

**Texas Board of Water Engineers**

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**CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1955**

Prepared in cooperation with the  
United States Department of the Interior, Geological Survey  
and other agencies, under the direction of  
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**July 1957**

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## CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1955

### Introduction

This report makes available to the public data on the chemical quality of the surface waters of Texas in the water year 1955. The results of chemical analyses of water obtained daily from selected points throughout the State and also the results for a number of miscellaneous samples obtained at various points during the period October 1, 1954 to September 30, 1955, are presented.

All natural waters contain 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 variation in chemical composition of different stream waters and, often, at different points on a particular stream is very wide.

The records of chemical analysis of surface waters given in this volume 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 eleventh 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 Wichita Falls, 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 Pecos River Commission, and the U. S. Corps of Engineers.

### Collection and Analysis of Samples

The samples for which data are given were collected from October 1, 1954, to September 30, 1955. 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 streams at, or near, the sampling point for the sampling period are included in most tables of analyses.

During the period October 1, 1954 to September 30, 1955, samples were collected daily at 27 points on Texas streams and twice weekly at 4 sampling points in Trinity Bay near the mouth of the Trinity River. In addition to the data on chemical quality included in this report, temperature data for streams at 21 of the 27 sampling stations and sediment data for 1 of the sampling stations are available in the files of the U. S. Geological Survey, Austin, Texas. Records of chemical quality of streams at 52 additional sampling points for varying lengths of time have been published in previous reports of this series. The location 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.

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 using equal volumes of successive samples having similar conductances. For some streams that are subject to sudden and large changes in chemical composition or concentration, samples were composited for shorter periods on the basis of the concentration of dissolved solids indicated by the measurements of specific conductance of the daily samples. At several sampling stations where changes in chemical composition occur gradually, daily samples for an entire month were composited.

#### Expression of Results

All data in the tables of analyses are reported in parts per million except those for mean discharge, tons per acre-foot, tons per day, percent sodium, specific conductance, sodium-adsorption ratio, and pH. A part per million is a unit weight of a constituent in a million unit weights of water. 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 is 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 are residues on evaporation and for more than 1,000 parts per million are sums of determined constituents unless noted otherwise. In obtaining the sum, the bicarbonate is calculated to 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. Specific conductance, a measure of a water's ability to conduct an electric current, is reported in micromhos at 25°C. The values for pH are reported on a numerical scale. 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 ( $\text{CaCO}_3$ ).

The weighted averages of analyses are reported for those sampling stations for which discharge records are available. The weighted average of analyses 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/

#### Additional Available Data

Chemical analyses of samples collected at several additional stations in the Rio Grande Basin are published in the Water Bulletins of the International Boundary and Water Commission, El Paso, Texas.

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

## LOCATION OF QUALITY OF WATER SAMPLING STATIONS

### Arkansas River Basin

1. Canadian River near Tascosa
2. Canadian River near Amarillo
3. Canadian River near Borger

### Red River Basin

4. Prairie Dog Town Fork Red River  
near Brice
5. Mulberry Creek near Brice
6. Salt Fork Red River near Wellington
7. Elm Creek near Shamrock
8. Quitaque Creek near Quitaque
9. Pease River near Crowell
10. Little Wichita River  
near Archer City
11. Little Wichita River near  
Henrietta
12. Red River near Gainesville
13. Red River at Denison Dam  
near Denison
14. Sulphur River near Darden

### Sabine River Basin

15. Sabine River near Emory
16. Sabine River near Tatum
17. Sabine River at Logansport, La.
18. Sabine River near Ruliff
19. Cow Bayou near Mauriceville

### Neches River Basin

20. Neches River near Rockland
21. Angelina River near Lufkin
22. Neches River at Evadale

### Trinity River Basin

23. Clear Fork Trinity River  
at Fort Worth
24. Trinity River near Rosser
25. Trinity River near Oakwood
26. Trinity River at Romayor
27. Trinity River near Moss Bluff
28. Old River near Cove
29. Trinity River at Anahuac
30. Trinity Bay near Anahuac

### San Jacinto River Basin

31. San Jacinto River (West Fork)  
near Humble
32. San Jacinto River near  
Huffman

### Brazos River Basin

33. Double Mountain Fork Brazos River  
near Rotan
34. Double Mountain Fork Brazos River  
near Aspermont
35. Salt Fork Brazos River near Peacock
36. Salt Fork Brazos River near Aspermont
37. Clear Fork Brazos River at Nugent
38. Paint Creek near Haskell
39. Clear Fork Brazos River at  
Fort Griffin
40. Hubbard Creek near Breckenridge
41. Brazos River near South Bend
42. Brazos River at Possum Kingdom  
Dam near Graford
43. Brazos River near Whitney
44. Leon River near Eastland
45. Lampasas River near Belton
46. Navasota River near Easterly
47. Brazos River at Richmond

LOCATION OF QUALITY OF WATER SAMPLING STATIONS--Continued

Colorado River Basin

- |   |  |
|---|--|
| 48. Colorado River above Bull Creek<br>near Knapp | 53. Morgan Creek near Colorado<br>City |
| 49. Bull Creek near Ira                           | 54. Colorado River at Robert Lee       |
| 50. Bluff Creek near Ira                          | 55. Oak Creek near Blackwell           |
| 51. Deep Creek near Dunn                          | 56. Colorado River near San Saba       |
| 52. Colorado River at Colorado City               | 57. Colorado River at Austin           |
|   | 58. Colorado River at Wharton          |

Guadalupe River Basin

- |  |                                 |
|--|---------------------------------|
| 59. Guadalupe River near Spring Branch | 61. San Antonio River at Goliad |
| 60. Guadalupe River at Victoria        |                                 |

Nueces River Basin

- |                             |                                    |
|-----------------------------|------------------------------------|
| 62. Nueces River at Cotulla | 64. Nueces River near Three Rivers |
| 63. Nueces River at Tilden  | 65. Nueces River near Mathis       |

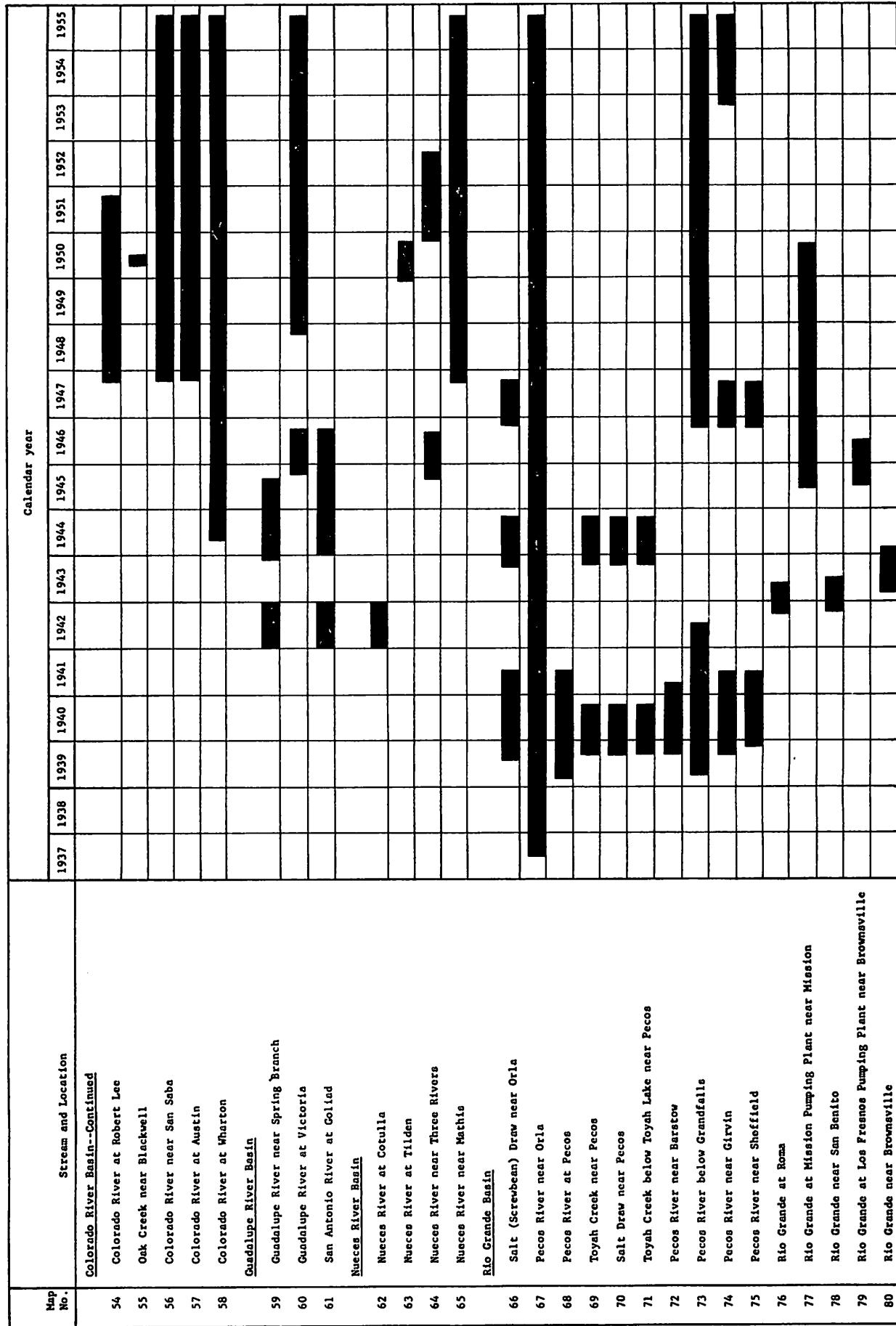
Rio Grande Basin

- |  |   |
|--|---|
| 66. Salt (Screwbean) Draw near Orla            | 74. Pecos River near Girvin                                       |
| 67. Pecos River near Orla                      | 75. Pecos River near Sheffield                                    |
| 68. Pecos River at Pecos                       | 76. Rio Grande at Roma  |
| 69. Toyah Creek near Pecos                     | 77. Rio Grande at Mission Pumping<br>Plant near Mission           |
| 70. Salt Draw near Pecos                       | 78. Rio Grande near San Benito                                    |
| 71. Toyah Creek below Toyah Lake<br>near Pecos | 79. Rio Grande at Los Fresnos Pump-<br>ing Plant near Brownsville |
| 72. Pecos River below Barstow                  | 80. Rio Grande near Brownsville                                   |
| 73. Pecos River below Grandfalls               |   |

