

TEXAS BOARD OF WATER ENGINEERS

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CHEMICAL COMPOSITION OF  
TEXAS SURFACE WATERS, 1957

By  
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# CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1957

By L. S. Hughes

## INTRODUCTION

This report makes available to the public data on the chemical quality of the surface waters of Texas in the water year 1957. Results are presented for chemical analyses of water samples obtained daily from selected points throughout the State and also the results for other samples obtained at various points during the period of October 1, 1956, to September 30, 1957.

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

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

## COOPERATION

This is the thirteenth in a series of reports covering surface waters of Texas prepared by the U. S. Geological Survey in cooperation with the Texas Board of Water Engineers. These reports may be obtained by writing the Board of Water Engineers, Austin, Texas.

Cooperating in the collection of these data were the city of Fort Worth, the Colorado River Municipal Water District, the Canadian River Municipal Water Authority, the Hubbard Creek Water Committee, the Lower Colorado River Authority, the Lower Neches River Authority, the Brazos River Authority, the Sabine River Authority, the Red Bluff Water Power Control District, the Chambers-Liberty Counties Navigation District, the Greenbelt Municipal and Industrial Water Association, and the U. S. Corps of Engineers.

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

## COLLECTION AND ANALYSIS OF SAMPLES

The samples for which data are given were collected from October 1, 1956, to September 30, 1957. Descriptive statements are given for each sampling station for which a regular series of chemical analyses have been made. These statements give



the location of the stream sampling station, drainage area of the stream above the station, length of time for which records are available, extremes of dissolved solids, hardness, and water temperature, and other pertinent data. Records of discharge of the stream at or near the sampling point for the sampling period are included in most tables of analyses.

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

During the period covered by this report samples were collected daily at 30 points on Texas streams and twice weekly at four sampling points in Trinity Bay near the mouth of the Trinity River. Samples were collected twice monthly at five points in a small area on Salt Croton and Haystack Creeks near Aspermont. In addition to the data on chemical quality included in this report, temperature data for streams at 25 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 53 additional sampling points for varying lengths of time have been published in previous reports of this series. The locations of the active and inactive stations are shown on the accompanying map and the periods of operation of all the stations are shown on the bar graph. The five sampling points on Salt Croton and Haystack Creeks are indicated as a single location (39) on the map.

Water samples were usually obtained daily at or near a Geological Survey 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 a similar conductances. For some streams that are subject to sudden and large changes in chemical composition or concentration, samples were composited for shorter periods on the basis of the concentration of the daily samples. At several sampling stations where changes in chemical composition occur gradually, daily samples for an entire month were composited.

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

This report includes chemical quality records for 8 stations in the Rio Grande Basin where samples were collected by the International Boundary and Water Commission and analyses made by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, California. At 2 of the stations, samples were collected daily; at the others, from 1 to 14 samples were collected each month. A single monthly composite sample was made for analysis by taking from each individual sample an amount of water proportional to the volume of river flow represented by the sample. Results of these analyses are also published in equivalents per million in Water Bulletin Number 27 of the International Boundary and Water Commission, together with stream flow and related data.

EXPRESSION OF RESULTS

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

Mean discharge is reported in cubic feet per second, which 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 parts per million (ppm) 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. For those analyses in which a determined value for sodium is reported separately, this value is used in computing the percent sodium.

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

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

where the concentrations of the constituents are expressed in equivalents per million. Waters are divided into four classes with respect to sodium hazard depending upon the SAR value and the specific conductance. 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<sub>3</sub>).

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

The methods of analysis were the same as or modifications of those in standard publications for water analysis. 1/

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- 1/ Collins, W. D., 1928, Notes on practical water analysis: U. S. Geol. Survey Water-Supply Paper 596-H, p. 235-261; American Public Health Association Standard methods for the examination of water, sewage, and industrial wastes, 10th ed., 1955; Scott, W. W., 1939, Standard methods of chemical analysis, v. II, p. 2049-2055, 5th ed.; Theroux, Eldridge, and Mallmann, 1943, Laboratory manual for chemical and bacteriological analyses of water and sewage, 3rd ed.
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#### SURFACE-WATER RUNOFF AND CHEMICAL QUALITY CONDITIONS

At the beginning of the 1957 water year most of Texas was still experiencing a severe drought that began about 1950. Streamflow for the 1956 water year was deficient throughout the state - at many points it was the lowest for any year of record. The drought continued through the winter of 1956-1957 but was broken in the spring by flood-producing rains over much of the State. As a result of these rains, runoff for the 1957 water year exceeded long-time averages at a majority of the sampling stations. Mean discharges for selected stations for the 1956 and 1957 water years, as well as for the period of record, are shown in figure 1.

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

During the 1957 water year the chemical quality of many of the streams was subject to extreme variations. Drought conditions during the first six months of the water year resulted in new maximum concentrations of dissolved solids at some stations, whereas heavy rainfall during the spring produced floods of minimum concentrations of dissolved solids. In table 1 are listed the mean discharges and the maximum, minimum, and weighted average concentrations of dissolved solids for the 1956 and 1957 water years for those stations operated under the Texas Board of Water Engineers-U. S. Geological Survey sampling program.

#### Arkansas River Basin

Although runoff of the Canadian River near Amarillo during the 1957 water year was almost three times as great as that during 1956, it was still below average for the 20 years of record. A new maximum of 3,000 ppm of dissolved solids was established in March 1957 when a small rise, following a long period of extremely low flow,

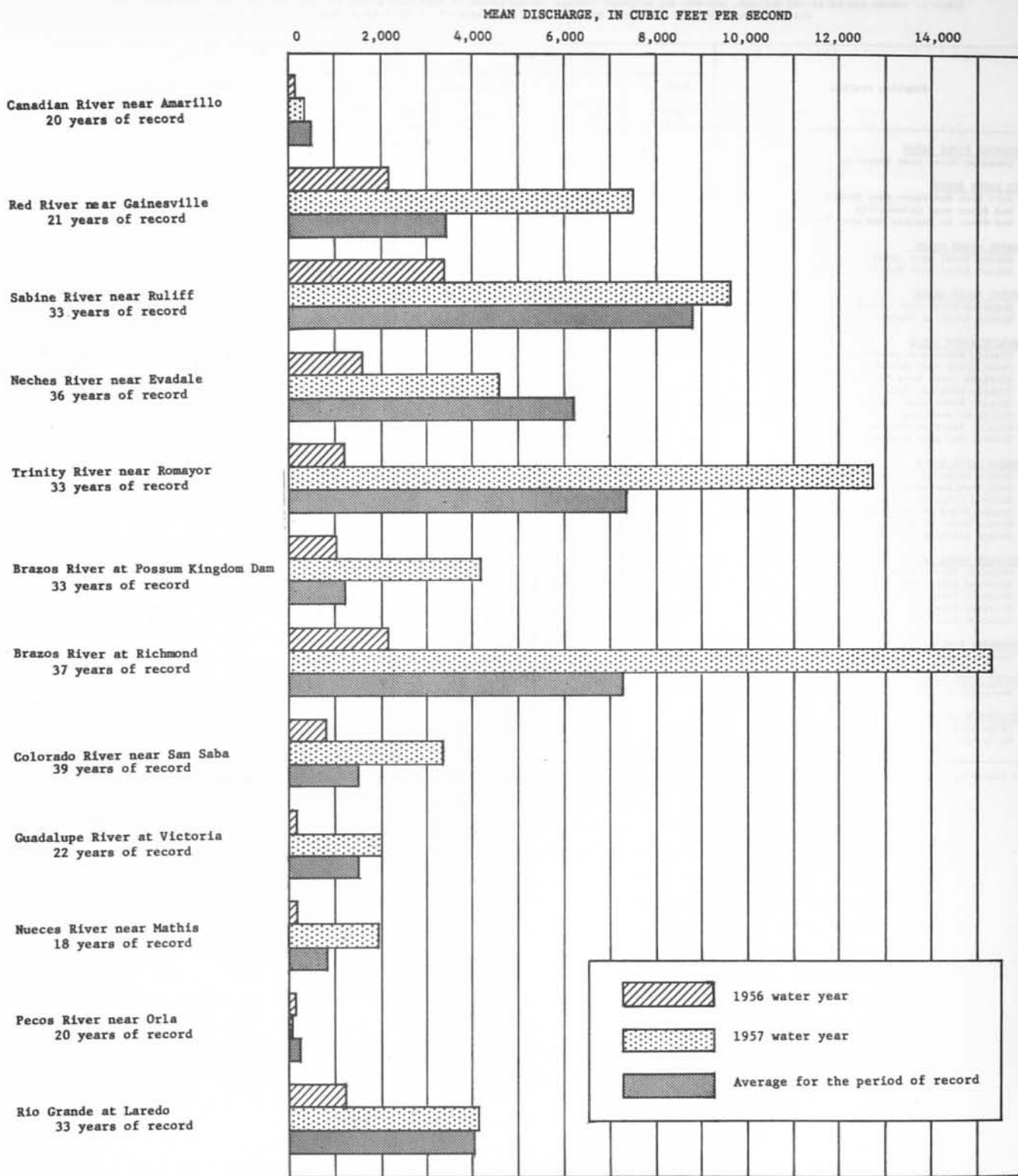


Figure 1.--Mean discharge at selected stations for the 1956 and 1957 water years and for the period of record.

Table 1. --Mean discharge and maximum, minimum and weighted average concentration of dissolved solids for the 1956 and 1957 water years for stations operated under the Texas Board of Water Engineers--U. S. Geological Survey sampling program.

Sampling station	1956 WATER YEAR				1957 WATER YEAR			
	Mean discharge (cfs)	Dissolved solids (ppm)			Mean discharge (cfs)	Dissolved solids (ppm)		
		Maximum	Minimum	Weighted average		Maximum	Minimum	Weighted average
<b>ARKANSAS RIVER BASIN</b>								
Canadian River near Amarillo	108	1,970	372	823	313	3,000	252	613
<b>RED RIVER BASIN</b>								
Salt Fork Red River near Hedley	--	2,600	443	--	--	2,520	231	--
Red River near Gainesville	2,177	5,490	446	1,530	7,484	4,260	335	917
Red River at Denison Dam near Denison	3,550	1,280	954	1,030	10,890	1,380	696	840
<b>SABINE RIVER BASIN</b>								
Sabine River near Tatum	516	936	126	229	3,968	805	74	126
Sabine River near Ruliff	3,421	193	63	103	9,645	250	47	88
<b>NECHES RIVER BASIN</b>								
Angelina River near Lufkin	413	333	80	153	1,089	365	42	88
Neches River at Evadale	1,608	199	82	117	4,607	222	50	78
<b>TRINITY RIVER BASIN</b>								
Trinity River near Rosser	280	1,800	279	678	5,805	1,730	190	231
Cedar Creek near Mabank	60.7	--	--	--	911	471	51	76
Richland Creek near Fairfield	--	13,500	189	--	--	12,200	131	--
Trinity River at Romayor	1,211	1,180	155	405	12,690	1,730	105	201
Trinity River near Moss Bluff	--	3,930	129	--	--	1,670	114	--
Old River near Cove	--	7,850	271	--	--	11,300	77	--
Trinity River at Anahuac	--	18,400	375	--	--	--	--	--
Trinity Bay near Anahuac	--	--	--	--	--	--	--	--
<b>BRAZOS RIVER BASIN</b>								
Double Mountain Fork Brazos River near Aspermont	131	--	--	--	352	4,420	689	910
Salt Fork Brazos River near Aspermont	135	--	--	--	299	76,900	1,280	3,220
Hubbard Creek near Breckenridge	22.7	2,200	152	212	633	1,810	118	181
Brazos River at Possum Kingdom Dam near Graford	983	2,640	806	1,370	4,145	2,130	331	443
Brazos River at Whitney Dam near Whitney	1,571	1,290	766	1,010	6,213	1,380	337	459
Brazos River at Richmond	2,158	1,190	318	834	15,290	1,230	161	317
<b>COLORADO RIVER BASIN</b>								
Colorado River at Colorado City	23.8	--	--	--	143	19,800	208	555
Colorado River near Silver	--	--	--	--	496	6,190	180	329
Colorado River near San Saba	772	1,520	171	242	3,354	1,100	149	204
Colorado River at Austin	1,331	249	225	234	4,900	259	184	201
Colorado River at Wharton	1,041	288	178	246	5,937	312	108	198
<b>GUADALUPE RIVER BASIN</b>								
Guadalupe River at Victoria	132	427	304	368	1,973	404	142	227
<b>NUECES RIVER BASIN</b>								
Nueces River near Mathis	184	410	254	296	1,962	322	177	208
<b>RIO GRANDE BASIN</b>								
Pecos River below Red Bluff Dam near Orla	a 125	7,340	3,620	5,190	a 60.6	12,800	4,010	8,050
Pecos River near Girvin	26.4	--	--	--	37.9	--	--	--

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



apparently flushed out an accumulation of salt residues from the stream bed. The weighted average for the 1957 water year was 613 ppm as compared with 823 for the 1956 water year.

#### Red River Basin

Increased rainfall in 1957 caused marked improvement in the quality of water at the daily sampling stations on the Red River, near Gainesville and at Denison Dam. Runoff at the Gainesville station during the 1957 water year was more than three times that during the 1956 water year and the weighted average of dissolved solids decreased from 1,530 ppm in 1956 to 917 ppm in 1957. Water stored in Lake Texhoma above Denison Dam had increased in mineral content during the drought years until in December 1956 the water being released contained as much as 1,380 ppm of dissolved solids. Flood runoff so improved the stored water that at the end of the water year, the analysis of the September composite sample showed only 849 ppm of dissolved solids.

#### Sabine River Basin

The Sabine River drains an area of high rainfall in East Texas and Western Louisiana, and the water, except where polluted by oil field or other industrial wastes, is almost always low in dissolved solids. During the low-flow year, 1956, the weighted average of dissolved solids at Ruliff was only 103 ppm, and the above-average flow of 1957 decreased the weighted average to 88 ppm. At the upstream station near Tatum, the quality of the water is more directly affected by drought and by pollution from oil fields. Here, the weighted average of dissolved solids was 229 ppm for the 1956 water year as compared with only 126 ppm in the 1957 water year.

#### Neches River Basin

The Neches River is similar to the Sabine River in that it also drains an area of high-rainfall, and the water in the basin is usually of good quality except where polluted by oil-field or other industrial wastes. Runoff at Evadale in 1957 was nearly three times that of 1956 but was still less than the 36-year average for the station. Weighted average of dissolved solids for the 1956 water year was 117 ppm; for the 1957 water year with its more nearly normal flow, the average was 78 ppm.

#### Trinity River Basin

Normally, streamflow in the upper Trinity River basin is controlled by reservoirs located above Fort Worth and Dallas, and base flow in the Trinity River for some distance below the two cities is maintained by sewage effluent. Analyses of low-flow samples collected from the Trinity River near Rosser show the effect of this sewage effluent and show nitrate concentrations generally ranging from 60 to 100 ppm. Samples collected in October 1956--as well as those collected in August and September of 1956 and published in the report for the 1956 water year--had chloride concentrations more than 500 ppm, apparently owing to the use of Red River water to supplement the Dallas public supply. Dissolved-solids concen-

trations at the sampling station near Rosser ranged from a maximum of 1,730 ppm, during the time when quality was affected by Red River water, to a minimum of 190 ppm toward the end of the flood period.

Runoff of the Trinity River at Romayor during the 1957 water year exceeded by 10 times the runoff during 1956. Relatively high concentration of dissolved solids occurred during the drought period at the beginning of the year, the maximum being 1,730 ppm. Flood flows during the second six months of the water year generally contained less than 200 ppm of dissolved solids, and the weighted average for the year was 201 ppm.

#### Brazos River Basin

Two stations, Double Mountain Fork Brazos River near Aspermont and Salt Fork Brazos River near Aspermont, for which records are available for the period October 1948 to November 1951, were re-established in October 1956 as part of a study to evaluate sources of salinity in the upper Brazos River basin. Under low-flow conditions the Salt Fork carries water which is extremely high in sodium and chloride, contributed in part by salt springs and seeps in the Salt Croton Creek area. Runoff for the Salt Fork near Aspermont during the 1957 water year was almost twice the 18 year average of 160 cfs; nevertheless, the weighted average of dissolved solids was 3,220 ppm. The maximum concentration of dissolved solids for the year was 76,900 ppm; the minimum was 1,280 ppm, which occurred during a flood period in June. The Double Mountain Fork is not so highly mineralized as the Salt Fork, and its load of dissolved solids consists principally of calcium and sulfate. The weighted average of dissolved solids for the 1957 water year was 910 ppm; the maximum was 4,420 ppm and the minimum, 689 ppm.

Water discharged from Possum Kingdom Reservoir during the first six months of the 1957 water year had an average of about 1,800 ppm of dissolved solids. Flood flows which spilled from the reservoir during April, May and June had dissolved solids as low as 331 ppm. Subsequent releases increased sharply in concentration until the water stored in the reservoir at the end of the water year, as shown by the September analysis, contained 831 ppm of dissolved solids. It is apparent that the spring flood flows did not completely flush out the reservoir but instead passed over the denser, more mineralized water without thorough mixing.

Water stored in Whitney Reservoir is generally of better quality than that stored in Possum Kingdom Reservoir because the intervening drainage area does not have sources of highly saline water as does the Brazos River above Possum Kingdom Reservoir. However, the weighted average of dissolved solids for the 1957 water year at Whitney Dam was 459 ppm, which is slightly greater than the 443 ppm at Possum Kingdom.

Runoff of the Brazos River at Richmond during the 1957 water year was more than twice that of the long-time average, and seven times the runoff during the drought year 1956. The quality of the water available for use at Richmond was greatly improved by favorable rainfall so that during the 1957 water year the dissolved-solids concentration exceeded 500 ppm on only 140 days, and exceeded 1,000 ppm on only 68 days. By comparison, during the 1956 water year the dissolved solids was greater than 500 ppm on 352 days and was 1,000 ppm or more on 97 days.



## Colorado River Basin

During the 1957 water year a sampling station was re-established on the Colorado River at Colorado City. It had previously been operated from 1946 to 1954. Sampling was begun also at a new station, Colorado River near Silver, in northern Coke County. These two stations are being operated to provide information on the quality of water that would be available for storage in a proposed reservoir near the Silver site. Low flows of Colorado River at Colorado City are highly saline owing to inflow from salt spring areas upstream, whereas flood flows are of good quality. During the water year the dissolved solids ranged from a minimum of 208 ppm to a maximum of 19,800 ppm. Downstream, at the station near Silver, low flows continue to be of poor quality, though not nearly so saline as at Colorado City. During the water year the dissolved solids ranged from a minimum of 208 ppm to a maximum of 19,800 ppm. Downstream, at the station near Silver, low flows continue to be of poor quality, though not nearly so saline as at Colorado City. During the 1957 water year, the water of poor quality was only a small fraction of the total flow, and the weighted average of dissolved solids was 320 ppm.

The station on the Colorado River near San Saba measures inflow to Lake Buchanan, uppermost of the six Highland Lakes. Here, dissolved solids generally range from 250 to 500 ppm, although concentration more than 1,000 ppm are occasionally observed. During 10 years of collection of chemical quality records, the annual weighted average of dissolved solids has ranged from 184 to 380 ppm. During the 1957 water year the runoff was more than twice the 39-year average and the weighted average of dissolved solids was 204 ppm.

The station at Austin measures the chemical quality of water that has been thoroughly mixed by passage through six reservoirs. Only gradual changes in composition occur at this station. A general improvement in the quality of the water stored in the lakes during the 1957 water year is indicated by a decrease in dissolved solids from 243 ppm in January to 190 ppm in September.

Inflow to the Colorado River below Austin produces little significant change in the chemical composition of the river.

## Guadalupe River Basin

The Guadalupe River drains a large part of the Edwards Plateau. Water from this area is generally of the calcium bicarbonate type and rarely exceeds 400 ppm in dissolved solids. Even in a time of drought, the 1956 water year, weighted average of dissolved solids for the Guadalupe River at Victoria was only 368 ppm. In 1957, with almost 15 times as much runoff, the weighted average was reduced to 227 ppm.

## Nueces River Basin

The only sampling point in the Nueces River basin for the 1957 water year was at the outflow from Lake Corpus Christi near Mathis. Past records indicate

that considerable variation in chemical quality occurs at upstream points in the basin, but mixing of flood flows in Lake Corpus Christi results in water that is always of good quality. Reservoir capacity is small in relation to the average runoff from the basin, and storage has been at a high percentage of capacity most of the time since the reservoir was put into use. Releases and spills from the reservoir during the 1957 water year were 10 times as great as those during 1956 and more than twice as great as the 18-year average runoff at this station. The weighted average of dissolved solids was only 208 ppm for the 1957 water year.

#### Rio Grande Basin

Although the drought was broken for much of the State during 1957, rainfall was light in extreme West Texas and runoff continued to be deficient in the Pecos River and the upper Rio Grande. Red Bluff Reservoir on the Pecos River was the only large reservoir in the state having less water in storage at the end of the water year than at the beginning. The weighted average of dissolved solids of the water released from Red Bluff Reservoir during the 1957 water year was 8,050 ppm as compared with 5,190 ppm in 1956. During the 1957 water year, rainfall in the Rio Grande basin below Langtry was about normal and runoff at Laredo was slightly more than the average for 33 years of record. Storage in Falcon Reservoir increased from 263,200 acre-feet to 1,731,000 acre-feet during the 1957 water year and the resulting improvement in the quality of the stored water is indicated by a reduction in dissolved-solids concentration from 612 ppm in October 1956 to 336 ppm in September 1957.

LOCATION OF QUALITY OF WATER SAMPLING STATIONS

Map Ref.		Map Ref.	
	<u>Arkansas River Basin</u>		<u>Trinity River Basin</u>
1	Canadian River near Tascosa	24	Clear Fork Trinity River at Fort Worth
2	Canadian River near Amarillo		
3	Canadian River near Borger	25	Trinity River near Rosser
		26	Cedar Creek near Mabank
	<u>Red River Basin</u>	27	Richland Creek near Fairfield
4	Prairie Dog Town Fork	28	Trinity River near Oakwood
	Red River near Brice	29	Trinity River at Romayor
5	Mulberry Creek near Brice	30	Trinity River near Moss Bluff
6	Salt Fork Red River near Hedley	31	Old River near Cove
		32	Trinity River at Anahuac
7	Salt Fork Red River near Wellington	33	Trinity Bay at Anahuac
8	Elm Creek near Shamrock		<u>San Jacinto River Basin</u>
9	Quitaque Creek near Quitaque	34	San Jacinto River (West Fork) near Humble
10	Pease River near Crowell		
11	Little Wichita River near Archer City	35	San Jacinto River near Huffman
12	Little Wichita River near Henrietta		<u>Brazos River Basin</u>
13	Red River near Gainesville	36	Double Mountain Fork Brazos River near Rotan
14	Red River at Denison Dam near Denison	37	Double Mountain Fork Brazos River near Aspermont
15	Sulphur River near Darden	38	Salt Fork Brazos River near Peacock
		39	Salt Croton Creek near Aspermont
	<u>Sabine River Basin</u>	40	Salt Fork Brazos River near Aspermont
16	Sabine River near Emory		
17	Sabine River near Tatum	41	Clear Fork Brazos River at Nugent
18	Sabine River at Logansport, La.	42	Paint Creek near Haskell
		43	Clear Fork Brazos River at Fort Griffin
19	Sabine River near Ruliff		
20	Cow Bayou near Mauriceville	44	Hubbard Creek near Breckenridge
		45	Brazos River near South Bend
	<u>Neches River Basin</u>	46	Brazos River at Possum Kingdom Dam near Graford
21	Neches River near Rockland		
22	Angelina River near Lufkin	47	Brazos River near Whitney
23	Neches River at Evadale	48	Leon River near Eastland
		49	Lampasas River near Belton
		50	Navasota River near Easterly
		51	Brazos River at Richmond

LOCATION OF QUALITY OF WATER SAMPLING STATIONS--Continued

<u>Map Ref.</u>		<u>Map Ref.</u>	
	<u>Colorado River Basin</u>		<u>Rio Grande Basin</u>
52	Colorado River above Bull Creek near Knapp	71	Rio Grande near El Paso
53	Bull Creek near Ira	72	Rio Grande below Old Fort Quitman
54	Bluff Creek near Ira	73	Rio Grande at Upper Presidio
55	Deep Creek near Dunn	74	Rio Grande near Johnson Ranch
56	Colorado River at Colorado City	75	Rio Grande at Langtry
57	Morgan Creek near Colorado City	76	Salt (Screwbean) Draw near Orla
58	Colorado River near Silver	77	Pecos River near Orla
59	Colorado River at Robert Lee	78	Pecos River at Pecos
60	Oak Creek near Blackwell	79	Toyah Creek near Pecos
61	Colorado River near San Saba	80	Salt Draw near Pecos
62	Colorado River at Austin	81	Toyah Creek below Toyah Lake near Pecos
63	Colorado River at Wharton	82	Pecos River below Barstow
		83	Pecos River below Grandfalls
		84	Pecos River near Girvin
	<u>Guadalupe River Basin</u>	85	Pecos River near Sheffield
64	Guadalupe River near Spring Branch	86	Pecos River near Shumla
65	Guadalupe River at Victoria	87	Rio Grande at Laredo
66	San Antonio River at Goliad	88	Rio Grande below Falcon Dam
		89	Rio Grande at Roma
		90	Rio Grande at Mission Pumping Plant near Mission
	<u>Nueces River Basin</u>	91	Rio Grande near San Benito
67	Nueces River at Cotulla	92	Rio Grande at Los Fresnos
68	Nueces River at Tilden		Pumping Plant near Brownsville
69	Nueces River near Three Rivers	93	Rio Grande near Brownsville
70	Nueces River near Mathis		

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

PERIODS OF OPERATION OF QUALITY OF WATER SAMPLING STATIONS IN TEXAS

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

PERIODS OF OPERATION OF QUALITY OF WATER SAMPLING STATIONS IN TEXAS—Continued

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

PERIODS OF OPERATION OF QUALITY OF WATER SAMPLING STATIONS IN TEXAS—Continued



Map No.	Stream and Location	Calendar year																					
		1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	
	<u>Rio Grande Basin</u>																						
71	*Rio Grande near El Paso																						
72	*Rio Grande below Old Fort Quitman																						
73	*Rio Grande at Upper Presidio																						
74	*Rio Grande near Johnson Ranch																						
75	*Rio Grande at Langtry																						
76	Salt (Screwbeam) Draw near Orla																						
77	Pecos River near Orla																						
78	Pecos River at Pecos																						
79	Toyah Creek near Pecos																						
80	Salt Draw near Pecos																						
81	Toyah Creek below Toyah Lake near Pecos																						
82	Pecos River near Barstow																						
83	Pecos River below Grandfalls																						
84	Pecos River near Girvin																						
85	Pecos River near Sheffield																						
86	*Pecos River near Shumba																						
87	*Rio Grande at Laredo																						
88	*Rio Grande below Falcon Dam																						
89	Rio Grande at Roma																						
90	Rio Grande at Mission Pumping Plant near Mission																						
91	Rio Grande near San Benito																						
92	Rio Grande at Los Fresnos Pumping Plant near Brownsville																						
93	Rio Grande near Brownsville																						

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

PERIODS OF OPERATION OF QUALITY OF WATER SAMPLING STATIONS IN TEXAS—Continued

ARKANSAS RIVER BASIN  
CANADIAN RIVER NEAR AMARILLO, TEX.

LOCATION--At gaging station at bridge on U. S. Highways 87 and 287, 2,000 feet downstream from Pitcher Creek, 2.0 miles downstream from Fehndle & Santa Fe Railway bridge, and 19 miles north of Amarillo, Potter County.

DRAINAGE AREA--9,425 square miles.

RECORDS AVAILABLE--Chemical analyses: July 1948 to October 1949, February 1950 to September 1957.

Water temperatures: August 1949 to September 1952.

Sediment records: August 1949 to September 1952.

EXTREMES, 1936-57--Dissolved solids: Maximum, 3,000 ppm Mar. 21; minimum, 232 ppm Sept. 21-30.

Hardness: Maximum, 974 ppm Mar. 21; minimum, 69 ppm Sept. 6.

Specific conductance: Maximum observed, 4,490 microhm/cm Mar. 21; minimum observed, 372 microhm/cm Aug. 17, Sept. 24.

Water temperature: Maximum observed, 76°F July 31; minimum observed, freezing point on many days during winter months.

EXTREMES, 1948-57--Dissolved solids: Maximum, 3,000 ppm Mar. 21, 1957; minimum, 232 ppm Sept. 21-30, 1957.

Hardness: Maximum, 974 ppm Mar. 21, 1957; minimum, 69 ppm Sept. 6, 1957.

Specific conductance: Maximum observed, 4,490 microhm/cm Mar. 21, 1957; minimum observed, 372 microhm/cm Aug. 17, Sept. 24, 1957.

Water temperature: Maximum observed, 95°F June 29, 1951; minimum observed, freezing point on many days during winter months.

REMARKS--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhm/cm at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1956	4.71	58		60	31	123		286	93	110	3.6	66		705	0.96	8.97	277	42	50	3.3	1,090	7.5
Oct. 11-20	11.8	60		59	30	129		285	96	108	3.2	69		a694	.94	22.1	271	37	51	3.4	1,100	7.0
Oct. 21-30	5.77	58		58	32	119		273	94	105	3.6	69		a673	.92	10.5	276	52	48	3.1	1,100	7.4
Nov. 1-10	9.68	56		61	29	125		288	89	112	3.6	58		a676	.92	17.7	272	36	50	3.3	1,080	7.2
Nov. 11-20	7.82	65		56	33	141		291	108	117	3.6	71		a738	1.00	15.6	276	38	53	3.7	1,190	7.1
Nov. 21-30	9.30	61		64	36	132		286	125	118	3.6	69		770	1.05	19.3	308	74	48	3.3	1,230	7.7
Dec. 1-10	9.14	72		67	36	147		297	127	132	4.0	78		835	1.14	20.6	316	72	50	3.6	1,240	8.0
Dec. 11-20	11.7	68		76	34	139		310	142	120	4.0	62		831	1.13	26.3	330	76	48	3.3	1,230	7.6
Dec. 21-31	11.7	65		69	35	132		282	120	120	4.0	85		805	1.09	25.4	316	85	48	3.2	1,250	7.7
Jan. 1-10, 1957	9.38	67		64	36	126	15	274	125	117	3.6	82		a771	1.05	19.5	308	83	46	3.1	1,230	7.7
Jan. 11-20	8.14	71		59	36	133	15	284	112	127	3.2	85		a781	1.06	17.2	295	62	48	3.3	1,250	7.5
Jan. 21-31	9.95	73		60	38	137	16	277	120	124	3.6	102		a810	1.10	21.8	306	79	48	3.4	1,330	7.7
Feb. 1-10	12.5	72		59	34	128		270	111	104	3.6	92		745	1.01	25.1	288	66	49	3.3	1,190	7.1
Feb. 11-17, 22-23, 26-28	11.1	70		63	36	138		365	114	114	4.0	19		755	1.03	22.6	304	5	50	3.4	1,290	7.2
Feb. 18-21, 24-25	11.2	67		112	46	272		247	300	332	3.2	84		1,340	1.82	40.5	468	266	56	5.4	2,200	7.1
Mar. 1-9	14.2	53		104	41	236		248	250	292	3.2	72		1,170	1.59	44.9	428	255	55	5.0	1,920	6.8
Mar. 10-20	7.36	64		70	34	145		276	124	134	4.0	93		3,000	4.08	16.3	314	88	50	3.5	1,340	7.2
Mar. 21	37	37		260	79	671		170	888	945	2.0	38		3,000	4.08	300	974	834	60	9.3	4,490	8.2
Mar. 22-25	31.2	37		59	25	141		218	139	135	2.4	45		724	.98	61.0	250	72	55	3.9	1,160	7.1
Mar. 26-31	22.0	43		97	37	235		280	260	270	2.8	21		1,100	1.50	65.3	394	164	56	5.1	1,820	7.2

a Sum of determined constituents.

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nes-ium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-just-ment ratio	Specific conduct-ance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Cal-cium, mag-nes-ium	Non-carbon-ate					
Apr. 1-4, 1957	10.5	52		130	46		312	249	358	398	2.4	58		1,480	2.01	42.0	514	310	57	6.0	2,350	7.2	
Apr. 5-10	10.9	61		70	35		143	276	123	135	3.2	94		856	1.12	24.3	318	92	49	3.5	1,310	6.8	
Apr. 11-20	8.66	60		69	34		156	267	124	154	3.2	97		864	1.15	19.7	312	93	52	3.9	1,380	7.1	
Apr. 21-26	14.5	60		66	35		144	320	120	149	3.2	21		788	1.07	30.9	308	46	50	3.6	1,350	7.2	
Apr. 27	469	30		79	32		450	390	317	462	1.4	1.2		1,560	2.12	1,980	328	8	75	11	2,440	8.2	
Apr. 28-30	965	20		40	14		137	187	110	130	1.2	2.2		1,555	.75	1,450	158	4	65	4.8	938	7.5	
May 1-10	76.6	22		92	33		321	223	326	375	1.2	11		1,290	1.75	267	365	182	66	7.3	2,150	6.1	
May 11, 14-15, 23-24	2,665	22		94	38		368	229	338	452	1.6	12		1,440	1.96	10,360	390	202	67	8.1	2,390	7.8	
May 12-13, 18-22, 26-30	330	19		52	20		184	191	172	189	1.6	6.4		1,02	1.02	670	212	56	65	5.5	1,230	8.0	
May 16-17, 25, 31	1,310	18		36	13		99	201	78	76	1.6	2.2		.59	.59	1,530	144	0	60	3.6	707	7.9	
June 1-3	3,254	17		44	15		166	217	127	154	1.4	2.0		.86	.86	5,580	172	0	68	5.5	1,080	7.8	
June 6-10	234	19		66	22		250	213	241	258	1.4	7.9		1.34	1.34	624	255	80	68	6.8	1,610	7.9	
June 11-20	25.9	47		172	65		439	252	549	600	2.0	26		2,020	2.75	141	696	490	58	7.2	3,220	8.1	
June 21-22, 27-30																							
July 1-3	25.1	55		118	44		279	270	330	342	2.4	35		1,340	1.82	90.8	476	254	56	5.6	2,130	7.9	
July 4-10	502	22		43	16		118	176	115	114	1.6	3.6		.71	.71	705	174	30	60	3.9	896	7.9	
July 11-14, 18-22	5.61	64		62	36		146	322	129	131	3.2	34		788	1.07	11.9	302	38	51	3.7	1,240	7.6	
July 15	8.77	68		68	38		127	324	102	128	3.6	50		.744	1.01	17.6	326	60	46	3.1	1,220	7.7	
July 16-17, 23-25	76.3	26		92	41		373	6458	214	428	2.0	1.0		1,410	1.92	68.5	398	22	67	8.1	2,620	8.5	
July 26-29, 31	1,036	19		38	14		146	287	260	268	1.6	13		1,090	1.48	225	303	68	66	6.8	1,770	7.8	
July 30, Aug. 1-3, 7-10	1,498	17		35	12		106	189	94	78	1.4	1.5		.62	.62	1,830	137	0	63	3.9	730	7.8	
Aug. 4-6	4,357	16		20	6.8		70	162	46	32	1.4	2.5		.40	.40	3,650	79	0	66	3.4	448	7.8	
Aug. 11-16	383	18		48	16		135	191	109	146	1.2	2.0		.83	.83	629	186	30	61	4.3	1,020	8.0	
Aug. 15-21	3,341	17		34	11		72	185	62	47	.8	1.0		.47	.47	3,090	130	0	54	2.7	561	8.1	
Aug. 22-31	367	18		46	16		123	187	123	113	.8	7.5		.75	.75	514	181	28	60	4.0	909	8.0	
Sept. 1-5, 7-10	332	18		56	19		159	199	162	160	.8	5.1		.92	.92	608	218	54	61	4.7	1,130	7.9	
Sept. 6	723	--		17	6.7		--	184	--	35	1.6	.5		--	--	69	0	0	--	--	460	8.2	
Sept. 11-13	214	18		42	14		138	210	125	111	.8	2.5		.75	.75	320	162	0	56	4.7	935	7.9	
Sept. 14-17	473	20		34	11		81	189	66	56	.8	3.0		.50	.50	466	130	0	68	3.1	615	8.0	
Sept. 18-20	30	28		96	32		258	212	288	315	1.0	14		1,140	1.55	92.3	371	198	60	5.8	1,860	7.9	
Sept. 21-30	13.0	30		47	9.3		27	218	16	12	.4	2.5		.36	.36	8.8	156	0	28	1.0	400	8.2	
Weighted average	313	19		46	17		148	200	130	141	1.3	5.0		.613	.613	518	185	21	64	4.7	1,010	--	

a Sum of determined constituents.

b Includes equivalent of 17 parts per million of carbonate (CO<sub>3</sub>).

ARKANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Diss. charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	
													Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 3, 1956	1.94	84		47	34	133		4269	92	112	3.2	79	716	0.97	258	38	53	3.6	1,170	8.4
Nov. 4	36.1	80		56	35	123		300	90	118	--	--	--	--	288	42	--	--	1,190	8.2
Jan. 17, 1957	10.0	74		62	40	183		314	86	100	2.6	62	871	1.18	284	26	49	3.2	1,140	7.8
Feb. 20	72.2	74		52	40	183		522	102	190	2.6	70	318	--	318	0	56	4.5	1,280	7.6
Mar. 21	13.1	74		54	33	122	--	88	88	100	2.8	72	--	--	--	--	--	--	1,310	8.2
Apr. 23	22.5	70		51	38	116	--	246	75	110	--	117	718	.98	270	68	50	3.3	--	--
May 20	7.29	90		57	38	128	--	243	78	108	--	131	716	.97	292	91	46	2.9	1,260	--
June 16	10.2	90		32	38	108	--	521	106	195	2.8	80	756	1.03	298	63	49	3.3	1,100	8.6
July 16	14.8	63		48	38	108	--	424	123	180	1.6	95	711	.97	240	46	55	3.8	1,070	8.4
Aug. 26	20.8	35		45	20	109	--	384	63	80	4.0	37	631	.69	301	2	44	2.7	1,040	8.0
Sept. 16	14.8	56		58	35	133	--	404	92	86	3.6	26	893	.94	194	30	45	2.3	707	8.2
															288	0	50	3.4	1,140	7.5
EAST AMARILLO CREEK NEAR AMARILLO																				
Jan. 17, 1957	1.95	26		57	13	19		237	14	7.6		0.6	263	0.36	195	0	18	0.6	429	8.0
BONITA CREEK NEAR AMARILLO																				
Jan. 17, 1957	0.6	26		66	9.9	18		266	15	6.8		2.4	275	0.37	205	0	16	0.6	438	7.9
CHICKEN CREEK NEAR AMARILLO																				
Jan. 17, 1957	0.79	24		55	9.8	17		216	17	12		4.4	245	0.33	176	1	17	0.6	401	7.9
COETAS CREEK NEAR AMARILLO																				

a Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).  
 b Residue on evaporation at 180°C.  
 c Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).  
 d Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

MED RIVER BASIN

SALT FORK RED RIVER NEAR HEDLEY, TEX.

LOCATION: --Half a mile downstream from Whitefish Creek, 2 1/2 miles upstream from Jesse Arroyo and about 9 miles northeast of Hedley, Donley County.  
 DRAINAGE AREA: --868 square miles of which 209 square miles is probably noncontributing.  
 RECORDS AVAILABLE: --Chemical analyses: March 1956 to September 1957.

Water temperatures: March 1956 to September 1957.  
 EXTREMES, 1956-57: --Dissolved solids: Maximum 1,957.  
 Hardness: Maximum 1,640 ppm Jan. 10-12, 18, 25; minimum 126 ppm Aug. 29.

Specific conductance: Maximum observed, 3,530 microhm/cm Jan. 25; minimum observed, 382 microhm/cm Aug. 29.  
 Temperature: Maximum observed, 95.7° Jan. 30; minimum observed, freezing point Jan. 10-18.

EXTREMES, March 1956 to September 1957: --Dissolved solids: Maximum, 600 ppm Apr. 30, 1956; minimum, 231 ppm Aug. 29, 1957.  
 Hardness: Maximum 1,640 ppm Apr. 30, 1956; and minimum, 126 ppm Aug. 29, 1957.

Specific conductance: Maximum observed, 3,530 microhm/cm Jan. 25, 1957; minimum observed, 382 microhm/cm Aug. 29, 1957.  
 Temperature: Maximum observed, 95.7° June 30, 1957; minimum observed, freezing point Jan. 10-18, 1957.

REMARKS: --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available. No flow during much of the period.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	So- dium (Na)	Po- tassium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	So- dium adorp- tion ratio	Specific conduct- ance (micro- mhos at 25° C)	pH	
													Parts per million	Tons per acre-foot	Tons per day	Cal- cium, magne- sium	Non-carbon- ate					
Dec. 20-23, 25-26, 28-31, 1956	(a)	34		166	53	122		217	510	128	0.7	7.0		1,130	1.56		632	454	30	2.1	1,600	7.4
Dec. 24, 27		42		330	119	259		233	1,170	325	1.0	7.2		2,370	3.22		1,310	1,120	30	3.1	3,030	7.9
Jan. 1-9, 1957		32		126	40	90		195	366	90	.7	7.0		868	1.15		479	319	29	1.8	1,230	7.9
Jan. 10-12, 25		26		370	125	256		216	1,280	340	1.0	1.7		7,510	3.41		1,440	1,260	28	2.9	3,190	8.0
Jan. 13-17		38		242	80	165		258	776	188	1.0	8.2		2,210	2.20		933	720	28	2.3	2,180	7.9
Jan. 18	0.26			371	125	261		276	1,260	328	1.0	5.6		2,520	3.43		1,440	1,210	28	3.0	3,260	7.8
Jan. 19, 20		27		128	33	75		166	351	27	1.7	7.5		81	1.06		455	319	26	1.5	1,130	8.0
Jan. 21-24, 26-31		34		179	55	143		231	529	155	1.0	6.9		1,230	1.67		672	467	32	2.4	1,730	8.0
Feb. 1-14, 16-18		30		124	40	132		201	363	150	1.0	6.3		893	1.28		474	310	38	2.6	1,410	7.9
Feb. 19-28		26		110	33	146		210	284	181	.8	7.2		935	1.27		410	238	44	3.1	1,430	8.0
Mar. 1-11, 13		30		100	34	144		202	293	162	.8	7.8		886	1.18		390	224	45	3.2	1,350	8.2
Mar. 14-20		30		157	52	123		159	490	160	1.0	6.2		1,100	1.50		405	476	31	2.2	1,620	7.9
Mar. 21-23, 25-31		30		102	33	122		209	258	149	1.0	3.2		876	1.19		390	218	40	2.7	1,250	8.0
Apr. 1-10		27		106	39	142		198	314	170	.8	3.2		961	1.31		425	262	42	3.0	1,380	8.2
Apr. 11-19		28		102	38	143		188	310	170	.8	3.6		936	1.27		411	257	43	3.1	1,360	8.0
Apr. 19-23		30		81	20	103		166	198	113	1.0	5.0		651	.89		286	148	44	2.7	973	7.8
Apr. 24-27, 29-30		32		101	31	111		162	294	126	.8	3.0		814	1.11		380	246	39	2.5	1,160	7.8
Apr. 28		19		71	12	39		163	120	34	.8	2.8		387	.53		226	93	27	1.1	574	7.6
May 1-14		37		108	34	124		179	312	144	.8	2.0		888	1.21		410	263	40	2.7	1,290	7.9
May 15-16		22		76	16	54		167	152	53	.8	2.2		468	.64		256	118	32	1.5	702	7.7
May 17-27		31		112	28	115		191	272	143	1.7	2.5		856	1.16		398	238	39	2.5	1,250	7.8
May 28-31, June 1		22		71	15	60		155	140	66	.7	2.8		476	.65		238	112	36	1.7	711	7.6
June 2-5		41		86	23	107		164	225	170	.8	2.0		709	.96		309	174	43	2.6	1,060	8.2
June 6-16		41		94	35	154		126	336	182	1.0	2.0		8907	1.23		378	275	47	3.4	1,370	8.1
June 17-25		44		102	39	158		110	386	185	1.0	3.0		8972	1.32		415	323	45	3.4	1,460	8.0
June 26-30, July 1		49		98	42	168		94	417	190	1.0	1.8		1,010	1.37		407	320	47	3.6	1,510	8.2
July 22-23		38		153	42	181		143	510	208	1.2	2.2		1,210	1.65		554	442	41	3.3	1,770	8.2
Aug. 5-8		32		112	31	135		125	317	168	1.2	1.8		970	1.25		407	279	62	2.9	1,380	8.2
Aug. 9		44		110	41	160		126	386	200	1.0	1.5		81,000	1.36		463	340	64	3.1	1,540	8.1
Aug. 29		15		38	7.5	30		111	57	25	.8	3.0		8231	.31		126	35	34	1.1	382	8.0

a No flow Oct. 1 to Dec. 19, July 2-21, 24-31, Aug. 1-4, 10-28, Sept. 15-30.

b Sum of determined constituents.

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

LOCATION.--At gaging station at bridge on U. S. Highway 77, a quarter of a mile downstream from Gulf, Colorado and Santa Fe Railway bridge, 5 miles downstream from Fish Creek, and 7 miles north of Gainesville, Cooke County, and at mile 791.5.  
DRAINAGE AREA.--30,782 square miles, of which 5,936 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: May 1944 to April 1946, October 1952 to September 1957.  
Water temperatures: October 1952 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 4,260 ppm Sept. 11-12; minimum, 335 ppm Apr. 26-30.  
Hardness: Maximum, 1,250 ppm Aug. 11-12; minimum, 158 ppm Apr. 26-30.  
Specific conductance: Maximum observed, 7,130 microhms Sept. 10; minimum observed, 461 microhms Apr. 27.  
Water temperatures: Maximum observed, 91°F July 13; minimum observed, freezing point Jan. 16, 17.  
EXTREMES, 1944-46, 1952-57.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 250 ppm Sept. 30, Oct. 1-3, 1945.  
Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 120 ppm Sept. 30, Oct. 1-3, 1945.  
Specific conductance: Maximum observed, 9,890 microhms Apr. 11, 1953; minimum observed, 325 microhms Oct. 1, 1945.  
Water temperatures (1952-57): Maximum observed, 95°F July 13, 1954; minimum observed, freezing point Dec. 23, 1953, Jan. 21, 1954, Jan. 16, 17, 1957.  
REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Record of specific conductance of daily samples for period October 1952 to September 1957 available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicarbonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-morp-tion ratio	Specific conductance (microhms at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1956	103	16	0.02	264	95	779	7.4	134	726	1,340	0.5	--	0.70	3,440	4.68	937	1,050	940	62	1.0	5,440	7.8
Oct. 11-13, 16-17	415	--	--	264	95	699	--	140	679	1,240	--	--	--	3,270	4.43	3,660	1,050	936	59	9.4	5,120	7.6
Oct. 18-15, 18, 20	1,586	--	--	108	21	198	--	110	212	333	--	3.3	--	1,000	1.36	4,280	335	265	55	4.6	1,670	7.5
Oct. 19	3,090	--	--	69	19	128	--	128	123	203	--	4.8	--	659	.90	5,300	250	145	53	3.5	1,070	7.6
Oct. 21	4,325	--	--	120	27	338	--	116	260	395	--	4.8	--	1,170	1.39	10,490	410	315	56	5.1	1,940	7.5
Oct. 22-23	4,635	--	--	78	16	152	--	128	139	245	--	3.8	--	741	1.01	8,670	288	163	55	4.0	1,260	7.8
Oct. 24-25	2,690	--	--	176	34	370	--	125	366	620	--	6.0	--	1,720	2.34	12,490	580	476	58	6.7	2,800	7.8
Oct. 26-30	1,164	--	--	134	26	251	--	112	314	400	--	3.5	--	1,250	1.70	3,930	440	348	55	5.2	2,040	7.6
Oct. 31	628	--	--	136	33	418	--	118	347	690	--	3.8	--	1,760	2.39	2,980	523	428	63	7.9	2,870	7.9
Nov. 1	548	--	--	168	32	455	--	122	350	760	--	3.3	--	1,910	2.60	2,830	550	450	64	8.4	3,160	7.6
Nov. 2-10	2,076	--	--	68	10	123	--	100	118	248	--	2.2	--	703	.96	3,950	245	163	56	4.0	1,220	7.4
Nov. 11-13	669	--	--	92	22	221	--	104	168	362	--	2.2	--	986	1.34	1,780	320	235	60	5.4	1,750	8.0
Nov. 14-15	370	--	--	124	27	293	--	134	230	500	--	2.4	--	1,300	1.77	1,300	420	310	60	6.2	2,260	7.9
Nov. 16-18	271	--	--	160	29	368	--	152	286	635	--	2.2	--	1,640	2.23	1,200	520	396	61	7.0	2,780	8.1
Nov. 19-20	228	--	--	198	45	511	--	188	353	690	--	1.9	--	2,200	2.99	1,350	680	526	62	8.5	3,680	8.4
Nov. 21-26	198	--	--	216	49	576	--	180	451	990	--	1.4	--	2,460	3.35	1,320	740	592	63	9.2	4,070	8.1
Nov. 25-30	162	--	--	244	71	692	--	180	515	1,220	--	--	--	2,950	4.01	1,290	900	752	63	10	4,860	8.1
Dec. 1-7	140	--	--	260	81	732	--	184	550	1,310	--	--	--	3,200	4.35	1,210	980	829	62	10	5,100	7.9
Dec. 8-10	313	--	--	178	57	471	--	164	353	660	--	1.9	--	2,130	2.99	1,800	680	558	60	7.8	3,510	8.3
Dec. 11-19	1,984	--	--	240	66	603	--	312	441	1,090	--	--	--	2,700	3.67	1,230	880	706	60	8.8	4,400	8.0
Dec. 20	2,040	--	--	154	43	349	--	152	258	655	--	1.2	--	1,670	2.27	9,200	580	435	58	6.4	2,760	8.6
Dec. 21-22	4,150	--	--	66	21	157	--	166	107	370	--	2.8	--	730	.69	8,180	230	183	57	4.2	1,270	8.6
Dec. 23-27	984	--	--	124	34	302	--	148	204	545	--	6.5	--	1,420	1.93	3,770	450	358	59	6.2	2,350	8.5
Dec. 28-31	401	--	--	180	58	479	--	182	354	850	--	6.2	--	2,170	2.95	2,350	680	550	60	8.0	3,550	8.3
Jan. 1-10, 1957	215	11	.01	202	53	532	--	220	380	940	.3	2.6	.30	2,400	3.26	1,390	770	540	62	8.6	3,830	7.5
Jan. 11-13	155	--	--	224	83	620	--	180	458	1,150	--	1.3	--	2,910	3.86	1,200	900	720	60	9.0	4,500	6.2
Jan. 14-20	126	--	--	264	98	701	--	218	523	1,320	--	--	--	3,350	4.56	1,120	1,000	882	59	9.4	5,080	7.2
Jan. 21-28	180	--	--	264	85	721	--	218	520	1,320	--	--	--	3,240	4.41	1,570	1,010	854	61	9.9	5,090	8.3
Jan. 26, 28-29	171	--	--	168	56	412	--	196	319	745	--	2.0	--	2,160	2.84	1,907	650	469	58	7.0	3,210	8.4
Jan. 27, 30-31	161	--	--	236	76	604	--	230	428	1,120	--	--	--	2,890	3.93	1,260	900	711	59	8.8	4,380	8.6
Feb. 1-5	224	--	--	264	85	702	--	188	385	1,320	--	6.0	--	3,360	4.57	2,030	1,010	856	60	9.6	5,050	8.4
Feb. 6	700	--	--	192	66	516	--	168	301	930	--	--	--	2,480	3.27	4,690	750	596	60	9.2	3,690	8.6
Feb. 7	1,080	--	--	156	46	394	--	162	275	715	--	12	--	1,980	2.69	5,770	580	449	60	7.1	2,960	8.6
Feb. 8, 10	1,470	--	--	106	34	244	--	148	270	460	--	5.0	--	1,280	1.74	5,080	405	300	57	5.3	2,040	8.3
Feb. 9	1,410	--	--	78	22	183	--	118	119	328	--	4.5	--	930	1.26	3,540	285	188	58	4.8	1,460	8.4

a Includes the equivalent of 4 parts per million carbonate (CO<sub>3</sub>).  
b Includes the equivalent of 8 parts per million carbonate (CO<sub>3</sub>).  
c Includes the equivalent of 6 parts per million carbonate (CO<sub>3</sub>).  
d Includes the equivalent of 2 parts per million carbonate (CO<sub>3</sub>).  
e Includes the equivalent of 12 parts per million carbonate (CO<sub>3</sub>).  
f Includes the equivalent of 10 parts per million carbonate (CO<sub>3</sub>).

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

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium-adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Feb. 11-15, 1957	752	--	--	80	24	200	112	133	355	--	--	3.7	--	981	1.33	1,990	300	208	59	5.0	1,630	8.2
Feb. 16-----	306	--	--	124	34	300	6152	205	540	--	--	3.8	--	1,690	2.03	1,230	450	325	59	6.2	2,150	8.6
Feb. 17-18-----	266	--	--	154	43	421	c166	282	740	--	--	3.8	--	1,910	2.62	1,390	560	424	62	7.7	3,050	8.6
Feb. 19-20-----	213	--	--	188	61	533	c190	353	960	--	--	2.8	--	2,540	3.45	1,460	720	564	62	8.6	3,860	8.4
Feb. 21-28-----	201	--	--	240	76	710	c200	466	1,280	--	--	--	--	3,270	4.45	1,770	910	746	63	10	4,960	8.4
Mar. 1-----	216	--	--	248	102	821	234	538	1,470	--	--	--	--	3,400	4.62	1,980	1,040	868	63	11	5,530	7.9
Mar. 2-3-----	390	--	--	204	71	663	160	443	1,170	--	--	--	--	2,780	3.78	2,930	800	669	64	10	2,500	7.7
Mar. 4-----	1,300	--	--	115	40	336	108	208	620	--	--	2.4	--	1,550	2.11	5,440	450	362	62	6.9	2,590	7.6
Mar. 5-6-----	1,390	--	--	75	25	206	96	128	370	--	--	3.0	--	987	1.34	3,700	288	210	61	5.3	1,660	7.5
Mar. 7-10-----	907	--	--	101	32	333	118	170	590	--	--	3.2	--	1,400	1.90	3,430	385	288	65	7.4	2,400	7.5
Mar. 11-----	790	--	--	120	35	411	136	226	700	--	--	3.5	--	1,670	2.27	3,560	645	336	67	8.5	2,610	7.7
Mar. 12-16-----	524	--	--	152	54	561	136	310	980	--	--	3.5	--	2,260	3.07	3,200	600	488	67	10	3,770	7.3
Mar. 17-----	300	--	--	200	68	706	136	436	1,240	--	--	--	--	2,930	3.98	2,370	780	668	66	11	4,700	7.8
Mar. 18-19-----	284	--	--	224	88	823	134	519	1,460	--	--	--	--	3,400	4.62	2,610	920	810	66	12	3,450	7.5
Mar. 20-----	254	--	--	144	49	494	110	316	860	--	--	4.4	--	2,080	2.83	1,430	560	670	66	9.1	3,490	7.6
Mar. 21-----	270	--	--	200	68	723	168	447	1,240	--	--	--	--	2,860	3.89	2,080	780	662	67	11	4,720	7.7
Mar. 22-25-----	1,930	--	--	122	43	388	124	223	700	--	--	2.3	--	1,730	2.35	9,020	480	378	64	7.7	2,850	7.5
Mar. 26-29-----	1,368	--	--	82	30	239	120	124	435	--	--	6.6	--	1,130	1.54	4,170	328	230	61	5.7	1,960	7.3
Mar. 30-31-----	554	--	--	120	43	379	138	255	650	--	--	3.3	--	1,710	2.33	2,560	475	362	61	7.6	2,780	7.6
Apr. 1-----	781	--	--	94	37	233	6138	178	420	--	--	3.0	--	1,170	2.49	2,470	368	276	57	5.1	1,970	8.3
Apr. 2-----	572	--	--	130	48	411	4148	291	700	--	--	2.4	--	1,770	2.41	2,730	520	398	63	7.8	2,830	8.4
Apr. 3-----	1,540	--	--	58	10	85	128	64	140	--	--	1.4	--	1,482	.66	2,000	186	81	50	2.7	927	8.2
Apr. 4-----	1,760	--	--	83	27	224	112	143	400	--	--	3.0	--	1,060	1.44	5,040	320	228	60	5.3	1,780	8.2
Apr. 5-6-----	809	--	--	136	49	472	126	278	830	--	--	2.2	--	2,000	2.72	4,370	560	436	66	8.8	3,300	7.9
Apr. 7-----	740	--	--	232	61	701	156	553	1,170	--	--	--	--	3,100	4.22	6,190	830	702	65	11	4,790	7.8
Apr. 8-9-----	2,270	--	--	160	49	392	6132	421	640	--	--	2.3	--	2,210	3.01	13,550	600	492	59	7.0	3,530	8.3
Apr. 10-13-----	968	--	--	138	32	343	146	296	560	--	--	4.8	--	1,580	2.15	4,130	475	356	61	6.8	2,620	8.1
Apr. 14-15-----	724	--	--	115	29	263	d134	221	450	--	--	3.9	--	1,250	1.70	2,640	620	295	59	5.7	2,120	8.3
Apr. 16-20-----	434	--	--	174	45	402	a172	330	715	--	--	3.2	--	1,900	2.58	2,230	620	479	59	7.0	3,130	8.4
Apr. 21-----	1,590	--	--	91	20	171	a140	124	310	--	--	2.3	--	804	1.09	3,450	310	196	55	4.2	1,740	8.4
Apr. 22-25-----	31,380	--	--	75	16	118	134	131	185	--	--	2.4	--	660	.90	55,920	252	162	51	3.3	1,100	8.2
Apr. 26-30-----	49,580	--	--	51	7.5	49	130	58	67	--	--	2.4	--	335	.46	44,850	158	52	40	1.7	353	8.2

a Includes the equivalent of 4 parts per million carbonate (CO<sub>3</sub>).  
b Includes the equivalent of 8 parts per million carbonate (CO<sub>3</sub>).  
c Includes the equivalent of 6 parts per million carbonate (CO<sub>3</sub>).  
d Includes the equivalent of 2 parts per million carbonate (CO<sub>3</sub>).  
e Includes the equivalent of 10 parts per million carbonate (CO<sub>3</sub>).



RED RIVER BASIN--Continued

RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	pH	
														Parts per mil-lion	Tons per acre-foot	Tons per day	Cal-cium, mag-ne-sium	Non-car-bonate				
May 1-2, 1957	58,700	--	--	120	20	185		122	248	300	--	2.2	--	976	1.33	134,700	380	280	51	4.1	1,640	8.0
May 3-10	44,140	--	--	86	13	110		140	131	182	1.9	1.9	--	614	.84	73,180	270	136	47	2.9	1,080	8.0
May 11-15	44,880	--	--	116	26	162		128	242	275	2.4	2.4	--	937	1.27	113,500	395	290	47	3.5	1,570	7.9
May 16-17	29,900	--	--	98	13	111		148	164	175	2.2	2.2	--	670	.91	54,090	300	178	45	2.8	1,130	8.2
May 18	60,000	--	--	68	11	63		c132	80	99	5.0	5.0	--	444	.60	71,930	214	90	39	1.9	704	8.4
May 19-20	91,500	--	--	100	20	112		116	209	185	1.4	1.4	--	722	.98	178,400	330	235	43	2.7	1,200	7.9
May 21-24	53,600	--	--	85	14	95		a138	144	150	2.0	2.0	--	584	.79	84,520	270	157	43	2.5	.982	8.4
May 25-27	40,500	--	--	74	13	75		a132	103	120	1.6	1.6	--	486	.66	53,140	240	116	40	2.1	.837	8.0
May 28-31	36,900	--	--	98	17	132		144	173	215	1.9	1.9	--	745	1.01	74,220	315	197	48	3.2	1,270	8.2
June 1-2	40,750	--	--	64	16	63		144	83	110	2.9	2.9	--	429	.58	47,200	224	106	38	1.8	756	7.9
June 3	70,000	--	--	86	20	130		116	130	245	2.9	2.9	--	774	1.03	146,300	296	201	49	3.3	1,330	7.9
June 4-10	45,660	--	--	160	32	253		136	372	410	2.2	2.2	--	1,370	1.86	168,900	530	418	51	4.8	2,220	7.9
June 11-12	12,900	--	--	116	62	303		168	347	510	2.4	2.4	--	1,310	2.05	52,390	545	424	55	5.6	2,470	8.0
June 13-14	9,035	--	--	208	51	437		168	478	740	2.8	2.8	--	2,060	2.80	50,250	730	592	57	7.0	3,340	8.0
June 15-20	7,508	--	--	232	54	528		172	315	900	2.6	2.6	--	2,410	3.28	48,850	800	659	59	8.1	3,910	7.9
June 21	17,400	--	--	166	40	357		136	380	600	3.2	3.2	--	1,700	2.31	79,870	580	468	57	6.4	2,810	7.9
June 22-27	6,842	--	--	140	32	240		148	260	430	3.6	3.6	--	1,270	1.73	23,460	480	358	52	4.8	2,100	7.9
June 28	3,180	--	--	176	67	456		130	437	810	4.2	4.2	--	2,090	2.84	17,940	715	608	58	7.4	3,480	7.9
June 29	2,780	--	--	256	54	563		236	514	960	2.5	2.5	--	2,610	3.55	19,390	860	666	59	8.3	4,180	7.9
June 30	2,700	--	--	264	81	714		176	625	1,240	--	--	--	3,160	4.30	23,040	990	846	61	9.9	5,030	7.8
July 1-10	1,605	24	0.03	264	88	792	--	184	672	1,300	0.3	--	0.47	3,320	4.22	14,390	1,020	869	63	11	5,280	7.9
July 11-20	823	--	--	224	124	144		144	696	1,450	--	--	--	3,660	4.98	8,130	1,070	932	65	11	5,780	7.6
July 21-25	834	--	--	232	88	722		162	590	1,250	--	--	--	3,170	4.31	7,140	940	807	63	10	5,050	7.9
July 26-30	3,552	--	--	162	59	448		148	408	760	1.7	1.7	--	2,050	2.79	19,660	645	524	60	7.7	3,290	7.8
July 31	3,580	--	--	108	41	301		144	272	490	3.0	3.0	--	1,390	1.89	13,440	440	322	60	6.2	2,180	7.8
Aug. 1-6	1,725	--	--	133	34	283		136	317	455	3.2	3.2	--	1,500	2.04	6,990	470	358	57	5.7	2,430	7.5
Aug. 5-8	780	--	--	172	51	452		160	403	760	1.7	1.7	--	2,070	2.82	4,360	640	509	61	7.8	3,260	7.5
Aug. 9-10	665	--	--	248	93	759		168	652	1,300	--	--	--	3,310	4.50	5,940	1,000	862	62	10	5,200	7.7
Aug. 11-12	1,975	--	--	368	81	726		162	964	1,200	--	--	--	3,590	4.88	19,140	1,250	1,120	56	8.9	5,330	8.0
Aug. 13-16	1,332	--	--	272	59	479		150	652	820	3.9	3.9	--	2,470	3.36	8,880	920	797	53	6.9	3,820	7.9
Aug. 17-20	763	--	--	312	71	822		136	741	1,400	--	--	--	3,550	4.83	7,310	1,070	958	63	11	5,600	7.8
Aug. 21-31	499	--	--	288	88	814		154	719	1,400	--	--	--	3,560	4.84	4,800	1,080	934	62	11	5,590	7.5
Sept. 1-10	481	--	--	312	93	891		156	794	1,320	--	--	--	3,860	5.23	5,010	1,160	1,030	63	11	6,030	7.7
Sept. 11-12	445	--	--	384	69	1,020		118	917	1,700	--	--	--	4,260	5.79	5,120	1,240	1,140	64	13	6,650	7.6
Sept. 13-20	402	--	--	292	66	699		142	657	1,220	--	--	--	3,180	4.32	3,450	1,000	884	60	9.6	5,000	7.8
Sept. 21-25	565	--	--	210	72	555		158	469	1,000	--	--	--	2,530	3.44	3,860	820	690	60	8.4	4,070	7.8
Sept. 26-30	1,962	--	--	142	33	272		136	324	445	5.2	5.2	--	1,380	1.88	7,310	490	378	55	5.3	2,260	7.6
Weighted average	7,484	--	--	107	23	169		136	209	283	--	--	--	917	1.25	18,530	362	250	50	3.9	1,550	--

a Includes the equivalent of 4 parts per million carbonate (CO<sub>3</sub>).  
c Includes the equivalent of 6 parts per million carbonate (CO<sub>3</sub>).

RED RIVER BASIN--Continued

RED RIVER AT DENISON DAM NEAR DENISON, TEX.

LOCATION:--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 4 miles northwest of Denison, Grayson County, and 3 miles upstream from gaging station near Colbert, Bryan County, Okla. DRAINAGE AREA:--39,719 square miles above dam, 39,777 square miles above gaging station, of which 5,936 square miles is probably noncontributing.

RECORDS AVAILABLE:--Chemical analyses: May 1944 to September 1957. Water temperatures: October 1945 to September 1957.

EXTREMES, 1956-57:--Dissolved solids: Maximum, 1,380 ppm Dec. 1-31; minimum, 696 ppm June 1-30. Hardness: Maximum, 465 ppm Dec. 1-31; minimum, 256 ppm June 1-30.

Specific conductance: Maximum observed, 2,430 microhos Mar. 20; minimum observed, 1,040 microhos June 19, July 5. EXTREMES, 1944-57:--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, 1944; minimum, 464 ppm Oct. 21-31, 1945.

Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946. Specific conductance: Maximum observed, 3,520 microhos Aug. 14, 1944; minimum observed, 656 microhos Oct. 16, 1945.

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 sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla., for water year October 1956 to September 1957 given in Water-Supply Paper 1511. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1956	66.7	12		132	32	299		124	333	470		0.8			1,340	1.82	241	461	360	59	6.1	2,200	8.0
Nov. 1-30	79.6	10		131	32	306		122	340	475		.8			1,350	1.84	290	458	358	59	6.2	2,260	7.7
Dec. 1-31	677	12		134	32	311		123	342	485		.7			1,380	1.88	2,520	465	364	59	6.3	2,290	7.8
Jan. 1-31, 1957	2,115	9.8		130	32	311		126	330	485		.8			1,360	1.85	7,770	455	352	60	6.3	2,280	7.9
Feb. 1-28	1,513	9.6		135	30	310		124	330	488		.5			1,360	1.85	5,560	460	359	59	6.3	2,320	8.2
Mar. 1-31	1,481	9.2		133	32	298		124	323	478		.5			1,330	1.81	5,320	464	362	58	6.0	2,260	7.8
Apr. 1-30	3,201	11		130	31	284		123	324	465		3.0			1,290	1.75	11,150	452	351	58	5.8	2,170	8.0
May 1-31	34,840	11		97	22	200		113	218	315		3.5			986	1.34	92,750	332	240	57	4.8	1,600	7.5
June 1-30	66,910	11		78	15	133		107	165	202		1.8			696	.95	125,700	256	168	53	3.6	1,130	7.6
July 1-31	12,610	14		92	17	155		117	195	238		1.5			822	1.12	27,990	300	204	53	3.9	1,310	7.7
Aug. 1-31	2,653	12		95	18	176		126	207	265		1.0			882	1.20	5,860	311	208	55	4.3	1,420	7.7
Sept. 1-30	4,672	10		90	18	164		130	188	250		1.2			849	1.15	11,170	298	192	54	4.1	1,350	8.0
Weighted average	10,890	11		89	18	167		112	195	258		2.2			840	1.14	24,700	296	204	55	4.2	1,370	--

RED RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Diss. charge (cf)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Iron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium	Non-carbonate			
Feb. 19, 1957	1.82	16		636	125	520	131	1,890	805	6.0	4,070	5.54	2,100	1,980	3.5	4.9	5,220	7.9			
Feb. 19, 1957	2.09	18		600	84	201	137	1,700	280	4.3	2,950	4.01	1,840	1,730	1.9	2.0	3,470	7.9			
Feb. 19, 1957	0.56	14		592	102	359	132	1,740	535	3.8	3,410	4.64	1,900	1,790	2.9	3.6	4,290	7.9			
Feb. 19, 1957	2.40	22		114	67	155	353	399	128	0.8	1,070	1.46	560	270	3.8	2.8	1,670	8.1			
Apr. 24, 1957	13.5	32		104	12	33	391	29	21		423	0.58	308	0	1.9	0.8					
Nov. 21, 1956	0.60	26		1,230	259	11,600	114	3,780	18,100		35,100	47.7	4,130	4,040	86	78	44,600	7.9			
Nov. 21, 1956	1.04	14		1,170	266	11,400	92	3,730	17,900		34,500	46.9	4,010	3,940	86	78	44,000	7.8			
Nov. 21, 1956	5.27	9.6		938	205	5,830	114	2,830	8,680		18,700	25.4	3,180	3,090	80	45	25,300	8.0			
Nov. 21, 1956	3.50	11		805	177	2,540	102	2,620	3,880		10,100	13.7	2,740	2,650	67	21	13,300	7.9			
Nov. 21, 1956	7.0	8.4		941	216	4,470	116	2,820	7,050		15,600	21.2	3,240	3,140	75	34	21,700	8.0			
Nov. 21, 1956	1.65	8.6		1,230	299	6,240	116	2,960	10,600		21,400	29.1	4,300	4,200	76	41	28,900	8.0			

NORTH GROESBECK CREEK NEAR QUANAH

SOUTH GROESBECK CREEK NEAR ACHE

GROESBECK CREEK NEAR QUANAH

WANDERERS CREEK AT ODELL

SHEETWATER CREEK NEAR WHEELER

NORTH FORK WICHITA RIVER 10 MILES SOUTHEAST OF PADUCAH

SALT CREEK 10 MILES SOUTHEAST OF PADUCAH

NORTH FORK WICHITA RIVER 15 MILES SOUTHWEST OF CHOWELL

MIDDLE FORK WICHITA RIVER AT MOUTH NEAR CHOWELL

NORTH FORK WICHITA RIVER NEAR TRUSCOTT

SOUTH FORK WICHITA RIVER NEAR BENJAMIN

SABINE RIVER BASIN  
SABINE RIVER NEAR TATUM, TEX.

