	1,393	11		46	19	34	3.8	183		34	61	.3	1.0		314	.43	1,180	193	43	1.1	532	7.5
June 1-30.....	1,882	10		44	19	34	3.8	177		34	60	.3	.8		306	.42	1,550	188	43	1.1	526	7.6
July 1-31.....	1,899	12		44	20	36	--	180		35	61	.3	.8		a298	.41	1,530	192	45	1.1	538	7.4
Aug. 1-24.....	1,757	12		43	19	35	3.9	157		37	62	.4	9.6		310	.42	1,470	186	57	1.1	555	6.8
Aug. 25-31.....	1,516	12		40	19	38	--	164		35	62	.3	.8		308	.42	1,260	178	44	1.2	520	7.7
Sept. 1-30.....	864	10		42	20	37	--	172		35	63	--	.5		a292	.40	681	188	46	1.2	538	7.6
Weighted average	1,414	11		43	19	34	--	177		33	57	0.3	1.6		293	0.40	1,120	186	40	1.1	516	7.3
Time-weighted average.....	--	11		45	19	34	--	184		33	56	0.3	1.7		302	--	--	192	41	1.1	526	7.4
Tons per day....	--	42		163	73	131	--	676		125	216	1.0	6.1		1,120	--	--	--	--	--	--	--

a Calculated from determined constituents.

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 bridge, 12 miles upstream from Jones Creek, and at mile 67.
DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1962.
Water temperatures: October 1945 to September 1948, March 1950 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 368 ppm Apr. 16-27; minimum, 160 ppm Nov. 14-17.
Hardness: Maximum, 224 ppm Feb. 1-17, Apr. 1-15, 16-27; minimum, 102 ppm Nov. 14-17.
Specific conductance: Maximum daily, 662 micromhos May 13; minimum daily, 204 micromhos Nov. 16.
Water temperatures: Maximum, 89°F Sept. 16; minimum, 37°F Jan. 12.
EXTREMES, 1944-62.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.
Hardness: Maximum, 232 ppm Jan. 16-31, 1961; minimum, 66 ppm Sept. 27-29, 1957.
Specific conductance: Maximum daily, 765 micromhos Feb. 5, 1957; minimum daily, 146 micromhos Sept. 27, 1957.
Water temperatures (1945-48, 1950-62): Maximum, 95°F July 26, 1954; minimum, 37°F Jan. 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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-31, 1961...	1,484	14		48	17	30		195		34	41	0.3	1.2		303	0.41	1,210	190	30	0.9	496	7.7
Nov. 1-13.....	2,374	17		54	16	31		205		34	43	.3	2.8		308	.42	1,970	200	32	1.0	508	7.4
Nov. 14-17.....	11,630	12		30	6.7	17		106		18	22	.3	1.8		a160	.22	5,020	102	16	.7	278	7.1
Nov. 18-30.....	3,953	14		48	15	28		177		31	44	.3	2.2		282	.38	3,010	182	36	.9	472	7.4
Dec. 1-31.....	3,419	15		52	17	35		199		34	52	.3	2.2		312	.42	2,880	200	36	1.1	530	7.9
Jan. 1-27, 1962...	2,569	11		52	19	41		218		37	55	--	3.0		342	.47	2,370	208	29	1.2	566	7.7
Jan. 28-31.....	3,072	13		44	14	35		165		38	47	--	2.2		a274	.37	2,270	168	32	1.2	481	7.4
Feb. 1-17.....	1,035	11		62	17	35		232		41	46	.3	1.8		332	.45	928	224	34	1.0	574	7.6
Feb. 18-19.....	936	--		--	--	--		158		23	33	--	--		--	--	--	145	16	--	391	8.0
Feb. 20-28.....	833	13		56	17	37		216		43	47	.3	1.8		324	.44	729	210	32	1.1	560	7.9
Mar. 1-31.....	813	11		58	19	40		217		51	53	.3	2.2		366	.50	803	222	44	1.2	593	7.6
Apr. 1-15.....	694	13		60	18	41		223		48	56	.3	1.2		361	.49	676	224	41	1.2	605	7.0
Apr. 16-27.....	705	14		60	18	42		216		50	60	--	1.2		368	.50	700	224	46	1.2	606	7.2
Apr. 28-30.....	2,493	--		--	--	--		160		23	42	--	--		--	--	--	148	17	--	416	7.8
May 1.....	1,990	--		--	--	--		140		24	34	--	--		--	--	--	137	22	--	375	7.7
May 2-10.....	824	12		58	14	41		180		57	58	.4	1.8		356	.48	792	202	54	1.3	578	7.0
May 11-20.....	540	12		58	17	40		211		42	60	--	1.5		351	.48	512	214	42	1.2	591	7.0
May 21-31.....	980	9.1		46	18	40		183		36	63	--	.8		322	.44	852	189	39	1.3	552	6.9
June 1-30.....	1,871	13		48	14	37		175		36	52	.3	2.0		295	.40	1,490	178	34	1.2	507	7.1
July 1-31.....	1,179	12		46	17	39		185		35	58	.0	.8		a299	.41	952	185	34	1.2	547	7.5
Aug. 1-31.....	888	12		44	19	51		205		38	64	.4	.8		332	.45	796	188	20	1.6	561	7.2
Sept. 1-30.....	1,324	14		45	16	45		194		38	53	.3	1.5		315	.43	1,130	178	20	1.5	510	7.1
Weighted average	1,716	13		49	16	35		190		35	49	0.3	1.9		303	0.41	1,400	187	31	1.1	511	7.4
Time-weighted average.....	--	13		51	17	38		199		39	52	0.3	1.7		321	--	--	196	33	1.2	539	7.3
Tons per day....	--	61		226	74	164		881		163	228	1.0	8.9		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1180. LAKE J. B. THOMAS NEAR VINCENT																						
Mar. 6, 1962		2.7	0.02	34	7.3	63		176	62	29	0.8	0.0		a295	0.40		115	0	54	2.6	494	7.2
8-1236.5. BEALS CREEK ABOVE BIG SPRING																						
Sept. 13, 1962	36.1	4.5		88	213	765		64	838	1,300		1.5		3,240	4.41		1,100	1,040	60	10	5,090	6.3
8-1370. MUKEWATER CREEK SUBWATERSHED NO. 9 NEAR TRICKHAM																						
Dec. 6, 1961		0.0		27	4.3	4.3	5.8	106	3.0	7.0	0.3	0.0		104	0.14		85	0	9	0.2	196	7.1
Jan. 8, 1962		.5		31	4.1	4.6	5.8	119	3.6	6.0	.2	.4		115	.16		94	0	9	.2	220	7.0
June 5		3.6		27	6.2	8.0	7.0	118	4.2	11	.3	1.2		126	.17		93	0	15	.4	234	7.4
June 13		2.8		24	5.8	7.7	6.4	106	4.2	10	.3	.8		114	.16		84	0	15	.4	214	7.4
July 3		5.0		22	3.1	6.1	6.1	89	3.6	7.5	.3	.8		98	.13		68	0	15	.3	183	7.2
8-1375. MUKEWATER CREEK NEAR TRICKHAM																						
Sept. 18, 1962	0.06	7.8		26	2.3	4.1	5.7	85	7.2	8.0	0.2	1.8		105	0.14		74	5	10	.2	174	6.4
DEEP CREEK SUBWATERSHED NO. 1 NEAR PLACID																						
Oct. 4, 1961		5.9		40	7.2	12		128	19	21	0.4	1.0		170	0.23		129	24	17	0.5	297	7.3
DEEP CREEK SUBWATERSHED NO. 2 NEAR PLACID																						
Oct. 4, 1961		3.7		34	3.6	6.0	3.8	102	16	12	0.5	0.8		a142	0.19		100	16	11	0.3	233	7.2
8-1390. DEEP CREEK SUBWATERSHED NO. 3 NEAR PLACID																						
Oct. 4, 1961		6.2		39	6.7	18		107	15	42	0.4	1.0		181	0.25		125	37	24	0.7	331	7.3
Oct. 10		5.3		36	6.0	15		100	14	35	.4	.8		162	.22		114	33	22	.6	304	6.7
Nov. 8		4.3		38	6.7	16		107	16	37	.4	.0		171	.23		122	35	22	.6	323	7.0
Dec. 6		3.3		41	6.9	16		114	17	38	.4	.8		179	.24		131	37	21	.6	335	7.0
Jan. 3, 1962		2.2		46	7.3	15		128	18	38	.4	.0		a208	.28		145	40	21	.5	364	7.2
Feb. 2		1.7		50	7.7	16		136	20	40	.4	.5		203	.28		156	43	18	.6	392	7.0
Feb. 19		1.6		51	7.4	18		137	21	44	.4	.8		211	.29		158	45	20	.6	401	6.7
DEEP CREEK SUBWATERSHED NO. 4 NEAR PLACID																						
Oct. 4, 1961		13		48	6.8	15		131	35	25	0.4	0.5		208	0.28		148	40	18	0.5	348	7.3

a Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1392. DEEP CREEK SUBWATERSHED NO. 5 NEAR PLACID																						
Oct. 4, 1961		6.7		40	6.9	14		121	27	22	0.3	0.2		a193	0.26		128	29	20	0.5	309	7.4
8-1400. DEEP CREEK SUBWATERSHED NO. 8 (DRY PRONG DEEP CREEK) NEAR MERCURY																						
Oct. 13, 1961		6.6		22	1.9	4.3	5.1	71	6.8	5.0	0.3	3.0		90	0.12		63	4	12	0.2	153	6.5
JIM NED CREEK NEAR COLEMAN																						
Oct. 9, 1961	216	8.9		32	4.2	7.2	3.9	107	10	13	0.2	1.8		134	0.18		97	9	13	0.3	223	7.6
Oct. 10	36.2	9.5		37	4.7	16		123	12	22	.3	1.2		a172	.23		112	11	24	.7	271	7.3
Oct. 13	12.0	9.9		50	8.0	23		162	25	34	.3	1.0		a235	.32		158	25	24	.8	407	7.0
July 26, 1962	2,540	13		68	4.4	6.2	4.8	216	12	11	.2	.8		a239	.33		188	11	7	.2	379	6.7
July 26	2,080	11		64	3.6	4.7	4.4	201	8.8	8.7	.2	.0		a213	.29		174	10	5	.2	348	6.7
July 27	428	8.3		38	4.2	11		119	9.2	20	.2	.2		a163	.22		112	15	18	.5	265	6.4
8-1450. BRADY CREEK AT BRADY																						
Oct. 9, 1961	5,620	9.0		26	3.6	15		88	13	18	0.2	2.0		130	0.18		80	8	30	0.7	210	7.4
Oct. 10	2,430	10		31	4.0	11		92	13	19	.2	.8		a143	.19		94	18	20	.5	225	7.6
Oct. 10	396	10		32	5.9	25		100	22	36	.2	1.8		a194	.26		104	22	34	1.1	312	7.6
Oct. 11	186	10		30	6.1	25		98	18	38	.2	1.8		177	.27		100	20	35	1.1	308	7.4
8-1460. SAN SABA RIVER AT SAN SABA																						
Oct. 10, 1961	8,000	13		44	11	12		177	14	14	0.4	1.8		197	0.27		155	10	15	0.4	345	7.1
Sept. 1-30, 1962	b39.8	19		44	32	16		286	17	16	.2	2.0		287	.39		242	7	13	.4	487	7.7
8-1515. LLANO RIVER AT LLANO																						
Oct. 11, 1961	187	12		33	20	12		183	13	18	0.4	0.5		a209	0.28		165	15	14	0.4	366	7.7
8-1535. PEDERNALES RIVER NEAR JOHNSON CITY																						
Oct. 11, 1961	56	9.1		34	42	50		242	38	89	0.4	1.0		a404	0.55		258	59	30	1.4	699	7.8
BARTON CREEK AT HAYS COUNTY LINE NEAR DRIPPING SPRINGS																						
Oct. 17, 1961				50	16			216		15							191	14			396	7.5