## 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
<b>Trinity River Basin--Continued</b>																			
27	Trinity River near Moss Bluff																		
28	Old River near Cave																		
29	Trinity River at Anahuac																		
30	Trinity Bay at Mouth of Trinity River near Anahuac																		
31	<u>San Jacinto River Basin</u>																		
32	San Jacinto River (West Fork) near Humble																		
33	<u>Brazos River Basin</u>																		
34	Double Mountain Fork Brazos River near Aspermont																		
35	Salt Fork Brazos River near Peacock																		
36	Salt Fork Brazos River near Aspermont																		
37	Clear Fork Brazos River at Nugent																		
38	Paint Creek near Hackell																		
39	Clear Fork Brazos River at Fort Griffin																		
40	Hubbard Creek near Breckenridge																		
41	Brazos River near South Bend																		
42	Brazos River at Possum Kingdom Dam near Graftord																		
43	Brazos River near Whitney																		
44	Leon River near Eastland																		
45	Lampasas River near Belton																		
46	Navasota River near Easterly																		
47	Brazos River at Richmond																		
	<u>Colorado River Basin</u>																		
48	Colorado River above Bull Creek near Knapp																		
49	Bull Creek near Ira																		
50	Bluff Creek near Ira																		
51	Deep Creek near Dunn																		
52	Colorado River at Colorado City																		
53	Morgan Creek near Colorado City																		

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



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. Highway 67 and 287, 2,000 feet downstream from Pitcher Creek, 2.0 miles downstream from Panhandle & Santa Fe Railway bridge and 19 miles north of Amarillo, Potter County.

DRAINAGE AREA--19,287 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1949 to September 1955.

Sediment Records: August 1949 to September 1952.

Hardness: Maximum 579 ppm Feb. 1-10; minimum 130 ppm July 22-31.

Specific conductance: Maximum daily, 3,330 microhos May 17; minimum daily, 466 microhos Aug. 8.

Water temperatures: Maximum observed, 74°F July 23; minimum observed, freezing point on many days during winter months.

EXTREMES, 1946-55.--Disolved solids: Maximum 860 ppm Dec. 25-29, 1952; minimum 90 ppm Aug. 10-12, 1951.

Specific conductance: Maximum daily, 3,980 microhos Dec. 26, 1952; minimum observed, freezing point on many days during winter months.

Water temperatures (1949-55): Maximum observed, 95°F June 29, 1951; minimum observed, 95°F June 29, 1951; water temperatures 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 1954 to September 1955 given in Water Supply Paper 1391.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron ( $\text{Fe}$ )	Calcium ( $\text{Ca}$ )	Magnesium ( $\text{Mg}$ )	Potassium ( $\text{K}$ )	Bicarbonate ( $\text{HCO}_3^-$ )	Sulfate ( $\text{SO}_4^{2-}$ )	Chloride ( $\text{Cl}^-$ )	Fluoride (F)	Nitrate ( $\text{NO}_3^-$ )	Boron (B)	Dissolved solids			Hardness as $\text{CaCO}_3$	Calcium, magnesium	Non-carbonate	Percent sodium	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day							
Oct. 1-5, 1954-55.	75.0	26	68	27	244	226	198	268	1.2	14	4.5	607	1.83	201	280	96	65	6.3	1,630	8.0		
Oct. 6-10	3,507	16	37	14	163	188	130	168	.8	2.5	1.500	2,046	128	150	0	70	5.8	1,030	7.8			
Oct. 21-31	31.5	43	106	43	359	346	432	1.6	2.5	1.500	2,116	442	318	528	64	59	7.5	2,440	7.8			
Rev. 1-10	18.5	58	126	52	257	387	440	2.8	49	1.580	2,115	77.2	546	320	57	6.5	2,480	7.8				
Rev. 11-20	18.1	62	130	54	334	277	375	422	3.2	65	1,590	2,033	68.8	528	303	56	6.2	2,440	7.8			
Rev. 21-30	17.1	68	124	53	304	274	354	375	3.6	71	1,590	2,033	68.8	528	303	56	5.7	2,330	7.3			
Dec. 1-10	14.4	76	110	52	269	291	305	235	2.8	71	1,350	1.84	52.5	488	250	54	5.3	2,180	8.0			
Dec. 11-20	8.70	86	86	47	242	339	227	235	2.8	100	1.290	1.60	27.5	408	130	56	5.2	1,870	7.0			
Dec. 21-31	9.11	79	112	55	233	277	281	288	2.4	100	1,290	1.75	31.7	506	278	50	4.5	2,030	7.4			
Jan. 1-31, 1955	14.8	77	134	56	333	330	370	400	3.6	74	1,910	64.3	296	56	6.1	2,440	7.4					
Feb. 1-10	21.1	67	138	57	371	346	402	440	2.8	69	1,720	2.34	98.0	579	296	58	6.7	2,590	7.4			
Feb. 11-17	12.4	86	112	53	286	291	305	335	3.6	101	1,620	1.93	97.5	498	259	56	5.6	2,230	7.3			
Feb. 18-28	8.60	86	75	44	186	296	297	170	190	3.6	93	1.36	2.13	32.2	368	126	52	4.2	1,600	8.1		
Mar. 1-10	8.36	72	68	38	161	307	110	125	2.8	101	856	1.16	19.3	74	326	50	3.4	1,390	7.0			
Mar. 11-20	8.64	72	60	37	150	305	114	120	2.8	101	815	1.11	19.0	302	52	32	3.4	1,320	8.2			
Mar. 21-31	9.75	72	67	36	150	314	112	125	2.4	105	835	1.14	22.0	315	58	51	3.7	1,340	7.1			
Apr. 1-10	9.84	76	70	40	136	310	113	122	4.0	99	867	1.18	23.0	339	85	46	3.2	1,360	7.2			
Apr. 11-20	13.0	78	66	39	125	334	110	102	4.0	67	815	1.11	28.6	325	82	46	3.0	1,220	7.4			
Apr. 21-30	1,809	72	62	38	132	317	117	112	3.6	61	796	1.08	3,890	310	50	48	3.3	1,240	7.2			
May 1-10	677	24	64	22	234	203	203	265	.8	6.1	4919	2.180	536	840	67	64	3.4	1,540	7.9			
May 11-18	121	36	116	42	407	224	224	518	.8	11	1,640	2.23	536	462	278	66	2.670	7.9				
May 19-28	2,801	22	46	16	149	198	133	140	1.2	4.0	4608	.83	4,600	181	19	64	4.8	1,010	8.0			
May 29-31, June 1-2, 6-10	74.2	30	92	33	305	218	295	378	1.2	9.2	1,250	1.70	250	365	186	65	7.0	2,070	8.0			
June 3-5, 25-27	1,030	28	34	12	111	172	91	95	1.2	4.5	465	.63	1,290	134	0	64	4.2	742	8.2			
June 11-18	1,33.6	128	49	350	256	412	410	1.6	15	1.580	2.115	163	521	320	59	6.7	2,550	7.9				
June 19-22, 28-30	44.2	36	72	26	162	192	195	190	1.2	7.8	793	1.08	94.6	1,570	149	55	3.5	754	8.0			
July 1-10	108	44	67	31	172	275	172	180	1.6	7.2	940	1.28	236	294	69	56	4.4	1,340	7.3			
July 11-21	113	66	25	12	232	216	210	262	1.2	5.2	4446	.61	1,380	130	0	65	4.3	773	7.9			
July 22-31	1,148	19	32	113	199	82	86	.8	3.5	4446	.61	1,380	130	0	65	4.3	773	7.9				
Aug. 1-6	302	26	54	19	161	204	163	186	1.2	4.2	4734	1.00	599	212	46	65	5.4	1,230	8.0			
Aug. 7-10	797	20	37	11	74	174	64	60	1.2	4.2	4734	1.00	599	212	46	65	5.4	1,230	8.0			
Aug. 11-20	516	24	40	13	121	197	108	98	1.2	2.5	4354	.76	705	154	0	63	4.3	886	7.9			
Aug. 21-22, 26-31	34.5	50	83	34	232	262	243	260	1.6	16	1,050	1.43	347	132	59	54	1,680	7.7				
Aug. 23-25	579	26	33	12	82	211	177	69	.8	4.0	383	.52	599	131	0	58	628	7.8				
Sept. 1-10	11.6	63	82	40	142	338	206	213	3.6	30	1,020	1.39	369	92	55	4.8	1,640	7.5				
Sept. 11-20	99.4	75	72	43	162	349	150	142	2.4	22	852	1.16	229	135	70	46	3.3	1,280	7.6			
Sept. 21-23, 25-30	698	18	38	9.7	120	189	105	90	2.8	22	4677	.65	689	135	0	66	4.5	796	8.1			
Weighted average-----	367	29	48	19	153	214	132	144	1.4	13	651	0.89	645	198	22	63	4.7	1,080	--			

a Sum of determined constituents.