LOCATION:--At gaging station at bridge on State Highway 43, 5 miles upstream from Porter Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 319.

DRAINAGE AREA:--3,586 square miles.

RECORDS AVAILABLE:--Chemical analyses: February 1952 to September 1957.

Water temperatures: February 1952 to September 1957.

EXTREMES: 1956-57:--Dissolved solids: Maximum, 805 ppm Oct. 21-31; minimum, 74 ppm Apr. 24-30.

Hardness: Maximum, 98 ppm Oct. 21-31; minimum, 22 ppm Apr. 24-30.

Specific conductance: Maximum observed, 1,590 microhos Nov. 7; minimum observed, 98.3 microhos Apr. 29.

Water temperatures: Maximum observed, 90°F on several days during July; minimum observed, 43°F, Jan. 16.

EXTREMES: 1952-57:--Dissolved solids: Maximum, 935 ppm Aug. 21-31, 1956; minimum, 74 ppm Apr. 24-30, 1957.

Hardness: Maximum, 106 ppm Sept. 1-10, 1956; minimum, 22 ppm Apr. 24-30, 1957.

Specific conductance: Maximum observed, 1,850 microhos Oct. 25, 1956; minimum observed, 42°F Feb. 10, 1956.

Water temperatures: Maximum observed, 98°F Aug. 13, 1956; minimum observed, 42°F Feb. 10, 1956.

REMARKS:--Values reported for dissolved solids concentrations are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium				
Oct. 1-10, 1956	10.2	5.6		20	7.8	246		145	18	340		0.8		730	0.99	83	0	87	12	1,320	8.0
Oct. 11-20	12.0	4.2		21	8.6	244		111	21	358		.2		723	.98	87	0	86	11	1,340	7.9
Oct. 21-31	32.5	4.6		24	9.0	273		148	26	385		.0		805	1.09	98	0	86	12	1,480	7.3
Nov. 1-13, 1956	154	7.0		25	8.3	249		81	36	378		1.0		753	1.02	96	30	85	11	1,430	7.4
Nov. 14, 25-30	146	1.3		18	4.5	83		58	30	116		1.8		320	.44	64	16	74	4.5	1,550	6.9
Nov. 16-24	238	9.2		13	3.1	38		42	24	48		1.2		a158	.21	46	12	64	2.4	280	6.8
Dec. 1-10	61.6	1.4		22	6.0	143		70	31	212		1.8		494	.67	79	22	80	7.0	872	7.6
Dec. 11-20	76.1	1.5		20	5.6	127		61	31	188		1.8		438	.60	72	22	79	6.5	775	7.3
Dec. 21-31, 1957	118	1.4		21	6.0	147		57	33	222		1.0		490	.67	76	30	81	7.3	886	7.2
Jan. 1-11, 1957	162	1.5		18	6.3	94		39	39	144		.5		360	.49	71	39	74	4.9	639	7.2
Jan. 12-20	139	1.1		23	6.9	143		47	46	220		1.2		504	.69	86	48	78	6.7	911	7.3
Jan. 21-31	352	1.2		19	5.8	105		36	37	164		1.8		388	.53	72	42	76	5.4	700	7.0
Feb. 1-5, 7-9	1,552	1.0		13	3.2	65		15	23	105		2.5		a229	.31	46	34	75	4.1	427	6.9
Feb. 6, 10-14	1,920	1.1		17	3.7	71		28	21	47		2.0		a142	.19	43	20	62	2.1	251	7.1
Feb. 15-28	625	1.6		17	5.2	71		29	32	115		1.5		a272	.37	65	41	71	3.9	497	7.0
Mar. 1-11	534	1.7		23	8.0	105		18	46	180		1.2		a369	.53	90	76	72	4.8	741	6.6
Mar. 12-18	893	1.1		18	4.5	50		36	28	79		1.8		a210	.29	63	34	63	2.7	389	7.2
Mar. 19-24	1,359	1.3		18	6.1	80		21	35	134		1.5		a298	.41	70	53	71	4.2	573	7.1
Mar. 25-31	3,524	9.8		11	3.2	26		27	19	38		1.0		a121	.16	41	18	58	1.8	222	7.2
Apr. 1-11	4,752	1.3		14	3.9	32		32	24	50		1.0		a154	.21	52	26	58	2.0	285	6.1
Apr. 12-23	5,842	1.3		11	3.4	24		36	15	35		.8		a120	.16	42	12	56	1.6	216	6.1
Apr. 24-30	18,560	8.2		4.7	2.5	16		14	12	23		.8		a74	.10	22	11	61	1.5	133	5.8
May 1-10	45,700	9.8		12	2.9	18		40	11	25		1.2		a100	.14	22	9	48	1.2	177	6.6
May 11-21	14,210	1.4		18	3.4	32		58	13	46		2.8		a158	.21	59	11	54	1.6	282	6.9
May 22-31	8,104	1.2		17	3.1	18		54	11	26		1.8		a116	.16	55	11	41	1.0	211	6.6
June 1-10	18,960	1.1		12	2.8	19		42	12	25		1.2		a104	.14	41	7	50	1.3	181	6.7
June 11-20	15,430	1.2		17	3.3	19		56	10	28		1.5		a119	.16	56	10	42	1.1	212	6.8
June 21-30	4,045	1.4		16	4.4	40		42	15	67		1.5		a179	.24	58	24	60	2.3	333	6.7
July 1-10	467	2.1		21	5.9	76		60	23	126		1.0		a299	.41	77	38	68	3.8	558	7.0
July 11-20	180	2.1		23	6.7	98		60	23	160		.5		398	.54	85	36	72	4.6	675	7.1
July 21-31	286	2.1		20	6.8	117		48	23	190		.5		439	.60	78	38	77	5.8	763	6.8
Aug. 1-10	294	2.3		17	5.7	93		48	22	145		2.5		359	.49	66	26	75	5.0	598	7.2
Aug. 11-20	228	1.8		13	4.4	48		38	22	107		1.5		282	.38	51	19	75	4.4	473	7.0
Aug. 21-31	89.2	1.6		14	4.9	41		48	21	120		.5		296	.40	55	16	76	4.7	511	7.1
Sept. 1-5	134	1.9		16	5.2	96		63	18	142		.5		330	.45	62	10	77	5.3	586	7.5
Sept. 6-20	131	1.7		18	6.3	143		68	41	176		1.0		497	.68	71	38	81	7.4	875	7.4
Sept. 21-27, 29-30	521	1.4		15	5.4	118		42	19	185		1.8		41	.56	60	25	81	6.6	726	7.0
Sept. 28	908	1.6		72	3.9	--		25	--	107		1.2		--	--	34	14	--	--	396	7.0
Weighted average	3,968	1.1		13	3.2	25		41	13	37		1.4		126	0.17	46	12	54	1.6	226	--

a Sum of determined constituents.

SABINE RIVER BASIN--Continued  
SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from Kansas City Southern Railway bridge, 4.5 miles downstream from Cypress Creek and at mile 40.  
DRAINAGE AREA.--9,440 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1957.  
Water temperatures: October 1947 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 250 ppm Dec. 1-12; minimum, 10 ppm Sept. 27-29.  
Hardness: Maximum, 52 ppm Aug. 1-10; minimum, 41 ppm Sept. 27-29.  
Specific conductance: Maximum observed, 555 microhmhos Dec. 5; minimum observed, 43 $\mu$  Jan. 21.  
Water temperatures: Maximum observed, 90 $^{\circ}$ F Aug. 4; minimum observed, 43 $^{\circ}$ F Jan. 21.  
EXTREMES, 1945-46, 1947-57.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 35 ppm June 5-11, 1950.  
Hardness: Maximum, 65 ppm Dec. 21-22, 1954; minimum, 8 ppm May 20-24, 1953.  
Specific conductance: Maximum observed, 774 microhmhos Dec. 26, 1948; minimum observed, 32.9 microhmhos May 22, 1953.  
Water temperatures: Maximum observed, 95 $^{\circ}$ F Aug. 12, 1953; minimum observed, 34 $^{\circ}$ F Jan. 28, 1948.  
REMARKS.--Values reported for dissolved solids are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhmhos at 25 $^{\circ}$ C)	pH
														Calcium	Non-carbonate			
Oct. 1-10, 1956	290	21		8.2	2.8	37		48	4.9	47		1.0		32	0	71	244	7.3
Oct. 11-20	277	21		8.0	2.4	36		46	4.7	46		.5		30	0	72	240	7.2
Oct. 21-31	287	22		7.8	2.5	40		44	5.6	53		.8		30	0	74	263	7.6
Nov. 1-10	463	20		7.4	2.3	38		41	5.8	50		.5		28	0	75	231	7.4
Nov. 11-16, 20-24	738	17		6.2	2.1	39		32	7.0	34		.2		24	0	78	246	6.8
Nov. 17-19, 25-30	991	15		8.6	3.1	76		50	9.6	105		.2		34	0	83	450	7.1
Dec. 1-12	561	15		10	4.0	76		56	12	105		.5		42	0	80	472	7.6
Dec. 13-20	1,720	12		6.0	1.7	32		20	8.5	46		.4		22	6	76	219	6.6
Dec. 21-26, 28	10,520	7.8		3.2	1.0	10		11	6.8	13		.2		3	6	65	153	6.3
Dec. 27, 29-31	4,602	12		4.8	1.5	17		14	11	22		.8		10	944	67	125	6.3
Jan. 1-10, 1957	1,901	16		4.2	1.8	23		20	8.8	28		2.2		18	2	73	146	6.8
Jan. 11-20	1,358	18		5.6	2.2	24		28	9.6	29		.8		23	0	69	169	6.7
Jan. 21-31	1,651	18		6.4	2.4	33		28	10	25		.8		26	3	73	219	6.8
Feb. 1-10	3,648	15		7.8	2.8	41		20	18	60		1.0		31	14	74	276	6.7
Feb. 11-20	3,808	14		9.4	3.0	44		16	20	64		1.6		23	71	31	285	6.6
Feb. 21-28	7,958	12		7.6	2.0	41		13	12	23		1.5		27	14	34	133	6.5
Mar. 1-13	5,485	11		6.2	2.2	19		14	13	27		1.2		24	13	63	177	6.3
Mar. 14-27	13,280	7.8		3.9	1.5	13		10	8.8	18		1.0		16	8	64	144	6.1
Mar. 28-31	14,100	11		6.8	2.2	18		14	15	26		1.0		26	14	60	134	6.5
Apr. 1-10	14,860	11		6.4	2.5	17		16	15	25		1.2		26	14	59	167	6.4
Apr. 11-20	17,170	12		7.8	2.5	19		17	16	27		2.5		30	18	37	172	6.7
Apr. 21-30	13,020	12		8.6	2.6	21		29	16	26		1.5		32	8	39	153	6.9
May 1-12	32,580	9.8		4.6	1.6	8.6	3.0	14	8.2	13	0.4	1.0		38	6	53	112	6.1
May 13-23	47,960	10		5.6	2.0	12		20	8.8	16		1.0		22	6	51	112	6.1
May 24-31	41,320	12		11	3.3	19		44	8.0	26		1.2		40	4	51	171	7.5
June 1-10	23,860	13		13	3.4	17		66	9.6	25		1.5		46	9	44	186	6.9
June 11-20	18,220	10		10	2.7	15		34	9.6	21		1.8		36	6	48	157	6.7
June 21-30	27,860	8.8		10	2.6	15		38	8.2	20		1.8		36	6	47	153	6.6
July 1-9	29,080	13		11	3.1	16		42	8.0	22		1.0		40	6	47	164	6.4
July 10-20	3,404	19		13	4.1	25		48	12	36		1.0		50	10	52	238	7.1
July 21-31	2,915	18		13	3.4	28		39	14	41		.5		44	12	58	188	6.5
Aug. 1-10	2,029	20		14	4.2	30		46	15	61		1.5		52	15	62	317	7.3
Aug. 11-20	1,523	20		12	4.4	37		46	14	53		1.0		46	8	63	291	7.1
Aug. 21-31	1,134	19		11	4.1	39		46	13	57		1.0		47	10	63	255	7.1
Sept. 1-10	1,109	19		11	3.5	41		44	12	58		.5		42	6	68	277	7.3
Sept. 11-25	1,313	16		9.2	3.0	41		38	10	59		.5		36	4	72	310	7.1
Sept. 26, 30	4,800	11		5.6	1.5	24		22	6.6	32		.5		20	2	72	156	7.1
Sept. 27-29	8,757	6.4		2.6	.9	14		10	5.6	18		.5		10	2	75	81.1	6.5
Weighted average	9,645	11		8.0	2.5	17		27	10	24		1.2		30	8	55	151	--

a Residue on evaporation at 180 $^{\circ}$ C.

NECHES RIVER BASIN

ANGELINA RIVER NEAR LUFFLIN, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 59, 400 feet upstream from Procella Creek, half a mile downstream from Little Loco Bayou, 1.5 miles upstream from Texas & New Orleans Railroad bridge, and 8 miles north of Lufflin, Angelina County.

RECORDS AVAILABLE--1,650 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1954 to September 1957.

Water temperatures: October 1954 to September 1957.

EXTREMES, 1936-57--Dissolved solids: Maximum, 365 ppm Jan. 11-20; minimum, 42 ppm Apr. 25-28, 30, May 1-2.

Specific conductance: Maximum, 64 ppm Oct. 21-31, Dec. 20-31; minimum, 15 ppm Apr. 23-28, 30, May 1-2.

Hardness: Maximum, 64 ppm Oct. 21-31, Dec. 20-31; minimum, 24 ppm Apr. 23-28, 30, May 1-2.

Water temperatures: Maximum observed, 89°F July 9; minimum observed, 41.8°F Jan. 18-19.

EXTREMES, 1934-57--Dissolved solids: Maximum, 812 ppm Nov. 4-18, 26-30, 1954; minimum, 42 ppm Apr. 25-28, 30, May 1-2, 1957.

Specific conductance: Maximum, 76 ppm Nov. 4-18, 26-30, 1954; minimum, 15 ppm Apr. 23-28, 30, May 1-2, 1957.

Hardness: Maximum observed, 89°F July 9, 1957; minimum observed, 40°F Jan. 24, 1953; Jan. 19-20, 24, 1956.

Water temperatures: Maximum observed, 89°F July 9, 1957; minimum observed, 40°F Jan. 24, 1953; Jan. 19-20, 24, 1956.

REMARKS--Values reported for dissolved solids are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-10, 1956	1.58	9.6	0.09	12	6.0	58		52	13	88		0.8		0.30	0.94	54	11	70	3.5	391	6.9	
Oct. 11-20	1.30	8.8	0.02	12	6.4	62		56	13	93				0.226	0.79	57	11	70	3.6	423	6.7	
Oct. 21-31	1.31	7.8	0.02	14	7.2	64		51	13	105				0.243	0.86	64	22	69	3.5	451	7.6	
Nov. 1-14	15.2	7.8	0.06	11	6.7	70		38	15	115				0.245	10.1	56	25	73	4.1	482	7.1	
Nov. 15-20	21.3	9.8	0.11	7.5	4.2	44		37	12	62				0.171	9.83	36	6	72	3.2	293	7.4	
Nov. 21-30	17.4	8.8	0.12	5.1	3.5	23		27	15	27				0.13	4.51	27	5	65	1.9	174	7.3	
Dec. 1-10	26.3	13	0.14	7.5	3.7	30		24	35	30				0.18	9.37	34	14	66	2.2	224	7.2	
Dec. 11-19	26.4	15	0.09	6.6	3.3	28		32	30	24				0.123	8.77	30	4	67	2.2	203	7.3	
Dec. 20-31	59.6	17	0.20	14	6.9	85		22	50	127				0.439	34.6	64	46	74	4.6	568	6.9	
Jan. 1-10, 1957	49.6	17	0.05	13	5.6	80		16	38	125				0.310	41.5	56	42	76	4.7	545	6.6	
Jan. 11-20	46.3	21	0.08	14	6.3	99		16	37	159				0.365	45.6	61	48	78	5.5	649	6.9	
Jan. 21-31	112	15	0.09	10	4.7	71		16	29	110				0.260	78.6	44	31	78	4.6	470	6.6	
Feb. 1-10	255	16	0.14	9.6	4.4	62		8	30	98				0.33	167	42	35	76	4.1	416	6.7	
Feb. 11-19	182	15	0.07	13	5.9	92		8	32	155				0.430	172	58	52	78	5.3	608	6.6	
Feb. 20-28	283	11	0.18	8.6	4.0	60		10	27	93				0.231	31	177	38	77	4.2	391	6.6	
Mar. 1-10	341	13	0.10	9.6	4.9	69		8	29	112				0.263	36	262	44	37	4.5	650	6.3	
Mar. 11-20	277	13	0.09	8.7	5.2	72		10	30	114				0.271	37	203	43	35	79	4.8	462	6.3
Mar. 21-31	615	12	0.18	6.9	4.6	55		10	26	86				0.196	27	325	36	28	77	4.0	362	6.3
Apr. 1-10	1,124	13	0.24	7.6	3.9	37		9	27	56				0.20	452	35	28	70	2.7	255	6.6	
Apr. 11-23	546	16	0.32	9.9	5.2	49		16	28	78				0.27	305	46	33	70	3.2	345	6.7	
Apr. 24, 29, May 3-9	13,040	13	0.34	5.8	2.8	15		22	12	19				0.11	2,780	26	8	55	1.2	117	6.7	
Apr. 25-28, 30, May 1-2	12,450	11	0.75	2.5	2.1	3.4	2.9	15	6.4	5.0				0.42	1,410	1.5	3	28	4.0	55.1	6.6	
May 10-20	3,740	15	0.51	8.0	3.9	13		32	10	19				0.87	12	879	36	10	44	1.0	144	6.6
May 21-31, June 1-3	832	14	0.73	8.9	4.1	17		34	13	23				1.00	14	225	39	11	48	1.2	164	6.9
June 4-10	3,149	13	0.78	5.2	2.5	7.5	2.6	18	10	12				0.64	544	23	8	38	0.7	93	6.4	
June 11-14, 16-20	4,376	14	0.67	7.0	3.1	13		26	10	19				0.81	1,111	30	9	49	1.1	128	6.5	
June 15, 21	3,140	15	0.96	8.3	3.7	30		32	11	44				1.30	1,100	36	10	64	2.2	233	7.0	
June 22-30, July 1	1,403	16	1.0	7.5	3.7	12		35	9.4	15				0.83	1,131	34	5	44	0.9	127	6.7	
July 2-10	4,35	18	1.1	9.9	4.3	21		42	14	27				1.18	139	42	8	52	1.4	187	6.7	
July 11-23	114	22	0.64	10	4.7	28		42	16	38				1.42	19	43.7	44	10	58	1.9	235	7.0
July 24-31	469	14	0.52	5.4	2.5	13		16	18	14				0.77	10	97.5	24	11	55	1.2	116	6.5
Aug. 1-10	249	16	0.44	7.1	3.2	19		21	22	22				1.01	14	67.9	31	14	57	1.5	161	7.0
Aug. 11-20	157	19	0.37	7.2	3.0	26		31	17	30				1.19	16	50.4	30	5	65	2.0	183	7.2
Aug. 21-31	63.7	18	0.40	8.0	3.0	29		40	12	35				1.26	17	21.7	32	0	66	2.2	202	7.2
Sept. 1-10	57.0	17	0.33	8.2	3.5	30		44	10	37				1.29	18	19.9	35	0	65	2.2	206	7.3
Sept. 11-20	89.2	14	0.38	5.4	3.5	22		34	14	22				1.5	24.1	28	2	61	1.8	159	7.4	
Sept. 21-30	114	13	0.45	5.0	3.0	17		28	14	17				0.84	11	25.9	25	2	60	1.5	135	7.2
Weighted average	1,089	13	0.54	6.0	3.1	17		22	12	23				88	0.12	259	28	10	57	1.4	138	--

a Residue on evaporation at 180°C.



NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado & Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Hill Creek, 15 miles upstream from Village Creek and at mile 55.  
DRAINAGE AREA.--7,908 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.  
Water temperatures: October 1947 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 222 ppm Oct. 21-31; minimum, 50 ppm May 3-15.  
Hardness: Maximum, 48 ppm Oct. 11-20, 21-31, Nov. 1-10, Aug. 1-10, 11-20; minimum, 14 ppm May 3-15.  
Specific conductance: Maximum observed, 422 microhos Jan. 25; minimum observed, 67.1 microhos Mar. 19.  
Water temperatures: Maximum observed, 93°F July 29-31; minimum observed, 40°F Jan. 18.  
EXTREMES, 1947-57.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 36 ppm May 5-12, 26-27, 1953.  
Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 14 ppm May 3-15, 1957.  
Specific conductance: Maximum observed, 422 microhos Jan. 25, 1957; minimum observed, 49.3 microhos May 9, 1953.  
Water temperatures: Maximum observed, 94°F June 29, 1953; minimum observed, 37°F Jan. 30-31, 1948, Jan. 31, 1949.  
REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-10, 1956-----	170	22		11	6.2	31		76	14	55	0.4	1.0		196	0.27	90.0	46	0	71	3.2	327	7.2
Oct. 11-20-----	194	22		13	3.9	50		84	12	52	.5	1.5		196	.27	103	48	0	70	3.2	325	7.3
Oct. 21-31-----	169	22		13	3.6	61		99	10	61	.5	1.8		222	.30	101	48	0	73	3.8	369	7.2
Nov. 1-10-----	131	24		13	3.5	50		94	9.8	48	.4	1.8		196	.27	69.3	48	0	69	3.1	326	7.9
Nov. 11-20-----	125	24		13	3.2	37		79	8.6	36	.4	1.2		162	.22	54.7	45	0	64	2.4	258	7.9
Nov. 21-30-----	72.3	24		13	3.0	29		67	9.0	29	.4	1.0		141	.19	27.5	44	0	59	1.9	224	7.7
Dec. 1-10-----	90.7	22		13	3.1	25		56	10	28	.2	1.2		130	.18	31.8	44	0	55	1.6	206	7.5
Dec. 11-20-----	91.6	21		13	3.0	24		58	11	26	.2	.5		128	.17	31.7	44	0	54	1.6	201	7.2
Dec. 21-31-----	239	18		11	2.4	24		33	17	28	.2	.5		115	.16	74.2	32	5	62	1.9	181	6.7
Jan. 1-12, 1957-----	115	20		11	2.7	21		37	14	27	.5	.8		115	.16	35.7	39	8	54	1.5	180	7.0
Jan. 13-20-----	131	21		12	3.3	47		62	15	55	.5	.8		185	.25	65.4	44	0	70	3.1	317	7.2
Jan. 21-31-----	228	19		12	2.9	61		62	18	72	.6	.5		216	.29	133	41	0	76	4.1	374	7.3
Feb. 1-11-----	189	18		12	2.6	51		45	17	67	.6	.8		191	.26	97.5	40	3	74	3.5	332	7.2
Feb. 12-22-----	140	22		13	2.5	40		44	14	55	.4	.8		170	.23	64.3	42	6	68	2.7	280	6.9
Feb. 23-28-----	1,237	15		10	2.5	47		44	25	52	.6	.5		175	.24	584	36	0	74	3.4	294	7.2
Mar. 1-9-----	1,833	38		8.7	2.5	39		31	26	43	.8	1.0		174	.24	861	32	6	72	3.0	258	6.8
Mar. 10-17-----	2,855	14		7.4	2.4	30		19	23	36	.8	1.8		124	.17	956	28	13	70	2.5	207	6.9
Mar. 18-21-----	4,865	8.2		4.0	1.5	14		12	13	15	.8	.8		63	.09	824	16	6	66	1.6	98.8	6.4
Mar. 22-31-----	5,943	12		7.4	2.4	26		19	19	34	.8	.5		111	.15	1,780	28	13	67	2.2	183	6.5
Apr. 1-10-----	7,069	13		7.6	2.2	18		15	19	24	.4	.5		92	.13	1,760	28	16	59	1.5	157	5.9
Apr. 11-20-----	4,430	13		7.2	2.4	18		15	19	24	.4	.8		92	.13	1,000	28	16	59	1.5	157	5.9
Apr. 21-30-----	5,544	14		8.6	2.8	24		16	24	32	.6	1.2		115	.16	1,720	33	20	61	1.8	196	5.7
May 1-2, 16-20-----	30,870	12		4.8	2.4	16		16	13	18	.7	3.8		79	.11	6,580	22	9	61	1.5	124	6.2
May 3-15-----	43,430	10		3.0	1.6	6.7	3.3	10	9.2	9.0	.7	1.2		50	.07	5,860	14	6	45	.8	75.9	6.1
May 21-31-----	15,340	14		8.6	3.3	13		34	10	16	.6	1.0		84	.11	3,480	35	7	45	1.0	140	6.9
June 1-10-----	6,217	14		11	4.0	15		42	11	20	.5	1.2		98	.13	1,650	44	10	42	1.0	168	6.7
June 11-22-----	8,133	14		9.0	3.4	15		31	13	19	.5	1.2		90	.12	1,980	36	11	47	1.1	151	6.5
June 23-30-----	14,550	9.6		6.6	2.6	10		22	9.6	14	.5	.8		65	.09	2,550	27	9	45	.9	113	6.5
July 1-10-----	6,182	16		9.2	3.3	13		38	8.4	16	.5	.8		86	.12	1,440	36	6	43	.9	136	6.6
July 11-25, 30-31-----	1,091	18		12	3.9	16		48	11	19	.5	.8		105	.14	309	46	6	42	1.0	167	7.0
July 23-29-----	1,060	14		8.8	3.1	12		33	11	14	.5	.5		80	.11	229	34	8	42	.9	132	6.7
Aug. 1-10-----	1,294	19		12	4.5	20		54	11	24	.4	1.0		119	.16	416	48	4	47	1.2	183	7.4
Aug. 11-20-----	744	18		12	4.4	20		54	13	23	.4	.5		118	.16	237	48	4	48	1.3	194	7.3
Aug. 21-31-----	1,032	14		10	4.7	25		52	14	28	.4	.5		123	.17	343	44	2	55	1.6	206	7.2
Sept. 1-10-----	662	16		11	4.0	25		53	13	28	.4	.5		124	.17	222	44	0	55	1.6	204	7.5
Sept. 11-25-----	540	17		11	3.9	25		54	12	28	.4	.2		124	.17	181	44	0	55	1.6	203	7.4
Sept. 26-30-----	1,464	11		6.8	2.7	19		30	11	22	.4	.5		88	.12	348	28	4	59	1.5	138	6.9
Weighted average-----	4,607	12		6.2	2.5	15		21	12	17	0.6	1.4		78	0.11	970	26	9	56	1.3	127	--



TRINITY RIVER BASIN  
TRINITY RIVER NEAR ROSSER, TEX.

LOCATION:--At gaging station at bridge on State Highway 34, 2.5 miles south of Rosser, Kaufman County, 8.5 miles downstream from East Fork and at mile 451.

DRAINAGE AREA--8,162 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1954 to September 1957.

Water temperature: October 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,730 ppm Oct. 1-10; minimum, 190 ppm June 21-30.

Hardness: Maximum, 310 ppm Oct. 11-20; minimum, 119 ppm June 21-30.

Specific conductance: Maximum observed, 2,990 microhos Oct. 13; minimum observed, 41 $\mu$  Jan. 18.

Water temperatures: Maximum observed, 84 $^{\circ}$ F July 27; minimum observed, 41 $^{\circ}$ F Jan. 18.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 1,800 ppm Aug. 21-31, 1956; minimum, 190 ppm June 21-30, 1957.

Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 119 ppm June 21-30, 1957.

Specific conductance: Maximum observed, 2,990 microhos Oct. 13, 1956; minimum observed, 279 microhos Apr. 27, 1957.

Water temperatures: Maximum observed, 97 $^{\circ}$ F July 1, 1955; minimum observed, 34 $^{\circ}$ F Jan. 20, 1956.

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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25 $^{\circ}$ C)	pH
														Calcium magnesium	Non-carbonate				
Oct. 1-10, 1956	118	28	94	94	18	496	213	353	555	78	1,730	2.35	531	308	134	78	12	2,740	8.0
Oct. 11-20	181	24	93	93	19	485	223	329	548	84	1,690	2.30	826	310	128	77	12	2,730	7.8
Oct. 21-31	127	18	82	82	15	362	174	332	362	67	1,320	1.80	453	266	124	75	9.7	2,150	7.1
Nov. 1-3	380	21	86	86	16	396	208	279	430	80	1,400	1.90	1,440	270	101	76	10	2,340	7.4
Nov. 4, 6	637	9.6	52	52	4.6	86	81	81	81	8.7	4,000	.34	668	148	14	56	3.1	698	7.6
Nov. 7-17	207	15	75	75	10	262	150	251	262	52	1,000	1.36	539	227	104	71	7.6	1,650	7.8
Nov. 18-30	131	22	73	73	13	390	272	328	328	71	1,360	1.85	481	236	13	78	11	2,190	7.1
Dec. 1-10	134	27	67	67	13	375	206	324	318	100	1,320	1.80	478	220	51	79	11	2,120	7.2
Dec. 11-20	176	28	69	69	13	391	191	344	338	104	1,380	1.88	626	226	70	79	11	2,230	7.7
Dec. 21-31	273	14	64	64	7.9	209	140	226	175	62	1,140	1.53	626	193	78	70	6.5	1,350	7.2
Jan. 1-10, 1957	157	22	69	69	12	297	18	192	286	81	1,140	1.55	483	222	64	71	8.7	1,860	7.0
Jan. 11-20	148	20	66	66	12	315	18	192	288	94	1,190	1.62	476	214	56	74	9.3	1,990	7.2
Jan. 21-31	170	20	66	66	12	322	19	184	299	99	1,210	1.65	555	214	63	75	9.6	2,030	7.1
Feb. 1-10	348	16	69	69	7.5	218	152	224	185	74	925	1.26	869	204	80	70	6.6	1,430	7.1
Feb. 11-19	176	16	65	65	8.0	214	183	204	175	64	863	1.17	410	195	45	70	6.7	1,390	6.9
Feb. 20-28	199	18	67	67	8.0	294	289	241	200	84	1,030	1.43	584	199	0	76	9.1	1,660	7.1
Mar. 1-10	186	24	68	68	8.2	258	179	242	212	82	992	1.35	498	202	56	74	7.9	1,360	7.3
Mar. 11-19, 21	375	18	63	63	8.0	252	194	215	214	67	973	1.32	985	190	31	74	8.0	1,340	7.3
Mar. 20, 22-24	860	14	53	53	4.0	112	146	114	90	33	506	.69	1,170	148	28	62	4.0	821	7.3
Mar. 25-31	338	15	68	68	6.1	162	160	160	146	49	711	.97	649	194	60	84	5.0	1,160	7.1
Apr. 1-11, 21	2,363	12	65	65	3.9	50	153	77	49	16	366	.50	2,340	178	52	38	1.6	587	7.5
Apr. 12-20	342	17	89	89	5.9	152	196	176	139	46	745	1.01	688	246	86	37	4.2	1,170	7.1
Apr. 22-30	26,870	11	46	46	2.6	19	125	37	14	7.1	210	.29	15,240	126	23	24	.7	390	7.3
May 1-10	20,920	11	51	51	3.2	25	140	35	27	6.3	241	.33	13,610	141	26	27	.9	368	7.3
* May 11-20	22,380	9.8	49	49	3.2	24	137	33	27	3.8	222	.30	13,410	135	23	25	.8	358	7.3
May 21-31	34,950	8.4	46	46	3.0	20	133	25	22	3.2	203	.28	19,160	126	17	23	.8	336	7.3
June 1-10	35,310	13	46	46	3.3	15	136	24	16	3.0	196	.27	18,790	128	17	21	.6	319	7.6
June 11-20	14,640	12	45	45	3.7	21	135	24	16	3.5	216	.29	8,140	118	17	24	.6	348	7.5
June 21-30	10,020	11	42	42	3.4	21	130	21	24	3.5	4190	.26	3,140	110	12	28	.8	333	7.7
July 1-10	8,808	16	46	46	3.6	20	140	22	24	2.5	214	.29	5,090	130	15	28	.8	350	7.6
July 11-20	6,132	14	43	43	3.3	21	130	22	23	2.5	209	.28	3,460	121	14	29	.8	344	7.7
July 21-31	6,216	14	43	43	3.5	21	132	22	24	3.0	202	.27	3,390	122	14	27	.8	344	7.6
Aug. 1-10	5,916	14	45	45	3.7	21	139	23	23	3.5	218	.30	3,480	128	16	26	.8	351	8.1
Aug. 11-20	6,157	13	45	45	3.5	24	142	23	23	3.5	218	.30	3,620	127	10	29	.8	353	8.1
Aug. 21-31	2,455	9.2	46	46	4.0	25	150	25	21	4.0	220	.30	1,660	127	4	59	1.0	367	7.8
Sept. 1-10	922	14	52	52	4.3	61	170	37	41	1.5	368	.50	1,016	127	8	48	2.2	582	8.2
Sept. 11-20	506	14	51	51	4.4	81	172	65	69	2.0	4389	.53	531	145	4	55	2.2	670	8.2
Sept. 21-30	593	12	51	51	4.4	89	159	89	70	2.0	452	.61	724	145	14	57	3.2	701	7.8
Weighted average	5,805	12	47	47	3.4	26	136	33	27	5.6	231	0.31	3,620	131	20	30	1.0	378	--

\* Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
CEDAR CREEK NEAR MABANK, TEX.