a Residue on evaporation at 180°C.
b Mean daily discharge.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1570. WALLER CREEK AT 38TH STREET AT AUSTIN																						
Oct. 5, 1961	0.30	16		128	5.5	54		349	45	61	0.4	49		531	0.72		342	56	26	1.3	841	7.0
Apr. 27, 1962	14.1	4.8		67	2.5	6.4	2.3	194	12	8.0	.2	12		210	.29		177	18	7	.2	371	6.6
June 3	830	5.8		40	1.8	2.0	3.2	131	3.8	1.8	.1	1.0		124	.17		107	0	4	.1	190	7.3
Sept. 6	52.0	4.0		28	1.7	5.5	3.0	88	7.0	9.0	.1	.8		102	.14		77	5	13	.3	180	7.4
Sept. 26	26.1	3.3		38	1.9	4.5	2.8	116	7.2	7.0	.1	1.2		123	.17		103	8	8	.2	222	6.9
8-1575. WALLER CREEK AT 23RD STREET AT AUSTIN																						
Oct. 5, 1961	1.42	14		110	8.7	50		275	61	75	0.4	30		484	0.66		310	85	26	1.2	803	6.9
Apr. 27, 1962	14.7	5.3		65	2.9	8.2	2.7	190	14	12	.2	7.9		211	.29		174	18	9	.3	383	6.6
June 3	1,380	6.0		42	1.9	2.6	3.2	137	5.4	2.8	.1	.2		131	.18		113	0	5	.1	204	7.0
Sept. 6	76.5	4.3		32	1.8	6.1	3.0	95	8.8	11	.1	.2		114	.16		87	9	13	.3	199	7.2
Sept. 26	41.3	4.6		41	2.4	7.1	3.4	124	11	12	.1	2.2		145	.20		112	11	12	.3	258	6.9
WILSHIRE CREEK AT ARDENWOOD ROAD AT AUSTIN																						
Sept. 30, 1961	0.1	18		130	5.2	40		323	52	80	0.4	0.0		485	0.66		346	82	20	0.9	830	6.7
CUMMINS CREEK AT FARM ROAD 109 NEAR COLUMBUS																						
Mar. 28, 1962	c5	22		80	5.5	42		250	20	61	0.4	0.0		a354	0.48		222	17	29	1.2	618	7.0

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

LLANO RIVER LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on the Llano River and its tributaries from the confluence of the North and South Llano Rivers in Kimble County to the gaging station 8-1515, Llano River at Llano, Llano County, Tex., a distance of 83.5 miles.

Chemical analyses, in parts per million, January 1962

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 (micromhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate			
Jan. 17	South Llano River	0.2 mile above confluence with North Llano River	98.0	--	--	--	--	252	--	14		--	240	0.33	63.5	216	10	--	432	7.4
17	North Llano River	0.6 mile above confluence with South Llano River	16.3	--	--	--	--	244	--	24		--	270	.37	11.9	222	22	--	482	7.5
17	Llano River	At flood gage-Llano River near Junction	127	11	60	18	11	252	12	18		5.2	259	.35	88.8	224	17	0.3	450	7.6
17	---do.------	600 ft. below falls on Roy Nelson ranch	129	--	--	--	--	248	--	18		--	249	.34	86.7	216	13	--	447	7.5
17	Johnson Fork Creek	400 ft. below county road crossing	14.5	--	--	--	--	276	--	20		--	267	.36	10.5	234	8	--	481	7.6
18	Llano River	1.7 miles below Johnson Fork Creek	148	--	--	--	--	248	--	18		--	247	.34	98.7	214	11	--	444	7.6
18	---do.------	About 3 miles above Sycamore Creek	142	--	--	--	--	252	--	19		--	247	.34	94.7	216	10	--	444	7.6
18	---do.------	About 1 mile below Sycamore Creek	144	--	--	--	--	232	--	20		--	239	.33	92.9	202	12	--	429	7.4
18	---do.------	About .5 mile above Red Creek	148	--	--	--	--	216	--	19		--	226	.31	90.3	188	11	--	406	7.4
18	---do.------	2.8 miles below Red Creek	149	--	--	--	--	232	--	20		--	240	.33	96.6	204	14	--	431	7.4
19	---do.------	1.8 miles above Saline Creek	152	--	--	--	--	236	--	20		--	230	.31	94.4	196	3	--	414	7.4
19	Saline Creek	At mouth	a.2	2.2	58	44	87	199	124	158		.0	571	.78	.31	326	162	2.1	1,020	7.6
19	Salt Creek Spring	1.5 miles above mouth of Salt Creek	a.01	--	--	--	--	448	--	30		--	438	.60	.01	394	27	--	787	7.3
19	Bear Creek	2.5 miles above mouth	.4	15	56	52	38	332	70	64		.0	458	.62	.49	354	82	.9	779	7.7
19	Llano River	About 1 mile below Leon Creek	145	--	--	--	--	204	--	20		--	231	.31	90.4	196	29	--	416	7.4
20	Big Bluff Creek	At mouth	a2.0	--	--	--	--	284	--	36		--	314	.43	1.70	252	20	--	565	7.6
20	Llano River	At Farm Road 1871	157	--	--	--	--	224	--	20		--	234	.32	99.2	198	14	--	420	7.4
20	Honey Creek	About .5 mile above mouth	3.04	--	--	--	--	284	--	21		--	286	.39	2.35	254	22	--	514	7.5
21	James River	About .2 mile above mouth	6.07	3.0	39	44	16	309	20	28		.5	302	.41	4.95	278	26	.4	563	7.8
21	Llano River	About .2 mile below James River	164	--	--	--	--	216	--	19		--	231	.31	101	196	19	--	415	7.5
22	---do.------	About 2 miles above Comanche Creek	156	--	--	--	--	230	--	21		--	244	.33	103	207	18	--	439	7.6
22	Comanche Creek	About 2.5 miles above mouth	a4.0	--	--	--	--	213	--	69		--	359	.49	3.88	216	42	--	645	7.8
22	Beaver Creek	At mouth	a6.0	--	--	--	--	255	--	60		--	348	.47	5.64	248	39	--	625	7.8
22	Llano River	500 feet below Beaver Creek	165	--	--	--	--	219	--	22		--	240	.33	107	199	20	--	431	7.6
22	Willow Creek	About .5 mile above mouth	a3.5	--	--	--	--	201	--	70		--	337	.46	3.18	190	26	--	606	7.7
23	Llano River	About .2 mile below Stone Creek	176	--	--	--	--	226	--	23		--	245	.33	116	204	19	--	440	7.7
23	---do.------	About 1.5 miles below Castell	175	--	--	--	--	216	--	23		--	239	.33	113	198	21	--	429	7.7
24	---do.------	About .5 mile below Hickory Creek	175	--	--	--	--	210	--	26		--	239	.33	113	193	21	--	430	7.6
24	San Fernando Creek	At State Highway 29	a5.0	6.7	43	35	43	267	36	63		.0	358	.49	4.83	252	32	1.2	656	7.8
24	Llano River	800 ft. below Upper Llano City Dam	185	6.7	40	22	14	204	16	24		2.6	255	.31	112	190	23	.4	421	7.6
24	---do.------	600 ft. below gaging station (8-1515) at Llano	188	--	--	--	--	204	--	24		--	225	.31	--	188	21	--	417	7.6

a Estimated.

PEDERNALES RIVER LOW-FLOW INVESTIGATION

Water samples were collected for chemical analysis and discharge measurements were made on the Pedernales River and its tributaries beginning 2 miles downstream from Harper in Gillespie County and ending at Hamilton Pool in Travis County, a distance of 103 miles.

Chemical analyses in parts per million, April to May 1962

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)[1]		Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Calcium, magnesium	Noncarbonate			
Apr. 3	Pedernales River	0.5 mile below Pantry Creek, .2 mile below head springs	0.85	13	82	22	32	314	17	50	--	25	a395	0.54	295	38	0.8	688	7.2
3	Pecan Draw	At mouth	b.15	--	--	--	--	256	13	36	--	--	285	.39	222	12	--	506	7.7
3	Pedernales River	0.3 mile below Pecan Draw	1.27	--	--	--	--	232	17	50	--	--	310	.42	220	30	--	555	7.7
4	---do.----------	3.1 miles below Pecan Draw	.99	--	--	--	--	214	19	52	--	--	290	.39	198	22	--	517	7.5
3	Scott Creek	About 1 mile above mouth	.75	--	--	--	--	248	12	27	--	--	265	.36	214	11	--	469	7.6
4	Pedernales River	1 mile below Flag Creek	2.32	4.2	36	27	29	224	19	42	--	.4	a268	.36	201	18	.9	491	7.5
4	---do.----------	3 miles below Flag Creek	2.10	--	--	--	--	232	19	42	--	--	285	.39	208	18	--	508	7.5
4	---do.----------	0.5 mile above White Oak Creek	1.92	--	--	--	--	254	19	44	--	--	300	.41	224	16	--	540	7.6
May 15	---do.----------	-----do.----------	.37	4.4	44	30	32	280	16	40	0.4	.2	a305	.41	234	4	.9	550	7.8
Apr. 4	White Oak Creek	0.2 mile above mouth	.89	--	--	--	--	280	26	40	--	--	320	.44	246	16	--	569	7.7
4	Pedernales River	0.2 mile above Spring Creek at crossing	2.22	--	--	--	--	274	24	49	--	--	335	.46	244	20	--	599	7.4
5	---do.----------	-----do.----------	10.4	--	--	--	--	248	23	46	--	--	305	.41	224	21	--	547	7.4
May 15	---do.----------	-----do.----------	.73	--	--	--	--	262	--	40	--	--	295	.40	226	12	--	530	7.6
Apr. 4	Spring Creek	At mouth	b.2	--	--	--	--	292	23	75	--	--	390	.53	280	40	--	699	7.5
May 15	Pedernales River	1 mile above State Highway 16	.46	--	--	--	--	280	--	44	--	--	315	.43	244	14	--	562	7.9
15	Wolf Creek	At Henke Ranch, 11 miles above mouth	.81	--	--	--	--	286	--	15	--	--	260	.35	240	6	--	465	7.6
15	---do.----------	At mouth	.71	11	46	31	25	232	17	34	.3	.2	c305	.41	242	12	.7	538	7.6
16	Pedernales River	0.8 mile above Bear Creek	1.66	--	--	--	--	308	--	50	--	--	350	.48	272	20	--	623	7.6
16	Bear Creek	1,000 feet above mouth	.16	--	--	--	--	276	--	28	--	--	285	.39	238	12	--	513	7.6
16	Liveoak Creek	0.5 mile above mouth	1.67	7.6	47	48	62	330	30	105	.4	.2	c472	.64	315	44	1.5	839	7.9
16	Pedernales River	0.7 mile below Live Oak Creek	4.75	--	--	--	--	322	--	92	--	--	440	.60	306	42	--	782	7.8
16	---do.----------	0.2 mil below Muesebach Creek	4.87	--	--	--	--	308	--	118	--	--	485	.66	320	68	--	870	7.6
16	Barrons Creek	About 1 mile above mouth	1.0	19	79	47	121	380	28	182	.7	67	a731	.99	390	79	2.7	1,280	7.3
16	Pedernales River	At U.S. Highway 290	5.36	8.6	58	45	70	334	37	119	.4	1.0	c524	.71	330	56	1.7	908	7.7
16	---do.----------	1 mile above Palo Alto Creek	6.88	--	--	--	--	312	--	124	--	--	500	.68	320	64	--	895	7.4
16	Palo Alto Creek	At mouth	b.1	14	58	60	54	418	27	95	.5	2.5	c534	.73	392	49	1.2	922	7.5
16	Pedernales River	0.3 mile above South Grape Creek	7.70	--	--	--	--	290	--	124	--	--	480	.65	296	58	--	854	7.9
17	South Grape Creek	400 feet below U.S. Highway 290	1.52	5.5	52	38	43	308	27	69	.4	1.5	c395	.54	286	34	1.1	694	7.8
17	Cave Creek	400 feet above mouth	b.1	--	--	--	--	430	--	68	--	--	460	.63	380	28	--	823	7.6
17	Pedernales River	0.3 mile below Cave Creek	12.0	--	--	--	--	304	--	117	--	--	475	.64	304	55	--	847	7.8
17	Three Mile Creek	At U. S. Highway 290	b.3	15	90	64	70	364	32	215	.6	3.2	a669	.91	488	189	1.4	1,310	7.6
17	Pedernales River	2.5 miles below Three Mile Creek	14.6	--	--	--	--	306	--	120	--	--	490	.67	314	63	--	876	7.6
17	---do.----------	0.4 mile above Gillespie-Blanco county line	13.7	--	--	--	--	292	--	120	--	--	480	.65	302	62	--	860	7.7
17	Two Springs	1 mile above McDougals Crossing	.5	--	--	--	--	348	--	30	--	--	365	.50	328	43	--	656	7.5
17	Pedernales River	At McDougals Crossing	14.9	3.3	38	46	58	266	40	106	.4	.0	a423	.58	284	66	1.5	800	7.4
17	Rocky Creek	At mouth	1.47	13	53	34	18	240	64	31	.5	3.2	a335	.46	272	76	.5	591	7.6
18	Pedernales River	2.4 miles below Rocky Creek	15.2	--	--	--	--	264	--	100	--	--	420	.57	280	64	--	779	7.3
18	North Grape Creek	0.5 mile above mouth	1.78	6.8	34	32	29	230	17	51	.3	.0	c286	.39	216	28	.9	525	7.7
18	Pedernales River	100 feet below North Grape Creek	17.4	--	--	--	--	252	--	87	--	--	395	.54	260	54	--	707	7.6
18	---do.----------	0.2 mile above Hickory Creek	16.0	--	--	--	--	246	--	91	--	--	400	.54	258	56	--	718	7.7