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

Date of collection	Water discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron ( $\text{Fe}$ )	Cal. citium ( $\text{Ca}_o$ )	Po-tassium ( $\text{K}$ )	Bicar-bonato ( $\text{HCO}_3$ )	So-dium ( $\text{Na}$ )	Mag-ne-sium ( $\text{Mg}$ )	Chemical analyses, in parts per million, water, year October 1954 to September 1955				Dissolved solids (Residue at 180°C)	Hardness as $\text{CaCO}_3$	So-dium adsorp-tion ratio	Per-cent so-dium	Specific conduct-ance (micro-mhos at 25°C)	pH		
									Chlo-ride ( $\text{Cl}$ )	Sul-fate ( $\text{SO}_4$ )	Ni-trate ( $\text{NO}_3$ )	Fluo-ride ( $\text{F}$ )	Bor-on (B)							
<i>E: AMARILLO CREEK NEAR AMARILLO</i>																				
Jan. 11, 1955-----	13.3	76	53	45	96	257	93	75	--	134		720	0.98		39	2.3	1,110	8.2		
Feb. 16-----	9.18	53	48	39	133	266	97	105	3.0	118		a727	.99		51	3.5	1,110	--		
Mar. 24-----	13.6	44	52	36	165	302	80	122	3.6	154		a806	1.10		56	4.3	1,370	7.0		
Apr. 18-----	12.0	109	59	40	145	311	133	111	3.6	85		a756	1.03		312	3.6	1,230	--		
May 17-----	12.6	96	57	36	129	291	119	94	3.2	81		764	1.04		51	4.9	1,100	--		
June 24-----	14.5	64	57	28	122	288	103	89	2.8	28		633	.86		256	3.0	974	--		
July 14-----	7.36	77	59	36	137	304	135	107	3.6	51		767	1.04		294	4.4	1,130	--		
Aug. 10-----	17.7	92	63	32	114	312	107	96	2.8	32		704	.96		289	3.3	1,090	--		
Sept. 8-----	10.4	60	55	36	133	324	114	101	3.6	46		722	.98		285	3.4	1,090	--		
Jan. 11, 1955-----	2.52	28	--	13	--	--	10	8.2	--	1.5		--	--		--	--	416	--		
<i>BONITA CREEK NEAR AMARILLO</i>																				
Jan. 11, 1955-----	4.08	24	32	7.9	13	132	6.8	4.8	--	2.5		a166	.23		112	0	20	.5	315	8.2
Jan. 11, 1955-----	1.29	32	24	9.6	18	130	15	10	--	3.8		a176	.24		100	0	28	.8	353	8.1

\* Sum of determined constituents.

**RED RIVER BASIN--Continued**  
**LITTLE MICHIGA RIVER NEAR ARCHER CITY, TEX.**

LOCATION.--At 808ting station at bridge on State Highway 79, 1.5 miles downstream from confluence of North and Middle Forks, and 4.8 miles north of Archer City, Archer County.  
 DRAINAGE AREA.--481 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: December 1932 to September 1955.  
 Water temperatures: December 1932 to September 1955.  
 ExtREMs, 1934-55.--Dissolved solids: Maximum, 475 ppm Nov. 17-18; minimum, 95 ppm Sept. 25-26.  
 Hardness: Maximum, 1,890 ppm Nov. 17-18; minimum, 40 ppm Sept. 25-26.  
 Specific conductance: Maximum daily, 3,350 micromhos Sept. 17, 1934; minimum, 35 micromhos Sept. 26, 1953.  
 ExtREMs, 1932-55.--Dissolved solids: Maximum, 2,340 ppm Sept. 19, 1934; minimum, 40 ppm Sept. 25-26, 1955.  
 Hardness: Maximum, 590 ppm Sept. 19, 1934; minimum, 40 ppm Sept. 25-26, 1955.  
 Specific conductance: Maximum daily, 3,730 micromhos Sept. 19, 1934; minimum daily, 103 micromhos Oct. 26, 1953.  
 NOTES.--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 for water samples available in district office at Austin, Tex. Records of discharge for water year October 1954 to September 1955 given in Water Supply Paper 1391.

Date of collection	Mean discharge (cfs)	Chemical analyses, in parts per million, water year October 1954 to September 1955										Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium carbonate	Specific conductance (micromhos at 25° C.)	pH		
		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)	Pants per million	Tons per acre-foot	Tons per day				
Oct. 5-14, 1934-----	21.0	12	31	8.7	33	5.1	185	5	24	0.5	0.8	0.211	0.29	12.0	114	0	37	1.3	379	8.2
Oct. 17-----	0	--	--	--	--	--	203	--	45	--	--	--	--	--	130	0	--	--	480	8.2
Oct. 24-----	0	--	--	--	--	--	215	--	46	--	--	--	--	135	0	--	--	495	8.2	
Nov. 1-----	0	--	--	--	--	--	226	--	49	--	--	--	--	141	0	--	--	519	8.2	
Nov. 5-----	0	--	--	--	--	--	124	--	700	--	--	--	--	345	244	--	--	2,340	7.9	
Nov. 7-----	0	--	--	--	--	--	229	--	51	--	--	326	.44	--	144	0	--	--	528	8.2
Nov. 10-----	16.0	13	16	5.0	34	4.1	77	5	46	.6	5.0	a168	.23	8.16	61	0	53	1.9	304	7.8
Nov. 11-14-----	1.55	1.5	1.7	5.0	86	3.2	78	6	127	.8	5.0	297	.40	1.24	64	0	73	4.7	561	7.7
Nov. 15-16-----	7.55	7.4	6.2	5.4	91	23	450	4	4.0	a846	1.15	17.2	225	150	68	6.7	1,600	7.8	6.7	
Nov. 17-18-----	1.65	8.6	129	37	538	7.6	86	13	1,110	.4	4.0	a190	2.57	8.42	475	406	71	11	3,550	7.8
Nov. 22-----	0	--	--	--	--	--	100	--	720	--	--	--	--	340	258	--	--	2,500	7.8	
Nov. 28-----	0	--	--	--	--	--	113	--	700	--	--	--	1,480	2.01	--	--	335	242	--	--
Dec. 11-13, 15-18-----	19.8	6.4	22	6.0	85	3.2	93	2	132	.5	3.5	314	.43	16.8	80	4	69	4.1	612	7.8
Dec. 14, 18-31-----	2.50	5.2	33	8.9	134	3.5	120	12	215	.5	3.0	a672	.64	3.19	120	22	70	5.3	912	7.8
Dec. 19-----	0	--	--	--	--	--	119	--	103	--	--	--	--	84	0	--	--	535	7.8	
Dec. 26-----	0	--	--	--	--	--	121	--	104	--	--	324	.44	--	84	0	--	--	531	7.8
Jan. 1-10, 14-16, 1935-----	2.52	8.4	33	11	106	152	14	154	.5	1.5	a603	.55	2.74	128	4	64	4.1	761	7.8	
Jan. 11-13-----	5.27	6.4	70	22	325	96	13	620	.6	4.0	1,110	1.51	15.8	264	185	73	8.7	2,140	7.5	
Jan. 17-19, 20-----	15.0	8.4	43	9.1	143	93	7.7	262	.5	3.0	576	.78	23.3	146	70	68	3.5	1,030	7.6	
Jan. 18-19, 21-----	46.5	10	18	4.9	65	88	7.2	87	.6	4.5	240	.33	30.1	166	0	68	3.5	447	7.5	
Jan. 22-24-----	0.97	11	36	5.2	101	89	7.4	172	.4	2.5	398	.56	1.04	106	33	67	4.3	726	7.5	
Jan. 30-----	0	--	--	--	--	--	95	--	232	--	--	--	--	130	52	--	--	888	8.0	
Feb. 4-----	73.0	10	37	14	152	97	6.4	278	--	4.5	614	.84	121	150	70	69	5.4	1,050	7.8	
Feb. 5-12-----	22.8	7.8	22	5.3	72	86	6.9	108	.4	3.5	270	.37	16.6	177	7	67	3.6	512	7.4	
Feb. 13-----	0	--	--	--	--	--	89	--	117	--	--	--	--	83	10	--	--	545	7.9	
Feb. 19-----	103	6.4	31	7.7	114	100	7.1	187	.6	3.0	424	.58	118	110	28	69	4.7	785	7.6	
Feb. 20-----	78.0	9.8	37	5.9	118	70	7.0	215	.8	4.0	481	.65	101	116	58	69	4.8	842	7.8	
Feb. 21-28-----	4.86	9.2	25	3.2	60	82	6.3	91	.5	4.5	257	.35	3.37	76	9	63	3.0	459	7.5	
Mar. 20, 22-23-----	27.4	9.6	11	1.57	157	81	8	300	.5	4.0	642	.67	47.5	161	94	68	3.4	1,160	7.4	
Mar. 21, 24-29-----	31.9	10	30	7.1	74	106	9.1	117	.3	4.0	330	.45	28.4	105	18	60	3.1	579	7.7	
Apr. 3-----	0	--	--	--	--	--	115	--	119	--	--	--	--	102	8	--	--	609	8.0	
Apr. 6-7, 27-----	68.5	10	26	6.9	57	94	9	90	.5	3.5	260	.35	48.1	96	17	57	2.5	488	7.3	
Apr. 8-9-----	7.70	9.4	53	12	174	86	9	335	.4	7.2	734	1.00	15.3	182	111	68	5.6	1,260	7.5	
Apr. 10-----	4.00	15	107	29	335	84	22	720	.2	7.3	1,80	1.74	13.8	386	317	65	7.4	2,510	7.9	
Apr. 11-16-----	3.30	11	38	8.3	103	102	8	102	.3	4.0	434	.59	3.87	128	44	64	4.0	785	7.6	
Apr. 15-17, 28-----	104	10	50	13	160	114	12	295	.3	5.0	638	.87	179	178	85	66	5.2	1,160	7.8	
Apr. 20-25-----	0	--	--	--	--	--	129	--	286	--	--	--	--	189	83	--	--	1,190	7.8	
Apr. 29-30, May 1-5-----	10.6	13	30	7.4	60	116	8.6	90	.4	3.5	278	.38	7.96	105	10	55	2.5	512	7.5	
May 8-15-----	0	--	--	--	--	149	--	83	--	--	--	--	--	123	1	--	--	527	8.0	
May 16-20, 26-27-----	226	12	36	7.4	71	103	7.4	125	.5	3.8	348	.43	212	121	36	56	2.8	607	7.9	
May 21-23, 25, 28-31-----	121	11	25	5.7	44	100	7.5	75	.6	4.2	244	.33	32	20	403	7.2	403	7.2		
May 24-----	34.0	14	49	--	168	87	10	320	.4	4.2	654	.90	173	102	68	54	5.6	1,180	7.5	