LOCATION--At gaging station at bridge on State Farm Highway 85, 2 miles downstream from Lacy's Fork and 3/4 miles southwest of Mabank, Kaufman County.  
DRAINAGE AREA--734 square miles.  
RECORDS AVAILABLE--Chemical analyses: April 1956 to September 1957.  
Water temperatures: April 1956 to September 1957.  
EXTREMES 1956-57--Dissolved solids: Maximum, 471 ppm Jan. 14-21; minimum, 31 ppm Feb. 24-25, Apr. 20, 23-28.  
Hardness: Maximum, 172 ppm June 28-30, July 1, 23-25; minimum, 17 ppm Feb. 24-25.  
Specific conductance: Maximum observed, 894 micromhos Jan. 17; minimum observed, 50.7 micromhos Apr. 20.  
Water temperatures: Maximum observed, 79°F June 27, Aug. 19, 21-22; minimum observed, 44°F Jan. 27-28.  
EXTREMES April 1956-September 1957--Dissolved solids: Maximum, 471 ppm Jan. 14-21, 1957; minimum, 31 ppm Feb. 24-25, 1957.  
Hardness: Maximum, 172 ppm June 28-30, July 1, 23-25, 1957; minimum, 17 ppm Feb. 24-25, 1957.  
Specific conductance: Maximum observed, 894 micromhos Jan. 17, 1957; minimum observed, 50.7 micromhos Apr. 20, 1957.  
Water temperatures: Maximum observed, 83°F on several days during May and June 1956; minimum observed, 44°F Jan. 27-28, 1957.  
REMARKS--Values reported for dissolved solids are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.  
Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
																						Per cent	Calcium magnesium
Nov. 4-17, 1956	851	8.4	--	13	2.6	1.5		43	19	11	0.6	2.9		94	0.13	140	42	7	44	1.0	150	7.4	
Nov. 18-30, Dec. 1-15	22	10.4	--	18	3.4	2.0		63	26	16	7.7	1.5		127	0.17	117	60	8	42	1.1	207	7.5	
Dec. 16-31	65.9	6.0	--	22	3.3	8.2		25	15	7.8	--	1.0		60	0.08	30	30	10	37	7.7	103	7.2	
Dec. 22-31	23.8	10.0	--	6.6	4.4	5.6		83	44	55	7.0	2.2		235	0.32	15.1	73	5	62	2.8	405	7.4	
Jan. 1-5, 1957	10.9	9.6	--	18	3.7	31		72	27	4.0	7.1	1.0		153	0.21	4.50	61	2	52	1.7	268	7.3	
Jan. 6-13	50.7	7.4	--	20	4.6	108		55	29	160	7.1	1.8		358	0.49	49.0	69	24	77	5.7	675	6.9	
Jan. 14-21	1.30	9.6	--	26	7.1	142		65	23	230	5.5	1.2		471	0.64	1.65	95	42	77	6.4	891	7.2	
Jan. 22-24, 30-31	1.295	8.2	--	8.7	1.6	7.2	4.1	34	11	5.2	5	2.0		66	0.09	231	28	10	32	6	101	6.8	
Feb. 1-4	72.4	8.4	--	18	2.8			56	30	10	1.6	3.8		120	0.16	23.5	56	10	42	1.1	198	7.1	
Jan. 25-29	66.8	10	--	17	3.6	22		63	22	19	5	2.2		127	0.17	22.9	57	5	45	1.3	214	7.4	
Feb. 5-9	6.90	12	--	23	5.5	30		78	33	31	5	1.2		175	0.24	3.26	80	15	45	1.5	304	7.2	
Feb. 10-18	8.90	14	--	23	8.1	43		66	37	63	6.1	1.2		222	0.30	5.33	91	37	51	1.9	406	7.7	
Feb. 19-23	72.1	5.8	--	3.3	2.1	8.4	3.4	18	7.8	8.2	8	2.0		51	0.07	9.93	17	2	46	5.0	79.1	6.7	
Feb. 24-25	110	7.8	--	11	2.8			45	14	15	6	2.5		94	0.13	27.9	38	1	50	1.2	161	7.4	
Feb. 26-28, Mar. 1-2	7.72	13	--	20	5.6	39		66	30	49	6	2.8		192	0.26	4.00	74	20	53	2.0	350	7.5	
Mar. 3-7	3.92	8.8	--	32	9.4	52		87	64	65	5	1.0		276	0.38	2.92	118	47	41	8	494	7.6	
Mar. 8-16	1.713	8.8	--	9.1	3.0	22		35	13	10	6	1.5		74	0.10	342	35	6	41	8	125	6.9	
Mar. 17, 21-22, 24	2.340	9.6	--	11	3.4	22		41	19	22	6	2.2		110	0.15	695	41	7	53	1.5	188	7.4	
Mar. 18-20, 23	3.36	12	0.44	20	3.3	20		66	22	18	8	3.5		132	0.18	127	64	10	40	1.1	221	7.5	
Mar. 25-31, Apr. 1-2	4.100	9.0	0.58	9.1	2.5	11		34	8.6	11	7	2.5		72	0.10	797	33	5	41	8	117	7.2	
Apr. 3-7	64.1	17	1.18	26	6.9	35		78	43	41	4	2.5		210	0.29	36.3	94	30	45	1.6	362	7.2	
Apr. 8-19	17.590	8.2	--	22	6.5	6.0	4.8	29	4.0	5.0	5	2.2		51	0.07	2.420	24	0	21	3	83.7	6.4	
Apr. 20, 23-28	12.920	11	1.18	11	3.0	6.0	5.0	50	5.2	7.5	5	3.2		78	0.11	2.720	41	0	22	4	130	6.7	
Apr. 21-22, 29-30	4.364	12	1.23	17	3.0	11		67	8.2	8.5	5	3.0		96	0.13	1.130	55	0	31	3	162	7.0	
May 1-5, 23	4.455	11	1.40	23	4.6	11		79	24	36	5	2.5		174	0.24	214	24	11	47	1.6	300	7.1	
May 6-12	2.392	11	1.36	16	3.5	19		58	17	18	5	3.2		118	0.16	762	54	6	43	1.1	196	6.6	
May 13-20	3.344	6.4	0.57	10	2.3	7.4	5.2	35	10	9.8	5	3.2		72	0.10	650	35	6	28	5	119	6.6	
May 21-24, 26-29	2.383	11	0.56	26	3.7	18		86	21	16	4	3.5		142	0.19	914	80	10	33	9	240	6.9	
May 25, 30-31	1.019	7.8	0.47	24	2.9	13		81	14	11	7	2.5		116	0.16	319	71	5	29	7	202	7.4	
June 1-3	2.500	8.6	0.36	11	3.2	13		40	12	14	8	1.5		84	0.11	567	41	8	41	9	143	7.1	
June 4-7	120	13	1.28	28	5.1	25		88	28	28	7	2.0		175	0.24	56.7	91	19	37	1.1	300	7.5	
June 8-10, 12-13	26.2	16	1.18	36	8.7	42		97	54	56	6	1.2		263	0.36	18.6	126	46	42	1.6	462	7.6	
June 11, 14-16	3.45	17	0.84	46	13	58		112	79	84	5	1.5		354	0.48	3.30	168	76	43	1.9	617	7.8	
June 17-24	8.33	12	0.52	18	3.9	24		67	21	24	5	2.0		138	0.19	3.10	61	6	46	1.3	238	7.2	
June 25-27	3.63	20	0.44	49	12	61		143	69	79	5	2.2		6386	0.52	3.78	172	55	43	2.0	622	7.9	
June 28-30, July 1	40.0	14	0.38	19	4.5	26		70	25	26	6	2.0		151	0.21	16.3	66	9	47	1.4	251	7.7	
Aug. 9-13	16	10	0.61	30	6.4	32		95	46	19	7	1.8		6223	0.70	--	101	23	40	1.4	346	7.8	
Aug. 15-22	612	9.2	0.57	16	2.8	24		36	23	22	6	2.5		96	0.13	1.95	38	2	51	1.3	154	7.2	
Sept. 22-26	5.65	9.6	0.57	16	2.8	24		36	23	22	6	1.8		128	0.17	1.95	51	6	51	1.5	211	7.1	
Sept. 27-30	911	9.2	--	11	2.5	12		42	8.7	9.4	5	2.6		76	0.10	187	38	3	41	0.8	127	--	
WEIGHTED AVERAGE																							

a No flow Oct. 1-31, Nov. 1-3, Dec. 16-18, July 2-22, 26-31, Aug. 1-9, 14-31, Sept. 1-21, 30.

b Residue at 180°C.

c Includes days of less than 0.05 second-foot flow.

TRINITY RIVER BASIN--Continued  
 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 1957.

WATER TEMPERATURES: April 1956 to September 1957.

EXTRIMES 1956-57 --Dissolved solids: Maximum, 12,200 ppm Oct. 11-17; minimum, 131 ppm Apr. 21-30.

Hardness: Maximum, 660 ppm Oct. 18; minimum, 79 ppm Nov. 5-8.

Specific conductance: Maximum observed, 20,000 microhos Oct. 10-11; minimum observed, 157 microhos Apr. 25.

Water temperatures: Maximum observed, 98°F Aug. 3; minimum observed, 40°F Jan. 19.

EXTRIMES April 1956-57 --Dissolved solids: Maximum, 13,500 ppm Aug. 11-31, 1956; minimum, 131 ppm Apr. 21-30, 1957.

Hardness: Maximum, 660 ppm Oct. 18, 1956; minimum, 79 ppm Nov. 5-8, 1956.

Specific conductance: Maximum observed, 22,000 microhos Aug. 22, 1956; minimum observed, 157 microhos Apr. 25, 1957.

Water temperatures: Maximum observed, 98°F Aug. 3, 1957; minimum observed, 40°F Jan. 19, 1957.

REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
Oct. 1-10, 1956								502	40		6,730				292			292				18,800	8.5
Oct. 11-17								533	41		7,110				12,200			296				19,500	8.6
Oct. 18								424	29		3,700						460					11,100	8.6
Oct. 19-20		8.4		40	4.1	393		135	0	63	560	0.8	3.0	1,140			116					2,080	7.8
Oct. 21-26		9.6		44	6.6	831		159	0	58	1,240		1.5	2,270			136					4,160	8.2
Oct. 27-31, Nov. 1-4		6.0		52	17	2,420		320	15	39	3,640	.6		6,350			200					10,900	8.5
Nov. 5-8		7.8		27	3.0	43		103	0	24	43	.6	1.5	222			79					358	7.9
Nov. 9-12		9.4		55	4.4	167		142	0	31	260	.5	1.5	635			154					1,120	8.0
Nov. 13-20		9.6		76	8.6	480		172	0	38	770	.5	1.5	1,470			225					8.0	8.0
Nov. 21-25		13		116	19	1,390		322	0	41	2,180	.8		3,920			368					6,890	8.2
Nov. 26-30, Dec. 1-10		6.6		91	27	2,530		395	0	45	3,870	.8		6,760			338					11,500	7.8
Dec. 11-19								513	10		5,130						419					14,900	8.3
Dec. 20-21								191	0		800						138					2,770	7.7
Dec. 22								151	0		64						128					545	7.9
Dec. 23-31		9.4		54	5.3	229		138	0	83	318	.8	3.8	787			156					1,420	7.7
Jan. 1-5, 1957		8.0		70	9.9	761		220	0	59	1,150	.7	4.1	2,170			215					3,910	8.1
Jan. 6-12		4.3		75	18	1,740		339	10	51	2,620	.7		4,690			261					8,230	8.4
Jan. 13-22		2.9		110	22	2,760		472	17	58	4,170	.9		7,370			365					12,600	8.4
Jan. 23		9.6		30	2.8	165		122	0	28	222	.8	2.5	852			87					988	7.9
Jan. 24-25		12		53	5.7	439		162	0	38	660	.8	6.7	1,300			156					2,430	7.8
Jan. 26-31		12		66	11	1,070		246	0	32	1,630	.8	4.0	2,950			210					5,370	8.1
Feb. 1, 10-13		14		70	7.6	389		208	0	54	580	.6	6.0	1,220			206					2,200	8.2
Feb. 2-5		12		35	2.7	30		118	0	28	23	.7	4.4	208			99					323	7.8
Feb. 6-9		15		54	4.9	126		172	0	43	168	.7	3.7	511			154					511	8.0
Feb. 14-20		6.2		76	14	1,040		221	0	66	1,600	.6	1.4	2,910			248					5,180	7.7
Feb. 21-22		2.4		70	21	1,850		314	0	52	2,820	.5		4,970			261					8,880	7.6
Feb. 23-28, Mar. 1-3		15		94	22	1,890		344	9	68	2,880	.6		5,150			324					8,990	8.3
Mar. 4-11		9.0		48	5.7	282		152	0	44	412	.5	3.8	882			143					1,640	7.9
Mar. 12-19		8.6		57	9.0	733		227	0	31	1,100	.5	2.7	2,050			180					3,750	8.0
Mar. 20, 26, 30-31		10	0.06	40	3.4	83		140	0	27	106	.6	1.8	362			114					634	7.6
Mar. 21-25, 27-29		11	.11	38	2.6	24		119	0	27	20	.6	3.2	200			106					354	7.5

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
 RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued  
 Chemical analyses, in parts per million, October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb. (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Apr. 1-7, 1957-----		13	.06	42	3.0	47	131	0	33	51	0.8	4.0	269	0.37	117	10	46	1.9	435	7.8		
Apr. 8-10, 20-----		14	.05	57	4.2	92	173	0	42	120	.8	2.5	430	.58	160	18	56	3.2	731	7.8		
Apr. 11-15, -----		15	.03	81	9.0	348	221	7	63	518	.8	4.7	1,160	1.58	239	58	76	9.8	2,050	8.5		
Apr. 16-19, -----		14	.02	98	11	691	289	0	66	1,050	.8	5.5	2,080	2.83	290	52	84	18	3,730	8.1		
Apr. 21-30, -----	9.6		.27	29	2.5	14	99	0	14	10	.8	2.0	1,131	.18	83	2	27	.7	217	7.9		
May 1-7, -----		14	.04	44	3.7	16	138	0	25	12	.5	3.2	202	.27	125	12	22	.6	313	7.2		
May 8-12, -----		14	.01	76	4.5	46	200	0	50	58	.5	9.9	376	.51	208	44	32	1.4	608	7.7		
May 13-15, -----		12	.03	45	3.4	23	130	0	33	23	.5	3.8	226	.31	127	20	29	.9	366	7.8		
May 16-17, 24-27, -----		12	.02	42	2.4	17	119	0	29	13	.5	3.8	188	.26	114	16	24	.7	299	7.6		
May 18-23, -----		15	.02	86	5.0	55	210	0	70	70	.4	12	444	.60	235	63	34	1.6	705	7.8		
May 28-31, -----		14	.02	60	3.0	28	160	0	39	32	.4	6.2	281	.38	162	31	27	1.0	446	7.6		
June 1-8, -----		11	.05	46	3.2	22	126	0	36	22	.7	3.8	225	.31	128	25	28	.9	354	7.3		
June 9-13, -----		15	.02	72	4.9	63	186	0	56	84	.7	7.2	403	.55	200	47	41	2.0	681	7.8		
June 14-28, -----		16	.02	78	6.0	170	208	0	67	245	.7	9.7	704	.96	219	54	63	5.0	1,230	7.7		
June 29-30, July 1-9, -----		16	.00	73	7.6	325	192	0	90	468	.5	7.8	1,080	1.47	214	56	77	9.6	1,940	8.0		
July 10-20, -----		12	.04	85	11	715	247	0	79	1,080	.7	2.5	2,110	2.87	257	54	86	19	3,800	7.9		
July 21-29, -----		15	.01	72	15	1,190	259	0	72	1,800	.6	2.0	3,290	4.47	241	28	91	33	5,930	8.2		
July 30-31, -----		11	.01	54	8.3	610	266	0	70	850	.7	2.5	1,740	2.37	168	0	89	20	3,130	8.2		
Aug. 1-6, 12-13, -----		10	.02	60	11	1,120	291	0	53	1,660	.8	2.0	3,060	4.16	194	0	93	35	5,530	8.1		
Aug. 7-11, -----		7.4	.05	43	7.6	574	173	2	34	852	.7	2.0	1,610	2.19	139	0	90	21	2,960	8.3		
Aug. 14-19, 25, -----		5.6	.03	81	14	1,120	282	7	46	1,700	.8	1.5	3,100	4.22	260	17	90	30	5,630	8.4		
Aug. 20-27, 26-31, -----																						
Sept. 1-2, -----																						
Sept. 3-10, -----	5.6		.02	96	22	2,160	379	13	46	3,300	.7	--	5,830	7.93	330	0	93	52	10,000	8.4		
Sept. 11-22, -----	5.2		.02	74	27	2,980	415	14	29	4,540	--	--	7,880	10.7	296	0	96	76	13,100	8.4		
Sept. 23-28, -----		11	.14	38	4.0	338	172	2	35	4,670	.8	2.0	986	1.34	112	0	87	14	1,840	8.3		
Sept. 29-30, -----		10	.14	30	2.5	118	128	0	24	148	.5	3.5	440	.60	86	0	75	5.6	739	8.2		
Sept. 29-30, -----	13		.11	41	4.3	322	188	0	39	440	.7	2.5	975	1.33	119	0	85	13	1,770	8.1		

\* Sum of determined constituents.

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

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado & Santa Fe Railway bridge and at mile 94.

DRAINAGE AREA.--17,192 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1957.

Water temperatures: February 1950 to September 1951, April 1953 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,730 ppm Oct. 21-31; minimum, 105 ppm Apr. 18-19, 26-27, 29-30.

Hardness: Maximum, 258 ppm Oct. 21-31; minimum, 49 ppm Apr. 18-19, 26-27, 29-30.

Specific conductance: Maximum observed, 3,800 microhos Oct. 30; minimum observed, 125 microhos Apr. 27.

Water temperatures: Maximum observed, 90°F July 12, 17, 20-21; minimum observed, 48°F Nov. 28, Jan. 18.

EXTREMES, 1945-50, 1953-57.--Dissolved solids: Maximum, 1,900 ppm Nov. 7, 1953; minimum, 82 ppm July 31, 1954.

Hardness: Maximum, 258 ppm Oct. 21-31, 1956; minimum, 32 ppm Nov. 1-3, 1953.

Specific conductance: Maximum observed, 3,800 microhos Oct. 30, 1956; minimum observed, 103 microhos Nov. 9, 1946.

Water temperatures: Maximum observed, 98°F July 18, 27, 1953; minimum observed, 38°F Jan. 18, 1956.

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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Iron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-10, 1956-----	158	17		65	9.7	374	92	195	104	528		1.0		1,190	1.62	508	202	42	80	11	2,080	8.1
Oct. 11-20-----	155	18		83	12	493	93	246	167	675		1.2		1,570	2.14	657	256	55	81	13	2,680	8.1
Oct. 21-31-----	224	18		82	13	554	106	248	165	770		1.2		1,730	2.35	1,050	258	55	82	15	2,930	8.0
Nov. 1-8-----	371	13		70	13	519	88	206	192	700		1.8		1,610	2.19	1,610	228	59	83	15	2,850	8.2
Nov. 9-19-----	2,911	8.8		36	3.4	88	118	118	46	106		2.5		356	4.48	2,800	105	8	65	3.7	641	7.8
Nov. 20-30-----	372	12		40	3.5	86	113	50	50	109		2.5		360	4.9	362	114	22	62	3.5	645	7.6
Dec. 1-13-----	270	12		36	4.1	93	93	92	50	129		5		390	5.3	284	107	32	65	3.9	671	7.5
Dec. 14-17, 22-28-----	608	12		54	6.0	193	165	63	63	278		1.2		733	1.00	1,200	159	40	72	6.6	1,250	7.8
Dec. 18-21, 29-31-----	652	13		79	11	453	189	194	194	610		1.2		1,460	2.00	2,570	241	86	37	13	2,590	8.2
Jan. 1, 1957-----	677	24		--	--	--	50	51	202	412		1.4		--	--	--	88	47	77	6.2	864	7.5
Jan. 2, 6, 8-10, 12-17-----	384	22		62	7.7	322	169	168	148	612		1.6		1,070	1.46	1,110	186	48	79	10	1,900	7.9
Jan. 18-31-----	424	18		76	12	538	220	220	172	730		1.8		1,670	2.27	1,910	234	54	83	15	2,960	8.1
Jan. 18-31-----	602	18		62	10	252	173	146	119	308		1.9		941	1.28	1,530	196	54	74	7.8	1,600	7.8
Feb. 1-2, 6-7-----	3,168	20		67	10	322	151	151	119	458		1.8		1,090	1.48	9,320	209	86	77	9.6	1,940	7.7
Feb. 3-5, 8-9-----	3,604	15		40	4.1	115	131	58	58	136		1.0		484	6.6	4,450	118	10	68	4.6	781	7.8
Feb. 10-19-----	1,904	15		37	3.8	66	66	42	42	82		5.6		a303	4.1	1,560	107	20	57	2.8	529	7.8
Feb. 20-28-----	1,348	14		38	4.4	83	97	50	50	111		5.5		a354	4.8	1,290	112	32	62	3.4	622	7.6
Mar. 1-19, 22-23, 27-28-----	1,301	17		40	4.9	123	94	63	63	169		7.1		496	6.7	1,740	119	42	69	4.9	834	7.7
Mar. 20-21, 24-26-----	4,190	16		27	2.6	59	79	35	35	72		4.7		a255	3.5	2,880	79	14	62	2.9	438	7.7
Mar. 29-31-----	5,660	16		31	3.6	114	81	51	51	153		6.6		a415	5.6	6,340	93	36	73	5.1	739	7.3
Apr. 1-6-----	10,750	13		26	2.0	34	34	29	29	31		2.2		a180	2.4	5,220	74	3	50	1.7	294	7.6
Apr. 7-17-----	7,462	15		30	2.5	39	82	25	25	52		4.5		a208	2.8	4,190	86	19	49	1.8	353	7.4
Apr. 18-19, 26-27, 29-30-----	8,125	22		41	3.7	42	118	38	38	49		5.0		260	3.5	5,700	117	20	44	1.7	432	7.6
Apr. 20-23, 25, 28-----	3,357	11		17	1.6	16	16	54	13	18		1.5		a105	1.4	952	49	4	42	1.0	164	7.3
Apr. 24-----	13,640	14		32	2.2	29	79	24	24	42		2.0		a184	2.5	6,780	88	24	41	1.3	312	7.4
May 1-10-----	8,340	15		29	2.6	17	106	49	49	124		4.0		a377	5.1	8,490	146	59	54	2.8	671	8.0
May 11-20-----	73,990	15		29	3.2	19	98	18	18	15		1.8		a146	2.0	29,130	84	4	31	.8	247	7.3
May 21-31-----	40,330	16		41	3.2	25	126	24	24	18		1.8		a184	2.5	36,740	115	12	26	.8	312	7.5
				47	3.7	25	144	27	27	27		1.8		234	3.2	25,480	132	14	29	.9	371	7.4

a Sum of determined constituents.

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

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
June 1-9, 1957-----	40,970	29		26	1.7	19		77	21	19		1.2		164	0.22	18,140	72	9	36	1.0	240	7.4
June 10-20-----	54,970	20		33	2.5	20		96	23	23		1.5		178	.24	26,420	93	14	32	.9	279	7.4
June 21-30-----	38,010	19		29	2.3	27		87	23	31		1.0		180	.24	18,470	82	10	41	1.3	284	7.6
July 1-10-----	13,050	45		27	.7	36		890	22	36		.5		234	.32	8,240	70	0	53	1.9	304	8.9
July 11-20-----	9,376	30		34	1.7	35		105	25	39		1.0		237	.32	6,000	92	6	45	1.6	345	8.7
July 21-31-----	7,111	33		27	.5	40		85	25	42		1.0		233	.32	4,470	70	0	55	2.1	330	9.1
Aug. 1-10-----	7,210	43		29	1.4	42		697	23	46		1.2		234	.32	4,560	78	0	54	2.1	353	8.9
Aug. 11-20-----	18,650	26		25	1.4	27		82	15	31		1.0		180	.24	9,060	68	1	46	1.4	267	8.2
Aug. 21-31-----	5,061	16		42	4.3	39		138	27	46		2.0		4244	.33	3,330	122	10	41	1.3	424	7.9
Sept. 1-10-----	2,513	15		39	4.1	43		134	26	50		1.2		250	.34	1,700	114	4	45	1.8	417	8.0
Sept. 11-18, 21-22-----	1,286	13		36	3.9	59		121	27	76		.2		282	.38	979	106	7	55	2.5	484	7.8
Sept. 19-20, 23-30-----	1,761	5.4		47	5.1	91		150	41	121		.2		390	.53	1,830	138	16	59	3.4	693	7.8
Weighted average-----	12,690	19		33	2.6	30		103	24	33		1.7		201	0.27	6,890	93	8	41	1.3	325	--

a Sum of determined constituents.

b Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

c Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

d Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

TRINITY RIVER BASIN--Continued  
TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION:--At Devers Pumping Plant Number One, one mile west of Moss Bluff, Liberty County.  
RECORDS AVAILABLE:--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1957.  
EXTREMES, 1956-57:--Dissolved solids: Maximum, 1,670 ppm Nov. 1-12; minimum, 114 ppm Apr. 16-30.

Hardness: Maximum, 470 ppm Oct. 1-3; minimum, 48 ppm Apr. 16-30.  
Specific conductance: Maximum observed, 5,860 microhos Oct. 1; minimum observed, 187 microhos Apr. 17.  
EXTREMES, 1949-57:--Dissolved solids: Maximum, 3,930 ppm Aug. 26-31, 1956; minimum, 110 ppm Oct. 4-10, 1949.

Hardness: Maximum, 790 ppm Aug. 26-31, 1956; minimum, 40 ppm Apr. 9-13, 1955.  
Specific conductance: Maximum observed, 7,650 microhos Aug. 27, 1952; minimum observed, 127 microhos Oct. 7, 1949.

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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-3, 1956	--	--	--	--	--	--	--	256	112	1,150	--	--	--	470	260	--	--	75	10	4,080	8.2	
Oct. 4-13	18	16	80	30	389	112	272	112	112	558	1.2	1.2	1.2	1,310	1.78	--	282	58	2,270	8.2		
Oct. 14-31	16	15	77	17	365	98	227	98	98	512	1.5	1.5	1.5	1,180	1.40	--	262	76	2,070	8.0		
Nov. 1-12	15	15	91	12	524	524	524	162	162	730	1.8	1.8	1.8	1,670	2.27	--	60	80	2,940	7.9		
Nov. 13, 14, 16, 18	7.8	11	34	3.2	83	39	104	116	116	104	3.5	3.5	3.5	337	.46	--	6	65	611	7.8		
Nov. 19-30	11	11	43	4.7	113	128	128	128	63	168	5.5	5.5	5.5	460	.63	--	133	28	820	7.5		
Dec. 1-16, 24	13	13	53	5.5	108	168	168	168	56	167	2.2	2.2	2.2	479	.65	--	154	32	814	7.6		
Dec. 17-23, 25-31	11	11	60	6.7	202	137	137	137	89	290	4.0	4.0	4.0	771	1.05	--	178	60	1,310	7.5		
Jan. 1-8, 10-13, 16-21, 1957	8.4	16	78	12	402	199	199	199	162	568	19	19	7.5	1,310	1.81	--	265	82	2,360	7.9		
Jan. 9	8.4	16	83	11	363	192	157	157	157	510	17	17	7.5	1,240	1.69	--	236	98	2,210	7.9		
Jan. 13, 22-31	16	16	58	8.4	244	180	180	180	128	295	17	17	7.5	878	1.19	--	180	32	1,510	7.7		
Feb. 1, 8, 10	13	13	36	6.1	126	118	118	118	66	166	10	10	4.5	503	.68	--	106	10	831	7.6		
Feb. 2-7, 9	16	16	97	9.2	377	145	145	145	143	460	24	24	4.5	1,130	1.54	--	204	85	1,960	7.6		
Feb. 11-28	12	12	35	3.6	86	99	99	99	39	86	5.9	5.9	5.9	4286	.40	--	102	21	527	7.6		
Mar. 1-10, 14-16	13	13	35	2.9	75	82	82	82	61	96	4.2	4.2	4.2	4323	.44	--	104	61	587	7.2		
Mar. 11-13, 25-26	15	15	36	4.9	114	82	82	82	61	157	7.5	7.5	7.5	4635	.59	--	110	43	796	7.5		
Mar. 17-24, 27-30	11	11	26	3.0	57	77	77	77	32	72	4.5	4.5	4.5	4244	.33	--	77	14	445	7.4		
Apr. 1-10	13	13	31	3.8	65	90	90	90	30	59	2.5	2.5	2.5	4228	.31	--	93	19	415	6.9		
Apr. 11-13	11	11	24	2.7	29	26	26	26	17	32	2.2	2.2	2.2	4162	.22	--	70	11	283	6.8		
Apr. 16-30	9.6	11	16	2.2	20	48	48	48	17	24	1.5	1.5	1.5	4116	.16	--	48	9	206	6.5		
May 3-9, 11-12	12	12	29	2.9	17	97	97	97	15	19	1.2	1.2	1.2	4163	.19	--	85	6	255	6.7		
May 10, 13-20	12	12	34	3.8	24	111	111	111	19	30	1.2	1.2	1.2	200	.27	--	101	10	319	6.7		
May 21-31	12	12	43	3.4	26	138	138	138	24	30	1.6	1.6	1.6	231	.31	--	126	13	371	7.1		
June 1-14	12	12	65	3.7	23	138	138	138	22	28	2.8	2.8	2.8	221	.30	--	128	14	372	7.2		
June 15-24, 27-31	11	11	47	4.2	30	141	141	141	22	41	3.0	3.0	3.0	240	.33	--	134	19	408	7.1		
July 1-4, 8	11	11	51	4.2	35	151	151	151	29	46	3.5	3.5	3.5	4234	.35	--	144	21	459	7.6		
July 11-20	12	12	48	3.9	34	143	143	143	26	44	3.5	3.5	3.5	4241	.33	--	136	19	435	7.9		
July 21-22, 24-31	10	10	47	4.0	32	136	136	136	28	43	3.5	3.5	3.5	4234	.32	--	134	22	429	7.4		
Aug. 1-8	13	13	46	3.7	37	144	144	144	26	44	3.0	3.0	3.0	4244	.33	--	130	12	425	7.9		
Aug. 9-15	9.2	13	76	2.0	22	83	83	83	15	25	1.8	1.8	1.8	4162	.19	--	73	5	230	7.7		
Aug. 16-31	13	13	46	3.8	36	144	144	144	24	48	2.2	2.2	2.2	248	.34	--	130	12	432	7.6		
Sept. 1-10	7.0	17	50	4.2	49	170	170	170	28	57	2.8	2.8	2.8	300	.41	--	144	5	510	7.9		
Sept. 11-20	7.0	17	49	4.4	53	160	160	160	26	68	1.0	1.0	1.0	298	.41	--	140	10	522	7.7		
Sept. 21-27	6.0	17	46	4.2	52	145	145	145	28	72	1.8	1.8	1.8	298	.41	--	132	14	520	8.0		
Sept. 28-30	5.8	17	19	1.5	30	62	62	62	14	37	2.0	2.0	2.0	4139	.19	--	54	3	234	7.3		

a Sum of determined constituents.



TRINITY RIVER BASIN--Continued  
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 June 1957, and September 1957.  
EXTREMES: 1956-57--Dissolved solids: Maximum, 11,300 ppm Oct. 14-29; minimum, 77 ppm Apr. 29, May 1-2.  
Hardness: Maximum, 2,460 ppm Oct. 14-29; minimum, 34 ppm Apr. 29, May 1-2.  
Specific conductance: Maximum observed, 18,000 microhos Oct. 15, 17; minimum observed, 101 microhos Apr. 29.

EXTREMES: 1949-57--Dissolved solids: Maximum, 11,300 ppm Oct. 14-29, 1956; minimum, 77 ppm Apr. 29, May 1-2, 1957.  
Hardness: Maximum, 2,460 ppm Oct. 14-29, 1956; minimum, 34 ppm Apr. 29, May 1-2, 1957.  
Specific conductance: Maximum observed, 18,000 microhos Oct. 15, 17, 1956; minimum observed, 101 microhos Apr. 29, 1957.

REMARKS--Values reported for dissolved solids are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-13, 1956		15													8,080	10.99		1,580	1,420	77	27	13,200	8.0
Oct. 14-29		14		218	251	2,490	191	619	4,390	6,240					11,300	15.37		2,460	2,320	75	30	17,900	7.8
Oct. 30		--		354	384	3,400	355	--	1,500	1,180					--	--		110	575	--	--	4,973	8.1
Oct. 31		--		--	--	--	378	--	1,180						--	--		110	575	--	--	4,110	8.2
Nov. 1-13		12		270	226	2,160	206	554	3,940						7,260	9.87		1,600	1,430	75	23	11,900	7.9
Nov. 14-20		12		104	61	794	183	239	1,300	1,300					2,610	3.55		510	360	77	15	4,490	7.7
Nov. 21-30, Dec. 1-3		13		82	49	540	148	166	910	1,840					1,840	2.50		406	284	74	12	3,350	8.1
Dec. 4-23		10		155	191	1,820	164	470	3,200	3,200					5,930	8.06		1,170	1,060	77	23	10,000	8.0
Dec. 24-27, 30-31		20		69	51	527	107	151	910	1,780					1,780	2.42		382	294	75	12	3,220	7.9
Dec. 28-29		26		44	19	186	95	71	312						706	.96		188	110	68	5.9	1,300	7.8
Jan. 1-12, 1957		12		64	23	330	128	105	535						1,130	1.54		254	149	74	9.0	2,090	7.9
Jan. 13-19, 21		11		88	31	463	151	149	760						1,580	2.15		346	222	74	11	2,870	7.9
Jan. 22-31, Feb. 1-6		12		105	65	732	168	208	1,250	1,250					2,460	3.35		530	392	75	14	4,360	8.2
Feb. 5-18		9.2		83	37	505	163	166	810						1,700	2.31		359	226	75	12	3,120	8.1
Feb. 19-27		8.2		19	5.8	81	54	31	119						294	.40		71	27	71	4.2	561	7.5
Feb. 28, Mar. 1-8		12		42	11	147	106	51	232						551	.75		150	63	68	5.2	1,020	8.0
Mar. 9-17		14		43	8.8	138	93	58	215						329	.72		144	68	68	5.0	968	7.8
Mar. 18-28		12		19	3.4	35	57	19	49						167	.23		61	15	55	1.9	296	7.4
Mar. 29-31, Apr. 1-3, 6-12		17		19	3.3	32	67	14	43						164	.22		62	7	53	1.8	292	7.1
Apr. 4-5, 13		14		16	2.5	19	53	10	25						115	.16		49	6	46	1.2	204	7.0
Apr. 14-22, 28		16		21	3.4	35	72	17	45						174	.24		66	7	53	1.9	308	7.1
Apr. 23-27		16		24	4.5	45	85	17	61						212	.29		79	9	55	2.2	383	7.3
Apr. 29, May 1-2		11		11	1.7	12	12	12	5.4						77	.10		34	0	43	.9	131	6.8
Apr. 30		--		--	--	--	120	--	177						--	--		149	50	--	--	833	7.6
May 3-10		16		17	2.8	20	74	6.4	20						121	.16		53	0	46	1.2	208	7.0
May 11-20		15		18	2.9	21	80	6.6	19						124	.17		56	0	45	1.2	209	7.2
May 21-31		16		24	3.3	21	97	9.6	20						144	.20		73	0	39	1.1	250	7.3
June 1-9		10		33	4.7	39	125	19	45						a238	.32		102	0	46	1.7	396	7.8
June 10		--		--	--	--	289	--	101						--	--		134	0	--	--	614	8.2
June 11-25		16		36	5.0	41	140	19	40						a242	.33		110	0	45	1.7	405	7.9
June 26-30		15		22	2.9	21	79	11	25						138	.19		67	2	41	1.1	235	7.4
Sept. 9-23		14		46	5.0	55	158	24	71						a306	.42		136	6	47	2.1	525	8.2
Sept. 24-30		15		28	4.0	29	100	17	35						a195	.27		86	4	42	1.4	309	8.0

<sup>a</sup> Residue on evaporation at 180°C.