1 Calculated from specific conductance.
a Calculated from determined constituents.
b Estimated.
c Residue at 180° C.

Chemical analyses in parts per million, April to May 1962

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)[1]		Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Calcium, magnesium	Noncarbonate			
May 18	Hickory Creek	At mouth	b.1	--	--	--	--	144	--	78	--	--	295	0.40	194	76	--	526	7.6
19	Pedernales River	1.9 miles above Flat Creek	16.4	--	--	--	--	252	--	89	--	--	400	.54	262	56	--	719	7.7
17	Flat Creek	0.3 mile above mouth	.77	--	--	--	--	302	--	32	--	--	335	.46	288	40	--	600	7.6
19	Pedernales River	At gaging station (8-1535) near Johnson City	15.3	5.9	34	40	50	248	35	83	0.4	0.2	a370	.50	250	46	1.4	695	7.6
19	----do.----	3.7 miles below gage near Johnson City	15.6	--	--	--	--	244	--	82	--	--	365	.50	254	54	--	683	7.7
20	----do.----	0.5 mile above Miller Creek	16.9	--	--	--	--	252	--	70	--	--	350	.48	256	50	--	653	7.6
20	Miller Creek	0.8 mile above mouth	2.75	7.4	43	17	11	182	24	18	.3	.2	c226	.31	177	28	.4	381	7.4
21	Pedernales River	3.3 miles below Pedernales Falls	23.8	--	--	--	--	240	--	53	--	--	320	.44	238	42	--	572	7.5
21	Flat Creek	4 miles above mouth	2.40	--	--	--	--	206	--	14	--	--	230	.31	192	23	--	394	7.6
21	Pedernales River	2.5 miles below Flat Creek	27.4	--	--	--	--	226	--	48	--	--	300	.41	222	37	--	538	7.6
21	Basin Creek	200 feet above mouth	.51	9.2	56	17	7.2	224	24	12	.3	.2	c239	.33	210	26	.2	412	7.6
21	Cypress Creek	0.2 mile above mouth	1.55	12	52	35	17	306	14	32	.4	.2	c319	.43	274	22	.4	571	7.6
21	Pedernales River	0.2 mile below Cypress Creek	30.3	7.7	38	29	25	222	25	43	.3	.2	c288	.39	214	32	.7	515	7.6

1 Calculated from specific conductance.
a Calculated from determined constituents.
b Estimated.
c Residue at 180°C.

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 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 1962.
Water temperatures: October 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 473 ppm Feb. 21-28; minimum, 77 ppm Nov. 14-17.
Hardness: Maximum, 274 ppm Jan. 1-27, Feb. 21-28; minimum, 35 ppm Nov. 14-17.
Specific conductance: Maximum daily, 1,070 micromhos Feb. 23; minimum daily, 97 micromhos Nov. 14.
Water temperatures: Maximum, 98°F July 21, 27, 28; minimum, freezing point Jan. 9-11.
EXTREMES, 1959-62.--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.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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 (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	Noncarbonate			
Oct. 1-10, 1961...	140	30		70	5.7	53		249		15	64	0.5	2.2		a397	0.54	150	198	0	1.6	615	7.6
Oct. 11-20.....	101	30		68	6.2	55		243		16	68	.5	1.8		364	.50	99.3	195	0	1.7	624	7.5
Oct. 21-31.....	115	26		65	5.3	52		232		14	64	.4	1.2		342	.47	106	184	0	1.7	587	7.6
Nov. 1-2.....	91.5	30		--	--	54		279		15	77	.4	1.8		--	--	--	237	8	1.5	717	7.6
Nov. 3-13.....	607	17		25	3.6	27		90		9.6	36	.3	1.2		164	.22	269	77	3	1.3	288	6.8
Nov. 14-17.....	5,182	12		10	2.5	8.4	4.4	42		5.0	12	.3	1.0		77	.10	1,080	35	1	.6	122	7.0
Nov. 18-22.....	693	18		30	3.4	20		103		8.2	26	.3	1.5		158	.21	296	89	4	.9	272	7.3
Nov. 23-30.....	248	25		68	5.1	33		220		13	47	.4	.8		a313	.43	210	190	10	1.0	511	7.9
Dec. 1-15.....	91.3	25		78	6.0	48		251		18	68	.4	1.8		a379	.52	93.4	219	14	1.4	638	7.4
Dec. 16-31.....	94.9	24		85	5.9	52		268		19	76	.4	1.5		a406	.55	104	236	17	1.5	678	7.6
Jan. 1-27, 1962...	77.4	20		99	6.4	57		310		22	84	.4	1.5		442	.60	92.4	274	20	1.5	776	7.5
Jan. 28-31.....	268	18		70	4.6	48		208		22	72	.4	1.8		a340	.46	246	194	23	1.5	599	7.6
Feb. 1-14.....	70.3	21		87	6.0	56		269		22	83	.4	1.5		a440	.60	83.5	242	21	1.6	714	7.5
Feb. 15-18.....	387	13		39	2.9	19		120		9.6	28	.3	2.8		174	.24	182	109	11	.8	308	7.3
Feb. 19-20.....	146	--		--	--	--		159		15	53	--	--		--	--	--	159	29	--	473	7.8
Feb. 21-28.....	99.0	26		100	5.9	59		326		20	80	.4	1.2		a473	.64	126	274	7	1.6	791	7.0
Mar. 1-16.....	80.1	25		63	6.4	63		205		22	90	.4	.8		a391	.53	84.6	184	16	2.0	648	7.6
Mar. 17-31,Apr.1-4	70.3	21		77	6.8	65		248		23	95	.4	.2		a428	.58	81.2	220	17	1.9	721	7.7

a Residue at 180°C.

8-1645. NAVIDAD RIVER NEAR GANADO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 5-8, 1962....	626	8.3		27	1.4	3.0	3.8	83		5.6	3.8	0.2	2.8		97	0.13	164	72	4	0.2	162	7.6
Apr. 9-11.....	138	18		46	4.2	37		133		17	60	--	1.8		249	.34	92.8	132	23	1.4	433	7.1
Apr. 12-23.....	68.4	22		79	6.5	63		262		20	89	--	.5		a436	.59	80.5	224	9	1.8	722	7.6
Apr. 24-26.....	765	13		38	3.5	37		117		14	54	--	3.2		221	.30	456	109	13	1.5	392	7.2
Apr. 27-May 1.....	2,992	12		21	2.4	13		68		6.6	18	--	2.0		108	.15	872	62	6	.7	185	6.4
May 2-4.....	469	--		--	--	--		105		8.0	26	.4	--		--	--	--	87	1	--	258	7.8
May 5-12.....	116	28		74	6.0	47		242		17	67	--	1.2		359	.49	112	209	10	1.4	601	7.5
May 13-20.....	62.6	23		64	8.9	74		240		17	101	--	1.5		407	.55	68.8	196	0	2.3	719	7.6
May 21-31.....	61.0	24		70	9.6	78		252		23	108	--	1.0		438	.60	72.1	214	8	2.3	748	7.6
June 1-7.....	940	9.2		26	3.6	18		78	6	8.4	24	.3	.8		134	.18	340	80	16	.9	237	8.5
June 8-28.....	126	20		52	8.8	47		187		20	66	--	1.8		308	.42	105	166	12	1.6	532	7.2
June 29-July 5....	911	15		24	4.6	23		88		10	32	--	2.2		154	.21	379	79	7	1.1	266	7.5
July 6-14.....	148	33		47	9.2	46		183		15	62	.4	.8		a326	.44	130	156	6	1.6	514	7.6
July 15-31.....	66.2	31		51	12	77		223		20	99	--	.8		a418	.57	74.7	176	0	2.5	701	7.5
Aug. 1-31.....	73.4	30		52	18	67		220		27	99	.5	.8		a416	.57	82.4	204	23	2.0	703	7.5
Sept. 1-25.....	290	31		37	12	47		172		11	63	.4	1.2		a304	.41	238	142	1	1.7	484	7.8
Sept. 26-30.....	227	20		24	5.4	30		107		6.8	36	--	1.5		177	.24	108	82	0	1.4	297	7.6
Weighted average	280	17		35	5.0	28		123		11	39	--	1.5		203	0.27	154	107	7	1.1	341	7.0
Time-weighted average.....	--	24		61	7.8	51		213		18	72	--	1.3		349	--	--	184	11	1.6	588	7.4
Tons per day....	--	13		26	3.7	21		93		8.1	30	--	1.1		--	--	--	--	--	--	--	--

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN LAVACA RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1635. LAVACA RIVER AT HALLETSVILLE																						
Sept. 24, 1962---------	2.13	21		64	5.6	69		208	32	90	0.6	0.2		a396	0.54		182	12	45	2.2	652	6.9
8-1640. LAVACA RIVER NEAR EDNA																						
Nov. 15, 1961----------	10,300	9.2		22	1.6	6.7	4.0	71	0.8	11	0.3	0.8		92	0.13		62	3	18	0.4	161	6.7
Jan. 6, 1962-----------	95.4	16		101	7.1	59		312	29	85	.5	2.8		a460	.63		281	26	31	1.5	784	7.0
June 12----------	77.7	20		90	5.0	43		285	20	58	.4	.0		376	.51		245	12	27	1.2	663	7.0
July 17----------	37.5	25		92	6.5	50		303	22	66	.4	.0		411	.56		256	8	30	1.4	711	7.3

a Residue on evaporation at 180°C.