**LITTLE WICHITA RIVER NEAR ARCHER CITY, TEX.--Continued**

Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued

a sum of determined constituents.

Represents 100 percent of runoff for water year October 1954 to September 1955.

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.

LOCATION.--At bridge station at bridge on State Highway 148, 1.5 miles northeast of Henrietta, Clay County, 4 miles upstream from Turkey Creek, and 5 miles upstream from Dry Fork Little Wichita River.  
 DRAINAGE AREA, 1,037 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1932 to September 1935.

Water temperatures: December 1932 to September 1935.

EXTRAS, 1934-55.--Dissolved solids: Maximum, 418 ppm Sept. 26; minimum, 25 ppm Feb. 20.

Specific conductance: Maximum daily, 3,360 microhos July 22; minimum daily, 96.9 microhos May 19.

Hardness: Maximum, 1,670 ppm Sept. 26; minimum, 1,670 ppm Feb. 20.

EXTRAS, 1934-55.--Dissolved solids: Maximum daily, 3,360 microhos July 22; minimum daily, 1.5 (12a-12p.m.), 16, 19, 1953; maximum, 57 ppm May 19, 1953.

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

Specific conductance: Maximum daily, 3,910 microhos May 1, 1953; minimum daily, 81.1 microhos Oct. 26, 1953.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residuals 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 1934 to September 1935 given in Water Supply Paper 1391.

Chemical analyses, in parts per million, water year October 1934 to September 1935

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	So- dium (Na)	Bicar- bonate (HCO <sub>3</sub> )	Sal- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Flu- oride (F)	Ni- tro- gen (NO <sub>x</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Per- cent carbo- nate	So- dium dis- solv- tion ratio	Specific conduct- ance (micro- hos at 25° C.)	pH	
													Parts per mil- lion	Tons per acre- foot	Tons per day						
Oct. 7, 1934	0	--	--	--	--	--	174	--	33	--	--	--	252	0.34	--	114	0	--	386	8.2	
Oct. 9-10	11.6	--	--	--	--	--	185	--	108	--	--	--	380	.52	11.9	130	0	--	641	8.2	
Oct. 21	0	--	--	--	--	--	195	--	109	--	--	--	380	--	--	137	0	--	665	8.2	
Oct. 27	0	--	--	--	--	--	194	--	110	--	--	--	380	--	--	140	0	--	672	8.2	
Nov. 5	0	--	--	--	--	--	197	--	113	--	--	--	380	--	--	141	0	--	683	8.2	
Nov. 11	0	--	--	--	--	--	200	--	115	--	--	--	380	.55	--	145	0	--	699	8.2	
Nov. 18	0	--	--	--	--	--	212	--	82	--	--	--	380	--	--	140	0	--	608	8.2	
Nov. 25	0	--	--	--	--	--	216	--	85	--	--	--	380	--	--	145	0	--	617	8.2	
Dec. 2	0	--	--	--	--	--	219	--	87	--	--	--	380	--	--	149	0	--	631	8.2	
Dec. 8	0	--	--	--	--	--	222	--	90	--	--	--	382	.52	--	153	0	--	653	8.2	
Dec. 13-15	43.9	7.4	47	14	219	85	12	402	0.4	4.5	450	1.02	88.9	176	102	72	7.1	1,430	7.9		
Dec. 16-17, 19-26, 28-	0	--	--	--	--	--	239	110	12	420	.3	--	370	1.18	2.98	79	89	74	7.8	1,540	7.8
Jan. 1, 1935	1.27	8.0	56	11	--	--	124	--	400	--	--	--	370	--	--	172	161	--	1,640	8.1	
Jan. 5	0	--	--	--	--	--	125	--	330	.5	--	--	370	--	--	155	63	--	1,230	8.1	
Jan. 8-20	7.55	7.8	39	9.7	148	114	9.3	250	5	2.0	349	.75	11.2	137	44	70	55	1,000	7.5		
Jan. 21	5.0	7.0	79	24	358	113	16	682	--	3.5	1,230	1.67	183	296	72	9.1	2,280	7.9			
Jan. 22-31	4.93	8.2	45	13	189	93	11	345	.4	3.0	730	.99	9.72	167	91	71	6.4	1,290	7.7		
Feb. 4, 7-18	14.7	8.2	--	--	--	--	124	--	400	--	--	--	308	.42	12.2	83	16	68	3.9	567	7.8
Feb. 5-6, 19	89.0	6.4	11	3.8	24	5.8	82	85	7.6	128	.5	3.0	308	.24	42.3	42	0	69	7.4	293	7.8
Feb. 20	32	6.8	--	--	--	10	43	55	5.6	5.0	--	5.0	376	--	--	25	0	47	1.8	97.9	7.4
Feb. 21	170	12	63	7.0	276	103	17	480	.8	7.3	976	1.33	44.6	187	102	76	8.8	1,670	7.9		
Feb. 22-28	20.2	7.6	27	4.1	86	67	7.1	145	.6	2.8	338	.46	16.4	85	30	69	4.0	597	7.3		
Mar. 1, 23-25	16.8	8.6	26	5.8	74	79	6.8	125	.2	2.5	316	.43	14.3	90	26	64	3.4	561	7.4		
Mar. 21	93	11	11	3.6	17	55	1	18	1.0	4.5	694	.13	23.6	41	0	47	1.1	168	7.7		
Mar. 22	243	9.2	24	5.1	38	67	4	59	.4	4.5	320	.30	144	81	10	50	1.8	359	7.4		
Mar. 26-31	.88	9.6	39	8.8	122	84	8	226	.5	3.5	539	.73	1.28	133	64	67	4.6	896	7.4		
Apr. 2, 5	0	--	--	--	--	--	98	--	216	--	--	--	130	50	--	130	50	--	683	7.8	
Apr. 7-8	128	12	22.4	12	5.5	51	76	6.3	14	4.0	497	.13	33.5	47	0	41	1.0	160	7.7		
Apr. 9-17	0	--	--	--	--	--	96	--	63	--	--	--	232	.32	14.0	73	11	60	2.6	404	7.5
Apr. 19	0	--	--	--	--	--	116	--	65	--	--	--	130	--	--	78	0	--	371	7.9	
Apr. 27	623	13	40	9.5	107	109	7	192	.2	4.5	426	.58	717	92	0	11	--	411	8.1		
Apr. 28	623	13	40	9.5	107	109	7	192	.2	4.5	426	.45	730	114	26	63	4.0	630	7.5		
Apr. 30, May 1-8, 15-17	49.6	13	32	8.0	71	64	120	7.4	120	3.5	3.5	44.2	.45	58	114	26	58	2.9	590	7.5	
May 18	821	16	236	15	8.4	34	2.3	448	.6	5.2	818	1.11	1,810	190	138	73	7.4	1,550	7.5		
May 19	1,630	7.2	11	19	4.5	33	2.2	448	.6	5.2	817	.08	220	29	1	39	1.7	96.9	7.4		
May 20-26	799	11	11	8.7	100	69	4.6	51	.5	2.0	420	.22	345	65	52	1.8	309	7.2			
May 27, 29-31	53.2	11	36	8.7	103	7	177	.5	2.8	443	.60	63.6	127	45	63	3.8	761	7.4			
May 28	160	15	25	6.5	48	70	.6	2.8	426	.31	97.6	89	54	54	2.2	416	8.0				