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

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percentage sodium	Specific conductance (micro-mhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
July 1, 3, 5, 8, 10, 12, 15-----		18		48	4.4	39	148	25	53			2.0	270	.37	138	17	38	1.5	468	7.8
July 17, 19, 22, 26, 29, 31-----		17		49	3.8	50	140	31	69			2.0	308	.42	138	23	44	1.8	524	7.8
Aug. 12, 14, 16, 19, 21, 23-----		11		34	2.8	41	100	30	51			2.0	221	.30	96	15	48	1.8	376	7.8
Aug. 2, 5, 7, 9, 26, 28, 30-----		14		47	4.0	61	141	29	85			2.5	341	.46	134	18	50	2.3	366	8.0
Sept. 2-----		--		--	--	156	180	46	228			--	--	--	178	30	66	5.1	1,110	8.1
Sept. 4, 6, 9, 11, 13, 16-----		14		56	4.6	91	167	35	129			1.5	424	.58	158	22	56	3.1	762	8.2
Sept. 18-----		--		--	--	458	172	120	780			--	--	--	370	229	13	10	2,430	8.1
Sept. 20-----		--		--	--	40	164	25	46			--	--	--	138	4	39	1.5	458	8.2
Sept. 23-----		--		--	--	181	181	50	272			--	--	--	191	63	67	5.7	1,220	8.2
Sept. 25-----		--		--	--	127	166	43	185			--	--	--	165	26	63	4.3	960	8.1
Sept. 27-----		--		--	--	69	137	33	93			--	--	--	127	14	54	2.7	601	8.0
Sept. 30-----		--		--	--	42	64	18	58			--	--	--	61	9	60	2.4	334	7.7

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued

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

LOCATION.--At four sampling stations in Trinity Bay opposite mouth of Trinity River, near Anahuac, Chambers County. Station 2- In Anahuac Channel immediately below delta. Station 3- In Anahuac Channel about 1½ miles southwest of Station 2. Station 6- In Anahuac Channel at south end. Station 7- In Trinity Bay about 1½ miles west of Station 6.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1957.

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1956 to September 1957

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 1, 1956-----	29,100	11,000	29,400	11,100	32,200	12,400	32,200	12,400
Oct. 8-----	32,800	12,300	32,600	11,900	32,700	12,100	36,200	13,900
Oct. 15-----	35,300	13,500	35,200	13,400	37,100	14,300	36,400	13,900
Oct. 22-----	24,600	8,870	24,800	8,970	35,200	13,400	26,200	9,510
Oct. 29-----	36,300	13,900	36,200	13,900	36,300	14,000	36,300	14,000
Nov. 6-----	33,200	12,500	33,200	12,500	39,900	15,500	39,800	15,600
Nov. 12-----	10,300	3,200	10,300	3,170	10,500	3,370	17,400	5,850
Nov. 19-----	10,200	3,220	12,500	4,040	25,000	8,870	31,200	11,600
Nov. 26-----	10,500	3,320	10,600	3,370	20,400	7,060	25,600	9,170
Dec. 3-----	25,300	9,170	28,900	10,600	30,400	11,300	32,300	12,300
Dec. 10-----	22,100	7,800	21,800	7,800	28,000	10,200	29,400	10,800
Dec. 17-----	31,500	11,700	31,100	11,600	32,100	12,100	32,300	12,100
Dec. 24-----	6,610	1,980	6,580	1,980	7,380	2,250	10,400	3,300
Dec. 31-----	2,980	800	2,980	820	3,190	890	3,610	1,030
Jan. 7, 1957-----	27,400	10,200	26,500	9,900	28,200	10,500	30,600	11,500
Jan. 14-----	17,900	6,240	28,600	10,800	30,700	11,700	29,700	11,200
Jan. 21-----	29,800	11,300	29,900	11,300	30,100	11,400	30,700	11,700
Jan. 28-----	19,900	7,060	15,900	5,400	21,900	7,940	29,400	11,100
Feb. 4-----	3,010	800	4,320	1,230	17,200	5,870	17,300	5,900
Feb. 11-----	2,100	542	2,160	562	2,130	550	2,190	572
Feb. 18-----	21,300	7,600	10,700	3,420	19,800	6,980	23,500	8,580
Feb. 25-----	12,000	3,940	4,430	1,320	12,500	4,140	24,600	9,070
Mar. 4-----	1,420	350	1,420	348	14,400	4,810	18,700	6,460
Mar. 11-----	4,960	1,480	2,790	770	1,350	325	4,620	1,350
Mar. 18-----	906	193	916	199	919	203	890	185
Mar. 25-----	705	164	691	166	764	178	835	201
Apr. 1-----	512	61	580	91	446	59	454	60
Apr. 3-----	503	71	476	60	580	94	1,030	224
Apr. 5-----	535	77	531	73	476	61	626	96
Apr. 8-----	370	62	411	71	417	76	439	84
Apr. 10-----	363	60	362	60	413	72	470	81
Apr. 12-----	396	67	600	126	415	72	472	79
Apr. 15-----	469	65	647	110	546	76	608	95
Apr. 17-----	696	128	491	66	550	80	518	72
Apr. 19-----	492	65	473	65	512	71	530	75
Apr. 22-----	410	81	372	70	367	69	473	96
Apr. 24-----	529	105	432	83	386	69	389	69
Apr. 26-----	403	77	395	72	379	68	402	71
Apr. 29-----	332	59	281	45	--	--	255	39
May 1-----	387	74	261	41	289	36	251	39
May 3-----	317	45	259	28	236	38	267	31
May 6-----	290	37	276	32	336	62	286	34
May 8-----	272	34	387	65	270	31	260	30
May 10-----	263	30	279	32	266	30	279	32
May 13-----	420	67	332	38	291	28	334	41
May 15-----	348	29	315	29	338	35	315	30
May 20-----	345	30	465	67	372	36	414	49
May 22-----	374	34	353	32	502	70	375	34
May 24-----	365	34	373	36	444	56	372	35
May 27-----	318	31	328	39	310	32	279	30
May 29-----	386	36	391	39	614	96	450	52
May 31-----	432	47	405	39	390	37	391	38
June 3-----	423	39	419	40	419	40	--	--
June 5-----	411	40	438	51	485	63	412	42
June 7-----	488	67	389	39	409	44	397	44
June 10-----	398	42	427	50	397	43	387	40
June 12-----	514	75	506	58	404	42	390	40
June 14-----	385	36	382	36	382	36	385	35
June 17-----	545	63	484	42	415	41	405	37
June 19-----	462	40	443	40	391	36	381	35
June 21-----	--	--	414	38	397	38	407	43
June 24-----	391	39	--	--	391	38	408	44
June 26-----	434	49	--	--	434	46	405	40
June 28-----	492	88	490	89	490	90	494	91

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

Specific conductance, microhos at 25°C, and chloride, in parts per million, water year October 1956 to September 1957--Continued

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
July 1, 1957	444	47	436	45	445	45	464	52
July 2	446	45	484	51	441	44	456	45
July 3	453	50	381	81	453	50	303	58
July 5	471	53	452	50	462	52	484	53
July 10	466	54	544	73	523	73	470	53
July 12	499	60	496	60	512	63	372	76
July 15	480	52	507	61	614	69	467	34
July 17	517	62	308	59	491	36	303	57
July 19	549	73	377	92	377	74	313	62
July 22	513	67	521	69	566	74	326	67
July 23	558	76	578	82	566	73	566	73
July 26	564	81	607	85	558	77	528	72
July 29	540	71	535	69	517	70	526	69
July 31	612	98	556	82	580	83	646	94
Aug. 2	539	78	539	77	566	78	585	86
Aug. 5	551	81	549	82	578	83	553	82
Aug. 7	651	99	628	99	618	98	642	101
Aug. 9	568	88	568	87	588	85	578	88
Aug. 12	445	52	400	49	389	50	487	70
Aug. 14	357	47	344	46	337	45	317	44
Aug. 16	384	56	397	56	386	57	411	62
Aug. 19	346	48	323	44	332	47	336	45
Aug. 21	438	65	453	67	387	53	383	53
Aug. 23	569	101	516	74	516	83	478	69
Aug. 24	537	79	605	89	513	72	560	82
Aug. 28	539	78	545	82	518	66	502	70
Aug. 29	620	98	629	101	622	99	635	101
Sept. 2	615	96	628	98	621	97	639	101
Sept. 4	443	45	443	48	468	48	480	58
Sept. 6	757	128	690	110	680	112	787	141
Sept. 9	666	102	677	103	686	102	658	102
Sept. 11	930	182	912	156	862	160	796	139
Sept. 13	776	134	784	122	734	136	734	121
Sept. 16	763	127	732	127	764	131	773	131
Sept. 18	4,160	1,220	4,330	1,240	4,330	1,240	4,440	1,270
Sept. 20	1,030	202	1,000	202	971	190	1,150	265
Sept. 23	1,320	290	1,300	266	1,350	302	1,430	322
Sept. 25	849	156	843	152	818	147	806	143
Sept. 27	581	96	581	96	583	95	589	95
Sept. 30	337	59	340	58	333	56	342	59

TRINITY RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate			

BERBROOK RESERVOIR NEAR FORT WORTH

Nov. 16, 1956	3.7	0.01	4.3	5.3	11	8.2	1.57	1.0	0.3	1.4	1.77	0.24	129	0	1.5	0.4	31.5	7.8
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ELM FORK TRINITY RIVER RESERVOIR 6-0 NEAR MUEHSTER

Dec. 19, 1956	6.2	1.8	28	1.8	5.2	4.0	80	11	7.5	4	5.6	1.09	1.15	77	11	12	1.90	7.5
Mar. 20, 1957	1.8	1.85	185	12	285	80	39	702	.3	40	1,100	1.77	511	446	55	5.5	2,290	7.5

ELM FORK TRINITY RIVER NEAR MUEHSTER

Dec. 19, 1956	8.6	201	15	250	44	9.2	750	.5	3.8	1,260	1.71	564	528	49	4.6	2,520	7.5
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RICHLAND CREEK AT BRIDGE ON COUNTY ROAD ABOUT 3 MILES UPSTREAM FROM CHAMBERS CREEK NEAR WINKLER

Jan. 10, 1957	4.1	100	28	3,290	38	4,990	8,710	11.85	365	0	95	75	16,500	8.4
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CHAMBERS CREEK AT BRIDGE ON U. S. HIGHWAY 287 ABOUT 1½ MILES UPSTREAM FROM RICHLAND CREEK NEAR EUREKA

Jan. 10, 1957	1.4	136	30	2,550	1,505	73	3,920	6,960	9.47	464	51	92	51	11,900	8.6
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NORTH CHANNEL TERBIAGANA CREEK AT FM ROAD 488 NEAR FAIRFIELD

Nov. 5, 1956	5.4	33	11	450	44	24	1,738	1,290	1.75	128	92	88	17	2,430	6.8
Jan. 10, 1957	.9	194	71	1,800	77	84	3,220	5,410	7.36	775	712	83	28	9,520	7.3
Feb. 22	4.0	22	9.8	356	87	20	550	1,010	1.37	96	24	89	16	1,910	7.2
Mar. 19	.9	41	16	576	90	58	910	1,650	2.24	168	94	88	19	3,090	7.8
Mar. 27	9.6	18	5.8	192	60	15	298	570	.78	69	20	86	10	1,090	7.2
June 4	8.0	69	23	254	69	50	500	944	1.28	266	210	67	6.8	1,780	6.6

SOUTH CHANNEL TERBIAGANA CREEK AT FM ROAD 488 NEAR FAIRFIELD

Nov. 5, 1956	6.4	19	7.7	298	59	26	460	850	1.16	79	30	89	13	1,590	6.9
Feb. 22, 1957	9.2	14	3.6	71	50	24	95	245	.33	50	9	76	4.4	453	6.7
Mar. 19	9.0	19	5.5	97	64	34	133	332	.45	69	16	75	5.1	611	7.5
Mar. 27	13	13	4.5	66	59	18	86	236	.32	51	3	74	4.0	431	6.6
June 4	7.2	49	17	166	70	47	315	638	.87	192	135	65	5.2	1,220	7.5

TRINITY RIVER AT LIBERTY

Jan. 9, 1957	11	85	12	440	209	184	600	1,450	1.97	262	90	78	12	2,540	8.0
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TRINITY RIVER AT BRIDGE ON STATE HIGHWAY 73 NEAR WALLISVILLE

Jan. 9, 1957	10	84	7.7	563	114	178	840	1,740	2.37	242	148	83	16	3,050	7.4
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<sup>a</sup> Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

<sup>b</sup> Includes equivalent of 31 parts per million of carbonate (CO<sub>3</sub>).

BRAZOS RIVER BASIN  
BOULE 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, Stonefall 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 1957.

Water temperatures: November 1949 to November 1951, October 1956 to September 1957.

Sediment records: November 1949 to September 1951.

EXTREMES, 1936-57.--Dissolved solids: Maximum, 4,420 ppm July 9-16; minimum, 689 ppm June 1-7, 13-14, 19-20.

Hardness: Maximum, 2,150 ppm Oct. 1-15; minimum, 220 ppm Aug. 20-21.

Specific conductance: Maximum observed, 6,360 microhmhos July 10; minimum observed, 798 microhmhos Apr. 30.

Water temperatures: Maximum observed, 86°F June 8; minimum observed, freezing point Jan. 16.

EXTREMES, 1948-51; 1956-57.--Dissolved solids: Maximum, 4,740 ppm Aug. 3, 8, 1951; minimum, 666 ppm May 11, 12-13, 1950.

Hardness: Maximum, 2,310 ppm Aug. 5, 6, 1951; minimum, 220 ppm Sept. 9-10, 1948, Aug. 20-21, 1957.

Specific conductance: Maximum observed, 7,200 microhmhos Feb. 18, 1949; minimum observed, 798 microhmhos Apr. 30, 1957.

Water temperatures: Maximum observed, 72.00 microhmhos Feb. 18, 1949; minimum observed, freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957.

Sediment concentrations (Nov. 1949-51): Maximum daily, 77,700 ppm May 19, 1951; minimum daily, no flow on many days.

Sediment loads (Nov. 1949-51): Maximum daily, 565,000 tons May 11, 1950; minimum daily, 0 tons on many days.

REMARKS--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean, discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-15, 1956	60.31	17		698	99	563	98	2,010	850			1.5		4,290	5.83	3.59	2,130	2,070	36	5.3	5,340	7.6
Oct. 16-19, 29-31	59.9	12		324	30	134	83	861	182			2.8		1,590	2.16	2.57	2,130	864	24	1.9	2,050	7.5
Oct. 20-28	0	12		688	93	525	132	1,910	810			1.2		4,100	5.08	--	2,100	1,990	35	5.0	5,210	7.5
Nov. 1-2	20.7	14		288	27	154	74	770	212			4.0		1,500	2.04	83.8	1,830	769	29	2.3	2,060	7.4
Nov. 3-15	a.13	12		624	70	468	135	1,680	680			1.8		3,580	4.87	1.26	1,840	1,730	35	4.5	4,450	7.7
Nov. 16-30	0	9.0		712	85	464	145	1,920	720			2.0		3,980	5.41	--	2,130	2,010	32	4.4	4,820	7.8
Dec. 1-10	0	12		676	80	530	134	1,880	780			2.0		4,030	5.48	--	2,020	1,910	36	5.1	4,940	7.8
Dec. 11-18	0	10		708	82	476	142	1,940	710			.5		4,000	5.44	--	2,100	1,990	33	4.5	4,840	7.7
Dec. 19-21	7.53	6.4		270	19	99	56	724	118			1.8		1,270	1.73	25.8	752	706	22	1.6	1,620	7.4
Dec. 22-31	a.11	11		516	57	339	129	1,390	500			2.5		2,880	3.92	--	1,520	1,420	33	3.8	3,610	7.7
Jan. 1-10, 1957	0	10		571	67	394	137	1,520	610			1.8		3,240	4.41	--	1,700	1,590	34	4.2	4,120	7.8
Jan. 11-20	0	7.8		597	69	392	148	1,590	600			4.0		3,320	4.53	--	1,770	1,650	32	4.0	4,140	7.5
Jan. 21-31	0	6.4		595	81	366	150	1,630	560			3.5		3,320	4.52	--	1,820	1,690	30	3.7	4,140	7.5
Feb. 1-5	0	8.6		575	70	404	135	1,470	680			.8		3,270	4.44	--	1,720	1,610	34	4.2	4,410	8.2
Feb. 6-8, 10-11	1,070	13		1,774	177	142	123	467	138			4.2		1,040	1.41	3,000	1,504	403	38	2.8	1,540	7.9
Feb. 9, 13-28	70.5	13		480	64	752	133	1,270	1,180			1.5		3,830	5.18	759	1,460	1,350	53	8.6	5,650	7.9
Feb. 12-14	52.7	11		1,774	23	309	118	490	420			3.2		1,490	2.03	212	1,990	432	56	5.8	2,430	8.0
Mar. 1-19	4.59	15		655	87	674	131	1,780	1,060			1.0		4,340	5.90	6.91	1,990	1,880	42	6.6	5,800	7.9
Mar. 20-22	35.1	9.2		290	21	104	67	738	150			1.8		1,350	1.84	128	1,810	755	22	1.6	1,810	7.6
Mar. 23-31	56	13		580	70	396	152	1,480	660			.5		3,270	4.45	4.94	1,740	1,610	33	4.1	4,400	7.9
Apr. 1-2, 5-18	13.1	14		560	71	523	102	1,510	830			1.5		3,560	4.84	126	1,690	1,610	40	5.5	4,820	7.4
Apr. 3-4	86.5	20		308	27	288	85	854	385			4.5		1,930	2.62	451	880	810	42	4.2	2,580	7.7
Apr. 19-24	407	15		238	22	203	119	618	272			1.8		1,430	1.94	1,570	685	588	39	3.4	2,070	7.8
Apr. 25-30	2,946	15		168	15	78	115	418	78			4.0		889	1.21	1,070	480	386	25	1.5	1,180	7.4
May 1-4, 9-10	962	13		175	13	962	74	439	98			1.5		8878	1.19	2,280	490	409	28	1.7	2,280	7.7
May 5-8	100	16		196	22	222	117	536	288			2.5		1,340	1.82	362	580	484	45	4.0	2,060	7.9
May 11-21	2,926	13		133	13	85	108	358	75			2.5		780	1.06	1,160	385	296	32	1.9	1,090	7.7
May 22-24, 26-29	545	12		190	21	143	109	504	180			2.5		1,110	1.51	1,630	560	470	36	2.6	1,690	7.8
May 25, 30-31	3,055	9.8		194	9.0	20	72	450	24			2.5		787	1.07	6,490	520	461	8	4.4	982	7.4

a Includes days of less than 0.05 cfm flow.

b Sum of determined constituents.



BRAZOS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids				Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate							
June 1-7, 13-14,	2,869	16		104	14	89		122	273	87		4.2		689	0.94	5,300	317	217	38	2.2	1,020	7.8			
19-20, 1937-----	390	20		129	19	166		119	350	210		3.5		c1,030	1.40	1,080	400	302	47	3.6	1,550	7.8			
June 15-18, 23-25,																									
28-29-----	582	17		171	24	237		117	496	302		1.8		1,310	1.78	2,060	525	429	50	4.5	2,020	7.8			
June 21-22, 26-27-----	248	15		105	15	165		114	320	179		3.2		910	1.24	609	374	230	51	4.0	1,380	7.9			
June 30, July 1-8-----	23.0	22		384	61	688		88	1,120	1,040		1.5		3,360	4.57	209	1,210	1,140	55	8.6	5,050	7.7			
July 9-16-----	4.62	26		588	83	787		59	1,720	1,190		1.6		4,420	6.01	55.1	1,810	1,760	49	8.0	6,020	7.5			
July 17-23-----	1.27	22		588	83	506		61	1,770	720		2.2		3,720	5.06	12.8	1,810	1,760	38	5.2	4,760	7.4			
July 24, 27-31-----	1.730	15		178	21	231		101	538	275		4.2		1,310	1.78	608	530	468	49	4.4	1,990	7.6			
July 25-26-----	1.730	14		160	16	95		88	440	97		4.2		907	1.23	4,240	465	393	31	1.9	1,270	7.6			
Aug. 1-10-----	23.4	18		333	44	504		111	973	710		3.9		2,640	3.59	167	1,010	921	52	6.9	3,880	7.7			
Aug. 11-14, 22-26-----	42.4	16		223	24	283		115	656	348		2.5		1,610	2.19	184	655	561	48	4.8	2,400	7.9			
Aug. 15-19, 27-28-----	87.5	19		360	50	520		98	1,140	720		1.2		2,880	3.92	680	1,150	1,070	49	6.6	4,110	8.0			
Aug. 20-21-----	402	20		70	11	162		140	230	152		3.5		720	.98	781	220	105	62	4.7	1,170	8.2			
Aug. 29-31,																									
Sept. 1-7-----	a,18	20		576	77	493		109	1,680	700		.2		3,600	4.90	802	1,750	1,660	38	5.1	4,650	7.9			
Sept. 8-9, 11-12, 15-19	270	13		179	20	157		107	654	218		2.5		1,100	1.50	802	528	441	39	3.0	1,720	7.7			
Sept. 10, 13-14-----	271	14		107	13	103		117	290	98		9.7		3,000	1.01	543	370	224	41	2.5	1,070	7.6			
Sept. 20-30-----	1.85	15		456	59	460		107	1,280	680		.5		3,000	4.08	15.0	1,380	1,290	42	5.4	4,130	7.7			
Weighted average-----	352	14		152	16	110		110	400	123		3.0		910	1.24	865	445	355	35	2.3	1,300	--			

a Includes days of less than 0.05 cfm flow.

c Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued  
SALT FLAT CREEK AT WEIR B NEAR ASPERMONT, TEX.

LOCATION.--At mouth, about 20 miles northwest of Aspermont, Stone wall County.  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tassium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C.	
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, mag-nesium	Non-carbon-ate				Per-cent so-dium
Oct. 9, 1956	80.22					91,400			3,040	145,000						9,650		95			1.185
Oct. 18	.24					88,900			3,210	138,000						8,850		96			1.178
Oct. 20	.40					80,400			3,370	126,000						9,060		93			1.162
Oct. 23	.23					93,300			3,230	146,000						10,100		93			1.189
Nov. 9	.27					89,500	364	36	3,180	142,000						9,860	9,830	95	7.5		1.182
Nov. 22	.50					90,700	363	32	3,170	144,000						9,970	9,960	95	7.3		1.183
Dec. 7	.30					90,100			3,010	146,000						10,000		92			1.181
Dec. 20	.72					66,300			3,970	105,000						8,790		94			1.132
Jan. 11, 1957	.43					88,100			3,190	142,000						9,830		95			1.180
Jan. 24	8.44					86,400			3,060	139,000						10,100		94			1.174
Feb. 20	.60					68,300			3,540	108,000						8,400		95			1.137
Mar. 7	.41					88,300			3,250	143,000						9,480		95			1.176
May 15	.47					70,300			3,300	113,000						8,800		95			1.142
June 25	.60					77,000			3,460	121,000						9,250		95			1.135
July 11	.45					91,700			3,080	146,000						10,200		95			1.187
July 23	.73					79,300			3,620	124,000						8,620		95			1.160
Aug. 21	.62					91,100			3,050	143,000						9,570		95			1.186
Sept. 11	1.01					86,400			2,990	138,000						9,080		95			1.178
Sept. 27	.36					89,300			3,110	143,000						8,950		96			1.184

a Field estimate.

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

BRAZOS RIVER BASIN--Continued  
SALT CROTON CREEK AT WEIR C NEAR ASPERMENT, TEX.

LOCATION--Half a mile downstream from Salt Flat Creek, about 20 miles northwest of Asperment, Stonewall County.  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bi-car-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate			
Oct. 9, 1956	80.47					96,400	--	--	3,100	153,000						9,430	--	96	--	1.198
Oct. 14	81.20					94,600	--	--	3,150	148,000						9,640	--	96	--	1.193
Oct. 20	81.85					86,200	--	--	2,440	40,500						4,100	--	92	--	1.049
Oct. 25	.82					86,100	--	--	3,400	134,000						9,040	--	95	--	1.173
Nov. 9	8.69					84,300	312	42	3,230	137,000						8,880	8,850	95	7.4	1.171
Nov. 22	.66					93,400	337	35	3,160	147,000						9,180	9,150	95	7.5	1.188
Dec. 7	.70					93,400	--	--	3,230	146,000						9,470	--	96	--	1.188
Dec. 20	2.25					31,600	--	--	2,770	50,200						5,210	--	93	--	1.066
Jan. 11, 1957	.64					93,300	--	--	3,300	147,000						9,320	--	96	--	1.186
Jan. 24	.71					91,500	--	--	3,320	147,000						9,240	--	96	--	1.185
Feb. 20	1.50					69,500	--	--	3,480	112,000						8,060	--	95	--	1.141
Mar. 7	.74					72,600	--	--	3,100	117,000						7,820	--	95	--	1.144
Mar. 22	.96					46,600	--	--	3,010	73,000						6,060	--	94	--	1.089
Apr. 9	.68					92,800	--	--	3,430	147,000						9,650	--	95	--	1.186
May 15	.70					59,300	--	--	2,860	86,800						7,370	--	94	--	1.112
June 25	.88					55,600	--	--	2,800	87,400						7,120	--	94	--	1.110
July 11	.86					95,500	--	--	3,410	150,000						9,760	--	96	--	1.191
July 23	1.01					73,400	--	--	3,770	115,000						8,100	--	95	--	1.148
Aug. 21	.62					94,000	--	--	2,820	150,000						8,400	--	96	--	1.193
Sept. 11	.86					87,500	--	--	2,970	140,000						8,670	--	96	--	1.180
Sept. 27	.56					92,400	--	--	3,150	146,000						8,290	--	96	--	1.187

a Field estimate.

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

BRAZOS RIVER BASIN--Continued

SALT CROTON CREEK AT WEIR D NEAR ASPERMONT, TEX.

LOCATION.--About 500 feet upstream from Haystack Creek and 1,000 feet upstream from gaging station, about 20 miles northwest of Aspermont, Stonewall County.  
 RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C.
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, magne-sium	Non-carbon-ate				
Oct. 9, 1956-----	a0.33					97,200	--	--	2,800	137,000						10,100	--	95	--	--	1.203
Oct. 18-----	.84					98,400	--	--	2,900	138,000						9,890	--	96	--	--	1.203
Oct. 19-----	a2.20					28,700	--	--	2,490	45,900						7,170	--	93	89,200	--	1.056
Oct. 24-----	.69					58,500	--	--	3,500	91,600						7,270	--	95	--	--	1.114
Nov. 9-----	.78					73,700	96	48	3,340	118,000						8,120	8,080	95	--	--	1.145
Nov. 22-----	.60					96,200	348	36	2,890	152,000						9,210	9,180	96	--	--	1.195
Dec. 7-----	.57					96,600	--	--	3,050	154,000						9,460	--	96	--	--	1.195
Dec. 20-----	2.36					42,500	--	--	2,590	67,000						5,220	--	95	--	--	1.082
Jan. 11, 1957-----	.53					95,400	--	--	3,420	150,000						9,660	--	96	--	--	1.190
Jan. 24-----	.71					94,700	--	--	3,250	148,000						9,420	--	96	--	--	1.189
Feb. 20-----	1.62					68,800	--	--	3,120	111,000						7,460	--	95	--	--	1.136
Mar. 7-----	.69					61,400	--	--	3,160	95,400						7,090	--	95	--	--	1.120
May 15-----	.8					21,800	--	--	2,270	34,500						4,180	--	92	76,600	--	1.043
May 27-----	a3.90					24,400	--	--	2,380	38,900						4,150	--	93	78,600	--	1.048
June 12-----	a19.5					4,270	--	--	1,200	6,750						1,270	--	86	19,700	--	1.007
June 24-----	a2.40					9,640	--	--	1,470	15,400						2,360	--	90	39,300	--	1.018
July 11-----	a4.0					99,800	--	--	2,780	138,000						10,600	--	95	--	--	1.205
July 24-----	a3.90					39,600	--	--	3,300	62,200						9,600	--	94	--	--	1.078
Aug. 21-----	a4.0					99,100	--	--	2,650	157,000						9,720	--	96	--	--	1.204
Sept. 10-----	.60					100,000	--	--	2,560	157,000						8,130	--	96	--	--	1.202
Sept. 27-----	.51					99,500	--	--	2,720	158,000						8,250	--	96	--	--	1.204

a Field estimate.

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

BRAZOS RIVER BASIN--Continued  
 HAYSTACK CREEK AT WEIR E NEAR ASPERMONT, TEX.

LOCATION--About 400 feet upstream from mouth, about 20 miles northwest of Aspermont, Stonewall County.  
 RECORDS AVAILABLE--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C.	
													Parts per million	Tons per acre-foot	Tons per day	Cal-cium, mag-ne-sium					Non-carbon-ate
OCT. 9, 1956-----	40.12					45,300	--	--	4,910	73,200						7,410		93	--	--	1.093
OCT. 18-----	1.04					41,600	--	--	3,920	85,100						6,330		94	--	--	1.083
OCT. 19-----	4.48					3,650	--	--	2,180	8,890						2,720		82	25,300	--	1.012
OCT. 24-----	.10					39,600	--	--	4,780	61,800						7,080		93	--	--	1.080
NOV. 9-----	.18					32,900	109	79	4,240	52,600						6,150	6,090	92	--	--	1.065
NOV. 22-----	.18					33,500	118	89	4,370	56,000						6,400	8,330	92	--	--	1.071
NOV. 27-----	.21					34,600	--	--	4,460	55,100						6,310		92	--	--	1.070
DEC. 7-----	.51					18,600	--	--	3,120	30,100						4,450		90	68,200	--	1.038
DEC. 20-----	.14					37,400	--	--	4,530	59,500						6,740		92	--	--	1.076
JAN. 26-----	.19					33,800	--	--	4,300	54,300						6,230		92	97,700	--	1.088
FEB. 20-----	.43					28,400	--	--	3,860	45,500						5,080		92	85,600	--	1.056
MAR. 7-----	.17					35,300	--	--	4,370	56,100						6,360		92	--	--	1.070
MAR. 20-----	.90					25,000	--	--	3,200	39,100						4,680		93	87,500	--	1.068
MAR. 20-----	6.97					8,950	--	--	1,510	14,100						2,150		90	56,800	--	1.016
MAY 15-----	.46					13,800	--	--	3,300	21,700						4,280		88	54,100	--	1.039
MAY 27-----	.20					15,500	--	--	3,320	24,500						4,650		88	56,700	--	1.032
JUNE 12-----	1.18					4,170	--	--	2,570	6,760						2,890		76	20,800	--	1.009
JUNE 26-----	1.01					5,210	--	--	2,550	8,510						3,170		78	25,000	--	1.010
JULY 11-----	.16					26,300	--	--	4,650	42,200						6,210		90	85,100	--	1.054
JULY 24-----	.52					11,100	--	--	3,000	17,900						3,890		86	44,700	--	1.022
AUG. 21-----	.16					30,300	--	--	4,850	68,400						6,020		92	94,200	--	1.083
SEPT. 10-----	.40					31,500	--	--	4,420	69,300						5,640		92	95,000	--	1.084
SEPT. 27-----	.30					29,200	--	--	4,360	65,300						5,380		92	88,400	--	1.080

a Field estimate.

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

BRAZOS RIVER BASIN--Continued  
SALT CROTON CREEK NEAR ASPERMONT, TEX.

LOCATION.--At gaging station just below the mouth of Haystack Creek and about 20 miles northwest of Aspermont, Stonewall County.  
DRAINAGE AREA.--69 square miles, approximately.  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in Water Supply Paper 1512 as "Dove Creek near Aspermont."

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C.		
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate						
Oct. 9, 1956	--																						
Oct. 18	1.79					89,700			3,370	146,000							9,860						1.187
Oct. 19	5.20					72,700			3,530	114,000							8,390						1.164
Oct. 24	.64					36,300			2,630	53,400							6,730						1.067
						59,000			4,080	92,300							7,530						1.116
Nov. 8	1.08					56,700	211	53	3,820	91,700							7,420	7,380					1.112
Nov. 22	1.72					87,100	303	48	3,460	138,000							9,230	9,190					1.175
Dec. 6	1.00					79,200	--	--	3,440	126,000							8,950	--					1.156
Dec. 20	3.08					38,900	--	--	2,650	61,900							5,210	--					1.075
Jan. 10, 1957	.73					66,000	--	--	4,000	106,000							8,160	--					1.133
Jan. 24	.90					63,300	--	--	3,890	104,000							7,960	--					1.131
Feb. 20	1.96					34,200	--	--	3,420	87,000							6,790	--					1.104
Mar. 7	.51					39,300	--	--	4,250	63,100							6,400	--					1.078
Apr. 3	2.96					36,300	--	--	3,360	57,000							5,510	--					1.070
Apr. 9	.74					67,400	--	--	4,120	107,000							8,280	--					1.135
Apr. 20	50					11,100	--	--	1,840	17,900							2,740	--					1.021
Apr. 28	760					3,060	--	--	992	4,980							1,270	--					1.004
Apr. 28	2,800					1,100	11	259	1,230	1,730							1,400	1,190					--
Apr. 28	5,500					868	10	169	988	1,340							1,140	1,000					--
May 15	1.27					16,700	--	--	2,680	26,100							4,070	--					1.033
May 17	50					2,480	--	--	1,260	4,080							1,630	--					1.004
May 22	760					17,300	--	--	2,100	28,100							3,540	--					1.033
May 27	1.07					20,000	--	--	2,840	31,800							4,340	--					1.038
May 31	50					1,110	11	132	1,360	1,700							1,470	1,310					--
May 31	760					517	12	167	1,450	800							1,580	1,440					--
June 1	2,800					4,520	--	--	1,520	7,140							1,790	--					1.008
June 12	20.7					2,470	--	--	1,430	3,880							1,510	--					1.004
June 23	760					1,330	--	--	1,320	2,060							1,090	982					--
June 24	3.44					6,840	--	--	1,760	10,900							2,410	--					1.013
July 10	.57					85,500	--	--	3,460	135,000							10,400	--					1.171
July 24	4.33					38,700	--	--	3,350	60,400							5,610	--					1.077
July 25	247					1,940	--	--	1,660	3,090							1,750	--					1.004
July 25	107					581	13	95	1,310	870							1,340	1,260					--
July 25	38.6					845	--	72	1,450	1,280							1,520	1,460					1.185
Aug. 21	.61					90,500	--	--	3,290	143,000							9,280	--					1.170
Sept. 10	1.03					83,800	--	--	3,220	134,000							7,440	--					1.170
Sept. 27	.74					83,200	--	--	3,430	131,000							8,220	--					1.168

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

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

LOCATION.--At gaging station at bridge on U. S. Highway 83, 5 1/2 miles downstream from Salt Croton Creek and 13.2 miles northwest of Aspermont, Stonewall County.  
DRAINAGE AREA.--4,830 square miles, approximately, of which 2,770 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1951, October 1956 to September 1957.  
Water temperatures: October 1948 to September 1951, October 1956 to September 1957.

EXTRUDES, 1956-57.--Dissolved solids: Maximum, 76,900 ppm Feb. 1-6; minimum, 1,280 ppm June 2-4.  
Hardness: Maximum, 5,590 ppm Feb. 1-6; minimum, 392 ppm June 2-4.

Specific conductance: Maximum observed, 103,000 microhos Mar. 22; minimum observed, 1,820 microhos June 3.  
Water temperatures: Maximum observed, 91° Sept. 6; minimum observed, freezing point on Jan. 16, 17.

EXTRUDES, 1948-51, 1956-57.--Dissolved solids: Maximum, 78,500 ppm Mar. 21, 24-28, 1949; minimum, 1,280 ppm June 2-4, 1957.  
Hardness: Maximum, 5,590 ppm Feb. 1-6, 1957; minimum, 372 ppm May 19-23, 24 (12-10 P. M.), 1951.