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 bridge, 10 miles upstream from Coleto Creek, and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1962.
Water temperatures: November 1950 to September 1962
EXTREMES, 1961-62.--Dissolved solids: Maximum, 432 ppm Dec. 16-31; minimum, 189 ppm Nov. 15-22.
Hardness: Maximum, 272 ppm Dec. 16-31; minimum, 124 ppm Nov. 15-22.
Specific conductance: Maximum daily, 817 micromhos Mar. 6; minimum daily, 257 micromhos Nov. 18.
Water temperatures: Maximum, 88°F Aug. 11, 12; minimum, 36°F Jan. 11, 12.
EXTREMES, 1945-46, 1948-62.--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 (1950-62): Maximum, 90°F Aug. 4, 27, 1952; minimum, 36°F 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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-10, 1961...	906	18		57	18	33		230		34	42	0.4	4.0		342	0.47	837	216	28	1.0	552	7.6
Oct. 11-20.....	1,234	17		56	18	32		222		32	44	.4	4.4		335	.46	1,120	214	32	1.0	545	7.6
Oct. 21-31.....	971	16		62	14	32		229		31	40	.4	4.8		343	.47	899	212	24	1.0	532	7.6
Nov. 1-14.....	1,314	19		60	14	33		226		30	41	.3	4.2		320	.44	1,140	207	22	1.0	525	7.2
Nov. 15-22.....	4,839	15		38	7.2	18		132		21	22	.4	2.8		a189	.26	2,470	124	16	.7	331	7.0
Nov. 23-30.....	1,244	19		67	13	35		221		42	48	.4	4.2		348	.47	1,170	220	40	1.0	570	7.5
Dec. 1-15.....	1,023	17		71	21	42		270		40	64	.3	.0		a388	.53	1,070	264	42	1.1	665	7.6
Dec. 16-31.....	972	14		78	19	41		280		42	60	.3	4.9		432	.59	1,130	272	43	1.1	695	7.5
Jan. 1-31, 1962...	906	11		66	19	40		247		43	54	.3	5.8		a360	.49	881	242	40	1.1	635	7.6
Feb. 1-14.....	844	15		51	19	44		198		46	61	.3	4.2		350	.48	798	205	42	1.3	590	7.9
Feb. 15-16.....	1,380	12		41	7.7	19		139		25	31	--	4.0		208	--	--	134	20	--	370	7.9
Feb. 17-28.....	891	13		53	18	44		205		43	60	.3	4.0		346	.47	832	206	38	1.3	592	7.8
Mar. 1-10.....	786	15		54	19	52		209		45	73	.2	3.2		a364	.50	772	212	41	1.6	637	7.6
Mar. 11-20.....	804	15		52	19	41		207		40	58	.2	3.8		343	.47	745	208	38	1.2	580	7.5
Mar. 21-31.....	755	13		57	19	43		219		42	62	.2	3.0		366	.50	746	220	40	1.3	608	7.6
Apr. 1-10.....	860	15		56	16	39		210		37	53	.3	4.0		349	.47	810	206	34	1.2	564	7.7
Apr. 11-20.....	764	17		59	18	45		224		41	64	--	3.0		388	.53	800	221	38	1.3	629	7.3
Apr. 21-30.....	1,210	14		56	15	34		210		31	48	--	3.2		330	.45	1,078	201	29	1.0	533	7.5
May 1-10,.....	1,001	24		57	14	43		201		44	55	.4	3.5		a340	.46	919	200	35	1.3	580	7.5
May 11-20.....	654	22		45	16	36		187		34	47	--	3.2		306	.42	540	178	26	1.2	504	7.5
May 21-31.....	597	20		48	16	37		202		32	46	--	1.8		313	.43	505	186	20	1.2	520	7.4
June 1-15.....	1,150	21		50	15	28		196		26	40	.3	3.0		284	.39	882	186	26	.9	473	7.5
June 16-30.....	611	20		53	16	28		214		26	39	--	2.2		296	.40	488	198	22	.9	502	7.3
July 1-10.....	680	21		44	17	32		189		25	46	.3	2.2		307	.42	564	180	25	1.0	494	7.2
July 11-20.....	484	18		52	16	35		215		28	46	.3	1.5		329	.45	430	196	20	1.1	532	7.5
July 21-31.....	383	19		50	17	32		215		27	41	.4	1.2		313	.43	324	195	19	1.0	519	7.4
Aug. 1-31.....	332	22		54	18	39		231		32	49	.4	1.0		333	.45	299	208	19	1.2	563	7.5
Sept. 1-10.....	493	21		52	18	38		220		32	49	.3	1.8		a320	.44	426	204	23	1.2	541	7.6
Sept. 11-20.....	996	16		48	11	30		181		28	36	--	2.5		263	.36	707	165	16	1.0	445	7.9
Sept. 21-30.....	719	17		56	13	30		214		28	36	--	2.5		290	.39	563	193	18	.9	486	7.6
Weighted average	914	17		55	16	35		210		34	47	--	3.3		321	0.43	793	202	30	1.1	537	7.4
Time-weighted average.....	--	17		56	17	37		218		35	50	--	3.1		334	--	--	209	30	1.1	558	7.5
Tons per day....	--	41		137	39	86		519		84	116	--	8.3		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1678. GUADALUPE RIVER AT SATTLER																						
Sept. 4, 1962	17.6	13		52	20	11		236	19	16	0.3	0.0		256	0.35		212	19	10	0.3	441	7.1
8-1710. BLANCO RIVER AT WIMBERLY																						
Apr. 4, 1962	42.0	7.1		56	17	12		218	28	17	0.3	3.5		248	0.34		210	31	11	0.4	428	7.3
Aug. 22	22.0	11		52	17	7.5	0.9	214	17	15	.3	2.0		a228	.31		200	24	8	.2	407	7.3
Sept. 26	227	6.4		46	7.0	3.3	1.5	158	7.6	5.8	.2	1.2		a157	.21		144	14	47	.1	273	6.8
8-1724. PLUM CREEK AT LOCKHART																						
Apr. 4, 1962	0.50	1.7		82	12	91		199	165	82	0.7	0.0		559	0.76		254	91	44	2.5	870	7.0
June 4	65	11		70	5.6	65		172	103	63	.4	.8		439	.60		198	56	42	2.0	691	6.9
8-1746. PEACH CREEK BELOW DILLWORTH																						
Apr. 2, 1962	5.13	15		172	42	155		174	476	212	0.4	0.8		a1,160	1.58		602	459	36	2.7	1,730	7.1
May 7	7.84	20		69	15	62		115	148	84	.3	.2		a456	.62		234	140	36	1.8	763	6.7
June 4	140	12		37	6.4	34		76	64	44	.3	1.0		a236	.32		119	56	38	1.4	421	6.4
Sept. 24	b .05	20		53	8.6	34		118	94	33	.3	.2		331	.45		168	71	3.1	1.1	468	6.5
8-1750. SANDIES CREEK NEAR WESTHOFF																						
Apr. 5, 1962	28.9	10		52	13	169		246	95	175	0.4	1.0		654	0.89		183	0	67	5.4	1,110	7.1
May 10	5.88	18		47	12	104		200	77	105	.4	.1		491	.67		167	3	58	3.5	816	6.6
June 4	200	11		20	4.3	61		107	35	53	.3	1.8		260	.35		68	0	66	3.2	429	6.9
Sept. 27	2.17	26		26	5.2	94		212	29	61	.5	.5		a346	.47		86	0	70	4.4	564	6.5
8-1770. COLETO CREEK NEAR SCHROEDER																						
Apr. 4, 1962	5.23	21		71	11	82		215	33	134	0.4	0.0		476	0.65		222	46	45	2.4	805	7.3
May 10	5.79	22		71	9.5	64		212	26	109	.4	.0		a406	.55		216	42	39	1.9	741	7.2
June 4	247	12		52	3.4	27		140	5.8	58	.2	.1		a228	.31		144	29	29	1.0	427	6.6
July 17	2.07	30		60	7.9	69		186	23	109	.4	.0		412	.56		182	30	45	2.2	683	7.4
Sept. 27	7.94	24		76	8.0	56		226	26	93	.5	.0		428	.58		222	38	35	1.6	676	7.3

a Calculated from determined constituents.
b Field estimate.

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.--3,918 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1945 to September 1946, September 1958 to September 1962.
Water temperatures: September 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 718 ppm Apr. 1-10; minimum, 137 ppm June 3.
Hardness: Maximum, 360 ppm Mar. 1-15; minimum, 74 ppm June 3.
Specific conductance: Maximum daily, 1,270 micromhos June 29; minimum daily, 218 micromhos June 3.
Water temperatures: Maximum, 89°F Aug. 10; minimum, 42°F Jan. 10, 11.
EXTREMES, 1945-46, 1958-62.--Dissolved solids: Maximum, 808 ppm Sept. 18, 1959; minimum, 85 ppm Oct. 27, 1960.
Hardness: Maximum, 370 ppm May 1-15, 1961; minimum, 57 ppm Oct. 27, 1960.
Specific conductance: Maximum daily, 1,390 micromhos Apr. 3, 1959; minimum daily, 138 micromhos Oct. 27, 1960.
Water temperatures (1958-62): Maximum, 89°F Sept. 5, 1961, Aug. 10, 1962; 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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-3, 1961....	295	19		65	12	63		201		67	77	0.4	5.2		a408	0.55	325	212	47	1.9	676	7.9
Oct. 4-12.....	400	23		85	19	86		275		92	101	.5	14		566	.77	611	290	64	2.2	899	8.1
Oct. 13-20.....	702	19		64	14	56		215		58	64	.5	12		398	.54	754	217	41	1.7	657	7.9
Oct. 21-27.....	388	21		91	19	71		283		85	92	.4	10		a528	.72	553	305	73	1.8	868	8.1
Oct. 28-31.....	1,091	15		47	8.2	40		147		46	44	.4	7.8		282	.38	831	151	30	1.4	471	7.6
Nov. 1-14.....	466	21		81	16	67		250		81	81	.5	9.7		505	.69	635	268	63	1.8	795	7.6
Nov. 15-17.....	3,645	13		31	4.5	19		108		21	16	.4	4.5		a162	.22	1,590	96	7	.8	279	7.2
Nov. 18-22.....	658	18		66	13	52		218		57	59	.5	11		408	.55	725	218	40	1.5	656	7.5
Nov. 23-30.....	403	22		96	19	76		298		98	90	.5	9.2		578	.79	629	318	74	1.9	909	7.6
Dec. 1-15.....	344	21		104	23	79		317		112	101	.4	8.0		635	.86	590	354	94	1.8	974	8.0
Dec. 16-31.....	341	19		104	22	78		315		104	102	.4	10		632	.86	582	350	92	1.8	985	7.9
Jan. 1-15, 1962...	334	21		96	23	84		306		103	104	.3	15		645	.88	582	334	83	2.0	997	7.7
Jan. 16-31.....	328	21		100	21	84		304		104	106	.4	13		a598	.81	530	336	87	2.0	1,010	7.7
Feb. 1-28.....	325	20		96	19	91		292		103	110	.5	16		647	.88	568	318	78	2.2	985	7.9
Mar. 1-15.....	248	11		105	24	98		318		120	124	.4	14		706	.96	473	360	100	2.2	1,070	8.0
Mar. 16-31.....	242	19		102	23	99		307		120	126	.5	9.8		688	.94	450	349	98	2.3	1,070	7.8
Apr. 1-10.....	252	20		105	23	102		308		125	133	.5	8.9		718	.98	489	356	104	2.3	1,100	7.8
Apr. 11-16.....	427	21		80	19	88		280		82	106	--	5.2		592	.73	683	278	48	2.3	934	7.6
Apr. 17-30.....	338	22		94	22	98		296		110	124	--	8.8		670	.86	611	325	82	2.4	1,030	7.7
May 1-5.....	449	13		59	12	48		180		60	60	.5	5.8		356	.48	432	196	49	1.5	587	8.1

a Calculated from determined constituents.