RED RIVER BASIN--Continued  
LITTLE WICHITA RIVER NEAR HERMITTA, TEX.--Continued

Date of collection	Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued										Specific conductance (micro-mhos at 25° C.)	pH							
	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-codium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Fluoride (F)	Dissolved solids	Hardness as CaCO <sub>3</sub>	Sediment absorption ratio	Percent sediment			
June 1-3, 6, 1955-----	105	13	33	8.1	90	103	9	152	0.5	3.0	.53	390	111	32	63	683	7.7		
June 4-5, 7-9, 11-----	151	12	23	5.7	44	91	5.9	64	.5	3.5	.30	222	90.5	5	54	2.1	389	7.8	
June 10, 12-17-----	85.3	12	39	9.4	103	91	7.3	195	.5	3.0	.614	614	95.3	137	62	3.8	804	7.7	
June 18-20-----	96.7	8.6	18	4.4	30	63	4.0	48	.5	2.5	.4147	.20	384	62	10	51	2.76	7.6	
June 21-26-----	67.3	14	19	4.6	26	76	4.0	39	.4	1.8	.4146	.20	344	67	5	46	1.4	274	7.6
June 27-30, July 1-----	2,446	--	--	--	--	119	--	38	--	--	--	--	--	92	0	--	--	332	8.0
July 2, 7, 14-----	0	--	--	--	--	138	--	42	--	--	--	--	--	104	0	--	--	355	8.2
July 19-21-----	113	12	15	4.0	19	77	3.7	16	.4	3.5	.16	.18	41.5	53	0	43	1.1	185	8.0
July 22-31-----	8,89	17	101	28	429	81	17	860	.4	4.0	1,500	2.04	36.0	368	302	72	9.7	2,840	7.8
Aug. 1, 3, 5, 10-----	0	--	--	--	--	115	--	352	--	--	--	--	--	185	91	--	--	1,350	7.9
Aug. 16, 26-----	0	--	--	--	--	128	--	412	--	--	--	--	--	226	119	--	--	1,550	8.0
Aug. 31, Sept. 1-----	1,50	14	34	10	112	100	6.7	195	.6	3.5	.432	.59	1.75	126	64	66	4.3	815	7.9
Sept. 14, 21-----	0	--	--	--	--	115	--	252	--	--	--	--	--	138	64	--	--	1,010	7.9
Sept. 22-23-----	43.5	11	28	8.0	100	72	6.9	178	--	2.5	.369	.50	43.3	102	43	68	4.3	720	7.8
Sept. 26-----	92	11	113	33	481	74	18	980	.4	2.2	1,670	2.27	415	418	358	71	10	3,250	7.8
Sept. 25-27-----	1,818	6.0	9.6	2.1	13	47	2.8	12	.2	3.0	.472	.10	365	33	0	46	1.0	123	7.4
Sept. 28-30-----	3,650	8.4	16	2.2	18	70	3.3	18	.2	2.0	.102	.16	1,272	50	0	43	1.1	176	7.5
Weighted average-----	bil4	9.7	19	4.1	36	69	4.3	56	0.3	2.4	168	0.23	51.7	64	8	55	1.9	306	--

a Sum of determined constituents.

b Represents 100 percent of runoff for water year October 1954 to September 1955. No flow on many days.



RED RIVER NEAR CANTERVILLE, TENN.--Continued  
RED RIVER NEAR CANTERVILLE, TENN.--Continued

Date of collection	Chemical analyses, in parts per million. Water year October 1934 to September 1935--Continued										Specific conductance (micro-mhos at 25° C.)	pH									
	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Irons (Fe)	Cat. 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)	(Residue at 180°C.)	Dissolved solids	Hardness as CaCO <sub>3</sub>	Per cent sodium carbonate	Sodium adsorption ratio			
May 1-3, 1935-----	147	--	95	742	--	149	565	1,350	--	--	3,300	6.49	1,310	985	62	10	5,310	7.6			
May 4-5-----	203	--	92	34	293	--	126	166	520	--	3.0	3.0	1,290	1.75	714	267	63	6.6	2,220	7.7	
May 6-10-----	175	--	192	76	585	--	142	466	1,010	--	2.590	2.52	2,190	3.52	790	674	62	9.1	4,240	7.7	
May 11-12-----	268	--	146	59	431	--	136	325	795	--	2.6	2.010	2.73	1,450	605	694	61	7.6	3,270	7.9	
May 13-18-----	4,529	--	220	56	553	--	119	601	850	--	4.6	2.10	3.41	30,690	780	682	61	8.6	4,000	7.9	
May 19-20-----	32,100	--	84	2,6	116	--	136	170	42	--	4.2	4.2	53,910	220	168	53	3.4	1,050	7.8		
May 21-26-----	31,000	--	104	18	185	--	124	235	280	--	1.9	1.9	891	1.21	126,600	335	234	53	4.4	1,560	7.9
May 27-31-----	8,536	--	144	22	310	--	157	296	500	--	2.8	2.8	1,370	1.86	31,570	450	322	60	6.4	2,390	7.7
June 1-----	4,050	--	161	21	312	--	148	300	490	--	3.0	3.0	1,460	1.99	15,970	440	318	61	6.5	2,390	7.9
June 2-6-----	6,386	--	232	54	578	--	128	733	925	--	3.6	3.6	2,820	3.84	49,380	900	795	58	8.4	4,260	7.5
June 7-10-----	8,380	--	122	51	432	--	122	703	725	--	2.80	2.80	3,10	51,590	790	690	54	6.7	3,520	7.8	
June 11-13-----	12,750	--	142	35	245	--	132	313	425	--	6.0	6.0	1,280	1.74	44,060	500	392	52	4.8	2,130	7.6
June 14-20-----	6,064	--	108	29	183	--	124	210	350	--	5.2	5.2	1,020	1.39	16,700	390	288	51	4.1	1,760	7.5
June 21-27-----	20,750	--	149	37	244	--	124	355	430	--	5.2	5.2	1,340	1.82	75,070	520	418	50	4.7	2,230	7.5
June 28-30-----	2,690	--	186	53	371	--	134	438	623	--	3.5	3.5	1,850	2.52	13,440	680	570	54	6.2	3,040	7.6
July 1-11-----	3,018	--	304	78	659	--	150	790	1,100	--	--	--	3,100	4.2	25,260	1,080	957	57	8.7	4,900	7.8
July 12-20-----	19	0.00	280	103	777	8.0	154	756	1,310	0.4	2	0.41	3,670	4.72	1,120	994	60	10	5,590	7.4	
July 21-----	1,060	--	232	78	643	--	164	561	1,100	--	--	--	2,630	3.85	8,100	980	766	61	9.3	4,630	7.7
July 22-25-----	1,955	--	146	46	366	--	140	302	630	--	2.6	2.6	1,610	2.19	8,500	540	426	60	7.5	2,750	7.8
July 26-----	1,290	--	184	61	487	--	150	412	850	--	2.3	2.3	2,140	2.67	7,450	710	587	60	7.9	3,580	6.0
July 27-31-----	1,078	--	328	81	735	--	142	614	1,300	--	--	--	3,360	4.84	10,360	1,130	1,030	58	9.4	5,380	7.8
Aug. 1-6-----	1,303	--	356	73	867	--	126	900	1,400	--	--	--	3,830	5.21	13,470	1,190	1,090	61	11	6,000	7.4
Aug. 7-10-----	1,052	--	220	63	543	--	126	565	900	--	1.8	1.8	2,450	3.33	6,960	810	707	59	8.3	4,020	8.1
Aug. 11-12-----	1,145	--	256	54	667	--	140	641	1,120	--	--	--	2,990	4.07	9,240	930	816	61	9.5	4,880	8.3
Aug. 13-14-----	713	--	176	56	477	--	124	437	825	--	1.1	1.1	2,120	2.88	4,080	670	568	61	8.0	3,540	8.2
Aug. 15-----	564	--	156	56	454	--	126	363	790	--	2.5	2.5	1,960	2.67	2,980	620	517	61	7.9	3,210	8.2
Aug. 16-20-----	487	--	232	78	702	--	134	596	1,150	--	--	--	2,970	4.06	3,910	900	790	63	10	4,880	8.1
Aug. 21-31-----	360	--	276	88	804	--	158	714	1,320	--	--	--	3,330	4.06	1,030	920	62	11	5,550	8.1	
Sept. 1-10-----	388	--	244	71	689	--	145	589	1,180	--	--	--	2,960	4.03	3,100	900	780	62	10	4,820	7.9
Sept. 11-14-----	324	--	192	54	539	--	144	635	900	--	3.1	3.1	2,100	3.13	2,010	700	582	63	8.9	3,740	7.8
Sept. 15-18-----	292	--	222	67	608	--	166	514	1,050	--	--	--	2,680	3.64	2,110	830	694	61	9.2	4,350	7.4
Sept. 21-----	266	--	150	48	388	--	122	356	660	--	1.6	1.6	1,730	2.35	1,240	570	470	60	7.1	2,870	6.0
Sept. 22-23-----	397	--	234	85	722	--	164	596	1,200	--	--	--	3,000	4.08	3,220	935	800	63	10	4,910	6.1
Sept. 24-25-----	2,195	--	118	40	312	--	126	282	510	--	1.8	1.8	1,390	1.89	8,240	460	357	60	6.3	2,370	8.0
Sept. 26-30-----	14,360	--	48	12	63	--	120	118	118	--	1.7	1.7	--	--	15,930	1,170	722	51	2.8	722	7.7
Weighted average-----	2,630	--	141	32	282	--	130	326	462	--	--	--	1,370	1.86	9,730	486	377	56	5.6	2,270	--

<sup>a</sup> Includes equivalent of 4 parts per million carbonate (CO<sub>3</sub><sup>2-</sup>).