Specific conductance: Maximum observed, 111,300 microhos Mar. 24, 25, 1949; minimum observed, 1,820 microhos June 3, 1957.  
Water temperatures (1948-51, 1956-57): Maximum observed, 91° Sept. 6, 1957; minimum observed, freezing point on many days during winter months.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex.  
Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	Density at 20° C	
												Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate						
Oct. 1-15, 1956-----	0.20	19	1,540	356	18,100		153	3,610	28,700				32,400	73.9	29.3	5,310	5,180	88	108	63,300	7.9	1.036
Oct. 16-31-----	12.2	15	1,340	302	17,400		136	3,050	27,600				49,800	70.0	1,700	4,590	4,470	89	112	61,200	7.6	1.034
Nov. 1-15-----	1.42	12	1,210	298	16,400		133	2,870	26,000				46,900	63.8	1,186	4,240	4,140	89	110	60,600	7.7	1.032
Nov. 16-30-----	.35	12	1,410	339	15,800		172	3,370	25,500				46,300	63.2	45.3	4,910	4,770	87	98	59,800	7.8	1.032
Dec. 1-10-----	.33	13	1,440	340	15,900		156	3,450	25,400				46,600	65.4	62.8	4,990	4,860	87	98	59,300	7.7	1.032
Dec. 11-20-----	3.35	9.7	1,320	338	17,100		147	3,190	27,300				49,300	66.1	66.1	4,710	4,590	89	108	61,700	7.6	1.034
Dec. 21-31-----	.67	10	1,410	380	23,200		149	3,300	36,800				63,200	92.7	123	5,080	4,960	91	141	77,400	7.6	1.045
Jan. 1-15, 1957-----	.29	12	1,450	345	15,600		162	1,630	26,400				45,100	64.0	36.8	5,040	4,900	87	96	60,000	7.7	1.034
Jan. 16-31-----	.36	12	1,420	349	15,500		173	1,620	26,100				45,100	63.3	45.3	4,980	4,860	87	95	59,300	7.8	1.033
Feb. 1-6-----	.68	12	1,490	455	27,600		149	3,190	44,100				76,900	111	149	5,970	5,670	91	160	86,600	7.9	1.054
Feb. 7-9-----	91.0	17	293	46	2,100		125	731	2,270				6,560	8.91	8.91	1,610	818	83	30	10,600	8.1	1.002
Feb. 10-----	158	17	357	56	2,850		102	876	9,480				8,690	11.9	3,720	1,120	1,040	85	37	13,900	8.0	1.004
Feb. 11-12-----	9.55	16	475	115	5,920		95	1,140	9,410				17,100	23.5	465	1,660	1,580	89	63	25,600	8.0	1.010
Feb. 13-18-----	3.17	9.3	958	230	12,000		132	2,240	39,100				36,600	48.2	303	3,340	3,230	89	90	46,700	7.9	1.023
Feb. 19-28-----	3.00	9.1	1,320	375	21,800		135	2,880	34,800				61,300	87.0	518	4,840	4,720	91	136	73,400	7.9	1.043
Mar. 1-5-----	46.3	12	544	115	6,900		89	1,200	11,000				19,800	27.2	2,500	1,830	1,760	89	70	29,300	7.8	1.011
Mar. 6-20-----	.73	9.7	1,300	327	16,900		147	3,120	26,900				48,600	66.3	99.0	4,590	4,470	89	108	59,400	7.8	1.033
Mar. 21-31, Apr. 1-2-----	2.17	9.2	1,470	394	22,700		145	3,230	38,300				64,200	91.3	393	5,290	5,170	90	136	73,800	7.8	1.046
Apr. 3-5-----	30.2	7.2	447	85	3,940		80	1,030	6,310				11,900	16.3	976	1,460	1,400	85	45	18,500	7.7	1.006
Apr. 6-10-----	.72	8.6	1,130	264	13,200		127	2,770	21,000				38,400	53.5	76.4	3,900	3,800	88	92	48,600	7.4	1.024
Apr. 11-20-----	12.6	12	1,340	322	15,600		129	3,040	23,000				45,400	63.6	1,990	4,670	4,560	88	99	61,200	7.6	1.031
Apr. 21-22, 28-----	1,259	17	866	63	2,760		121	1,440	4,330				9,260	12.7	31,600	1,720	1,610	78	29	14,600	7.2	1.004
Apr. 23-27, 29-----	1,339	19	334	32	771		129	822	1,180				3,230	4.39	11,680	965	860	63	11	5,140	7.5	1.004
Apr. 30-----	2,650	18	173	18	293		127	436	412				1,420	1.93	10,160	505	401	56	5.7	2,230	7.8	1.004
May 1-8-----	285	16	332	50	1,700		111	805	2,700				5,600	7.70	4,310	1,030	943	78	23	9,360	7.6	1.004
May 9-10-----	1,095	20	384	25	465		117	970	700				2,610	3.55	7,720	1,060	990	49	6.2	3,750	7.8	1.004
May 11, 17, 25-27, 31-----	1,825	16	323	42	1,350		116	805	2,120				4,710	6.41	16,850	978	885	75	19	7,620	7.9	1.004
May 12-14, 19-20-----	4,012	16	156	19	384		114	407	452				1,020	2.18	17,330	467	374	64	7.7	2,600	7.8	1.004
May 15-16, 18, 21-24-----	2,723	16	250	31	665		106	636	1,030				2,690	3.66	19,780	752	664	66	11	4,370	7.7	1.004
May 28-30-----	157	16	389	81	2,400		158	1,010	3,790				7,760	10.6	3,300	1,300	1,170	80	29	12,300	7.9	1.002



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

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Density at 20° C
												Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
June 1, 5-10, 1957-----	1,512	15	236	35	854	118	603	1,320			5.0	3,130	4.26	12,780	733	636	72	14	5,110	7.8	--
June 2-4-----	4,590	15	126	19	300	127	319	428			6.1	1,280	1.74	15,860	392	288	62	6.6	2,080	7.8	--
June 11, 13, 16-17-----	4,248	18	346	63	1,740	122	850	2,780			--	5,860	7.97	3,920	1,120	1,020	77	23	9,420	7.9	--
June 12, 14-15, 23-26-----	520	18	336	41	882	103	898	1,350			2.5	3,580	4.87	5,030	1,010	922	66	12	5,570	7.8	--
June 18-22-----	1,842	19	129	23	364	122	350	525			4.2	1,470	2.00	7,310	416	316	66	7.8	2,450	7.9	--
June 27-30, July 1-3-----	56.1	19	411	94	2,080	120	1,100	3,320			--	7,080	9.65	1,070	1,410	1,310	76	24	11,300	7.9	1.002
July 4-10-----	15.6	19	675	149	4,420	113	1,710	7,110			--	14,100	19.6	606	2,300	2,200	81	40	21,400	7.8	1.020
July 11-23, 25-----	29.1	17	1,040	232	9,310	105	2,590	14,900			--	28,100	38.9	2,250	3,550	3,460	85	68	38,600	7.7	1.019
July 24, 26, 30-31-----	140	17	280	48	1,500	120	762	2,320			--	4,990	6.79	1,890	896	798	78	22	8,330	8.0	--
July 27-29-----	156	18	168	31	567	116	465	850			2.1	2,160	2.94	910	546	452	69	11	3,610	7.8	--
Aug. 1, 6-10-----	20.3	15	447	87	2,150	124	1,210	3,390			--	7,360	10.0	404	1,470	1,370	76	24	11,500	7.7	1.002
Aug. 2-5-----	52.0	14	183	37	784	109	494	1,210			2.8	2,780	3.78	390	608	519	74	14	4,660	7.5	--
Aug. 11, 15-16, 20, 23-25-----	19.0	16	428	72	1,970	115	1,100	3,120			--	6,760	9.19	347	1,360	1,270	76	23	10,600	7.9	--
Aug. 12, 17-19, 26-27-----	4.75	13	760	158	5,750	102	1,910	9,200			--	17,800	24.5	231	2,550	2,460	83	50	25,600	7.8	1.011
Aug. 13-14, 21-22-----	70.5	15	288	37	789	96	808	1,180			3.0	3,170	4.31	603	870	792	66	12	5,050	7.8	--
Aug. 28-31, Sept. 1-11-----	1.13	15	1,410	326	14,300	161	3,320	22,900			--	42,400	59.3	133	4,860	4,730	86	89	53,700	7.7	1.028
Sept. 12-13-----	188	18	354	43	896	152	953	1,340			2.3	3,680	5.00	1,870	1,060	936	65	12	5,690	8.0	--
Sept. 14-15-----	21.0	14	510	71	3,310	83	1,230	5,250			--	10,400	14.2	592	1,560	1,500	82	36	16,100	7.8	1.004
Sept. 16-18-----	3.83	12	872	184	7,800	108	2,090	12,500			--	23,500	32.4	246	2,930	2,840	85	63	33,900	7.8	1.014
Sept. 19-30-----	.53	9.6	1,480	328	16,100	156	3,490	25,700			--	47,200	66.3	69.8	5,040	4,910	87	99	60,600	7.8	1.033
Weighted average-----	299	17	247	33	882	117	625	1,360			--	3,220	4.38	2,600	752	656	72	14	5,080	--	--

BRAZOS RIVER BASIN--Continued  
HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION:--At gaging station at bridge on U. S. Highway 183, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.

DRAINAGE AREA--1,087 square miles.

Water temperature:--Chemical analyses: April 1955 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum, 1,810 ppm Aug. 8-31; minimum, 118 ppm Feb. 6-8.

Hardness: Maximum, 766 ppm Sept. 1-11; minimum, 72 ppm Feb. 6-8.

Specific conductance: Maximum observed, 3,920 microhos July 24; minimum observed, 121 microhos Apr. 27.

EXTREMES 1955-57.--Dissolved solids: Maximum, 2,200 ppm Apr. 17-28, 1956; minimum, 118 ppm Feb. 6-8, 1957.

Hardness: Maximum, 866 ppm Apr. 17-28, 1956; minimum, 72 ppm Feb. 6-8, 1957.

Specific conductance: Maximum observed, 5,530 microhos Apr. 18, 1956; minimum, 121 microhos Apr. 27, 1957.

REMARKS:--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-15, 1956	a0.09	6-8	82	14	107	193	17	107	14	410	0.4	1.2		776	1.05	0.19	262	176	62	5.2	1,500	8.0
Oct. 16-31	a18.8	8-6	52	20	129	62	1.5	129	20	114	5	1.5		328	45	16.6	155	50	66	2.2	618	7.8
Nov. 1-14	198	7-0	37	4.3	102	29	4.5	102	14	50	6	4.5		196	27	105	110	26	37	1.2	347	7.7
Nov. 15-30	a.41	7-6	34	3.6	106	15	2.0	106	12	21	5	2.0		148	20	16	99	12	25	1.7	258	7.3
Dec. 1-14	a0	7-0	39	4.4	107	17	1.0	107	12	22	7	1.0		166	23	0	115	10	26	1.7	289	7.3
Dec. 15-19, 22-31	a49.2	6-2	35	3.5	100	18	1.5	100	10	27	3	1.5		148	20	19.7	96	12	29	1.8	269	7.9
Dec. 20-21	370	6-0	38	4.7	95	56	2.0	95	18	93	4	2.0		168	36	263	115	35	31	2.2	472	7.7
Jan. 1-13, 1957	a.04	6-2	32	3.8	102	23	1.2	102	11	38	4	1.2		163	22	0.02	95	17	34	1.7	301	7.7
Jan. 14-31	a0	5-2	33	4.0	101	25	1.2	101	10	42	4	1.2		170	23	0	99	16	36	1.1	316	7.6
Feb. 1-5	a5.08	5-2	36	4.3	95	31	1.5	95	10	60	3	1.5		186	26	2.66	107	29	39	1.3	369	7.9
Feb. 6-8	7,473	6-2	25	2.3	79	11	2.0	79	7-0	21	2	2.0		118	16	2,380	72	7	31	1.7	213	7.8
Feb. 9-28	22.4	8-8	46	5.4	126	33	1.8	126	14	62	2	1.8		234	32	14.2	137	34	34	1.2	435	7.8
Mar. 1-19	a.14	10	62	8.6	169	46	1.8	169	26	86	5	1.8		324	44	17	190	52	34	1.5	389	8.1
Mar. 20-31, Apr. 1-3	14.1	7-4	41	4.5	111	25	1.8	111	18	45	5	1.8		197	27	7.56	121	30	31	1.0	362	7.7
Apr. 4-22	13.2	6-4	59	8.0	121	75	1.2	121	15	160	5	1.2		385	52	13.7	180	81	47	2.4	742	7.7
Apr. 23-24	1,140	7-6	64	9.8	103	103	1.2	103	11	230	7	1.2		479	65	1,670	200	116	53	3.2	937	7.5
Apr. 24-25	382	7-6	42	5.2	112	66	1.5	112	13	82	7	1.5		255	35	263	126	34	44	1.8	464	7.8
Apr. 26-30, May 1	10,510	7-0	29	2.7	86	16	2.5	86	7-6	26	7	2.5		136	18	3,800	83	13	30	1.2	241	7.8
May 2-7	2,734	8-6	38	4.4	100	30	1.5	100	10	58	7	1.5		201	27	1,680	113	31	37	1.2	375	7.7
May 8-9, 16-17	903	10	47	5.9	115	34	1.5	115	16	72	3	1.5		266	23	2,586	162	47	34	1.3	457	7.4
May 10-15, 18-20	5,799	9-2	36	4.0	103	18	2.8	103	9-0	35	3	2.8		165	22	3,010	110	24	28	1.8	301	7.9
May 21-27	6,261	9-6	38	3.9	106	20	3.2	106	9-8	38	4	3.2		175	26	3,010	111	24	28	1.8	321	7.8
May 28-31, June 1-5	1,008	11	62	9.0	129	61	5.9	129	23	134	4	5.9		389	50	1,000	192	86	41	1.9	692	7.7
June 6-8, 13-15	1,032	9-6	49	6.4	114	40	3.5	114	16	88	4	3.5		267	36	766	169	55	36	1.4	511	7.6
June 9-12	122	12	88	14	156	94	4.0	156	40	215	3	4.0		569	75	1,811	277	169	42	2.5	1,030	7.9
June 16-21	332	13	61	8.7	121	31	4.2	121	31	128	5	4.2		365	50	327	188	89	41	1.9	686	8.0
June 22-30	30.7	13	102	18	153	45	4.2	153	45	312	5	4.2		712	97	59.0	378	203	47	3.2	1,390	8.1
July 1-12	4,701	11	160	32	186	235	4.9	186	93	550	4	4.9		1,190	162	15.1	530	378	49	4.4	2,170	8.1
July 13-24, 27-31, Aug. 1-4	16.6	11	211	63	208	313	6.3	208	150	760	6	6.3		1,590	2.16	71.3	706	533	49	5.1	2,870	7.7
July 25-26, Aug. 5-7	237	17	40	6.0	94	36	6.3	94	17	73	--	6.3		241	33	154	125	48	38	1.4	436	8.1
Aug. 8-31	50	14	204	51	386	149	5.9	386	259	820	4	5.9		1,810	2.46	2.44	718	596	56	6.2	3,160	7.8
Sept. 1-11	44	14	218	54	327	176	4.5	327	315	710	4	4.5		1,730	2.35	2.06	766	622	48	5.1	2,980	7.9
Sept. 14-21	7.12	10	129	34	291	171	2.6	291	108	630	5	2.6		1,260	1.71	24.2	462	372	58	5.9	2,640	7.9
Sept. 22-23	652	7-4	70	14	125	108	3.1	108	31	268	5	2.8		572	78	1,010	232	144	58	3.6	1,090	7.8
Sept. 12-13, 24-30	44.7	9-6	48	7.2	109	52	2.2	109	23	104	6	2.2		301	41	36.3	150	60	43	1.9	563	8.0
Weighted average	633	8-6	36	4.1	98	24	2.9	98	10	46	0.5	2.9		180	0.25	308	107	26	33	1.0	331	--

a Includes days of less than 0.05 second foot flow.

BRAZOS RIVER BASIN--Continued

BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.

LOCATION--Immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto, DRAINAGE AREA--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE--Chemical analyses: January 1942 to September 1957.

Water temperatures: October 1949 to September 1955.

EXTREMES, 1936-57--Dissolved solids: Maximum, 2,130 ppm Oct. 1-31; minimum, 331 ppm Apr. 26-30, May 1-10.

Hardness: Maximum, 670 ppm Oct. 1-31; minimum, 135 ppm Apr. 26-30, May 1-10.

Specific conductance: Maximum observed, 3,630 micromhos Oct. 28; minimum observed, 494 micromhos May 4.

EXTREMES, 1942-57--Dissolved solids: Maximum, 2,640 ppm Jan. 1-31, 1956; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.

Hardness: Maximum, 828 ppm Jan. 1-31, 1956; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.

Specific conductance: Maximum observed, 5,172 micromhos Jan. 7, 1956; minimum observed, 494 micromhos May 4, 1957.

Water temperatures (1949-55): Maximum observed, 76°F Sept. 27-30, 1950; minimum observed, 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 sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Palo Pinto for water year October 1956 to September 1957 given in Water-Supply Paper 1512. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micromhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				Sodium adsorption ratio
Oct. 1-31, 1956-----	67.3	12		219	30	501		128	518	790		0.8		2,130	2.90	387	670	565	62	3,430	7.6	
Nov. 1-30-----	111	12		200	29	430		118	504	660		1.0		1,890	2.57	566	618	522	60	3,090	7.4	
Dec. 1-31-----	263	9.8		195	28	410		114	505	620		.8		1,820	2.48	1,290	602	508	60	2,920	7.9	
Jan. 1-31, 1957-----	299	9.6		195	27	402		114	498	610		.5		1,800	2.45	1,450	598	504	59	2,910	7.9	
Feb. 1-28-----	349	9.6		191	26	376		115	466	582		.7		1,710	2.33	1,610	584	490	38	2,770	7.7	
Mar. 1-31-----	144	9.4		176	25	349		111	427	542		1.0		1,580	2.15	614	542	451	58	2,590	7.5	
Apr. 1-25-----	198	9.8		182	26	367		113	446	568		1.5		1,660	2.26	887	561	468	59	2,690	7.4	
Apr. 26-30, May 1-10-----	38,920	7.4		45	5.4	60		74	73	91		1.8		331	.45	34,280	135	74	49	2.3	573	7.1
May 11-20-----	30,840	7.0		53	5.8	60		84	84	92		1.8		359	.49	29,890	157	88	45	2.1	611	7.0
May 21-31-----	27,800	8.4		64	7.8	76		94	112	115		1.8		451	.61	33,850	191	114	46	2.4	759	7.4
June 1-9-----	17,730	8.2		55	6.4	69		94	87	102		1.8		399	.54	19,100	164	68	48	2.3	671	7.3
June 10-30-----	3,200	12		113	12	125		100	240	192		1.8		786	1.07	6,790	332	250	45	3.0	1,240	7.4
July 1-31-----	603	13		114	13	118		104	238	185		2.0		789	1.07	1,280	338	253	43	2.8	1,220	7.8
Aug. 1-31-----	531	12		114	14	136		111	232	200		2.5		840	1.14	1,200	342	251	46	3.2	1,290	7.6
Sept. 1-30-----	367	9.6		112	14	144		119	232	220		1.5		831	1.13	823	337	240	68	3.4	1,310	7.5
Weighted average-----	4,145	8.0		61	7.2	79		85	108	119		1.8		443	0.60	4,960	182	112	49	2.6	743	--

BRAZOS RIVER BASIN--Continued

BRAZOS RIVER AT WHITNEY DAM NEAR WHITNEY, TEX.

LOCATION--On State Highway 22, 2.4 miles upstream from Coon Creek, 4.0 miles upstream from gaging station and 7.4 miles southwest of Whitney, Hill County, and at mile 442.

DRAINAGE AREA--26,170 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE--Chemical analyses: October 1947 to May 1948, October 1948 to September 1957.

Water temperatures: October 1947 to May 1948, October 1948 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,380 ppm Oct. 1-31; minimum, 337 ppm June 11-20.

Hardness: Maximum, 474 ppm Oct. 1-31; minimum, 148 ppm May 4.

Specific conductance: Maximum observed, 2,350 micromhos Dec. 6, 8-9; minimum observed, 538 micromhos June 12.

Water temperatures: Maximum observed, 92°F July 21, 28, 29; minimum observed, 42°F Jan. 27, 28.

EXTREMES, 1947-57.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.

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

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

Water temperatures: Maximum observed, 98°F July 8, 1954; minimum observed, 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 sums of determined constituents.

Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-31, 1956-----	639	13		147	26	303		115	361	470		1.0		1,380	1.88	2,380	474	380	58	6.1	2,230	7.9
Nov. 1-30-----	41.3	9.8		149	23	292		114	356	452		.8		1,340	1.82	149	466	373	58	5.9	2,260	8.0
Dec. 1-31-----	31.8	11		150	23	302		117	363	462		.8		1,370	1.86	118	468	372	58	6.1	2,300	8.0
Jan. 1-31, 1957-----	612	8.8		145	21	297		118	351	448		.2		1,130	1.81	2,000	468	352	59	6.1	2,230	7.9
Feb. 1-28-----	661	9.6		128	23	282		118	312	430		1.0		1,240	1.69	2,210	415	318	60	6.0	2,150	7.9
Mar. 1-31-----	645	9.2		131	20	253		116	295	395		.8		1,160	1.58	2,020	409	314	57	5.4	1,960	7.8
Apr. 1-30-----	1,472	8.6		124	19	233		114	266	370		1.6		1,080	1.47	4,290	388	294	57	5.1	1,830	7.6
May 1-3, 5-17-----	18,790	9.6		68	9.9	115		98	125	176		1.8			.78	29,170	210	130	54	3.5	976	7.5
May 6-----	8,350	--		--	--	--		101	--	87		--		--	--	148	65	55	--	--	384	7.6
May 18-31-----	43,610	9.8		55	7.0	76		99	82	116		1.5		416	.57	48,980	166	85	50	2.6	713	7.6
June 1-10-----	38,530	13		53	5.8	56		101	69	86		1.8		354	.48	36,830	156	73	64	2.0	579	7.4
June 11-20-----	36,260	12		51	5.6	53		104	67	78		1.5		337	.46	31,170	150	65	44	1.9	548	7.7
June 21-30-----	34,130	10		58	6.6	57		113	71	91		1.2		380	.52	33,020	172	79	42	1.9	617	7.4
July 1-31-----	3,510	15		72	10	79		141	103	120		2.0		488	.66	4,020	220	105	44	2.3	802	7.9
Aug. 1-31-----	723	15		77	9.9	86		155	110	125		1.5		539	.73	1,050	232	106	44	2.5	863	7.9
Sept. 1-30-----	798	11		84	12	101		147	134	155		1.0		632	.86	1,360	239	138	46	2.7	997	7.9
Weighted average-----	6,213	11		62	7.9	82		106	96	126		1.5		459	0.62	7,700	187	100	49	2.6	766	--

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

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas & New Orleans Railroad bridge, and at mile 93. DRAINAGE AREA.--4,050 square miles, approximate of which 9,240 square miles is probably noncontributing. RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1957.

Water temperatures: November 1950 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,230 ppm Oct. 1-10; minimum, 161 ppm Apr. 24-30.

Hardness: Maximum, 415 ppm Oct. 1-10; minimum, 104 ppm Apr. 24-30.

Specific conductance: Maximum observed, 2,230 micromhos/cm; minimum, 104 micromhos/cm.

Water temperatures: Maximum observed, 87°F Aug. 18-19; minimum, 43°F Jan. 18.

EXTREMES, 1945-57.--Dissolved solids: Maximum, 1,400 ppm Sept. 1-10, 1951; minimum, 133 ppm Aug. 27-31, 1947.

Hardness: Maximum, 446 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-20, 1950.

Specific conductance: Maximum observed, 2,340 micromhos/cm; minimum, 64 micromhos/cm.

Water temperatures (1950-57): Maximum observed 91°F Aug. 5, 1951; minimum observed, 40°F Dec. 24, 1953.

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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-10, 1956-----	593	12		130	22	275		136	307	412	--	1.0	1,230	1.67	1,970	415	304	59	5.9	2,020	7.9
Oct. 11-20-----	384	8		121	24	271		146	301	395	--	.5	1,200	1.63	1,890	400	281	60	5.9	1,970	8.1
Oct. 21-31-----	742	8		128	23	274		136	319	402	--	.2	1,220	1.66	2,440	414	302	59	5.9	2,010	8.1
Nov. 1-11-----	1,237	9.0		118	20	235		132	273	350	--	.9	1,070	1.46	3,370	376	268	58	5.3	1,780	7.7
Nov. 12-20-----	1,658	8.4		54	8.1	66		135	67	89	--	2.3	367	.50	1,640	168	58	45	2.2	634	8.0
Nov. 21-30-----	998	6.4		55	8.0	59		171	42	81	--	1.0	347	.47	935	170	30	43	2.0	608	7.7
Dec. 1-10-----	989	8.8		55	9.0	51		176	37	72	--	1.0	328	.45	876	174	30	39	1.7	587	8.1
Dec. 11-20-----	947	9.0		60	9.8	54		190	43	74	--	.5	314	.47	880	189	34	38	1.7	619	8.1
Dec. 21-31-----	1,116	8.6		56	8.9	57		177	43	78	--	.8	1,040	.47	1,040	176	31	41	1.9	613	8.0
Jan. 1-9, 1957-----	689	11		62	9.8	66		199	63	78	--	1.5	398	.54	525	195	32	43	2.1	674	7.8
Jan. 10-23-----	680	8.8		90	16	128		233	125	175	--	.5	672	.91	1,230	290	100	49	3.3	1,130	8.0
Jan. 24-31-----	906	6.2		126	21	241		147	285	360	--	.2	1,110	1.31	2,720	401	280	57	5.2	1,900	8.1
Feb. 1-10-----	830	15		126	21	229		164	250	358	--	.5	1,080	1.47	2,420	402	268	55	5.0	1,850	7.7
Feb. 11-20-----	894	6.6		95	17	205		134	196	312	--	.5	898	1.22	2,170	308	198	59	5.1	1,550	7.5
Feb. 21-28-----	1,056	11		108	18	236		146	209	372	--	.2	1,030	1.40	2,910	344	224	60	5.6	1,780	7.5
Mar. 1-10-----	1,222	10		100	17	225		135	193	350	--	3.5	8964	1.31	3,180	320	209	60	5.5	1,700	7.6
Mar. 11-17-----	1,095	7.8		108	18	216		144	220	330	--	.5	8971	1.32	2,850	344	226	58	5.1	1,680	7.8
Mar. 18-31-----	6,623	8.6		46	6.0	55		108	57	77	--	2.2	325	.44	5,810	140	51	46	2.0	548	7.5
Apr. 1-11-----	6,491	12		46	5.0	44	4.6	124	39	67	0.6	2.8	305	.61	5,350	136	34	40	1.6	499	7.7
Apr. 12-23-----	3,481	9.4		56	7.3	84		118	81	119	--	1.5	440	.60	4,140	170	73	52	2.8	729	7.6
Apr. 24-30-----	6,790	8.2		35	4.1	14	3.2	110	23	16	--	3.0	4161	.22	26,640	104	14	22	.6	280	7.9
May 1-5, 9-----	98,870	14		40	4.4	14	4.0	125	21	20	--	1.5	190	.26	51,210	118	16	20	.6	303	7.3
May 6-8, 10-15-----	78,540	14		56	7.1	58		120	70	85	--	3.5	386	.52	81,850	169	70	43	1.9	612	7.3
May 16-20-----	81,540	14		43	5.3	24	3.6	123	33	34	--	2.8	34	.33	53,720	129	28	28	.9	379	7.3
May 21-31-----	81,780	13		54	7.7	61		116	68	92	--	2.8	390	.53	65,050	166	71	44	2.0	624	7.4
June 1-10-----	67,500	13		48	7.0	41		116	56	63	--	3.0	300	.41	54,680	149	54	37	1.5	507	7.7
June 11-20-----	57,840	12		51	7.7	36	3.8	117	52	55	--	2.5	287	.39	42,500	148	52	34	1.3	477	7.7
June 21-30-----	57,710	12		51	7.7	42	3.9	121	60	65	--	2.2	324	.44	46,110	158	60	36	1.5	532	7.6
July 1-10-----	32,170	14		58	8.3	47	4.2	140	61	73	--	1.8	361	.49	31,360	178	64	36	1.5	594	7.7
July 11-20-----	9,518	14		59	7.9	33	4.1	159	46	56	--	2.2	322	.44	8,270	180	49	28	1.1	530	7.8
July 21-31-----	6,973	12		54	7.4	28	4.5	163	32	43	--	1.8	286	.39	5,380	165	32	26	.9	480	7.7
Aug. 1-10-----	6,679	22		54	8.1	39	4.9	168	42	57	--	1.5	318	.43	5,730	168	30	33	1.3	527	8.1
Aug. 11-20-----	1,999	16		62	8.9	44	4.5	194	47	63	--	1.0	356	.48	1,920	191	32	33	1.4	593	8.2
Aug. 21-31-----	1,361	16		72	15	80		200	91	110	--	.5	518	.70	1,900	241	77	42	2.2	839	7.8
Sept. 1-10-----	1,034	12		75	16	87		191	99	118	--	.2	538	.73	1,500	253	96	41	2.2	866	8.0
Sept. 11-20-----	1,962	12		74	17	80		194	101	128	--	.2	568	.77	1,480	254	96	43	2.4	896	7.9
Sept. 21-30-----	2,972	11		65	14	70		168	85	103	--	.2	475	.65	3,810	220	82	41	2.0	738	7.8
Weighted average-----	15,290	13		50	6.9	46		124	54	65	--	2.5	317	0.43	13,090	154	52	39	1.6	519	--

a Sum of determined constituents.

BRAZOS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Diss-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (µm)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
DOVE CREEK AT WEIR A, 21 MILES NORTHWEST OF ASPERMONT																					
Oct. 20, 1956	0.10	9.0		293	46	1,190	56	1,900	940	940		5.9		3,290	4.47	920	874	65	11	4,750	7.2
Oct. 23	.01	2.7		559	60	940	85	1,440	1,500	1,500		.5		4,540	6.17	1,640	1,570	55	10	6,460	7.2
Mar. 7, 1957	.02			409	34	847	987	63	947	1,640						1,160	1,110	65		6,460	7.7
May 15	.01					1,355	8.4		1,480	1,360						1,660	1,160	53		6,270	
June 23	.01					1,355	8.4		1,130	250						1,210	1,160	22		2,600	7.8
MILLERS CREEK AT COUNTY ROAD CROSSING 12 MILES SOUTHWEST OF SEYHOOR																					
Feb. 21, 1957	0.00	12		34	5.3	15	128	16	13	13		2.1		161	0.22	108	3	24	0.6	238	8.2
Mar. 22	12.3	11		29	5.9	14	113	15	9.0	14		6.1		146	-20	96	3	24	.6	219	8.1
May 28						19	136	31	14	14						123	12	25		292	7.8
Aug. 22	.00						176		24	24						170	26			444	8.2
BELTON RESERVOIR NEAR BELTON																					
June 17, 1957		9.6	0.04	37	3.4	8.2	122	10	7.5	0.4		2.2		138	0.19	106	6	14	0.3	245	7.2
NOLANS CREEK AT BELTON																					
Dec. 6, 1956	3.18	3.3		71	8.1	92	261	56	86			20		464	0.63	211	0	49	2.7	633	7.4
LAMPASAS RIVER AT US HIGHWAY 81 NEAR BELTON																					
Dec. 6, 1956	3.78	5.4		52	12	42	188	13	73			0.2		290	0.39	180	26	33	1.3	526	8.2
LAMPASAS RIVER BELOW MOUTH OF SALADO CREEK NEAR BELTON																					
Dec. 7, 1956	15.1	7.6		65	16	33	243	20	54			3.5		318	0.43	228	29	24	0.9	573	7.4
SAN GABRIEL RIVER AT FARM ROAD 487 FIVE MILES NORTHWEST OF ROCKDALE																					
Dec. 3, 1956	0.43	9.4		53	4.4	80	205	79	51			1.5		379	0.52	149	0	54	2.9	630	8.0
ELM CREEK AT US HIGHWAY 190 NEAR CAMERON																					
Dec. 4, 1956	0.83	7.4		57	5.0	79	211	55	71			3.5		382	0.52	162	0	51	2.7	680	7.3
NAVASOTA RIVER AT STATE HIGHWAY 6 NEAR NAVASOTA																					
Dec. 3, 1956	6.76	8.8		104	21	993	95	23	1,700			4.5		2,900	3.94	345	267	86	23	5,290	6.9



COLORADO RIVER BASIN  
COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION.--At gaging station at Colorado City, Mitchell County, 3.517 feet upstream from bridge on U. S. Highway 80, 4,100 feet upstream from Texas & Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.

DRAINAGE AREA.--4,082 square miles, approximately, of which 2,590 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1954; November 1956 to September 1957.

Water temperatures: November 1952 to September 1954; November 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 19,800 ppm Jan. 24-31, Feb. 1-6; minimum, 208 ppm May 12-14, 17-18.

Hardness: Maximum, 2,390 ppm Jan. 24-31, Feb. 1-6; minimum, 85 ppm May 25-26, 31, June 1-2.

Specific conductance: Maximum observed, 36,500 microhos Dec. 19; minimum observed, 245 microhos May 14.

Water temperatures: Maximum observed, 93°F July 30; minimum observed, freezing point on several days during December and January.

EXTREMES, 1946-54, 1956-57.--Dissolved solids: Maximum, 32,800 ppm Apr. 1-10, 1952; minimum, 176 ppm Oct. 26, 1947.

Hardness: Maximum, 4,500 ppm Aug. 9-12, 1946; minimum, 65 ppm Sept. 13-20, 1949.

Specific conductance: Maximum observed, 45,800 microhos Apr. 1-10, 1952; minimum observed, 245 microhos May 14, 1957.