8-1885. SAN ANTONIO RIVER AT GOLIAD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 (Residue at 180°C)			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	Noncarbonate			
May 6-18, 1962....	241	21		89	18	83		270		96	104	--	9.9		562	0.76	366	296	74	2.1	896	8.0
May 19-31.....	187	23		94	20	104		300		102	130	--	9.6		638	.87	322	317	71	2.5	1,040	7.5
June 1.....	483	--		--	--	--		257		90	115	0.5	--		--	--	--	282	72	--	922	8.0
June 2.....	3,040	--		--	--	--		101		21	34	--	--		--	--	--	101	18	--	322	7.6
June 3.....	5,190	--		--	--	--		89		8.6	16	--	--		a137	.19	1,920	74	1	--	218	7.4
June 4-6.....	1,937	22		40	5.5	30		126		36	30	--	5.3		a231	.31	1,210	122	19	1.2	379	7.6
June 7-10.....	536	20		59	11	53		197		50	61	--	10		371	.50	537	192	30	1.7	613	7.5
June 11-20.....	243	27		88	19	85		279		86	110	--	11		595	.81	390	298	69	2.1	937	7.8
June 21-29.....	179	25		101	21	104		298		110	142	--	7.6		688	.94	333	338	94	2.5	1,090	8.0
June 30.....	200	--		--	--	--		216		74	103	--	--		--	--	--	240	63	--	803	7.9
July 1-2, 4-10....	237	24		86	17	95		270		95	114	.6	8.5		586	.80	375	284	63	2.5	948	7.5
July 3.....	338	--		--	--	--		125		36	39	--	--		--	--	219	115	13	--	393	7.7
July 11-20.....	122	23		98	22	109		292		126	141	--	4.2		686	.93	226	335	96	2.6	1,100	7.8
July 21-31.....	132	21		82	23	117		254		142	136	--	5.9		a652	.89	232	299	91	2.9	1,060	7.3
Aug. 1-27.....	112	24		91	22	113		274		127	143	.6	5.0		671	.91	203	318	93	2.8	1,110	7.8
Aug. 28-31.....	379	20		66	15	73		220		80	78	--	14		464	.63	475	226	46	2.1	772	7.3
Sept. 1-8.....	156	27		80	19	99		270		94	113	.6	16		597	.81	251	278	56	2.6	931	7.6
Sept. 9.....	801	--		--	--	--		204		68	79	--	--		--	--	--	209	42	--	692	7.8
Sept. 10-11.....	1,677	25		34	4.4	34		116		25	36	--	6.0		a221	.30	1,000	103	8	1.5	345	7.7
Sept. 12-17.....	269	20		64	12	67		207		66	77	--	9.0		424	.58	308	209	40	2.0	679	7.8
Sept. 18-30.....	193	21		86	17	95		270		96	113	--	11		577	.78	301	284	63	2.5	916	7.7
Weighted average	374	20		75	16	69		237		79	84	--	9.3		488	0.66	493	253	59	1.9	761	7.7
Time-weighted average.....	--	21		86	19	92		274		99	107	--	10		590	--	--	300	75	2.2	936	7.7
Tons per day....	--	20		78	17	177		248		85	91	--	9.8		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
CALAVERAS CREEK SUBWATERSHED NO. 3 NEAR ELMENDORF																						
Sept. 6, 1962----------		3.3		19	5.7	16		106	3.8	10		0.2		110	0.15		71	0	33	0.8	207	6.8
CALAVERAS CREEK SUBWATERSHED NO. 4 NEAR ELMENDORF																						
Sept. 6, 1962----------		4.1		19	6.3	18		98	16	10	0.5	0.2		122	0.17		73	0	35	0.9	222	6.7
CALAVERAS CREEK SUBWATERSHED NO. 1 NEAR ELMENDORF																						
Sept. 6, 1962----------		2.6		14	4.2	11		82	1.6	4.8	0.4	0.2		79	0.11		52	0	32	0.7	149	6.7
8-1824. CALAVERAS CREEK SUBWATERSHED NO. 6 NEAR ELMENDORF																						
Sept. 6, 1962----------		7.8		56	13	57		137	126	50	0.7	0.0		a382	0.52		193	80	39	1.8	614	6.9
CALAVERAS CREEK SUBWATERSHED NO. 7 NEAR ELMENDORF																						
Sept. 6, 1962----------		5.9		25	3.8	4.6	6.6	94	8.4	5.5	0.5	1.5		108	0.15		78	1	10	0.2	186	6.6
CALAVERAS CREEK SUBWATERSHED NO. 8 NEAR ELMENDORF																						
Sept. 6, 1962----------		9.8		20	3.9	14		74	16	13	0.5	0.2		113	0.15		66	5	32	0.7	198	6.6
CALAVERAS CREEK SUBWATERSHED NO. 5 NEAR ELMENDORF																						
Sept. 6, 1962----------		8.2		22	3.7	10		84	16	4.2	0.5	0.2		106	0.14		70	1	25	0.5	180	6.7
CALAVERAS CREEK SUBWATERSHED NO. 9 NEAR ELMENDORF																						
Sept. 6, 1962----------		7.3		11	2.6	12		55	9.6	5.8	0.5	0.2		76	0.10		38	0	41	0.8	128	6.7
CALAVERAS CREEK SUBWATERSHED NO. 10 NEAR ELMENDORF																						
Sept. 6, 1962----------		8.0		31	4.3	11		126	6.4	5.0	0.4	0.0		128	0.17		95	0	19	0.5	226	7.0

a Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1860. CIBOLO CREEK NEAR FALLS CITY																						
Oct. 25, 1961	28.7	16		83	15	77		211	147	76	0.5	1.8		a545	0.74		268	96	38	2.0	831	7.5
Jan. 5, 1962	34.6	11		101	21	111		258	196	112	.3	7.1		a727	.99		338	127	42	2.6	1,130	7.1
Jan. 30	34	13		107	19	112		275	190	112	.3	7.6		a714	.97		345	120	41	2.6	1,130	7.1
Apr. 18	26.4	12		86	24	135		187	203	170	.3	2.2		a738	1.00		313	160	48	3.3	1,200	7.4
June 4	32	11		44	7.6	54		139	73	47	.3	.8		a326	.44		142	28	45	2.0	532	6.7
Aug. 1	8.15	17		70	21	133		168	216	132	.4	.0		672	.91		261	124	53	3.6	1,090	7.3
Sept. 5	8.22	18		83	19	125		218	192	126	--	.2		670	.91		285	106	49	3.2	1,100	7.5
8-1865. ECLETO CREEK NEAR RUNGE																						
Oct. 24, 1961	1.03	12		32	3.4	43		144	17	35	0.5	0.5		214	0.29		94	0	50	1.9	371	7.0
Jan. 2, 1962	1.36	20		72	9.9	119		314	64	108	.5	.5		a570	.78		220	0	54	3.5	928	7.6
Jan. 30	1.1	17		76	12	148		342	79	139	.5	.0		a647	.88		239	0	57	4.2	1,080	7.5
June 2	971	12		50	1.6	6.1	5.3	168	4.4	6.0	.2	.0		a169	.23		131	0	9	.2	292	6.9
June 4	75	12		23	2.4	28		96	14	23	.3	1.5		151	.21		67	0	47	1.5	262	6.5
June 5	15.9	11		22	3.5	33		92	26	26	.4	2.0		169	.23		69	0	51	1.7	304	6.3
Sept. 27	.01	19		36	3.1	13		134	6.8	8.5	.2	1.2		154	.21		103	0	21	.6	246	6.6
ESCONDIDO CREEK SUBWATERSHED NO. 9 NEAR KENEDY																						
Sept. 4, 1962		37		48	5.1	21		190	16	10		1.2		231	0.31		141	0	25	0.8	367	6.9
ESCONDIDO CREEK SUBWATERSHED NO. 8 NEAR KENEDY																						
Sept. 4, 1962		41		41	3.2	25		174	16	7.5		0.2		220	0.30		115	0	32	1.0	337	6.9
ESCONDIDO CREEK SUBWATERSHED NO. 6 NEAR KENEDY																						
Sept. 4, 1962		15		36	4.7	43		174	26	24		0.2		a260	0.32		109	0	46	1.8	402	7.2
ESCONDIDO CREEK SUBWATERSHED NO. 5 NEAR KENEDY																						
Sept. 4, 1962		19		31	5.8	88		170	43	75		2.0		348	0.47		102	0	65	3.8	604	7.2
ESCONDIDO CREEK SUBWATERSHED NO. 7 NEAR KENEDY																						
Sept. 4, 1962		15		44	3.6	27		178	21	10		0.8		209	0.28		125	0	32	1.1	358	7.1

a Residue on evaporation at 180°C.

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

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
ESCONDIDO CREEK SUBWATERSHED NO. 10 NEAR KENEDY																						
Sept. 4, 1962---------		5.6		20	3.8	16		108	4.8	5.5		0.2		109	0.15		66	0	35	0.9	196	6.8
ESCONDIDO CREEK SUBWATERSHED NO. 3 NEAR KENEDY																						
Sept. 4, 1962---------		2.5		34	8.2	63		105	28	98	1.1	0.1		a298	0.41		118	32	54	2.5	537	7.0
ESCONDIDO CREEK SUBWATERSHED NO. 4 NEAR KENEDY																						
Sept. 4, 1962---------		19		58	8.0	74		161	28	126		0.5		392	0.53		178	46	48	2.4	728	7.0
ESCONDIDO CREEK SUBWATERSHED NO. 2 NEAR KENEDY																						
Sept. 4, 1962---------		9.6		55	6.5	61		146	26	106		1.2		337	0.46		164	44	45	2.1	635	6.9
8-1870. ESCONDIDO CREEK SUBWATERSHED NO. 1 NEAR KENEDY																						
Sept. 4, 1962---------		11		57	3.0	26		224	10	9.0		5.6		232	0.32		155	0	27	0.9	379	7.0
8-1879. ESCONDIDO CREEK SUBWATERSHED NO. 11 NEAR KENEDY																						
Sept. 14, 1962--------		1.7		23	3.2	28		118	4.8	21	0.3	0.0		140	0.19		71	0	47	1.4	263	6.5

a Residue on evaporation at 180°C.

8-1895. MISSION RIVER AT REFUGIO, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 560 feet upstream from Missouri and Pacific Railway bridge, and 0.2 mile southwest of Refugio, Refugio County.
DRAINAGE AREA.--643 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 47,000 ppm Aug. 11-31; minimum, 181 ppm June 2-4.
Hardness: Maximum, 4,380 ppm Aug. 11-31; minimum, 73 ppm June 2-4.
Specific conductance: Maximum daily, 63,500 micromhos Aug. 19, 20; minimum daily, 239 micromhos June 3.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 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)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density[a] (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-12, 1961...	6.0	32		643	81	6,170	48	227		23	10,600	--	--	17,700	24.3	287	1,940	1,750	61	26,700	7.1	1.011
Oct.13-31.....	5.7	32		807	116	8,090	73	256		19	14,200	--	--	23,500	32.5	362	2,490	2,280	70	35,200	6.9	1.016
Nov. 1-13.....	5.7	32		729	95	7,080	54	276		31	12,500	--	--	20,700	28.6	319	2,210	1,980	65	32,100	7.0	1.015
Nov. 14-17.....	112	--		70	6.5	387	--	92		16	700	--	1.0	--	--	--	201	126	12	2,340	7.2	--
Nov. 18-21.....	10.8	20		363	54	3,730	35	161		26	6,360	--	--	10,700	14.6	312	1,130	996	48	17,400	7.5	1.006
Nov. 22-30.....	9.2	26		633	92	6,040	45	248		24	10,700	--	--	17,700	24.3	440	1,960	1,760	59	27,200	6.8	1.011
Dec. 1-31.....	6.6	30		691	97	6,990	51	261		29	12,000	0.4	--	20,000	27.6	356	2,120	1,910	66	29,900	7.2	1.013
Jan. 1-10, 1962...	7.1	34		728	109	7,690	45	285		55	13,200	.7	--	28,000	30.4	537	2,260	2,030	70	32,800	6.8	1.016
Jan. 11-17.....	6.5	35		549	77	5,200	32	305		39	9,000	.6	--	15,100	20.8	265	1,690	1,440	55	23,800	7.0	1.010
Jan. 18-31.....	5.7	32		692	99	6,540	47	296		38	11,600	.7	--	19,200	26.4	295	2,130	1,890	62	29,100	6.7	1.012
Feb. 1-28.....	5.3	36		720	108	7,390	54	193		37	12,800	.8	--	21,200	29.2	303	2,240	2,080	68	31,800	7.3	1.014
Mar. 1-15.....	5.6	37		808	105	8,250	54	230		39	14,100	--	--	23,500	32.4	355	2,450	2,260	72	34,000	7.2	1.015
Mar. 16-31.....	5.6	35		797	112	8,220	55	248		38	14,300	--	--	23,700	32.7	358	2,450	2,250	72	34,200	6.9	1.016
Apr. 1-21.....	5.6	39		894	124	9,780		148		34	16,900	--	--	27,800	38.5	420	2,740	2,620	81	39,500	7.0	1.018
Apr. 22-23.....	8.3	--		--	--	--		148		--	7,060	--	--	--	--	--	1,230	1,110	--	18,700	7.9	1.005
Apr. 24-30.....	3.1	--		--	--	--		169		31	17,200	--	--	--	--	--	2,850	2,710	--	40,100	6.9	1.018
May 1-June 1.....	3.3	36		1,260	151	13,900		177		26	23,900	--	--	39,400	54.9	351	3,760	3,620	99	52,200	7.0	1.025
June 2-4.....	2,213	26		26	2.0	32		94		3.6	42	--	3.2	181	.25	1,080	73	0	1.6	280	7.7	--
June 5-6.....	322	--		--	--	--		150		9.2	900	--	--	--	--	--	254	131	--	2,940	7.7	
June 7-24.....	15.6	34		358	53	3,300		230		29	5,720	--	--	9,610	13.1	405	1,110	922	43	15,800	7.2	1.005
June 25-30.....	9.7	36		462	62	4,260		242		32	7,400	--	--	12,400	17.0	325	1,410	1,210	49	19,800	7.2	1.007
July 1-15.....	12.6	48		574	88	5,940		167		36	10,300	--	--	17,100	23.5	582	1,790	1,660	61	26,500	7.3	1.010
July 16-25.....	4.0	51		802	118	8,730		142		38	15,100	--	--	24,900	34.4	269	2,490	2,370	76	36,500	7.2	1.016
July 26-31.....	3.3	49		922	136	10,600		153		42	18,200	--	--	30,000	41.6	267	2,860	2,730	86	42,300	7.0	1.019
Aug. 1-10.....	2.9	47		1,250	183	14,200		146		27	24,600	--	--	40,400	56.5	316	3,870	3,750	99	54,100	7.4	1.028
Aug. 11-31.....	1.9	34		1,430	198	16,600		181		21	28,600	--	--	47,000	66.0	241	4,380	4,230	109	60,700	6.6	1.033
Sept. 1-8.....	2.2	28		515	74	5,400		194		17	9,320	--	--	15,400	21.1	91.5	1,590	1,430	59	21,900	7.6	1.009
Sept. 9-11.....	1,643	--		--	--	--		102		2.8	78	--	--	--	--	--	164	80	--	--	7.9	--
Sept. 12-14.....	119	--		--	--	--		102		3.6	375	--	--	--	--	--	126	42	--	1,390	7.9	--
Sept. 15-30.....	14.3	30		603	77	6,260		210		17	10,800	--	--	17,900	24.6	691	1,821	1,650	64	25,000	7.8	1.011
Weighted average	41.9	27		139	18	1,010		118		7.9	1,940	--	--	3,330	4.53	377	418	324	17	7,070	7.6	--
Time-weighted average.....	--	35		772	107	6,860		210		30	14,000	--	--	23,400	--	--	2,360	2,190	71	33,600	7.0	--
Tons per day....	--	3.0		16	2.0	115		13		0.9	219	--	--	--	--	--	--	--	--	--	--	--