<sup>b</sup> Sum of determined constituents.

<sup>c</sup> Includes equivalent of 2 parts per million carbonate (CO<sub>3</sub><sup>2-</sup>).

<sup>d</sup> Includes equivalent of 11 parts per million carbonate (CO<sub>3</sub><sup>2-</sup>).

<sup>e</sup> Includes equivalent of 6 parts per million carbonate (CO<sub>3</sub><sup>2-</sup>).

<sup>f</sup> Includes equivalent of 5 parts per million carbonate (CO<sub>3</sub><sup>2-</sup>).

<sup>g</sup> Includes equivalent of 1 part per million carbonate (CO<sub>3</sub><sup>2-</sup>).

## RED RIVER AT MERTON DAM NEAR MARSH, TEX.

RED RIVER EASTER--Continued

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 4 miles northeast of Danison, Grayson County, and three miles upstream from gaging station near Colbert, Bryan County, Okla. ...39,719 square miles above gaging station, of which 5,936 square miles is probably non-contributing.

DRAINAGE AREA.--39,719 square miles above dam, 39,777 square miles above gaging station, of which 5,936 square miles is probably non-contributing.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1955.

Water temperatures: October 1945 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 1,000 ppm Sept. 1-30; minimum, 850 ppm Oct. 1-31.

Hardness: Maximum, 351 ppm Sept. 1-30; minimum, 305 ppm Oct. 1-31.

Specific conductance: Maximum daily, 1,730 micromhos Aug. 18-19, Sept. 7-9; minimum daily, 1,430 micromhos Oct. 1, 4-7.

EXTREMES, 1944-55.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-10, 1944; minimum, 484 ppm Oct. 21-31, 1945.

Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946.

Specific conductance: Maximum daily, 3,520 micromhos Aug. 16, 1944; minimum daily, 636 micromhos Oct. 16, 1945.

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 gaging station near Colbert, Okla., for water year October 1954 to September 1955 given in Water-Supply Paper 1391. No appreciable inflow between dam and gaging stations except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate ( $\text{HCO}_3^-$ )	Sulfate ( $\text{SO}_4^{2-}$ )	Chloride (Cl)	Fluoride (F)	Nitrate ( $\text{NO}_3^-$ )	Boron (B)	Dissolved solids			Hardness as $\text{CaCO}_3$	Specific conductance (micro-mhos at 25°C)	Sodium adsorption ratio	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-31, 1954	1,049	12	86	22	177	122	120	278	0.4	1.5	0.08	880	1.20	2,630	305	205	56	4.4	1,480	7.7		
Nov. 1-30	1,970	14	89	24	186	5.6	126	200	.1	1.2	.08	904	1.23	4,810	320	218	55	4.5	1,500	7.9		
Dec. 1-31	2,078	12	93	24	190	5.4	129	202	.4	1.0	.16	934	1.27	5,240	330	225	55	4.5	1,560	8.1		
Jan. 1-31, 1955	325	11	94	24	188	5.6	128	208	.4	.8	.16	936	1.27	821	333	228	55	4.5	1,560	8.0		
Feb. 1-28	1,016	9.4	93	20	188	5.6	127	200	.295	.4	.8	.16	942	1.28	2,580	314	210	56	4.6	1,520	7.4	
Mar. 1-31	821	8.4	93	21	187	5.5	128	201	.295	.4	1.2	.17	938	1.28	2,080	318	214	56	4.5	1,560	7.5	
Apr. 1-30	1,174	6.2	96	22	182	5.3	130	198	.288	.5	.8	.15	921	1.25	2,920	325	218	54	4.4	1,530	8.0	
May 1-31	3,203	8.0	98	22	181	--	124	205	.300	.3	1.0	.13	932	1.27	8,060	335	234	54	4.3	1,520	7.7	
June 1-30	11,640	8.4	96	22	184	5.4	127	201	.295	.2	1.5	.16	907	1.23	28,510	325	221	55	4.4	1,510	8.0	
July 1-31	3,568	11	100	21	196	5.6	125	215	.315	.5	2.2	.16	990	1.35	9,540	337	234	55	4.7	1,630	7.8	
Aug. 1-31	3,600	12	103	21	206	5.7	126	233	.328	.2	2.0	.13	998	1.36	9,700	344	240	56	4.8	1,700	7.5	
Sept. 1-30	2,688	11	106	21	212	6.0	122	240	.342	.4	1.2	.14	1,000	1.36	7,260	351	251	56	4.9	1,720	7.8	
Weighted average	2,762	9.9	96	22	190	5.5	126	209	.306	0.3	1.5	0.14	937	1.27	6,990	330	227	55	4.5	1,570	..	

<sup>a</sup> Sum of determined constituents.

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

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

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Chemical analyses, in parts per million, water year October 1934 to September 1935																					
Date of collection	Water discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron (Fe)	Calcium ( $\text{Ca}_s$ )	Magnesium ( $\text{Mg}_s$ )	Sodium ( $\text{Na}_s$ )	Potassium ( $\text{K}_s$ )	Bicarbonate ( $\text{HCO}_3^-$ )	Sulfate ( $\text{SO}_4^-$ )	Chloride ( $\text{Cl}^-$ )	Fluoride ( $\text{F}^-$ )	Nitrate ( $\text{NO}_3^-$ )	Dissolved solids (Sum)	Hardness as $\text{CaCO}_3$	Specific conductance (micro-mhos at 25°C)	pH					
													Parts per milliliter	Tons per acre-foot	Percent sodium carbonate	.Sodium adsorption ratio					
Jan. 12, 1935-----	2.68	29	--	568	125	137	77	1,770	225	--	7.0		2,900	3.94		1,930	1,870	13	1.4	3,320	7.8
Jan. 12, 1935-----	.24	30	--	560	84	71	69	1,660	75	--	8.0		2,520	3.43		1,740	1,690	8	.7	2,720	7.8
Jan. 12, 1935-----	2.98	36	--	13	--	--	--	18	16	--	1.0		--	--		0	--	--	--	506	--
Jan. 12, 1935-----	1.67	39	--	131	28	78	76	393	98	--	2.5		863	1.17		442	380	28	1.6	1,280	7.9
Jan. 12, 1935-----	1.51	49	--	31	--	--	--	77	96	--	26		--	--		365	273	60	5.6	1,050	7.6
Jan. 12, 1935-----	--	6.6	0.01	105	25	247	112	251	368	0.4	1.0		1,080	1.47						966	--
February 1935-----	--	3.8	.00	73	18	129	122	161	205	.3	.2		4682	.93		256	156	52	3.5	1,130	7.7
Rev. 1, 1935-----	--	4.5	.00	3.6	2.2	8.6	27	5.0	5.8	.2	.8		44	.06		18	0	51	.9	69.0	6.9
Aug. 22, 1935-----	--	15	.10	7.4	3.7	24	39	13	28	.3	.2		1120	.16		34	2	61	1.8	185	7.1
Rev. 2, 1935-----	--	15	.10	7.4	3.7	24	39	13	28	.3	.2		1120	.16		34	2	61	1.8	185	7.1
BUCK CREEK NEAR WELLINGTON												SWEETWATER CREEK NEAR WHEELER				ELM CREEK NEAR SHANROCK				ROARING SPRINGS NEAR ROARING SPRINGS	
DOZIER CREEK NEAR WELLINGTON												LAKE TEKOMA AT PERRIN AIR FORCE BASE				RANDELL LAKE NEAR DENISON				CANEY LAKE AT RED RIVER ARSENAL NEAR TEXARKANA	
BIG CYPRESS HATOC NEAR KAPACK																					

a Residue on evaporation at 180°C.

## SABINE RIVER BASIN

## SABINE RIVER NEAR TATUM, TEX.

LOCATION.--At bridge station at bridge on State Highway 43, 5 miles upstream from Potter's Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 339.

DRAINAGE AREA--3,586 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1932 to September 1935.

Water temperatures: February 1932 to September 1935.

EXTREMES: 1934-55.--Dissolved solids: Maximum, 823 ppm Oct. 16-25; minimum, 119 ppm Oct. 31, Nov. 1-8, 12-15.

Hardness: Maximum, 96 ppm Oct. 16-25; minimum, 32 ppm Sept. 3-4, 7-13.

Specific conductance: Maximum daily, 1,850 microhos Nov. 23; minimum daily, 154 microhos Nov. 4.

Water temperatures: Maximum observed, 90° July 7-11; minimum observed, 45° Mar. 26-28.

EXTREMES: 1932-55.--Dissolved solids: Maximum, 823 ppm Oct. 16-25, 1934; minimum, 82 ppm May 10-20, 1933.

Hardness: Maximum, 106 ppm Sept. 1-10, 1934; minimum, 29 ppm Sept. 9-10, 12-18, 1933.

Specific conductance: Maximum daily, 1,850 microhos Oct. 23, 1934; minimum daily, 123 microhos May 10-11, 1933.

Water temperatures: Maximum observed, 95° July 7, 13, 1934; minimum observed, 45°P on several days during winter months.

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 1934 to September 1935 given in Water-Supply Paper 1392.