Water temperatures (1956-57): Maximum observed, 93°F July 30, 1957; minimum observed, freezing point on several days during December 1956 and January 1957.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
Nov. 15-21, 1956-----	40.09	4.0		263	115	3,050		68	644	4,930		--		9,040	12.3	3.70	1,170	1,070	85	39	14,600	7.4
Nov. 22-30-----	4.09	3.5		385	173	4,720		76	1,090	7,330		--		13,900	18.9	3.38	1,070	1,610	86	50	21,300	7.6
Dec. 1-10-----	4.05	2.8		434	188	5,320		82	1,290	8,320		--		15,800	21.5	--	1,860	1,790	86	54	23,800	7.5
Dec. 11-20-----	4.4	4.4		489	237	6,360		89	1,360	10,360		--		15,800	21.5	206	2,190	1,720	86	59	27,700	7.4
Dec. 21-31-----	5.30	4.5		376	173	4,310		103	1,210	7,180		--		15,000	20.4	185	1,150	1,560	85	46	20,200	7.6
Jan. 1-10, 1957-----	78	3.9		428	183	5,050		91	1,180	8,160		--		15,000	20.4	31.6	1,820	1,250	86	51	23,200	7.6
Jan. 11-23-----	37	5.8		530	222	6,330		105	1,460	10,400		--		19,300	26.2	19.3	2,260	1,150	86	60	28,100	7.7
Jan. 24-31, Feb. 1-6-----	2.85	4.5		569	235	6,670		122	1,500	10,180		--		19,800	26.9	152	2,390	2,290	86	59	28,800	7.6
Feb. 7-----	676	13		283	102	2,750		80	319	4,760		--		8,270	11.2	15,090	1,130	1,060	84	36	14,300	7.5
Feb. 8-----	1,800	11		36	5.3	101	5.6	109	35	148		4.1		6,400	8.6	1,940	111	22	65	4.2	721	7.8
Feb. 9-10-----	74	8.2		74	16	477		92	178	2,350		2.8		1,520	2.07	304	258	183	80	13	2,800	7.5
Feb. 11-18-----	10.1	8.4		163	52	1,930		92	328	2,350		--		4,380	5.96	119	620	565	83	25	7,520	7.8
Feb. 19-28-----	3.37	6.5		260	90	2,460		102	353	4,040		--		7,660	10.1	67.9	1,020	935	84	33	12,300	7.8
Mar. 1-10-----	94	4.6		354	122	3,220		111	853	5,750		--		10,600	16.4	26.9	1,380	1,290	85	41	16,800	7.8
Mar. 11-18-----	2.25	1.7		410	124	4,100		91	862	6,440		--		12,300	16.7	8.30	1,530	1,460	85	45	19,100	7.6
Mar. 19-31-----	3.88	5.6		372	146	3,810		94	891	6,240		--		11,500	15.6	120	1,530	1,450	84	42	18,000	7.5
Apr. 1-10-----	4.33	3.9		394	157	4,020		80	941	6,610		--		12,200	16.6	10.9	1,630	1,560	84	43	18,900	7.3
Apr. 11-18-----	40	3.5		425	172	4,420		75	1,090	7,220		--		13,400	18.2	--	1,770	1,710	84	46	20,500	7.3
Apr. 19-24-----	41.46	8.2		400	155	3,970		67	1,010	6,240		--		11,800	16.0	46.5	1,640	1,580	84	42	18,700	7.1
Apr. 25-27-----	1,775	12		45	6.7	163		94	219	2,288		2.2		615	8.4	2,950	140	63	72	6.0	1,090	7.4
Apr. 28-30-----	1,541	11		32	4.3	181		99	27	85		2.2		284	3.9	1,180	98	17	58	2.7	494	7.0
May 1, 9-10-----	376	9.8		44	6.6	376		84	51	242		1.0		595	8.1	604	136	67	71	5.6	1,010	7.3
May 2-8-----	22.5	1.8		140	39	904		123	266	1,508		4.0		2,910	3.96	177	510	409	79	17	5,110	7.3
May 11, 19, 27-----	776	1.3		45	6.3	131		114	66	1,198		3.0		532	7.2	1,110	138	44	67	4.9	906	7.6
May 12-14, 17-18-----	1,919	12		50	3.3	35		99	16	46		3.0		208	2.8	1,080	88	7	47	1.6	346	7.4
May 15-16, 20-21, 24, 28-29-----	59.1	12		57	23	303		126	94	492		2.0		1,040	1.41	166	236	134	74	8.6	1,900	7.6
May 22-23, 30-----	20.6	13		100	23	535		140	158	870		2.0		1,770	2.41	98.4	344	230	77	13	3,200	7.6
May 25-26, 31, June 1-2, 4, 7, 8-----	4,784	12		28	3.5	46		104	19	56		2.0		232	3.000	--	85	0	54	2.2	391	7.3

a Includes days of less than 0.05 cfs flow.

b Sum of determined constituents.

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

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
June 3, 1957	289	12		51	7.8	127		114	28	220		2.0		6504	0.69	393	158	64	64	4.4	967	7.6
June 4-6	54.3	15		90	1.8	374		156	130	600		3.5		1,310	1.78	192	298	170	73	9.4	2,370	8.0
June 7-12, 17, 20	19.0	12		157	4.7	957		142	334	1,560		2.0		3,140	4.27	161	585	468	78	17	5,490	8.0
June 13-16, 18-19	47.7	13		114	2.9	647		138	247	1,020		2.0		2,140	2.91	276	404	290	78	14	3,790	8.0
June 21-30	13.6	9.2		160	5.4	1,090		151	349	1,780		1.5		3,520	4.79	129	621	498	79	19	6,180	8.1
July 1-8	a.74	6.3		182	6.8	1,470		119	433	2,400		--		4,620	6.28	9.23	734	636	81	24	7,900	7.8
July 9-22	a0	11		275	10.9	2,320		104	737	3,770		--		7,270	9.89	--	1,130	1,050	82	30	11,900	7.7
July 23-30	29.7	9.6		109	3.6	988		97	275	1,560		2.0		3,030	4.12	243	420	340	84	21	5,330	7.8
July 31, Aug. 2-4	27.8	10		36	7.0	146		94	47	218		3.8		524	.71	39.3	119	42	73	5.8	944	7.7
Aug. 1, 5-8	18.9	6.0		102	3.5	900		91	239	1,440		2.5		2,770	3.77	141	398	324	83	20	5,000	7.4
Aug. 9-18	a.08	7.0		110	4.2	1,140		69	312	1,800		4.0		3,450	4.69	.75	447	390	85	23	6,010	7.8
Aug. 19-23	3.57	5.0		180	7.4	1,930		48	444	3,150		--		5,810	7.90	56.0	754	714	85	30	9,770	7.5
Aug. 26-31, Sept. 1-6	a.02	8.2		232	9.1	2,370		93	564	3,780		--		7,040	9.57	.48	953	877	84	33	11,700	7.7
Sept. 7-8	21.7	6.2		169	5.0	1,410		112	350	2,300		--		4,340	5.90	254	627	535	83	25	7,510	7.9
Sept. 9-11	11.2	5.2		61	1.6	483		98	136	740		1.8		1,490	2.03	45.1	218	138	83	14	2,730	7.9
Sept. 12-20	a1.48	5.6		101	3.1	909		77	224	1,460		1.3		2,770	3.77	11.1	380	316	84	20	4,980	7.7
Sept. 21-22	8.80	6.4		36	4.8	91		103	32	133		2.1		6356	.48	8.46	109	24	64	3.8	667	8.0
Sept. 23-30	a0	5.2		54	1.0	265		70	90	425		1.0		946	1.29	--	176	118	77	8.7	1,670	7.7
Weighted average	c1.63	12		40	7.4	151		102	42	235		--		555	0.75	244	130	47	72	5.8	946	--

a Includes days of less than 0.05 cfs flow.

b Sum of determined constituents.

c Represents more than 99% of discharge for the year.

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

LOCATION--At gaging station at bridge on county road, 5.4 miles southwest of Silver, Coke County, 11 miles upstream from Pecan Creek, 16.4 miles northwest of Robert Lee, and at mile 74.3.  
 DRAINAGE AREA--15,479 square miles, approximately, of which 11,600 square miles is probably noncontributing.  
 RECORDS AVAILABLE--Chemical analyses: October 1956 to September 1957.  
 Water temperatures: October 1956 to September 1957.  
 EXTREMES, 1956-57--Dissolved solids: Maximum, 6,190 ppm Nov. 3-10; minimum, 180 ppm June 1-4.  
 Ingress: Maximum, 1,050 ppm Mar. 14-16; minimum, 93 ppm Apr. 29-30.  
 Specific conductance: Maximum observed, 12,000 micromhos Jan. 18; minimum observed, 202 micromhos June 2.  
 Water temperatures: Maximum observed, 85°F June 21; minimum observed, 38°F Dec. 9.  
 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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 15-16, 1956	613	11		41	4.7		22	117	42	19	0.5	2.2		204	0.28	338	122	26	28	0.9	326	7.5
Oct. 17-19	576	11		42	5.3		17	139	27	13		2.3		191	.26	297	127	13	23	.7	312	7.6
Oct. 20-24	40.5	10		36	5.1		35	115	36	37	.5	2.8		222	.30	24.3	111	17	41	1.5	374	7.9
Oct. 25-29	4.66	10		44	7.0		77	117	64	100	.6	2.0		358	.48	4.36	140	44	54	2.6	634	7.5
Oct. 30-31	212	13		48	4.9		19	133	30	26	.5	4.8		211	.29	121	121	31	23	.7	349	7.7
Nov. 1	112	18		70	14		150	127	143	214		4.5		678	.92	205	233	129	38	4.2	1,160	8.1
Nov. 2	37	15		117	29		631	116	314	960	.6	5.0		2,130	2.90	213	410	314	77	14	3,640	7.9
Nov. 3-10	5.69	7.8		201	98		2,030	79	348	3,470	.3	--		6,150	8.42	.75	904	840	83	29	10,500	7.2
Nov. 11-20	8.05	8.2		231	90		1,740	94	462	2,950	.3	--		5,530	7.52		946	870	80	23	9,240	7.8
Nov. 21-30	8.0	5.8		259	88		1,770	100	547	2,980	.3	--		1,010	7.75		992	926	79	24	9,420	7.6
Dec. 1-9	8.0	3.8		251	89		1,840	109	511	3,100	.3	--		5,850	7.96		896	902	80	25	9,660	7.7
Dec. 10-17	8.0	5.0		214	88		1,840	111	381	3,120	--	--		5,700	7.75		896	805	92	27	9,610	7.7
Dec. 18-20	4.0	5.6		90	22		483	125	169	800	--	1.8		1,610	2.19		315	256	77	12	2,840	7.8
Dec. 19-20	440	8.6		39	5.2		20	72	27	21		2.2		1,92	.26	228	118	16	27	8	325	8.0
Dec. 21, 23-25	32.7	6.4		80	27		272	128	218	400	--	7.5		1,070	1.46	94.5	310	206	66	6.7	1,880	7.4
Dec. 22	33	7.0		41	9.4		110	95	89	149	--	1.2		462	.63	41.2	142	64	93	4.0	805	7.6
Dec. 26-31	2.80	7.0		92	30		402	129	286	375	--	2.0		1,470	2.00	11.1	353	248	71	9.3	2,540	7.7
Jan. 1-10, 1957	1.8	5.8		133	37		572	148	405	840	--	2		2,070	2.82	1.01	484	362	72	11	3,500	7.9
Jan. 11-20	8.0	6.3		229	52		917	164	670	1,380	.6	3		3,340	4.34		866	651	72	14	5,480	8.0
Jan. 21-28	8.0	4.4		217	53		927	174	650	1,400	.6	6		3,350	4.52		760	617	73	13	5,390	7.8
Jan. 29-31				284	66		1,350	188	741	2,120	.4	--		4,660	6.34	.38	980	826	75	19	7,530	7.8
Feb. 1-2, 4-5	8.03	4.0		111	35		452	156	328	660	.7	5		1,660	2.26	6.45	420	292	70	9.6	2,860	8.0
Feb. 3	128	10		39	6.9		80	90	38	129	.3	2.2		327	.51	139	123	51	59	3.1	1,959	7.8
Feb. 6-7	432	8.2		34	12		284	98	106	430	.3	2.8		1,000	1.39	1,100	186	104	77	12	2,770	7.9
Feb. 8-13	11.0	7.8		86	21		471	95	180	730	.5	1.0		1,560	2.19	49.3	300	224	77	12	2,770	7.9
Feb. 14-20	4.23	6.4		124	32		552	127	372	1,060	.6	2.0		2,260	3.09	25.2	401	324	76	14	3,600	7.9
Mar. 1-13	.69	6.4		161	42		105	136	268	1,330	.3	1.5		5,000	3.62	1.76	1,050	936	75	20	8,180	7.8
Mar. 14-16	90	13		306	69		1,450	136	723	2,330	.3	5.0		1,260	1.71	306	1,358	271	66	7.3	2,180	7.8
Mar. 17-19	8.60	20		111	20		320	104	232	70	.3	2.5		928	.60	6.87	138	51	46	1.8	2,486	7.8
Mar. 20-23	356	12		60	12		134	114	102	203	.3	3.0		616	.84	592	199	106	59	4.1	1,040	7.7
Mar. 24-31				100	26		444	86	230	715	.7	2.2		1,570	2.14	31.2	356	286	73	10	2,740	8.0
Apr. 1-2, 6	7.35	11		69	7.4		48	136	41	67	.7	6.0		3,003	.61	82.6	152	60	41	1.7	523	8.3
Apr. 3-4	1.01	7.8		56	9.4		151	94	31	238	.7	2.5		2,860	.86	38.5	173	96	66	6.6	1,080	7.6
Apr. 7-16	1.48	7.2		169	64		837	108	369	1,380	.6	2.5		3,800	5.17	15.4	602	514	75	15	4,950	7.8
Apr. 17-18	1.50	13		228	57		1,100	131	582	1,800	.9	2.0		3,111	4.26	3,460	154	686	75	17	6,400	8.1
Apr. 19	4,120	13		30	6.9		80	40	120	370	.7	3.5		311	.54	152	164	60	55	2.9	566	8.0
Apr. 20-25	4,700	13		46	7.7		81	105	40	320	.7	2.5		813	1.11	10,320	207	90	60	6.6	1,430	7.9
Apr. 26	3,970	13		45	11		216	142	79	336	.7	3.5		375	.67	4,430	114	20	50	2.2	407	7.8
Apr. 27	3,970	9.8		27	5.2		71	127	32	104	.7	3.0		344	.37	5,090	134	30	50	2.7	686	7.8
Apr. 28	3,460	9.6		33	6.4		71	127	32	104	.7	3.0		206	.28	2,530	93	11	48	1.8	365	7.8
Apr. 29-30	4,355	7.8		30	4.5		39	101	22	49	.7	2.0		206	.28	2,530	93	11	48	1.8	365	7.8

a Includes days of less than 0.05 cfs flow.  
 b Sum of determined constituents.

COLORADO RIVER BASIN--Continued

COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
													Parts per mil.	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
May 1-4, 1957	329	10		44	6.4	78		106	54	112	0.6	3.8	380	0.52	338	136	4.9	55	2.9	665	6.8
May 5-8	17.0	12		72	14	226		120	127	352	.6	1.8	901	1.23	41.4	238	140	67	3.1	1,520	7.7
May 9-10	2,645	12		50	8.1	91		135	52	133	.6	3.5	437	.59	2,880	159	46	55	3.1	741	7.4
May 11	17,400	11		34	4.4	20		112	23	20	.5	3.0	161	.25	8,500	104	12	70	.9	731	7.2
May 12-15	6,902	11		36	6.3	43		121	42	45	.6	3.0	263	.36	4,901	116	17	45	1.6	431	7.2
May 16-17	967	11		39	8.5	71		138	65	73	.8	1.8	356	.46	929	132	19	54	2.7	583	7.9
May 18-19	6,990	11		35	5.4	40		108	31	52	.5	3.2	266	.33	4,640	110	22	44	2.7	416	7.4
May 20-22	907	10		39	7.6	67		119	58	80	.7	2.0	338	.46	828	128	30	53	2.6	573	7.4
May 23-30	2,770	11		45	7.2	59		128	51	77	.5	3.2	331	.45	2,480	143	36	47	2.1	560	7.4
May 31	4,760	12		39	6.2	52		108	40	73	.5	3.0	296	.40	3,600	123	34	48	2.1	497	7.6
June 1-4	7,382	9.4		32	4.9	25		97	26	32	.4	2.5	1,880	.24	3,590	100	20	35	1.1	322	7.3
June 5-6	902	27		51	9.1	71		131	68	96	.6	4.8	396	.54	964	164	57	49	2.4	467	7.9
June 7-9	282	24		71	14	155		150	120	225	.5	4.8	710	.97	341	234	112	59	4.4	1,200	8.0
June 10-20	231	20		89	21	279		130	190	430	.4	4.0	1,100	1.50	686	308	202	66	9.9	1,940	7.9
June 21-30	34.8	14		137	33	467		125	331	740	.4	2.2	1,790	2.43	168	478	375	68	9.3	3,980	7.8
July 1-6, 15, 19-20	13.2	15		214	53	738		106	565	1,190	.4	2.0	2,830	3.85	101	752	665	68	12	7,730	7.8
July 7-14, 16-18	10.2	15		273	69	1,250		105	778	1,980	.3	2.5	4,420	6.01	222	964	878	74	16	7,080	7.8
July 21-23, 28-31	18.3	15		248	70	1,150		119	608	1,900	.4	3.0	4,050	5.51	200	707	810	73	17	6,790	7.9
July 24-25	262	12		54	6.7	52		115	64	78	.5	3.0	8329	.45	233	162	68	41	1.8	882	7.8
July 26	158	17		65	13	127		113	120	192	.9	3.0	1,594	.81	253	216	123	46	3.8	1,040	8.0
July 27	68	14		122	26	345		130	264	550	.5	4.0	1,390	1.89	255	412	305	65	7.4	2,400	8.1
Aug. 1-10	28	8.0		178	48	954		117	440	1,530	.5	3.0	3,220	4.38	243	642	546	76	16	5,570	7.8
Aug. 11-17	8.10	13		222	55	1,020		141	572	1,620	.6	3.0	3,570	4.86	78.1	780	664	74	16	6,050	7.8
Aug. 18-19, 22-23	369	13		62	15	195		127	131	280	.6	3.0	791	1.08	786	216	112	66	3.8	1,400	8.1
Aug. 20-21	118	12		38	8.8	86		106	63	114	.7	3.2	1,578	.51	120	330	43	59	3.3	3,081	8.1
Aug. 24-28	6.30	14		117	28	485		122	290	750	.6	1.5	1,750	2.38	29.8	407	307	72	10	3,020	8.1
Aug. 29-31, Sept. 1-2	3.92	15		195	47	985		147	534	1,250	.5	1.5	3,170	4.58	35.7	680	360	76	16	3,380	7.9
Sept. 3-5, 11-13	38.2	10		136	29	326		116	326	520	.5	1.5	1,440	1.92	145	458	384	61	6.6	3,350	7.7
Sept. 6-10	3.76	10		158	35	636		127	402	990	.5	.5	2,850	3.11	23.2	538	434	72	12	2,950	7.8
Sept. 14-19	5.78	8.6		170	43	813		117	460	1,270	.5	.5	4,010	5.45	32.5	774	670	77	19	6,080	7.9
Sept. 20	3.00	12		218	56	1,190		128	624	1,850	.8	--	4,279	.38	1,030	137	25	40	1.6	6,099	7.8
Sept. 21-24	1,361	10		45	6.0	42		137	38	52	.6	3.0	1,576	.78	56.0	180	192	62	4.4	1,940	7.9
Sept. 25-26	36	16		58	8.6	137		100	200	200	.8	2.5	8968	1.32	24.6	296	158	68	6.8	1,700	7.5
Sept. 27-30	9.42	12		82	13	254		122	164	380	.8	2.0	329	0.45	441	131	35	51	2.4	365	--
Weighted average	696	11		41	6.9	64		117	46	88	0.6	2.9	329	0.45	441	131	35	51	2.4	365	--

a Includes days of less than 0.05 cfs flow.  
b Sum of determined constituents.

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

LOCATION.--At seining 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 47 1/2.  
 DRAINAGE AREA.--30,600 square miles, approximately, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: September 1947 to September 1957.  
 Water temperature: September 1947 to September 1957.

Sediment records: December 1950 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,100 ppm Aug. 28-31, Sept. 1-5; minimum, 149 ppm Apr. 20-23, 25-29.  
 Hardness: Maximum, 436 ppm Aug. 28-31, Sept. 1-5; minimum, 69 ppm May 11-20.  
 Specific conductance: Maximum observed, 2,150 microhos Aug. 31; minimum observed, 196 microhos Apr. 23.  
 Water temperature: Maximum observed, 90° F July 28; minimum observed, 59° F Jan. 17.  
 EXTREMES, 1947-57.--Dissolved solids: Maximum, 1,350 ppm Oct. 13-19, 1947; minimum, 102 ppm Sept. 23-25, 1955.  
 Hardness: Maximum, 522 ppm Oct. 13-19, 1947; minimum, 71 ppm June 23-30, 1949.  
 Specific conductance: Maximum observed, 3,420 microhos Sept. 20, 1947; minimum observed, 161 microhos Sept. 11, 1955.  
 Water temperature: Maximum observed, 98° F Aug. 31, 1956; minimum observed, freezing point Jan. 29, 1948, Jan. 30, 1951.  
 REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.  
 Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sol-uble sil-ica (SiO <sub>2</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium adorp-tion ratio	Specific con-ductance (microhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Cal-cium, mgm-	Non-car-bon-ate				
Oct. 1-10, 1956-----	111.2	12	47	22	52	339	316	19	74	83	0.8	2.2	35.5	0.47	10.4	209	13	35	1.5	625	7.8	
Oct. 11-19-----	732	11	53	19	56	316	140	26	62	29	3.2	2.2	365	50	761	206	29	37	1.7	651	7.8	
Oct. 20-31-----	2,143	10	43	7.7	27	130	29	38	38	29	2.5	2.5	249	136	1,440	138	23	36	1.2	436	8.1	
Nov. 1-10-----	628	10	42	7.3	27	130	29	38	38	29	2.5	2.5	236	132	1,397	136	27	30	1.0	391	7.8	
Nov. 11-20-----	177.7	10	42	9.0	27	150	12	12	42	42	2.5	2.5	4232	30	46.6	142	19	29	1.0	392	8.0	
Nov. 21-30-----	31.6	12	49	14	34	196	19	19	50	50	2.5	2.5	4276	38	23.5	180	20	29	1.1	489	8.2	
Dec. 1-10-----	20.6	12	54	18	41	229	21	21	62	62	1.0	1.0	344	47	19.1	208	21	30	1.2	575	8.2	
Dec. 11-18, 20-----	124	10	58	20	47	246	23	23	72	72	1.2	1.2	367	50	132	226	22	31	1.4	644	8.2	
Dec. 19-----	928	9.6	26	10	19	146	9.4	9.4	26	26	1.2	1.2	412	22	406	107	22	26	1.4	277	8.2	
Dec. 21-24-----	458	8.0	26	7.5	29	123	26	26	132	132	1.2	1.2	467	56	450	147	22	56	3.0	692	7.9	
Dec. 25-31-----	176	8.0	45	9.3	29	148	23	23	29	29	1.2	1.2	230	34	119	151	19	30	1.0	430	8.1	
Jan. 1-10, 1957-----	67.9	8.2	59	14	40	300	41	41	81	81	1.2	1.2	346	47	65.3	203	41	30	1.2	582	8.1	
Jan. 11-20-----	47.6	7.6	79	22	54	243	82	82	83	83	1.2	1.2	484	66	62.2	282	86	29	1.4	774	8.1	
Jan. 21-31-----	44.5	8.2	79	24	60	265	75	75	93	93	1.5	1.5	513	70	61.6	296	78	31	1.5	822	8.1	
Feb. 1-10-----	48.8	9.4	71	24	61	344	80	74	93	93	1.6	1.6	432	64	62.2	276	76	32	1.6	805	8.0	
Feb. 11-19-----	234	7.0	70	18	86	306	80	80	135	135	1.2	1.2	510	71	35.2	248	88	41	2.4	895	7.9	
Feb. 20-28-----	127	7.8	75	18	85	301	84	84	130	130	1.2	1.2	530	71	182	262	98	41	2.4	897	7.9	
Mar. 1-10-----	60.1	7.0	75	21	87	329	94	94	130	130	1.2	1.2	482	66	76.2	264	76	36	1.0	811	7.1	
Mar. 11, 22-31-----	1,163	10	42	3.2	33	229	27	27	99	99	3.2	3.2	252	52	738	120	24	24	1.5	404	7.1	
Mar. 12-21-----	737	8.6	42	21	33	182	124	124	206	206	1.5	1.5	722	72	722	294	145	48	3.2	1,160	7.9	
Apr. 1-6-----	550	9.2	42	8.6	24	148	21	21	34	34	2.8	2.8	288	31	339	140	19	28	1.9	381	7.8	
Apr. 7-18-----	206	7.8	62	14	91	156	77	50	143	143	2.0	2.0	502	28	279	212	84	40	2.7	845	8.1	
Apr. 19, 24, 30-----	19,090	11	43	5.6	35	134	22	22	51	51	1.3	1.3	286	68	12,270	121	21	21	1.3	471	8.1	
Apr. 20-23, 25-29-----	18,020	11	36	3.7	30	120	16	16	27	27	2.0	2.0	149	40	4,440	104	11	11	1.6	233	7.9	
May 1-10-----	8,052	9.8	38	5.0	22	128	16	16	27	27	4.0	4.0	244	28	4,440	116	11	11	1.9	224	7.6	
May 11-20-----	42,310	10	39	3.5	16	110	11	11	14	14	3.0	3.0	135	21	17,780	89	14	25	2.7	378	7.6	
May 21-31-----	20,770	10	39	4.0	18	123	16	16	23	23	4.0	4.0	194	15	10,680	115	14	25	2.7	313	7.6	
June 1-9-----	14,590	10	42	6.0	19	134	30	30	26	26	4.0	4.0	213	23	8,390	129	30	26	1.7	308	7.5	
June 10-20-----	2,962	13	54	10	33	160	35	35	33	33	6.9	6.9	313	43	2,250	116	42	29	1.1	378	7.4	
June 21-30-----	1,134	18	68	15	30	186	69	69	108	108	7.6	7.6	415	43	1,430	231	76	42	2.0	780	8.2	
July 1-10-----	377	19	68	20	20	210	71	71	9.4	9.4	8.6	8.6	343	56	323	232	60	39	1.4	863	8.1	
July 11-20-----	169	22	70	24	24	232	74	74	11.5	11.5	12	12	516	27	248	273	83	27	1.8	878	8.1	
July 21-31-----	411	16	82	24	24	228	100	100	157	157	10	10	650	68	699	303	116	42	2.5	878	8.0	
Aug. 1-12-----	207	15	88	31	31	191	169	169	190	190	9.7	9.7	774	74	1,035	433	190	43	2.8	1,230	8.1	
Aug. 13-27-----	114	17	81	33	33	195	170	170	196	196	2.3	2.3	795	75	1,08	455	238	178	43	2.0	1,220	7.9
Aug. 28-31, Sept. 1-5-----	92.1	16	102	44	44	191	170	170	218	218	2.5	2.5	811,000	1,50	2,74	205	279	53	4.7	1,870	7.9	
Sept. 6-12-----	103	16	74	32	32	208	142	142	218	218	2.5	2.5	8730	99	2,05	316	146	44	3.5	1,270	8.0	
Sept. 13-24-----	1,265	11	48	9.1	9.1	158	48	48	58	58	3.2	3.2	298	41	1,020	157	104	38	1.8	501	8.0	
Sept. 25-30-----	1,194	10	64	18	18	158	40	40	136	136	3.2	3.2	541	74	1,740	234	104	48	2.8	918	8.0	
Weighted average-----	3,354	10	38	5.3	23	125	19	19	29	29	3.4	3.4	204	0.28	1,850	117	14	30	0.9	333	--	

a Sum of determined constituents.

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from bridge on U. S. Highway 290 in Austin, Travis County, half a mile downstream from Barton Creek and 4.5 miles upstream from gaging station at Montopolis bridge on U. S. Highway 283.  
 DRAINAGE AREA.--36,400 square miles, approximately above gaging station, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.  
 Water temperatures: October 1947 to September 1957.  
 EXTRACTS, 1956-57.--Dissolved solids: Maximum, 239 ppm June 2-3; minimum, 184 ppm July 1-31.  
 Hardness: Maximum, 171 ppm Jan. 1-31; minimum, 122 ppm June 1, 4-30.  
 Specific conductance: Maximum observed, 152 micromhos Dec. 1; minimum observed, 288 micromhos Sept. 23.  
 Water temperatures: Maximum observed, 82°F Aug. 19, 20; minimum observed, 49°F Jan. 13, 19, Feb. 19, 1957.  
 EXTRACTS, 1947-57.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.  
 Hardness: Maximum, 214 ppm Jan. 1-31, 1954; minimum, 122 ppm June 1, 4-30, 1957.  
 Specific conductance: Maximum observed, 291 micromhos July 1, 1948; minimum observed, 243 micromhos Dec. 2, 1953.  
 Water temperatures: Maximum observed, 87°F on several days during summer months; minimum observed, 43°F Jan. 28, 1948, Feb. 4, 1949.  
 REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.  
 Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1312. 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 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1956-----	310	8.0		41	11		29	162	22	39	0.2	0.8		237	0.32	196	148	15	30	1.0	412	7.7
Nov. 1-30-----	182	9.2		45	11		31	167	25	42	.4	.8		246	.33	121	157	20	30	1.1	440	8.0
Dec. 1-31-----	175	9.2		42	12		31	168	20	44	.3	.5		242	.33	114	154	16	31	1.1	432	8.0
Jan. 1-31, 1957-----	172	6.4		49	12		23	167	23	41	.3	.5		245	.33	114	171	34	22	.8	437	8.1
Feb. 1-28-----	189	7.8		42	11		31	164	22	42	.3	.8		242	.33	123	150	16	31	1.1	428	8.0
Mar. 1-31-----	229	8.2		40	11		32	158	23	41	.5	1.2		237	.32	147	145	16	32	1.1	423	8.2
Apr. 1-30-----	2,166	8.0		37	11		28	149	21	37	.3	2.2		226	.31	1,320	138	16	31	1.0	397	7.5
May 1-31-----	2,270	8.4		38	7.8		26	137	18	34	.3	1.8		207	.28	15,240	126	14	31	1.0	363	7.4
June 1, 4-30-----	18,180	9.6		38	6.7		21	132	16	27	.6	4.0		188	.26	9,230	122	14	27	.8	329	7.5
June 2-3-----	12,360	14		49	9.2		31	168	29	39	.6	4.5		239	.35	8,640	161	24	29	1.0	433	8.1
July 1-31-----	4,899	11		39	6.4		13	131	13	19	.5	3.2		184	.25	2,430	124	16	18	.5	304	7.7
Aug. 1-31-----	2,665	9.6		40	6.6		17	143	14	20	.3	3.0		197	.27	1,420	127	10	22	.6	337	8.0
Sept. 1-30-----	2,388	9.6		40	6.6		18	145	12	23	.3	1.5		190	.26	1,230	127	8	23	.7	321	7.8
Weighted average----	4,900	9.1		38	7.1		23	137	17	30	0.4	2.6		201	0.27	2,660	124	12	28	0.9	349	---

a Sum of determined constituents.

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER AT WHARTON, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 59 in Wharton, Wharton County, 1,000 feet downstream from Texas & New Orleans Railroad bridge, 12 miles upstream from Jones Creek and at mile 67.  
 DRAINAGE AREA--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE--Chemical analyses: April 1944 to September 1957.

Water temperatures: October 1945 to September 1948, March 1950 to September 1957.  
 EXTREMES, 1936-57--Dissolved solids: Maximum, 312 ppm Dec. 1-25; minimum, 106 ppm Sept. 27-29.  
 Hardness: Maximum, 199 ppm Dec. 1-25; minimum, 66 ppm Sept. 27-29.  
 Specific conductance: Maximum observed, 785 microhos Feb. 5; minimum observed, 146 microhos Sept. 27.  
 Water temperatures: Maximum observed, 86° July 29; minimum observed, 38° Jan. 17.  
 Water temperatures: Maximum observed, 765 microhos Feb. 5; minimum, 66 ppm Apr. 1-10, 1948; minimum, 106 ppm Sept. 27-29, 1957.  
 EXTREMES, 1944-57--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 66 ppm Sept. 27-29, 1957.  
 Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 66 ppm Sept. 27-29, 1957.  
 Specific conductance: Maximum observed, 765 microhos Feb. 5, 1957; minimum observed, 146 microhos Sept. 27, 1957.  
 Water temperatures (1945-48, 1950-57): Maximum observed, 95° July 26, 1954; minimum observed, 38° Jan. 17, 1957.

REMARKS--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.  
 Records of discharge for water year October 1956 to September 1957.

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ton (B)	Dissolved solids (Residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-hos at 25°C)	pH	
														Tons per acre-foot	Tons per day	Cal-cium, mag-ne-sium	Non-carbon-ate					
Oct. 1-31, 1956-----	296	16		50	12	32	5.2	200	24	43	0.3	0.5		a279	0.38	223	174	10	28	1.1	478	7.9
Nov. 1-30-----	220	10		56	13	34	5.0	224	26	47	--	.6		304	.41	181	192	8	27	1.1	529	8.2
Dec. 1-25-----	279	8.8		57	14	36	4.9	229	26	47	.4	.5		312	.62	235	199	12	26	1.0	564	8.2
Dec. 26-31-----	449	8.6		39	5.4	18	4.2	129	22	24	.5	1.8		194	.26	246	119	14	24	.7	331	7.9
Jan. 1-31, 1957-----	251	6.2		57	12	31	4.7	216	29	43	--	.5		292	.40	198	191	14	26	1.0	519	8.2
Feb. 1-28-----	361	5.8		49	13	39	4.8	199	27	55	.3	1.2		296	.40	289	176	13	32	1.3	534	7.9
Mar. 1-10-----	423	11		43	8.0	25	4.4	154	25	34	--	2.5		246	.33	281	140	14	27	.9	406	8.2
Mar. 11-17-----	497	8.2		48	10	30	4.6	183	26	41	--	1.0		272	.37	365	162	10	28	1.0	466	8.2
Mar. 18-31-----	3,266	9.2		34	3.8	11	4.1	115	14	14	--	3.8		168	.23	1,670	100	6	19	.5	260	8.0
Apr. 1-23-----	1,265	11		43	6.3	18	4.5	147	20	26	.5	2.2		222	.30	746	134	13	22	.7	359	7.8
Apr. 24-28-----	9,598	9.0		36	4.5	11	4.3	120	17	14	.5	3.2		a158	.21	4,060	108	10	17	.5	279	7.7
Apr. 29-30, May 1-3-----	35,240	12		34	3.4	7.5	4.0	105	17	9.5	--	4.2		153	.21	14,560	98	12	14	.3	237	7.2
May 4-31-----	27,230	9.6		40	7.4	23	4.9	140	20	34	--	2.5		219	.30	16,100	131	16	27	.9	374	7.6
June 1-10-----	36,730	11		38	5.9	16	4.3	123	18	25	--	3.5		195	.27	18,290	120	18	22	.6	325	7.6
June 11-20-----	28,600	12		38	5.6	13	4.3	125	16	21	--	4.2		186	.25	14,360	118	16	19	.5	307	7.5
June 21-30-----	7,052	13		43	7.2	15	4.3	146	17	23	--	4.7		214	.29	4,070	137	18	19	.6	369	7.6
July 1-31-----	4,277	13		43	6.9	13	4.0	144	15	23	--	3.2		a192	.26	2,220	136	18	17	.5	362	7.8
Aug. 1-31-----	2,151	12		38	7.8	15	4.2	140	17	20	.3	2.0		200	.27	1,160	127	12	20	9.6	331	7.8
Sept. 1-26, 30-----	2,936	11		38	7.5	17	4.5	142	15	24	--	1.0		194	.26	1,540	126	10	22	.7	323	7.9
Sept. 27-29-----	24,360	10		24	1.2	7.0	5.2	77	11	9.5	1.4	1.0		a108	.15	7,100	66	3	17	.4	169	7.7
Weighted average-----	5,937	11		39	6.3	17	4.5	131	18	25	--	3.0		198	0.27	3,170	124	16	22	0.7	331	--

a Sum of determined constituents.