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

MISCELLANEOUS ANALYSES OF STREAMS IN SAN ANTONIO-NUECES COASTAL AREA IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
BLANCO CREEK AT STATE HIGHWAY 202 NEAR REFUGIO																						
Oct. 24, 1961	0.99	35		78	16	84		291	32	121	0.5	0.0		a510	0.69		260	22	41	2.3	857	7.5
Jan. 3, 1962	1.09	36		97	18	106		324	45	166	.4	.0		661	.90		316	50	42	2.6	1,090	7.2
Jan. 30	1.62	38		95	21	127		326	55	194	.4	.0		700	.95		324	56	46	3.1	1,180	7.3
Apr. 5	1.50	34		66	20	129		240	51	197	.4	.0		637	.87		247	50	53	3.6	1,060	7.5
June 13	5.71	27		60	8.6	50		214	18	70	.4	.0		347	.47		185	10	37	1.6	592	6.8
8-1893. MEDIO CREEK NEAR BEEVILLE																						
June 2, 1962	2,650	7.0		42	1.5	5.8	5.2	142	3.4	5.5	0.1	0.5		144	0.20		111	0	10	0.2	256	6.6
June 5	9.74	12		30	2.9	47		124	20	43	.3	6.9		233	.32		87	0	54	2.2	398	7.0
MEDIO CREEK NEAR REFUGIO																						
Jan. 30, 1962	b1	33		92	23	152		323	51	238	0.4	0.5		766	1.04		324	60	50	3.7	1,320	7.3
Apr. 5	.99	32		65	23	152		231	48	245	0.4	1.0		719	.98		256	67	56	4.1	1,200	7.5
ARANSAS RIVER 4.2 MILES NORTHEAST OF SKIDMORE																						
Nov. 28, 1961	0.30	9.8		27	7.3	518		564	37	508	2.0	1.5		a1,390	1.89		98	0	92	23	2,440	7.9
Jan. 3, 1962	.53	4.4		25	6.4	431		490	33	415	1.6	.2		a1,160	1.58		89	0	91	20	2,090	8.3
Jan. 30	b .4	1.6		24	7.8	511		546	39	500	1.8	6.7		a1,360	1.85		92	0	92	23	2,450	8.5
Sept. 26	1.56	16		49	6.6	191		344	15	188	.6	.5		675	.92		150	0	74	6.8	1,110	7.2
ARANSAS RIVER 10.8 MILES SOUTHEAST OF SKIDMORE																						
Nov. 28, 1961	0.07	32		131	46	229		225	74	532	0.4	1.2		1,160	1.58		516	332	49	4.4	2,080	7.5
Jan. 3, 1962	.11	38		136	46	239		244	81	540	.5	.2		1,200	1.63		528	328	50	4.5	2,200	7.4

a Calculated from determined constituents.
b Field estimate.

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 Patricio County.
DRAINAGE AREA.--16,660 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 378 ppm July 1-31; minimum, 328 ppm Nov. 1-30.
Hardness: Maximum, 184 ppm Mar. 1-31; minimum, 148 ppm Sept. 1-30.
Specific conductance: Maximum daily, 773 micromhos July 28; minimum daily, 459 micromhos June 3.
Water temperatures: Maximum, 89°F July 22; minimum, 46°F Jan. 13.
EXTREMES, 1947-62.--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 1961 to September 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°C)			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	Noncarbonate			
Oct. 1-31, 1961...	110	18		58	6.3	47		202		32	51	0.4	1.0		334	0.45	99.2	170	5	1.6	529	7.9
Nov. 1-30.....	105	18		60	7.2	45		209		32	50	.3	.8		328	.45	93.0	179	8	1.5	540	7.6
Dec. 1-31.....	102	19		60	6.9	47		205		33	54	.3	.8		338	.46	93.1	178	10	1.5	552	7.6
Jan. 1-31, 1962...	107	18		61	7.1	49		214		34	54	.2	.8		340	.46	98.2	181	6	1.6	553	7.8
Feb. 1-28.....	112	18		62	6.9	49		213		34	55	.3	.8		354	.48	107	183	8	1.6	570	7.6
Mar. 1-31.....	95.6	20		62	7.2	55		220		38	59	.3	.5		368	.50	95.0	184	4	1.8	589	7.6
Apr. 1-30.....	107	22		60	7.2	57		211		38	63	.3	.8		366	.50	106	179	6	1.9	591	7.9
May 1-31.....	133	23		56	8.0	59		197		41	68	.3	.8		372	.51	134	172	11	2.0	602	7.4
June 1-30.....	103	21		50	7.8	61		179		39	72	.2	.8		352	.48	97.9	157	10	2.1	586	7.2
July 1-31.....	133	19		50	7.6	66		185		40	75	.3	.8		378	.51	136	156	5	2.3	616	7.4
Aug. 1-31.....	128	17		50	7.7	74		189		45	80	.3	.8		368	.50	127	156	2	2.6	643	7.7
Sept. 1-30.....	90.7	17		47	7.3	70		175		40	80	.3	.8		a348	.47	85.2	148	4	2.5	603	7.0
Weighted average	111	19		56	7.3	57		200		37	64	0.3	0.8		355	0.48	106	170	7	1.9	583	7.5
Time-weighted average.....	--	19		56	7.3	57		200		37	63	0.3	0.8		354	--	--	170	7	1.9	581	7.5
Tons per day....	--	5.7		17	2.2	17		60		11	19	0.1	0.2		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-1940. NUECES RIVER AT COTULLA																						
Apr. 26, 1962	0.79	5.7		54	13	49		175	53	66	0.3	1.2		a328	0.45		188	44	36	1.6	584	7.1
8-2055. FRIO RIVER AT DERBY																						
Apr. 26, 1962	41.1	11		51	4.5	14		137	21	28	0.2	2.2		199	0.27		146	34	17	0.5	356	6.8
8-2070. FRIO RIVER AT CALLIHAM																						
Apr. 25, 1962	1.40	4.3		55	19	374		306	163	430	0.7	0.0		1,200	1.63		215	0	79	11	2,060	7.2
July 2	4.07	12		42	5.5	96		186	49	93	.4	.0		a391	.53		128	0	62	3.7	703	6.7
Sept. 13	3.75	13		40	6.6	246		350	104	188	--	2.5		772	1.05		127	0	81	9.5	1,320	7.3
8-2080. ATASCOSA RIVER AT WHITSETT																						
Apr. 25, 1962	15.9	21		80	21	335		495	186	292	0.8	1.8		1,180	1.60		286	0	72	8.6	1,920	7.4
NUECES RIVER AT CALALLEN																						
Jan. 31, 1962		15	0.09	42	8.3	62	7.9	122	45	96	0.4	0.0	0.30	a348	0.47		139	39	48	2.3	597	7.6

a Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN NUECES-RIO GRANDE COASTAL AREA IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
8-2120. SAN FERNANDO CREEK NEAR ALICE																						
Oct. 31, 1961	0.71	26		38	17	502		389	210	468	3.2	62		1,520	2.07		165	0	87	17	2,550	7.7
Dec. 4	.91	27		40	18	532		600	198	448	--	2.2		1,560	2.12		174	0	87	18	2,650	7.2
Jan. 10, 1962	.95	25		38	18	554		628	197	460	1.8	.2		1,600	2.18		169	0	88	19	2,760	7.4
June 1	631	11		36	2.6	5.9	6.3	127	4.8	4.0	.2	3.8		a150	.20		100	0	11	.3	237	6.5
June 1	332	16		57	3.7	20		205	11	12	.3	1.8		a238	.32		157	0	22	.7	386	6.6
June 1	559	12		54	3.0	11		189	6.4	5.5	.3	1.0		a202	.27		147	0	14	.4	329	6.5
June 2	265	15		43	2.7	6.8	6.7	147	6.4	5.5	.2	3.2		a170	.23		118	0	10	.3	272	6.5
June 2	77.3	13		42	3.0	13		139	10	11	.3	5.3		166	.23		117	0	20	.5	292	6.6
June 3	340	12		35	2.7	6.2	6.9	126	4.8	5.0	.2	2.0		a148	.20		98	0	11	.3	238	6.5
Sept. 10	2,130	7.4		26	1.7	7.1		94	.4	6.1	.2	.8		100	.14		72	0	10	.2	167	6.7
Sept. 10	463	11		33	2.6	11		124	3.2	7.5	--	2.5		132	.18		93	0	21	.5	234	6.8
SAN FERNANDO CREEK 3.5 MILES NORTHEAST OF KINGSVILLE																						
Jan. 10, 1962	0.13	9.0		62	20	790		432	314	900	1.2	0.5		2,310	3.14		237	0	88	22	3,850	7.4
Feb. 1	b .3	2.3		64	19	777		437	326	870	1.2	.0		2,270	3.09		238	0	88	22	3,900	7.6
Sept. 10	b .05	17		56	19	270		368	128	260	.1	2.0		934	1.27		218	0	73	7.9	1,630	6.9
SAN FERNANDO CREEK AT U. S. HIGHWAY 77, 2.8 MILES NORTHEAST OF KINGSVILLE																						
Dec. 4, 1961	1.86	15		72	18	705		502	275	768	1.2	1.0		2,100	2.86		254	0	86	19	3,530	7.6
Sept. 11, 1962	1,270	12		31	3.5	17		126	8.8	10	--	2.0		146	.20		92	0	28	.8	261	7.2
SAN FERNANDO CREEK AT RANCH ROAD 2045, 3.4 MILES EAST OF KINGSVILLE																						
Nov. 1, 1961	4.23	17		80	34	748		362	596	740	1.1	0.5		2,390	3.25		340	43	83	18	3,870	6.7
Nov. 7	b1	18		78	34	666		361	462	710	1.1	.2		2,150	2.92		334	38	81	16	3,520	6.8
SANTA GERTRUDIS CREEK NEAR KINGSVILLE																						
Nov. 1, 1961	0.01	15		398	250	2,770		255	1,460	4,470				9,490	13.0		2,020	1,810	75	27	14,300	7.6
Nov. 6	b .05	16		437	263	2,880		312	1,530	4,670				9,950	13.6		2,170	1,920	74	27	14,700	7.0
Dec. 4	b .03	15		427	298	2,870		294	1,560	4,720	0.6			10,000	13.7		2,290	2,050	73	26	15,200	6.8
Jan. 10, 1962	b .02	15		427	262	2,950		271	1,570	4,750				10,100	13.8		2,140	1,920	75	28	14,800	6.9
Feb. 1	b .01	--		--	--	--		148	--	5,580				--	--		2,620	2,500	--	--	17,400	7.6
Sept. 10	b .1	24		128	50	778		252	678	925		0.2		2,710	3.69		525	318	76	15	3,740	7.0

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

8-3640. RIO GRANDE NEAR EL PASO, TEX.