Chemical analyses: In parts per million, water year October 1934 to September 1935

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- ta- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Flu- oro- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>	Cal- cium, magnes- ium	Non- carbon- ato	Per- cent so- dium	So- dium adorp- tion ratio	Specific conduct- ance (micro- mhos at 25° C.)	pH
														Parts per mil- lion	Parts per mil- lion	Tons per acre- foot							
Oct. 1-15, 1934-----	27.3	12	22	7.1	174	121	7.9	252	0.8	0.73	39.5	84	0	82	8.3	1,020	7.7						
Oct. 16-23-----	80.0	7.8	24	8.4	262	69	20	199	1.0	1.12	178	94	38	86	12	1,510	7.8						
Oct. 24-30-----	916	8.8	17	5.7	124	26	30	446	2.8	.61	1,100	66	44	80	6.6	787	6.8						
Oct. 31, Nov. 1-8, 12-15-----	3,200	11	13	2.1	25	37	15	33	2.0	.119	1,030	40	10	57	1.7	211	7.2						
Nov. 9-11, 16-26-----	2,057	13	14	3.4	54	28	84	124	1.2	.231	1,280	50	27	70	3.3	381	7.3						
Nov. 27-30-----	408	16	18	4.8	77	31	29	294	3.0	.294	324	65	40	72	4.2	523	7.3						
Dec. 1-10-----	250	20	25	5.2	122	28	38	202	2.0	.461	.63	311	83	60	76	5.8	803	6.7					
Dec. 11-12, 15-20, 25-31-----	802	18	18	4.5	81	17	36	133	1.5	.326	.44	706	63	49	74	4.5	553	6.4					
Dec. 13-14, 21-26-----	841	16	20	4.9	105	16	37	175	.8	.299	.54	906	70	57	77	5.5	686	6.4					
Jan. 1-3, 8-11, 1935-----	527	20	17	7.1	97	18	43	138	1.2	.386	.52	549	72	58	75	6.8	638	6.9					
Jan. 4-7, 12-20-----	992	18	15	6.8	84	16	41	136	1.2	.342	.47	666	53	73	4.5	582	6.8						
Jan. 21-31-----	1,398	17	16	6.2	71	18	44	112	1.2	.304	.41	1,150	65	50	70	3.8	509	7.0					
Feb. 1-8-----	2,168	16	13	4.5	53	15	28	87	1.0	.236	.32	1,380	50	38	70	3.3	387	6.7					
Feb. 9-19-----	3,193	14	14	4.0	36	31	29	53	1.0	.4168	.23	1,350	55	30	58	2.9	302	7.0					
Feb. 20-28-----	2,422	16	14	4.7	49	15	32	81	1.0	.228	.31	1,690	54	42	66	2.9	375	6.7					
Mar. 1-9-----	1,308	17	17	5.5	56	30	37	87	1.0	.255	.35	901	65	40	65	2.6	426	7.3					
Mar. 10-19-----	637	20	18	6.9	87	22	42	161	1.8	.352	.48	605	73	55	72	4.4	608	7.1					
Mar. 20-31-----	4,723	10	9.5	3.0	35	15	19	55	1.8	.178	.24	2,270	36	24	68	2.5	263	7.0					
Apr. 1-10-----	3,339	15	15	4.4	46	35	31	67	1.0	.229	.31	2,060	56	27	64	2.7	343	7.3					
Apr. 11-20-----	4,845	15	12	3.9	35	23	26	52	1.0	.187	.25	2,550	45	26	63	2.7	372	7.2					
Apr. 21-29-----	4,053	16	14	4.1	31	42	44	44	1.5	.187	.25	2,050	53	18	56	1.9	271	7.2					
Apr. 30, May 1-10-----	626	22	18	6.5	68	36	31	111	1.0	.302	.61	510	71	42	68	3.5	515	7.4					
May 11-22-----	464	20	17	6.7	90	35	28	167	1.0	.352	.48	441	71	42	73	4.6	607	7.1					
May 23-27-----	2,618	12	9.1	3.0	31	19	17	48	1.5	.157	.21	1,110	35	19	66	2.3	235	7.0					
May 28-31-----	1,298	16	16	5.3	74	31	25	119	2.0	.307	.42	1,980	61	36	72	4.1	511	7.1					
June 1-7-----	558	22	17	5.2	49	47	26	75	2.8	.238	.32	1,285	64	26	63	2.7	390	7.5					
June 8-16-----	282	22	19	6.6	98	66	28	157	1.5	.276	.31	285	75	28	74	4.9	650	7.5					
June 17-23-----	258	19	17	5.2	72	48	20	112	1.8	.290	.39	202	64	25	71	3.9	503	7.4					
June 24-30-----	188	17	21	7.1	134	51	19	16	1.0	.475	.65	241	81	39	78	6.5	838	7.3					
July 1-10-----	93.2	18	18	5.6	98	59	16	153	1.0	.340	.46	85.6	68	20	76	5.2	663	7.9					
July 11-18-----	229	15	16	5.3	118	42	15	189	1.2	.389	.53	241	62	28	80	6.3	710	7.1					
July 19-31-----	377	13	4.5	74	32	18	117	117	1.2	.274	.37	279	50	24	76	4.6	487	7.1					
Aug. 1-13-----	452	13	14	3.4	75	28	16	121	1.8	.274	.37	334	48	25	77	4.7	499	7.1					
Aug. 14-16, 23-----	235	14	20	7.0	181	38	21	298	1.8	.580	.79	368	80	49	83	8.8	1,110	7.5					
Aug. 17-22, 27-31-----	216	16	13	4.9	73	39	19	112	1.2	.264	.36	153	53	21	75	4.3	493	7.3					
Sept. 1-2, 5-6-----	1,026	13	16	3.8	192	27	13	50	2.0	.332	.65	922	50	28	80	5.5	575	7.0					
Sept. 3-4, 7-13-----	670	14	6.9	2.4	37	28	14	90	2.5	.4144	.20	260	32	10	72	2.8	234	7.3					
Sept. 14-16, 26-30-----	601	12	11	3.4	98	38	16	161	1.5	.322	.44	149	55	24	78	5.2	380	7.1					
Sept. 17-25-----	171	13	15	4.3	89	38	16	151	1.5	.44	.44	149	55	24	78	5.2	371	7.4					
Weighted averages-----	1,291	14	16	4.1	51	29	26	79	1.6	.226	.31	788	52	28	68	3.1	370	--					

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 1955.

Water temperatures: October 1947 to September 1955.

EXTRAPOLATED RECORDS.--Dissolved solids: Maximum, 318 ppm Dec. 21-22; minimum, 37 ppm Aug. 5-13.

Hardness: Maximum daily, 612 micromos Dec. 22; minimum daily, 50.4 micromos Aug. 9.

Specific conductance: Maximum observed, 88°F July 11-12, 24; minimum observed, 42°F Jan 31, Feb. 13.

Water temperatures: Maximum observed, 88°F July 11-12, 24; minimum observed, 42°F Jan 31, Feb. 13.

EXTRAPOLATED RECORDS.--Dissolved solids: Maximum, 611 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 daily, 776 micromos Dec. 26, 1948; minimum daily, 32.9 micromos May 22, 1953.