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

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (um)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				

LAKE J. B. THOMAS NEAR VINCENT

Oct. 17, 1956	3.6	0.00	32	6.1	5.3	3.6	173	45	22	0.9	0.4	0.4	0	105	0	252	0.34	0	51	2.3	429	7.9
Feb. 1957	3.4	.21	32	6.3	60	60	168	56	27	.8	.0	.0	0	105	0	269	.37	0	56	2.6	468	7.7

LAKE COLORADO CITY NEAR COLORADO CITY

Nov. 15, 1956	5.3	.03	39	9.4	56	6.6	167	62	47	.8	2.5	2.5	0	136	0	311	.42	0	46	2.1	516	7.6
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REALS CREEK AT BIG SPRING

Apr. 25, 1957	19	--	39	3.8	17	1.7	132	18	14	--	4.5	4.5	5	113	5	192	.26	5	25	7.7	298	8.1
May 11	18	--	30	2.3	11	11	98	9.4	10	--	4.5	4.5	4	84	4	133	.18	4	22	5	226	8.0
May 18	14	--	58	22	119	119	83	111	218	--	3.0	3.0	167	235	167	1629	.86	167	52	3.4	1,060	8.0
May 25	12	--	61	30	150	150	91	131	275	--	2.5	2.5	201	276	201	1765	1.04	201	54	3.9	1,260	7.9

OAK CREEK LAKE NEAR BLACKWELL

Nov. 15, 1956	2.8	.03	36	6.9	3.2	7.4	133	15	6.5	.2	1.8	1.8	10	119	10	145	.20	10	5	1	256	7.8
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a Residue on evaporation at 180°C.

GUADALUPE RIVER BASIN  
GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION:--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas & New Orleans Railroad 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 1957.

Water temperatures: November 1950 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 404 ppm July 1-10; minimum, 142 ppm Oct. 23-31.

Hardness: Maximum, 267 ppm June 16-20; minimum, 86 ppm Oct. 23-31.

Specific conductance: Maximum observed, 770 micromhos Feb. 20; minimum observed, 44°F Jan. 17.

Water temperatures: Maximum observed, 87°F June 1; minimum observed, 44°F Jan. 17.

EXTREMES, 1945-46, 1948-57.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 142 ppm Oct. 23-31, 1956.

Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 86 ppm Oct. 23-31, 1956.

Specific conductance: Maximum observed, 1,950 micromhos Jan. 11-17, 1946; minimum observed, 184 micromhos Oct. 24, 1956.

Water temperatures: Maximum observed, 90°F Aug. 4, 27, 1952; minimum observed, 40°F Feb. 1-2, 1951.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 1-18, 1956-----	32.2	21	43	13	13	74	214	26	84	84	---	0.5	366	0.30	31.8	161	0	30	2.5	631	8.3
Oct. 19-22-----	879	12	30	6.0	28	4.3	130	13	32	32	---	2.2	4192	.26	456	99	0	37	1.2	336	7.8
Oct. 23-31-----	109	12	29	3.0	13	4.9	110	9.2	14	14	---	.2	142	.19	41.8	86	0	24	.6	233	8.0
Nov. 1-10-----	84.8	17	41	5.1	22	5.2	152	16	26	26	---	2.7	219	.30	50.1	123	0	27	.9	351	8.1
Nov. 11-20-----	51.3	15	41	5.6	26	4.5	154	16	33	33	---	2.0	229	.31	31.7	125	0	30	1.0	375	7.9
Nov. 21-30-----	42.7	15	50	7.7	4.0	4.4	193	22	51	51	---	.9	289	.39	33.3	157	0	35	1.4	494	7.7
Dec. 1-10-----	50.3	17	37	11	35	4.8	236	27	66	66	0.5	.5	368	.50	50.0	187	0	38	1.7	622	7.8
Dec. 11-21-----	571	16	58	13	64	5.0	252	29	78	78	.5	1.8	400	.54	61.7	199	0	40	2.0	684	8.2
Dec. 22-31-----	828	9.0	35	4.5	22	4.5	124	19	28	28	.5	1.8	199	.27	44.5	106	4	30	.9	326	7.8
Jan. 1-10, 1957-----	121	11	40	5.6	26	4.7	142	21	29	29	---	4.2	223	.30	72.9	124	8	30	1.0	373	7.4
Jan. 11-20-----	112	14	48	7.8	29	4.5	179	24	35	35	---	2.8	262	.36	79.2	153	6	28	1.0	442	7.6
Jan. 21-31-----	121	13	55	10	35	4.5	208	28	44	44	---	2.5	304	.41	99.3	179	8	29	1.1	515	8.1
Feb. 1-12-----	139	14	60	15	62	4.2	249	38	72	72	.4	2.0	395	.54	148	212	8	39	1.9	670	8.0
Feb. 13-24-----	234	14	63	16	63	4.3	260	34	77	77	---	1.0	402	.55	276	222	9	38	1.8	697	8.1
Feb. 25-28-----	1,691	11	46	10	41	4.3	177	29	54	54	---	2.5	301	.41	1,370	156	11	36	1.4	499	7.9
Mar. 1-10-----	438	13	44	8.4	32	4.3	150	29	44	44	---	3.8	276	.38	326	144	22	32	1.2	444	8.1
Mar. 11-20-----	859	12	44	7.5	29	4.0	160	27	34	34	---	2.5	257	.35	596	141	10	30	1.1	413	8.2
Mar. 21-31-----	2,106	10	39	6.4	21	4.0	140	20	27	27	---	2.8	218	.30	1,240	124	10	26	.8	351	8.1
Apr. 1-10-----	1,659	11	39	6.0	22	4.2	133	21	30	30	.5	3.2	217	.30	972	122	13	27	.9	350	7.9
Apr. 11-20-----	974	14	52	8.7	30	4.2	178	27	44	44	.5	3.0	288	.39	757	166	20	28	1.0	467	7.9
Apr. 21-30-----	9,609	10	34	4.6	12	4.6	118	15	16	16	.4	2.8	4157	.21	4,160	104	8	19	.5	272	7.9
May 1-6-----	20,130	15	42	4.8	10	5.0	140	16	14	14	---	4.2	194	.26	10,540	124	10	14	.4	305	7.6
May 7-18-----	5,418	17	60	9.8	23	4.1	197	28	34	34	---	8.2	313	.43	2,890	190	28	20	.7	478	7.8
May 19-20, 30-31-----	7,538	13	36	6.1	15	4.6	222	17	22	22	---	4.2	195	.27	3,970	114	14	14	.6	305	7.6
May 21-29-----	2,627	17	67	14	25	3.6	230	32	38	38	---	8.6	351	.48	2,490	225	36	19	.7	542	8.1
June 1-9-----	13,020	12	47	5.6	13	4.6	150	18	21	21	---	4.0	210	.29	7,380	140	18	16	.5	345	7.4
June 10-15-----	3,023	14	62	11	21	4.0	202	26	35	35	---	6.5	304	.41	4,480	200	34	18	.6	491	7.6
June 16-30-----	1,603	16	79	17	30	3.1	266	37	51	51	---	7.3	393	.53	1,700	267	49	19	.8	652	7.8
July 1-10-----	867	21	65	18	40	3.0	229	41	63	63	---	8.1	404	.55	968	236	48	27	1.1	636	8.0
July 11-20-----	660	23	62	19	42	3.1	221	42	66	66	---	6.6	396	.54	706	232	52	28	1.2	638	8.0
July 21-31-----	499	19	58	18	43	3.0	219	41	67	67	---	2.5	382	.52	515	218	39	30	1.3	631	8.0
Aug. 1-10-----	392	20	46	19	44	3.1	191	41	69	69	---	2.0	370	.50	392	193	36	33	1.4	596	7.9
Aug. 11-30-----	357	20	54	18	43	3.0	217	40	69	69	---	2.0	386	.52	372	212	34	31	1.4	625	7.9
Aug. 21-30-----	241	21	54	13	41	3.9	212	35	75	75	---	1.5	346	.47	300	196	22	31	1.3	370	7.9
Sept. 1-23-----	360	18	51	18	35	3.1	211	37	69	69	---	1.9	485	.50	342	206	33	36	1.6	637	8.2
Sept. 24-30-----	15,250	11	32	4.9	13	5.1	114	16	18	18	---	2.5	186	.21	6,620	100	24	21	.6	274	8.0
Weighted average-----	1,973	13	45	7.3	18	4.5	153	21	26	26	---	4.0	227	0.31	1,210	142	17	21	0.7	370	---

# Sum of determined constituents.

GUADALUPE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Dec. 17, 1956				21	1.7			156		4.0				117	0.22	117	0			279	7.5
Feb. 25, 1957		5.0		22	1.3	12		83	7.2	4.5	0.5	3.5		96	.13	59	0	31	0.7	143	7.5
Mar. 12		11		30	1.6	10		87	3.4	3.2	.5	3.0		97	.13	61	0	27	.6	164	7.8
Apr. 17		12		42	2.3	4.9	6.2	111	2.8	2.5	.5	3.2		119	.18	81	0	11	.2	166	6.9
Apr. 22		18		19	1.8	14		143	5.4	10	.8	5.0		183	.25	113	0	21	.6	285	7.5
Apr. 27		7.8		19	.8	4.9		71	.6	.0	.5	2.0		71	.10	51	0	17	.3	127	7.9
Sept. 30		6.0		23	1.6	6.8	8.0	96	3.8	4.5	.2	1.0		102	.14	64	0	17	.4	174	7.4

ESCONDIDO RESERVOIR NO. 1 NEAR KENEDY

a Residue on evaporation at 180°C.

NUECES RIVER BASIN  
NUECES RIVER NEAR MATRIS, TEX.

LOCATION:--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on State Highway 359, 200 feet downstream from Texas & New Orleans Railroad bridge and 4 miles southwest of Matris, San Patricio County.

DRAINAGE AREA.--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.

Water temperatures: October 1947 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 322 ppm Sept. 1-30; minimum, 177 ppm May 1-31.

Hardness: Maximum, 174 ppm July 1-31; minimum, 90 ppm Apr. 24-30.

Specific conductance: Maximum observed, 677 microhmhos Apr. 9; minimum observed, 246 microhmhos May 31.

Water temperatures: Maximum observed, 90°F July 31; minimum observed, 50°F Jan. 18-19.

EXTREMES, 1947-57.--Dissolved solids: Maximum, 548 ppm June 1-30, 1948; minimum, 175 ppm Apr. 27-30, 1949.

Hardness: Maximum, 201 ppm May 1-24, 1951; minimum, 85 ppm Apr. 27-30, 1949.

Specific conductance: Maximum observed, 1,040 microhmhos July 1, 1948; minimum observed, 233 microhmhos July 30, 1949.

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

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness at CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-31, 1956-----	635	18		37	3.2	38	6.5	141	33	31	--	3.8		240	0.33	411	105	0	42	1.6	385	7.8
Nov. 1-30-----	108	17		36	2.6	39	6.2	137	39	29	--	3.2		246	.33	71.7	101	0	44	1.7	391	7.6
Dec. 1-31-----	93.3	17		40	3.2	45	5.6	156	39	30	0.7	2.2		269	.37	67.8	113	0	45	1.8	617	7.5
Jan. 1-31, 1957-----	60.4	15		40	3.4	39	6.8	158	30	31	--	2.0		257	.35	41.9	114	0	41	1.6	615	7.7
Feb. 1-28-----	63.6	17		42	3.4	44	6.6	169	30	36	--	2.5		282	.38	48.4	118	0	43	1.8	431	7.9
Mar. 1-31-----	321	19		41	3.1	54	6.2	178	32	42	--	2.5		309	.42	268	115	0	49	2.2	480	8.2
Apr. 1-23-----	648	14		36	2.8	67		159	37	53	.5	2.8		316	.43	553	102	0	59	2.9	491	6.0
Apr. 24-30-----	9,284	12		32	2.6	24	7.3	119	20	22	.5	4.8		184	.25	4,610	90	0	34	1.1	309	7.5
May 1-31-----	9,482	14		20	10	18	6.6	117	20	15	--	3.0		177	.24	4,530	92	0	28	.8	283	7.2
June 1-30-----	8,162	14		43	3.6	17	7.4	154	15	16	--	3.8		208	.28	4,570	122	0	22	.7	334	7.4
July 1-31-----	109	17		61	5.4	27	8.3	216	23	25	.4	3.5		290	.39	85.3	174	0	24	.9	458	8.0
Aug. 1-31-----	106	17		57	6.7	36	9.0	218	28	35	.4	3.0		312	.42	89.3	170	0	30	1.2	499	8.0
Sept. 1-30-----	1,735	17		53	6.1	48		200	31	44	.4	2.5		322	.44	1,510	157	0	40	1.7	509	8.0
Weighted average-----	1,962	14		33	6.3	22	7.2	140	20	20	--	3.4		208	0.28	1,100	108	0	29	0.9	333	--

a Sum of determined constituents.

RIO GRANDE BASIN

RIO GRANDE NEAR EL PASO, TEX.

LOCATION --At gaging station 5 miles northwest of El Paso, El Paso County, 6 miles northwest of Juarez, Chihuahua, and 1.9 miles above the American Dam. DRAINAGE AREA --29,267 square miles.

RECORDS AVAILABLE --Chemical analyses: 1933 to 1937.

REPORTS --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 1936 to September 1937 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1936 to September 1937

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Magnesium				
October 1936	31	2.5	--		165	37	861	--	262	1,110	769	--	0.6	0.89	3,200	4.35		564	348	77	16	4,580	8.0
November	28	3.8	--		168	38	858	--	275	1,100	768	--	(a)	.44	3,160	4.30		574	350	76	16	4,610	8.2
December	18	3.4	--		169	40	787	--	302	1,000	725	--	(a)	.79	2,980	4.06		586	338	75	14	4,400	8.5
January 1937	24	3.4	34		159	37	826	13	317	1,060	709	1.7	(a)	.82	3,040	4.13		547	287	76	15	4,420	8.2
February	28	2.4	--		191	36	934	--	253	1,260	814	--	(a)	1.02	3,450	4.69		625	418	76	16	4,970	8.0
March	30	28	--		134	29	371	--	202	567	374	--	1.2	.33	1,660	2.26		452	287	64	7.6	2,460	7.9
April	30	117	--		105	26	237	--	215	381	227	--	.6	.25	1,150	1.56		368	192	58	5.4	1,740	8.1
May	31	8.3	--		135	30	530	--	229	726	489	--	.6	.57	2,100	2.86		462	274	71	11	3,150	8.0
June	30	244	--		79	18	141	--	192	244	126	--	(a)	.21	759	1.03		271	114	53	3.7	1,160	7.8
July	31	602	13		63	13	72	6.6	181	142	57	.6	(a)	.15	447	.61		212	64	41	2.1	733	7.9
August	31	772	--		64	10	60	--	175	128	44	--	(a)	.12	428	.58		202	58	39	1.8	661	8.2
September	30	466	--		74	15	83	--	162	188	66	--	1.2	.11	523	.71		244	112	43	2.3	839	8.0

a Less than 0.4 parts per million.

RIO GRANDE BASIN--Continued  
RIO GRANDE BELOW OLD FORT QUITMAN, TEX.

LOCATION.--At gaging station at the rectified channel of the Rio Grande, 1.5 miles below Old Fort Quitman, Hudspeth County, and 81.1 river miles below the American Dam at El Paso.  
DRAINAGE AREA --37,035 square miles (United States and Mexico), from International Boundary and Water Commission Water Bulletin Number 26).  
RECORDS AVAILABLE --Chemical analyses: 1933 to 1957.

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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate						
October 1956-		0.9																						
November-----		0																						
December-----		0																						
January 1957-		0																						
February-----		0																						
March-----		0																						
April-----		0																						
May-----	2	12			59	4.9	48		162	103	23		2.5	0.13	358	0.49	168	35	38	1.6	542	8.0		
June-----		0																						
July-----		0																						
August-----		--																						
September-----		--																						

RIO GRANDE BASIN--Continued  
RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station 7.8 river miles above the junction of the Rio Conchos, and about 10 miles northwest of Presidio, Presidio County, and 285.7 river miles below the American Dam at El Paso.  
DRAINAGE AREA.--34,988 square miles (United States and Mexico); from International Boundary and Water Commission Bulletin Number 26).  
RECORDS AVAILABLE.--Chemical analyses, 1935 to 1957.

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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
October 1956	--	1.9					--		--							--	--	--	--	--	--	--	--
November	--	0					--		--							--	--	--	--	--	--	--	--
December	--	0					--		--							--	--	--	--	--	--	--	--
January 1957	--	0					--		--							--	--	--	--	--	--	--	--
February	--	0					--		--							--	--	--	--	--	--	--	--
March	--	0					--		--							--	--	--	--	--	--	--	--
April	--	0					--		--							--	--	--	--	--	--	--	--
May	2	18					25		168		14					230	0.34	136	0	28	0.9	377	
June	6	27					46		161		23					544	.74	288	172	26	1.2	751	
July	--	0					--		--							--	--	--	--	--	--	--	--
August	--	0					--		--							--	--	--	--	--	--	--	--
September	4	12					41		175		21					302	.61	162	19	35	1.4	688	



RIO GRANDE BASIN--Continued  
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 32.9 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 26).  
RECORDS AVAILABLE--Chemical analyses: 1948 to 1957.  
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 1936 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1936 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per duty	Calcium, magnesium					Non-carbonate
October 1936-	6	453	--	--	--	--	169	--	171	--	101	--	--	--	--	993	1.35	356	216	51	3.9	1,400	--
November-----	6	357	--	--	--	--	166	--	187	--	92	--	--	--	--	985	1.34	362	208	50	3.8	1,380	--
December-----	4	339	--	--	--	--	175	--	198	--	101	--	--	--	--	1,060	1.44	387	224	50	3.9	1,470	--
January-----	5	366	29	--	118	20	173	7.4	192	451	96	1.9	2.5	0.43	--	1,030	1.40	377	220	69	3.9	1,440	7.9
February-----	7	593	--	--	--	--	139	--	180	--	76	--	--	--	--	803	1.09	290	143	51	3.5	1,150	--
March-----	4	218	--	--	--	--	148	--	175	--	89	--	--	--	--	904	1.23	338	194	49	3.5	1,280	--
April-----	6	59	--	--	--	--	107	--	212	--	55	--	--	--	--	628	.85	238	64	49	3.0	922	--
May-----	5	911	--	--	--	--	127	--	183	--	60	--	--	--	--	727	.99	248	98	53	3.5	1,040	--
June-----	7	405	--	--	--	--	92	--	162	--	59	--	--	--	--	824	1.12	387	234	34	2.0	1,120	--
July-----	7	229	17	--	116	9.8	71	5.5	211	277	23	.8	1.2	.17	--	624	.85	330	158	31	1.7	908	8.0
August-----	9	745	--	--	--	--	94	--	174	--	46	--	--	--	--	763	1.04	346	203	37	2.2	1,050	--
September-----	7	402	--	--	--	--	128	--	171	--	67	--	--	--	--	703	.96	256	116	52	3.5	1,060	--

RIO GRANDE BASIN--Continued  
RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Val Verde County, 24.1 miles above the confluence with the Pecos River, and 614.1 river miles below the American Dam at El Paso, DRAINAGE AREA.--84,795 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 26).  
RECORDS AVAILABLE.--Chemical analyses: 1944 to 1957.  
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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1956-	10	1,540	--		60	9.5	43	--	159	113	27	--	1.9	0.09	386	0.52		188	58	33	1.4	561	7.9
November-----	4	594	--		92	21	115	--	195	299	69	--	2.5	.26	750	1.02		314	154	44	2.8	1,080	8.2
December-----	4	582	--		88	22	114	--	195	284	73	--	2.5	.26	743	1.01		308	148	45	2.8	1,070	8.0
January 1957-	5	608	26		91	24	116	5.5	192	303	74	1.5	2.5	.06	762	1.04		326	169	43	2.8	1,100	8.0
February-----	8	911	--		87	16	101	--	179	267	59	--	2.5	.17	675	.92		280	134	44	2.6	975	8.0
March-----	5	543	--		83	19	96	--	185	245	62	--	2.5	.22	660	.90		285	134	42	2.5	934	8.0
April-----	8	1,500	--		53	8.8	24	--	153	60	18	--	2.5	.06	265	.36		168	42	24	.8	420	8.2
May-----	8	3,120	--		64	6.2	30	--	168	87	20	--	1.9	.10	331	.45		186	48	26	1.0	506	7.9
June-----	4	1,150	--		83	13	60	--	175	190	41	--	1.2	.08	516	.70		260	117	33	1.6	759	8.0
July-----	4	566	13		74	17	38	5.1	191	166	41	1.0	1.2	.11	455	.62		254	98	32	1.6	733	8.0
August-----	5	922	--		137	17	81	--	192	371	48	--	1.9	.18	802	1.09		411	254	30	1.7	1,100	8.2
September-----	6	825	--		83	14	67	--	177	199	43	--	2.5	.14	505	.69		264	119	36	1.8	788	8.0

RIO GRANDE BASIN  
PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.

LOCATION:--Just below dam, 3 miles upstream from Salt (Screwbean) draw, 5 miles northeast 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 1957.

Water temperatures: March 1953 to September 1957.

EXTREMES, 1936-57.--Dissolved solids: Maximum, 12,800 ppm Aug. 1-13; minimum, 4,010 ppm Sept. 12-23.

Hardness: Maximum, 3,010 ppm May 1-31; minimum, 1,440 ppm Sept. 12-23.

Specific conductance: Maximum observed, 22,600 micromhos July 26; minimum observed, 4,870 micromhos Aug. 19.

Water temperatures: Maximum observed, 80°F on several days during July and August; minimum observed, 43°F Dec. 28-29.

EXTREMES, 1937-57.--Dissolved solids: Maximum, 15,600 ppm Sept. 17-30, 1953; minimum, 1,090 ppm June 1-2, 1948.

Hardness: Maximum, 3,430 ppm July 1-31, Oct. 1-16, 1953; minimum, 602 ppm June 1-2, 1948.

Specific conductance: Maximum observed, 24,200 micromhos Sept. 28, 30, 1953; minimum observed, 1,610 micromhos June 2, 1948.

Water temperatures (1933-57): Maximum observed, 80°F on many days during July and August; minimum observed, 40°F on several days during winter months.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Orla for water year October 1956 to September 1957 given in Water-Supply Paper 1512. Mean discharge values reported below have been adjusted to reflect inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (tms)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-31, 1956-----	25.0	14		681	227	2,460		103	2,360	3,860				9,650	13.1	651	2,630	2,350	67	21	13,700	7.7
Nov. 1-30-----	21.2	--		--	--	2,010	--	108	2,360	3,240				--	--	--	2,630	2,340	62	17	12,200	7.2
Dec. 1-31-----	23.4	14		673	245	2,480		129	2,340	3,930				9,740	13.2	589	2,690	2,380	67	21	14,100	7.6
Jan. 1-31, 1957-----	47.7	6.2		687	234	2,180		125	2,340	3,460				8,970	12.2	1,160	2,680	2,370	64	18	12,900	7.8
Feb. 1-28-----	265	5.0		649	219	2,090		127	2,220	3,290				8,540	11.6	6,110	2,520	2,620	64	18	12,200	7.6
Mar. 1-31-----	8.30	5.4		637	231	1,950		145	2,140	3,140				8,170	11.1	183	2,540	2,620	63	17	11,900	7.7
Apr. 1-30-----	7.96	8.2		689	249	2,330		132	2,270	3,780				9,390	12.8	202	2,740	2,640	65	13	13,900	7.5
May 1-31-----	39.1	3.8		704	305	2,990		120	2,530	4,800				11,400	13.5	1,200	3,010	2,910	68	24	16,300	7.8
June 1-30-----	20.3	9.6		617	234	2,460		99	2,160	3,910				9,440	12.8	517	2,500	2,620	68	21	13,800	7.8
July 1-31-----	16.9	8.8		617	249	2,680		80	2,250	4,550				10,600	14.4	484	2,560	2,500	71	25	15,500	7.2
Aug. 1-13-----	11.8	15		651	283	3,650		87	2,420	5,760				12,800	17.4	408	2,790	2,720	74	30	18,200	7.6
Aug. 14-18, 20-22-----	108	12		669	211	2,510		80	2,290	3,930				9,660	13.1	2,820	2,540	2,470	68	22	13,900	7.5
Aug. 19-----	13.0	--		--	--	--	--	410	--	850				--	--	--	1,450	1,110	--	--	4,870	7.5
Aug. 23-31-----	284	14		598	161	1,680		83	1,990	2,910				7,590	10.3	5,820	2,150	2,090	65	18	11,100	7.5
Sept. 1-11, 24-30-----	175	11		480	110	1,210		86	1,470	1,900				5,230	7.11	2,470	1,650	1,580	61	13	7,790	7.7
Sept. 12-23-----	131	6.4		442	81	836		68	1,310	1,300				4,010	5.43	1,420	1,440	1,380	56	9.6	5,920	7.6
Weighted average-----	60.6	8.5		610	196	1,990		107	2,060	3,130				8,050	10.9	1,320	2,330	2,240	65	18	11,600	--

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR GIVWIN, TEX.

LOCATION:--At supplementary gage at bridge on U. S. Highway 67, about half a mile downstream from Pamhandle & Santa Fe Railway bridge, 2.1 miles east of Givwin, Pecos County, 6 1/2 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 1957.  
Water temperatures: October 1953 to September 1957.  
EXTREMES: 1946-57--Hardness: Maximum, 4,820 ppm Sept. 1-20; minimum, 330 ppm May 18.  
Specific conductance: Maximum observed, 24,300 microhos July 13-15; minimum observed, 790 microhos Apr. 26.  
Water temperatures: Maximum observed, 92°F June 24; minimum observed, 40°F Nov. 29, Dec. 29-31.  
EXTREMES: 1939-41, 1946-47, 1953-57--Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.  
Specific conductance: Maximum observed, 25,600 microhos July 1, 1956; minimum observed, 790 microhos Apr. 26, 1957.  
Water temperatures (1953-57): Maximum observed, 93°F June 1, 1954; minimum observed, 38°F Feb. 3-4, 1956.  
REMARKS:--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in Water-Supply Paper 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent sodium	So-dium ad-just-ment ratio	Specific conductance (microhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium-mg/lm	Non-carbon-ate				
Oct. 1-15, 20-31, 1956	17.8					3,920	--	61	3,930	6,140					4,280	4,230	67	26	19,800	7.4		
Oct. 16-19	47.5					2,210	--	61	2,350	3,560					2,650	2,580	65	19	12,500	7.5		
Nov. 1-30	23.6					3,860	--	104	3,880	6,050					4,160	4,080	67	26	20,700	7.6		
Dec. 1-31, 1957	24.1					3,690	--	159	3,670	5,900					4,020	3,890	67	25	19,900	7.6		
Jan. 1-31, 1957	22.2					3,670	--	187	3,610	5,800					3,920	3,770	67	25	19,800	8.0		
Feb. 1-28	54.7					3,240	--	169	3,150	5,090					3,540	3,400	67	24	17,500	7.8		
Mar. 1-31	43.2					2,970	--	112	3,150	4,720					3,360	3,290	66	22	16,800	7.6		
Apr. 1-18	30.4					3,740	--	88	3,630	5,800					4,120	4,050	66	25	19,300	7.4		
Apr. 19-22	165					1,734	--	96	960	1,160					1,120	1,040	59	9.5	5,130	7.5		
Apr. 23-24, 27, 29-30	36.4					1,980	--	139	2,220	3,060					2,480	2,370	63	17	11,500	7.5		
Apr. 25-26, 28	964					36	--	82	332	51					411	344	16	7.8	19,924	7.5		
May 1-17, 25-27	24.9					3,570	--	139	3,530	5,570					3,830	3,720	67	25	19,000	7.5		
May 18	390					192	--	107	240	300				1,330	242	56	4.6	1,570	7.9			
May 19, 28	71.5					925	--	101	1,380	1,350				1,480	1,400	58	10	6,340	7.9			
May 20-24, 29-31	52.9					1,930	--	75	2,170	3,040					2,370	2,310	64	17	11,400	7.2		
June 1-9	45.3					2,260	--	96	2,370	3,610					2,690	2,610	65	19	13,200	7.5		
June 10-30	19.1					3,080	--	72	3,140	4,720					3,340	3,280	67	23	16,700	7.4		
July 1-22	15.8					4,530	--	63	4,260	6,970					4,680	4,630	68	29	23,100	7.5		
July 23-31	23.2					3,040	--	75	3,290	4,570					3,440	3,380	66	23	16,500	7.1		
Aug. 1-31	14.8					4,380	--	68	4,440	6,920					4,750	4,690	67	28	22,900	7.5		
Sept. 1-20	13.9					4,570	--	69	4,610	7,070					4,820	4,760	67	29	23,400	7.5		
Sept. 21-30	31.6					2,280	--	89	2,440	3,540					2,610	2,540	66	19	13,100	7.6		
Weighted average	37.9					2,420	--	107	2,510	3,790					2,760	2,670	66	20	13,270	--		

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR SIRMOLA, TEX.

LOCATION:--At gaging station about 6 miles north of Shunka, Val Verde County, 13.0 miles upstream from the Pecos High Bridge and 18.5 river miles upstream from the confluence with the Rio Grande.  
DRAINAGE AREA:--35,162 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 26).  
RECORDS AVAILABLE:--Chemical analyses: October 1956, to September 1957.  
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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg/liter	Non-carbonate				
October 1956-	7	354	--	--	91	34	189	--	153	205	307	--	2.5	0.07	997	1.36	366	241	53	4.3	1,580	7.8	
November-----	6	133	--	--	130	55	313	--	165	338	530	--	2.5	.20	1,560	2.10	552	417	55	5.8	2,500	7.9	
December-----	6	168	--	--	132	59	313	--	171	339	544	--	1.2	.06	1,550	2.11	570	430	56	5.7	2,560	7.9	
January 1957-	5	165	8	--	156	71	417	6.3	165	440	716	0.8	2.5	.19	2,040	2.77	680	544	57	7.0	3,180	7.8	
February-----	5	178	--	--	166	80	515	--	156	518	858	--	1.9	.25	2,380	3.24	728	610	60	8.2	3,710	7.8	
March-----	5	164	--	--	215	107	706	--	149	717	1,180	--	1.2	.32	3,210	4.36	975	852	61	9.8	4,890	7.9	
April-----	10	671	--	--	100	31	193	--	156	226	309	--	1.9	.11	1,010	1.37	377	250	53	4.3	1,630	8.1	
May-----	12	2,810	--	--	86	20	122	--	160	160	199	--	.6	.08	1,733	1.00	292	176	56	3.1	1,160	8.0	
June-----	4	694	--	--	104	42	266	--	149	280	401	--	1.9	.23	1,230	1.68	432	310	55	5.2	2,000	7.9	
July-----	5	275	8	--	108	49	276	7.0	156	301	449	.8	2.5	.16	1,330	1.81	468	341	56	5.5	2,160	8.0	
August-----	4	211	--	--	111	49	280	--	156	302	472	--	1.9	.18	1,380	1.88	480	352	56	5.6	2,740	8.0	
September-----	4	269	--	--	106	45	267	--	159	266	418	--	1.9	.25	1,210	1.65	447	317	55	5.1	2,040	8.0	

RIO GRANDE BASIN--Continued  
RIO GRANDE AT LAREDO, TEX.

LOCATION:--At gaging station at railroad bridge between Laredo, Webb County, and Nuevo Laredo, Tamaulipas, 884.3 miles below the American Dam at El Paso. DRAINAGE AREA.--135,976 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 26). RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1957. 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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Iron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
October 1956	28	2,690	--	--	--	--	42	--	159	--	51	--	--	--	--	390	0.53		204	74	31	1.3	593	--
November	28	1,090	--	--	--	--	108	--	174	--	122	--	--	--	--	693	.94		299	156	44	2.7	1,070	--
December	30	1,050	--	--	--	--	113	--	181	--	122	--	--	--	--	710	.97		304	156	45	2.6	1,100	--
January 1957	20	995	22	--	86	25	125	4.7	183	240	138	1.0	3.1	0.21	766	1.04		318	168	46	3.0	1,180	8.1	
February	20	1,280	--	--	--	--	129	--	177	--	129	--	--	--	768	1.04		320	175	47	3.1	1,190	--	
March	18	1,120	--	--	--	--	145	--	169	--	181	--	--	--	835	1.14		321	162	50	3.5	1,300	--	
April	25	7,800	--	--	--	--	34	--	135	--	44	--	--	--	294	.40		160	49	32	1.2	476	--	
May	30	21,970	--	--	--	--	28	--	140	--	37	--	--	--	281	.38		162	48	27	1.0	450	--	
June	16	6,160	--	--	--	--	66	--	131	--	80	--	--	--	454	.62		212	88	40	2.0	718	--	
July	10	1,150	10	--	75	21	95	4.3	153	182	122	.6	2.5	.10	604	.82		275	150	42	2.5	977	7.9	
August	15	1,550	--	--	--	--	105	--	153	--	99	--	--	--	578	.79		262	136	47	2.8	899	--	
September	15	2,840	--	--	--	--	52	--	141	--	61	--	--	--	364	.50		194	78	37	1.6	621	--	

RIO GRANDE BASTIN--Continued  
 RIO GRANDE BELOW FALCON DAM, TEX.

LOCATION --Immediately below Falcon Dam, Starr County, 2.5 miles upstream from gaging station near Chapeno, 970.9 river miles below the American Dam at El Paso.  
 DRAINAGE AREA --164,682 square miles (United States and Mexico); from International Boundary and Water Commission Water Bulletin Number 26).  
 RECORDS AVAILABLE --Chemical analyses: July 1955 to September 1957.  
 REMARKS --Chemical analysis 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 1956 to September 1957 given in International Boundary and Water Commission Water Bulletin Numbers 26 and 27.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sediment adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
October 1956-	5	440	--		72	18	104	--	135	195	121	--	0.6	0.30	612	0.83		254	143	47	2.8	966	8.0
November-----	5	506	--		69	15	90	--	137	172	103	--	2.5	.20	547	.74		236	124	45	2.6	873	8.0
December-----	11	3,060	--		73	17	87	--	149	166	101	--	1.2	.15	559	.76		250	128	43	2.4	888	7.9
January 1957-	10	2,700	11		74	18	94	5.5	159	181	106	0.8	1.9	.14	600	.82		261	131	43	2.5	936	8.0
February-----	6	764	--		85	22	115	--	175	217	131	--	1.2	.21	708	.96		300	156	45	2.9	1,100	8.0
March-----	1	43	--		85	24	127	--	165	237	149	--	.6	.26	771	1.05		309	174	47	3.1	1,180	8.2
April-----	6	328	--		85	25	138	--	159	246	163	--	(a)	.22	786	1.07		316	186	49	3.4	1,220	--
May-----	10	3,530	--		54	11	52	--	128	95	66	--	1.2	.15	368	.50		180	74	39	1.7	393	7.9
June-----	8	2,770	--		51	9.4	39	--	122	69	53	--	1.2	.05	311	.42		165	65	34	1.3	508	7.9
July-----	14	1,800	6		53	9.4	40	3.9	137	73	51	.4	.6	.07	311	.42		171	58	33	1.3	521	7.8
August-----	12	3,350	--		55	9.5	42	--	142	72	55	--	(a)	.10	344	.47		179	58	34	1.4	531	8.0
September-----	10	2,540	--		56	9.5	46	--	143	76	59	--	.6	.11	336	.46		178	60	36	1.3	567	8.1

-- a Less than 0.4 parts per million.