LOCATION.--At gaging station 5 miles northwest of El Paso, Texas, 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 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	31	122	--		116	34	341	--	250		548	292	--	a	0.41	1,514	2.06		430	225	7.1	2,270	8.0
November----	30	98.0	--		124	32	339	--	287		512	298	--	0.6	.27	1,563	2.13		439	204	7.0	2,300	8.1
December----	31	117	--		134	32	360	--	293		576	305	--	1.2	.41	1,667	2.27		466	226	7.3	2,400	8.2
January 1962	27	81.5	27		121	28	298	9.8	262		478	261	1.0	a	.31	1,395	1.90		418	203	6.3	2,090	7.8
February----	28	66.5	--		123	33	367	--	278		556	314	--	.6	.44	1,614	2.20		442	214	7.6	2,400	8.1
March-------	31	756	--		84	16	118	--	201		221	103	--	.6	.17	687	.93		276	111	3.1	1,070	8.0
April-------	30	603	--		95	19	147	--	229		277	121	--	a	.22	807	1.10		316	128	3.6	1,250	8.0
May---------	31	564	--		89	20	154	--	210		287	128	--	a	.18	839	1.14		305	132	3.8	1,270	8.0
June--------	30	876	--		83	16	124	--	217		236	94	--	a	.08	703	.96		271	94	3.3	1,080	8.0
July--------	33	1,039	21		72	16	123	7.8	183		225	96	.8	.6	.16	679	.92		247	97	3.4	1,040	7.9
August------	31	1,024	--		81	14	124	--	211		226	96	--	.6	.17	710	.97		260	88	3.3	1,050	7.8
September---	30	692	--		86	17	163	--	204		280	134	--	.6	.24	770	1.05		285	118	4.2	1,260	7.9

a Less than 0.4 parts per million.

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.--32,035 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).

RECORDS AVAILABLE.--Chemical analyses: 1933 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	4	28.8	--		419	120	1,370	--	291		1,260	3,000	--	0.6	0.79	5,812	7.90		1,540	1,300	15	8,300	8.0
November----	5	72.0	--		243	61	654	--	329		777	872	--	4.3	.49	2,947	4.01		858	588	9.7	4,360	8.1
December----	4	45.3	--		306	79	886	--	293		963	1,270	--	.6	.59	3,884	5.28		1,090	848	12	5,680	8.1
January 1962	4	28.8	27		366	99	1,090	13	314		1,120	1,610	1.0	.6	.53	4,703	6.40		1,320	1,060	13	6,880	8.1
February----	4	8.8	--		529	190	1,880	--	204		1,670	3,020	--	.6	1.05	7,722	10.5		2,100	1,930	18	11,000	7.9
March-------	4	6.5	--		626	213	2,140	--	247		1,810	3,590	--	.6	1.01	8,932	12.1		2,440	2,240	19	12,500	7.9
April-------	4	15.8	--		524	133	1,550	--	287		1,450	2,480	--	a	.88	6,552	8.91		1,850	1,620	16	9,550	7.8
May---------	5	20.5	--		434	122	1,320	--	257		1,280	2,080	--	.6	.76	5,683	7.73		1,580	1,370	14	8,270	7.8
June--------	4	13.7	--		575	141	1,820	--	207		1,640	2,990	--	a	.52	7,726	10.5		2,020	1,850	18	11,100	7.8
July--------	11	106	23		173	38	427	10	210		445	636	.8	.6	.31	1,937	2.63		590	418	7.6	3,020	7.7
August------	5	55.4	--		336	77	868	--	215		904	1,390	--	.6	.54	3,838	5.22		1,160	980	11	5,810	7.7
September---	8	484	--		171	34	380	--	273		469	497	--	1.9	.29	1,790	2.43		568	344	6.9	2,680	7.9

a Less than 0.4 parts per million.

8-3715. RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station 7.8 river miles above the junction of the Rio Conchos, and about 10 miles northwest of the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 285.7 river miles below the American Dam at El Paso.
DRAINAGE AREA.--34,988 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
RECORDS AVAILABLE.--Chemical analyses: 1935 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	6	11.6			--	--	40		145		--	27		--		479	0.65		242	124	1.1	645	--
November----	1	0			--	--	36		110		--	15		--		507	.69		280	190	.9	706	--
December----	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
January 1962	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
February----	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
March-------	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
April-------	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
May---------	--	0			--	--	--		--		--	--		--		--	--		--	--	--	--	--
June--------	3	1.2			--	--	52		101		--	24		--		622	.85		305	222	1.3	829	--
July--------	10	47.7	14		85	6.9	111	7.0	139		222	105	0.8	2.5	0.18	638	.87		242	128	3.1	1,010	7.5
August------	6	55.0			102	7.2	132		142		242	147		1.9		766	1.04		284	168	3.4	1,170	7.7
September---	11	199			--	--	206		236		--	234		--		1,032	1.40		343	150	4.8	1,570	--

8-3750. RIO GRANDE NEAR JOHNSON RANCH, TEX.

LOCATION.--At gaging station about 2 miles upstream from Johnson Ranch, Brewster County, 14 miles downstream from Castolon, and 392.9 river miles below the American Dam at El Paso.
DRAINAGE AREA.--70,715 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
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 and records of discharge for water year October 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	9	801	--		--	--	157	--	171		--	81	--	--	--	889	1.21		292	152	4.0	1,240	--
November----	8	535	--		--	--	174	--	183		--	96	--	--	--	987	1.34		327	177	4.2	1,390	--
December----	9	490	--		--	--	168	--	191		--	91	--	--	--	959	1.30		330	174	4.0	1,350	--
January 1962	9	492	34		107	19	160	5.9	202		399	85	1.9	3.1	0.35	936	1.27		347	182	3.7	1,340	7.8
February----	7	406	--		--	--	171	--	180		--	99	--	--	--	977	1.33		344	196	4.0	1,380	--
March-------	9	317	--		--	--	180	--	171		--	109	--	--	--	1,013	1.38		336	196	4.3	1,440	--
April-------	9	138	--		--	--	210	--	137		--	138	--	--	--	1,116	1.52		362	250	4.8	1,630	--
May---------	11	112	--		--	--	219	--	143		--	140	--	--	--	1,166	1.59		379	262	4.9	1,680	--
June--------	11	440	--		--	--	112	--	180		--	48	--	--	--	800	1.09		314	166	2.8	1,090	--
July--------	11	1,400	24		87	7.5	90	6.3	175		248	36	1.1	1.2	.19	619	.84		248	105	2.5	877	7.7
August------	9	319	--		95	8.5	152	--	163		339	90	--	1.2	--	826	1.12		272	128	4.0	1,190	7.7
September---	11	2,450	--		--	--	86	--	158		--	35	--	--	--	655	.89		274	145	2.3	895	--

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 31.

RECORDS AVAILABLE.--Chemical analyses: 1944 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	3	1,110	--		63	22	106	--	177		242	61	--	2.5	0.27	660	0.90		249	104	2.9	944	8.0
November----	8	858	--		83	18	116	--	186		280	70	--	3.1	.23	718	.98		283	130	3.0	1,050	8.0
December----	7	813	--		85	19	128	--	192		301	73	--	3.7	.33	767	1.04		290	132	3.3	1,100	8.1
January 1962	7	802	28		82	20	120	5.1	174		295	73	1.9	3.1	.27	726	.99		288	146	3.1	1,070	7.8
February----	7	738	--		77	21	116	--	153		294	74	--	3.7	.29	720	.98		280	155	3.0	1,050	8.0
March-------	7	619	--		81	20	119	--	171		295	73	--	3.1	.26	718	.98		283	143	3.1	1,080	8.1
April-------	6	485	--		71	19	95	--	165		236	64	--	1.2	.20	609	.83		258	123	2.6	930	7.9
May---------	9	541	--		76	19	96	--	168		240	69	--	.6	.19	626	.85		269	132	2.5	943	8.0
June--------	8	1,010	--		71	8.8	70	--	165		177	41	--	1.9	.14	515	.70		214	78	2.1	744	7.8
July--------	10	1,730	22		74	7.9	80	5.9	162		206	39	1.1	2.5	.19	525	.71		218	85	2.4	796	7.7
August------	9	675	--		87	11	92	--	193		229	53	--	3.1	.18	625	.85		263	104	2.5	914	7.7
September---	7	2,530	--		101	6.9	80	--	205		217	49	--	3.1	.16	606	.82		281	113	2.1	869	7.8

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 1962.
Water temperatures: March 1953 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 9,990 ppm Sept. 1-30; minimum, 7,560 ppm Jan. 1-31.
Hardness: Maximum, 2,880 ppm Aug. 1-31; minimum, 2,310 ppm Oct. 1-31.
Specific conductance: Maximum daily, 14,800 micromhos July 31, Aug. 1; minimum daily, 10,100 micromhos Feb. 1, 15.
EXTREMES, 1937-62.--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 (1953-62): Maximum, 81°F Aug. 1-4, 1958; minimum, 40°F on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge 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 1961 to September 1962

Date of collection	Mean discharge	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[a] (gm/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1961	60.1	18		607	194		1,980		124	2,190	3,010				8,060	11.0	1,310	2,310	2,210	18	11,400	7.5	1.005
Nov. 1-30.....	1.7	19		617	209		1,920		131	2,150	2,990				7,970	10.9	36.6	2,400	2,290	17	11,300	7.1	1.005
Dec. 1-31.....	1.8	21		606	237		2,320		180	2,110	3,680				9,060	12.4	44.0	2,490	2,340	20	13,300	7.2	1.006
Jan. 1-31, 1962	1.7	17		640	203		1,740		151	2,180	2,700	1.2			7,560	10.3	34.7	2,430	2,310	15	10,600	7.4	--
Feb. 1-28.....	1.1	15		645	209		1,730		142	2,180	2,730				7,580	10.3	22.5	2,470	2,350	15	10,300	7.6	--
Mar. 1-31.....	53.1	8.3		635	221		1,800		130	2,240	2,820				7,790	10.6	1,120	2,490	2,390	16	10,800	7.3	--
Apr. 1-30.....	114	5.4		632	212		2,050		121	2,220	3,190				8,370	11.4	2,580	2,450	2,350	18	11,700	7.5	1.004
May 1-31.....	77.2	6.3		647	244		2,160		117	2,390	3,360				8,870	12.1	1,850	2,620	2,520	18	12,300	7.1	1.005
June 1-30.....	59.5	6.4		691	246		2,330		118	2,410	3,680				9,420	12.9	1,510	2,740	2,640	19	13,300	7.5	1.006
July 1-31.....	176	7.2		696	272		2,440		116	2,630	3,780				9,880	13.5	4,690	2,860	2,760	20	14,200	6.9	1.006
Aug. 1-31.....	116	8.5		696	278		2,430		111	2,560	3,830				9,860	13.5	3,090	2,880	2,790	20	13,900	7.2	1.006
Sept. 1-30.....	68.7	9.8		671	268		2,530		114	2,530	3,930				9,990	13.7	1,850	2,780	2,680	21	13,400	7.0	1.006
Weighted average.....	61.4	8.3		666	248		2,260		118	2,430	3,520				9,190	12.4	1,520	2,680	2,580	19	12,900	7.1	--
Time-weighted average....	--	12		649	233		2,120		130	2,320	3,310				8,710	--	--	2,580	2,470	18	12,200	7.2	--
Tons per day.	--	1.4		110	41		375		20	404	583				--	--	--	--	--	--	--	--	--

a Values expressed in ppm should be multiplied by density, where given, when computing loads.

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 bridge, 2.1 miles east of Girvin, Pecos County, 6.5 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 1962.
Water temperatures: October 1953 to January 1959.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 18,800 ppm Sept. 1-30; minimum, 6,290 ppm May 20-31.
Hardness: Maximum, 4,940 ppm Sept. 1-30; minimum, 1,780 ppm May 20-31.
Specific conductance: Maximum daily, 25,400 micromhos Sept. 11, 12; minimum daily, 7,440 micromhos May 24.
EXTREMES, 1939-41, 1946-47, 1953-62.--Dissolved solids (1960-62): Maximum, 18,800 ppm Sept. 1-30, 1962; minimum, 1,410 ppm Mar. 28-29, 1961.
Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.
Specific conductance: Maximum daily, 29,100 micromhos Aug. 13, 1958; minimum daily, 790 micromhos Apr. 26, 1957.
Water temperatures (1953-59): Maximum, 93°F June 1, 1954; minimum, 38°F Feb. 3, 4, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Mean discharge	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[a] (gm/ml at 20°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1961	33.7	6.9		802	479		3,640	--	50	3,590	5,840				14,400	19.8	1,310	3,970	3,930	25	19,600	6.4	1.010
Nov. 1-30.....	40.4	10		734	355		3,120	55	100	3,050	4,760				12,100	16.6	1,320	3,290	3,210	24	16,900	6.5	1.008
Dec. 1-31.....	35.0	12		743	423		3,450	50	165	3,280	5,350				13,400	18.4	1,270	3,590	3,460	25	18,300	7.4	1.009
Jan. 1-31, 1962	33.8	18		773	449		3,820	48	198	3,410	5,850	2.7			14,500	19.9	1,320	3,780	3,610	27	19,400	7.6	1.009
Feb. 1-28.....	33.5	6.3		792	474		3,950	--	200	3,540	6,240				15,100	20.7	1,370	3,930	3,760	27	20,200	7.5	1.010
Mar. 1-31.....	33.2	5.4		802	495		4,080	47	169	3,640	6,340				15,500	21.3	1,390	4,040	3,900	28	20,200	7.2	1.010
Apr. 1-30.....	21.7	4.5		797	559		4,310	--	115	3,920	6,730				16,400	22.5	961	4,290	4,190	29	21,300	7.4	1.010
May 1-19.....	14.2	15		918	578		4,840	--	67	4,310	7,550				18,200	25.1	698	4,670	4,610	31	23,700	6.6	1.013
May 20-31.....	81.1	9.6		410	185		1,580	--	67	1,550	2,520				6,290	8.55	1,380	1,780	1,730	16	9,350	7.0	--
June 1-20.....	16.6	21		415	225		1,790	--	71	1,780	2,800				7,070	9.62	317	1,960	1,900	18	10,300	7.1	--
June 21-30.....	18.3	17		546	344		2,590	--	64	2,580	4,020				10,100	13.8	499	2,780	2,720	21	14,200	6.9	1.007
July 1-31.....	18.5	14		723	446		3,480	--	61	3,390	5,400				13,500	18.5	674	3,640	3,590	25	19,100	6.6	1.009
Aug. 1-31.....	13.4	11		850	568		4,450	--	56	4,150	6,920				17,000	23.4	615	4,460	4,410	29	21,800	7.1	1.012
Sept. 1-30.....	16.8	9.1		928	637		4,960	--	63	4,480	7,800				18,800	25.9	853	4,940	4,880	31	24,200	7.3	1.013
Weighted average.....	28.1	10		736	435		3,540	--	117	3,300	5,520				13,600	18.4	1,030	3,630	3,530	25	18,400	6.9	--
Time-weighted average....	--	11		760	465		3,740	--	109	3,480	5,840				14,400	--	--	3,810	3,720	26	19,200	6.9	--
Tons per day.	--	0.8		56	33		268	--	9	250	419				--	--	--	--	--	--	--	--	--

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

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 31).
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32).

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	5	180	--		90	56	232	--	153		268	470	--	2.5	0.17	1,380	1.88		455	330	5.7	2,180	7.8
November----	4	187	--		144	66	407	--	174		398	696	--	2.5	.21	1,916	2.61		632	490	7.1	3,070	7.9
December----	4	169	--		161	74	475	--	174		457	798	--	2.5	.25	2,192	2.98		705	562	7.8	3,460	8.0
January 1962	5	160	12		173	79	504	8.2	a180		498	842	1.1	2.5	.24	2,328	3.17		756	608	8.0	3,700	8.3
February----	4	161	--		182	92	568	--	156		550	971	--	1.9	.26	2,591	3.52		832	704	8.6	4,010	8.0
March-------	3	148	--		189	87	578	--	156		570	984	--	1.9	.26	2,662	3.62		830	702	8.7	4,150	7.9
April-------	--	130	--		--	--	--	--	--		--	--	--	--	--	--	--		--	--	--	--	--
May---------	5	114	--		156	79	522	--	126		490	886	--	.6	.24	2,336	3.18		716	612	8.5	3,690	7.9
June--------	4	119	--		142	67	446	--	137		425	770	--	.6	.22	2,107	2.87		630	518	7.7	3,320	7.8
July--------	4	129	13		144	70	494	7.4	131		450	836	1.1	.6	.23	2,181	2.97		646	538	8.5	3,530	7.5
August------	5	86.9	--		129	54	411	--	134		371	687	--	.6	.24	1,856	2.52		542	433	7.7	2,970	7.6
September---	3	236	--		100	31	228	--	164		206	369	--	3.1	.13	1,075	1.46		378	244	5.1	1,750	8.0

a Includes equivalent of 7 ppm carbonate (CO_3).

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 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	31	2,480	--		--	--	80	--	168		--	73	--	--	--	559	0.76		241	104	2.2	831	--
November----	30	2,280	--		--	--	81	--	169		--	85	--	--	--	552	.75		243	104	2.3	838	--
December----	31	1,960	--		--	--	103	3.9	181		--	112	--	--	--	636	.86		265	117	2.7	984	--
January 1962	31	1,870	24		71	23	105	--	165		194	117	1.0	4.3	0.17	629	.86		272	137	2.8	1,010	8.0
February----	28	1,550	--		--	--	110	--	131		--	133	--	--	--	665	.90		264	156	2.9	1,040	--
March-------	31	1,240	--		--	--	121	--	138		--	151	--	--	--	678	.92		270	156	3.2	1,110	--
April-------	30	1,720	--		--	--	100	--	140		--	124	--	--	--	574	.78		241	126	2.8	947	--
May---------	31	1,080	--		--	--	94	--	141		--	124	--	--	--	563	.77		242	126	2.6	922	--
June--------	30	1,580	--		--	--	73	--	162		--	81	--	--	--	515	.70		220	88	2.1	804	--
July--------	31	1,770	22		74	13	89	5.9	153		185	84	.8	5.6	.19	575	.78		237	112	2.5	891	7.7
August------	31	1,260	--		70	11	92	--	151		187	78	--	4.3	--	575	.78		219	96	2.7	864	7.7
September---	30	2,960	--		--	--	71	--	148		--	55	--	--	--	508	.69		223	102	2.1	753	--

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 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	10	1,510	--		57	20	80	--	125		165	87	--	a	0.17	516	0.70		224	122	2.3	806	8.0
November----	6	864	--		65	14	81	--	132		167	89	--	0.6	.13	528	.72		220	112	2.4	813	7.8
December----	12	2,020	--		64	16	83	--	134		171	87	--	.6	.18	540	.73		226	116	2.4	824	8.0
January 1962	13	4,570	13		66	16	80	5.1	135		173	82	1.0	.6	.16	513	.70		230	120	2.3	831	7.9
February----	12	6,620	--		69	15	80	--	137		174	85	--	a	.16	531	.72		232	120	2.3	838	8.0
March-------	9	1,040	--		61	21	83	--	140		180	87	--	.6	.16	542	.74		238	124	2.3	858	8.2
April-------	12	3,730	--		70	15	86	--	143		180	90	--	a	.17	543	.74		236	118	2.4	864	7.9
May---------	13	7,080	--		67	17	93	--	138		184	97	--	a	.15	567	.77		236	122	2.6	897	8.0
June--------	12	6,180	--		67	16	94	--	140		187	100	--	.6	.19	584	.79		231	116	2.7	901	7.8
July--------	12	1,200	12		65	17	99	5.5	134		190	104	.6	.6	.15	594	.81		232	122	2.8	922	7.8
August------	13	1,130	--		64	16	102	--	132		192	104	--	.6	.18	565	.77		227	119	2.9	929	7.7
September---	9	612	--		65	17	103	--	132		195	108	--	.6	.11	595	.81		230	122	2.9	912	7.7

a Less than 0.4 parts per million.

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 31).
RECORDS AVAILABLE.--Chemical analyses: January 1959 to September 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	15	1,880	--		55	20	86	--	131		161	97	--	0.6	0.21	531	0.72		219	112	2.5	836	7.8
November----	9	935	--		67	15	109	--	137		179	126	--	--	.27	602	.82		229	116	3.1	971	7.8
December----	14	2,020	--		65	15	89	--	137		177	91	--	.6	.12	543	.74		225	112	2.6	851	8.0
January 1962	13	4,570	13		64	17	83	5.1	138		171	89	0.8	--	.12	519	.71		229	116	2.4	844	7.8
February----	12	6,780	--		71	15	82	--	143		175	89	--	--	.22	549	.75		238	120	2.3	850	7.8
March-------	12	1,220	--		72	17	106	--	149		201	115	--	.6	.18	625	.85		250	128	2.9	990	8.0
April-------	11	3,780	--		69	16	89	--	143		182	96	--	--	.22	558	.76		238	120	2.5	887	7.9
May---------	16	6,970	--		71	15	93	--	140		187	101	--	--	.21	579	.79		240	125	2.6	900	8.0
June--------	12	6,700	--		66	16	94	--	134		189	103	--	--	--	591	.80		230	120	2.7	905	8.0
July--------	14	1,170	12		68	19	119	5.1	138		208	129	.8	.6	.27	661	.90		246	132	3.3	1,040	7.8
August------	13	1,210	--		69	16	113	--	142		201	118	--	.6	.23	630	.86		238	122	3.2	996	7.7
September---	12	1,550	--		70	4.9	78	--	146		130	78	--	1.9	.10	476	.65		196	76	2.5	729	7.7

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 31).
RECORDS AVAILABLE.--Chemical analyses: March 1959 to September 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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Month	Number of samples	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			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	Noncarbonate			
October 1961	14	1,540	--		72	28	176	--	134		235	230	--	0.6	0.40	863	1.17		294	184	4.4	1,390	7.9
November----	14	760	--		88	27	219	--	148		250	303	--	.6	.51	1,030	1.40		328	206	5.2	1,670	7.9
December----	13	1,340	--		89	25	199	--	159		261	257	--	--	.50	966	1.31		325	195	4.8	1,540	8.0
January 1962	14	2,060	13		72	18	111	4.7	137		195	131	0.8	--	.17	633	.86		255	142	3.0	1,020	7.8
February----	12	1,790	--		75	18	114	--	143		194	140	--	--	.29	673	.92		260	142	3.1	1,060	8.0
March-------	15	1,000	--		107	33	278	--	165		326	381	--	.6	.68	1,270	1.73		403	268	6.0	2,080	8.0
April-------	16	1,630	--		84	24	166	--	138		243	220	--	--	.40	845	1.15		308	194	4.1	1,370	8.0
May---------	19	2,550	--		78	19	131	--	146		217	154	--	--	.32	715	.97		272	152	3.5	1,160	7.8
June--------	13	3,320	--		72	19	131	--	141		214	152	--	--	.21	724	.98		259	144	3.5	1,130	7.8
July--------	14	974	16		100	33	283	5.5	151		336	383	.8	.6	.64	1,284	1.75		383	260	6.3	2,060	7.9
August------	21	948	--		95	28	241	--	146		298	332	--	.6	.49	1,126	1.53		350	230	5.6	1,830	7.7
September---	25	842	--		78	16	165	--	134		213	208	--	.6	.38	803	1.09		258	148	4.5	1,270	7.7

MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
RIO GRANDE AT EL PASO																						
Apr. 24, 1962----------		16	0.03	92	20	165	7.8	236	290	127	0.6	0.2	0.21	835	1.14		312	118	53	4.1	1,270	7.8
RIO GRANDE NEAR CASTOLON																						
Apr. 30, 1962----------		20	0.01	102	21	240		139	540	128	2.1	0.0		1,120	1.52		341	227	60	5.6	1,630	7.2
LAKE WALK NEAR DEL RIO																						
Feb. 19, 1962----------		12	0.01	55	12	5.5		208	6.8	9.8	0.3	8.0		a232	0.32		187	16	6	0.2	381	7.3
RIO GRANDE AT EAGLE PASS																						
Mar. 5, 1962----------		13	0.01	78	23	115		184	182	136	0.9	3.8		a679	0.92		289	138	46	2.9	1,070	7.3

a Residue on evaporation at 180°C.