Water temperatures (1947-50): Maximum observed, 95°F Aug. 12, 1953; minimum observed, 34°F Jan. 28, 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 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 carbonate	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot						
Oct. 1-10, 1954-----	333	21	7.7	2.8	33	47	6.2	40	5.3	45	1.0	142	0.19	128	30	0	70	2.6	223	6.9	
Oct. 11-20-----	391	21	7.2	2.6	32	43	5.3	40	6.5	45	1.0	142	.19	128	28	0	73	2.9	222	7.2	
Oct. 21-31-----	446	19	7.3	2.4	35	40	6.5	40	9.8	55	.8	148	.20	178	28	0	73	2.9	231	7.1	
Nov. 1-6-----	690	18	7.2	3.6	40	20	2.0	28	2.0	2.0	2.0	158	.21	294	33	0	73	3.1	270	7.3	
Nov. 7-12-----	2,910	13	11	4.3	86	28	2.0	17	31	31	1.2	209	.40	2,310	45	22	80	5.4	520	7.1	
Nov. 13-20-----	4,220	11	10	3.5	22	32	1.0	11	19	45	1.2	4112	.15	1,276	40	14	55	1.5	197	7.0	
Nov. 21-30-----	2,931	12	11	3.6	31	32	1.0	12	1.2	1.2	1.2	4139	.19	1,100	42	16	62	2.1	249	6.9	
Dec. 1-10-----	1,452	16	2.6	43	28	22	6.6	1.2	1.2	1.2	1.2	206	.28	808	46	23	67	2.8	318	7.3	
Dec. 11-20-----	1,278	17	13	2.6	43	27	19	6.6	1.5	1.5	1.5	194	.26	669	43	21	68	2.8	311	7.4	
Dec. 21-22-----	2,940	19	4.0	80	32	30	1.0	128	1.0	1.0	1.0	318	.43	2,520	65	39	73	4.3	534	7.4	
Dec. 23-31-----	2,070	14	2.6	43	18	18	6.8	1.0	1.0	1.0	1.0	191	.26	1,070	36	22	72	3.1	305	6.5	
Jan. 1-7, 1955-----	1,370	17	7.4	3.8	35	20	19	52	1.0	1.0	1.0	159	.22	674	34	18	69	2.6	261	7.0	
Jan. 8-11-----	2,040	16	8.4	4.1	52	17	22	80	1.8	1.8	1.8	209	.28	1,150	38	24	75	3.7	351	7.0	
Jan. 12-20, 22, 29-31	3,830	14	6.2	2.9	33	14	1.6	50	1.0	1.0	1.0	148	.20	1,530	28	16	72	2.7	232	6.6	
Jan. 21, 23-28-----	6,370	14	8.8	4.1	46	12	23	74	1.8	1.8	1.8	207	.28	3,560	39	29	72	3.2	334	6.5	
Feb. 1-6, 16-23, 27-28	8,300	11	6.6	3.1	30	14	21	42	1.5	1.5	1.5	148	.20	3,320	29	18	69	2.4	218	6.9	
Feb. 7-11, 24-26-----	17,420	7.4	1.5	14	10	19	1.0	19	1.0	1.0	1.0	682	.08	2,920	16	7	66	1.6	109	6.5	
Feb. 12-15-----	16,420	9.0	5.0	1.8	18	10	14	26	1.0	1.0	1.0	680	.11	3,550	20	12	67	1.8	144	6.8	
Mar. 1-8-----	8,260	14	9.0	9.2	24	15	21	36	1.8	1.8	1.8	4116	.16	2,590	35	22	60	1.8	201	6.7	
Mar. 9-17-----	3,710	17	11	4.0	35	26	27	51	1.0	1.0	1.0	4158	.21	1,580	44	24	63	1.7	231	7.0	
Mar. 18-26-----	3,350	19	13	3.9	37	30	24	56	1.5	1.5	1.5	4169	.23	1,520	49	24	62	2.3	292	7.1	
Mar. 27-31, Apr. 1-12-	10,320	10	8.8	2.2	22	18	16	33	1.0	1.0	1.0	4103	.14	2,930	31	16	61	1.7	188	6.7	
Apr. 1-6, 16-23-----	23,880	8.8	4.6	1.6	12	13	9.3	16	1.5	1.5	1.5	460	.08	3,870	18	7	59	1.2	107	6.8	
Apr. 23-30-----	13,610	13	7.8	2.6	23	17	29	2.2	1.0	1.0	1.0	4107	.05	3,930	30	10	62	1.8	178	6.8	
May 1-10-----	5,980	15	12	3.7	26	36	18	36	1.0	1.0	1.0	4112	.16	2,520	44	14	56	1.7	231	7.0	
May 11-20, 23-25-----	5,360	16	11	3.5	31	34	17	44	1.0	1.0	1.0	4154	.21	2,310	42	14	61	2.1	247	6.7	
May 22-----	9,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	4	--	--	59.1	6.7
May 21, 26-31-----	9,630	9.0	5.6	1.9	20	17	9.6	29	1.0	1.0	1.0	484	.11	2,180	22	8	67	1.9	151	6.6	
June 1-6-----	9,080	12	6.6	2.3	16	21	12	22	1.5	1.5	1.5	482	.11	2,010	26	9	58	1.4	145	6.8	
June 7-14-----	3,430	17	9.2	3.2	24	13	28	13	1.2	1.2	1.2	4139	.19	1,290	36	13	59	1.8	206	6.9	
June 15-30-----	1,740	22	11	3.9	34	42	16	48	1.0	1.0	1.0	167	.23	785	44	10	63	2.2	268	7.3	
July 1-10-----	1,450	18	10	3.7	35	40	13	49	1.0	1.0	1.0	4162	.22	634	40	7	66	2.4	267	7.0	
July 11-17-----	1,500	17	10	3.5	46	37	9.6	69	1.0	1.0	1.0	186	.25	745	40	10	71	3.1	316	7.4	
July 18-23, 30-31-----	3,090	9.0	4.2	1.8	17	20	5.9	22	1.0	1.0	1.0	4171	.10	592	18	2	67	1.7	127	6.7	
July 24-29-----	3,390	11	7.0	2.6	35	26	6.9	51	1.0	1.0	1.0	4129	.18	1,180	28	6	73	2.9	238	6.7	
Aug. 1-3-----	12	7.8	2.5	2.0	31	5.6	42	19	5.2	16	1.0	4114	.16	926	30	4	67	2.2	206	7.5	
Aug. 4-14, 20, 30-31--	8,300	11	4.8	1.5	12	19	5.2	10	3.2	10	1.0	460	.08	1,340	18	2	60	1.2	101	6.8	
Aug. 5-13-----	22,280	6.2	3.2	1.7	5.7	2.0	1.0	1.0	1.0	1.0	1.0	437	.05	2,230	11	3	48	1.8	168	6.5	
Aug. 14-29-----	2,910	16	7.0	2.6	22	30	7.3	20	1.0	1.0	1.0	465	.09	789	28	4	63	1.8	168	6.9	
Sept. 1-9-----	5,220	12	4.2	1.3	14	20	5.9	18	1.0	1.0	1.0	465	.09	916	16	0	66	1.6	106	6.4	
Sept. 10-11, 13-14-----	2,180	18	8.2	2.6	34	35	7.7	48	1.0	1.0	1.0	4136	.18	800	31	2	70	2.6	240	7.3	
Sept. 12, 15-20-----	2,120	15	11	2.3	52	30	12	82	1.5	1.5	1.5	4083	.26	1,190	41	16	73	3.5	356	6.6	
Sept. 23-30-----	2,350	14	5.6	1.4	20	22	5.5	28	1.0	1.0	1.0	487	.12	552	20	2	69	2.0	141	6.7	
Weighted average----	5,574	11	6.9	2.3	22	19	13	32	1.0	1.0	1.0	4,146	0.14	1,570	26	11	64	1.9	174	--	

a Sum of determined constituents

## SABINE RIVER BASIN--Continued

## COW BAYOU NEAR MAURICEVILLE, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, half a mile upstream from Kansas City Southern Railway Bridge, and 3 miles southwest of Mauriceville, Orange County.

DRAINAGE AREA.--127 square miles.

RECORDS AVAILABLE.--Chemical analyses, March 1952 to September 1955 (discontinued).

Water temperature: March 1952 to September 1954.

Extremes: Maximum, 917 ppm Nov. 18-22; minimum, 30 ppm Feb. 8-19.

Hardness: Maximum, 1,58 ppm Dec. 15-17; minimum, 8 ppm Nov. 14-24.

Extremes, 1952-55:--Dissolved solids: Maximum, 1,010 ppm July 29-31, 1953; minimum, 23 ppm Apr. 23-30, 1952.

Specific conductance: Maximum daily, 1,800 micromhos Nov. 23; minimum daily, 14.5 micromhos Sept. 15.

Extremes, 1952-55:--Dissolved solutes: Maximum, 1,010 ppm July 29-31, 1953; minimum, 23 ppm Apr. 23-30, 1952.

Hardness: Maximum, 1,800 ppm Nov. 1-9, 1953; minimum, 8 ppm Nov. 15-17, 1954.

Specific conductance: Maximum daily, 2,190 micromhos Aug. 26, 1953; minimum daily, 22.0 micromhos Apr. 24, 1952.

Remarks.--Values reported for dissolved solutes 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 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million. Water year October 1954 to September 1955.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Fluoride (F)	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>			Specific conductance (micro-mhos at 25°C.)			pH
		Parts per mill.	Parts per mill.	Parts per acre-foot	Parts per mill.	Parts per acre-foot	Tons per acre-foot	Tons per day	Calclum, magnesium	Non-carbonate	Sodium adsorption ratio	Percent sodium	Parts per mill.	Parts per mill.	Tons per day	Calclum, magnesium	Non-carbonate	Sodium adsorption ratio	Percent sodium	Specific conductance (micro-mhos at 25°C.)		
Oct. 1-4, 1954-----	±0.05	32	31	16	144	96	17	255	1.2	.73	.07	144	65	69	5.2	1,040	7.4					
Oct. 5-11-----	.29	11	5.9	3.2	31	10	6.2	57	1.5	1.21	.16	20	71	2.6	226	6.6						
Oct. 12-22, 27-31-----	0.14	19	12	6.4	59	35	10	103	1.5	228	.31	56	28	70	3.4	430	7.1					
Oct. 23-26-----	1.03	10	2.7	1.0	14	10	4.4	19	1.2	57	.08	16	11	3	73	1.8	83	6.4				
Oct. 1-10-----	.18	8.8	8.7	4.2	54	14	6.0	98	1.0	188	.26	39	28	75	3.8	367	6.7					
Nov. 11-16-----	.10	9.4	12	4.6	62	14	8.4	113	1.4	220	.30	48	37	74	3.9	423	7.0					
Nov. 15-17-----	10.3	2.6	1.9	1.8	9.6	1.4	1.6	1.0	1.0	3.8	.05	1.08	8	3	68	1.5	72	0				
Nov. 18-22-----	1.06	6.4	3.3	1.2	304	9	4.7	552	1.0	917	1.25	2.02	132	124	83	11	1,780	6.3				
Nov. 23-30-----	.11	12	3.5	15	288	26	8.1	528	1.2	900	1.22	.27	149	128	81	10	1,730	7.2				
Dec. 1-8-----	.11	20	3.6	16	240	60	15	435	.8	793	1.08	.24	156	107	75	8.4	1,310	7.7				
Dec. 9-16-----	.11	19	3.5	15	204	50	15	372	.2	687	.93	.20	164	75	75	7.4	1,320	7.3				
Dec. 17-31-----	.17	13	3.7	16	268	28	9.0	502	.2	859	1.17	.39	158	136	79	9.2	1,660	7.2				
Jan. 1-6, 1955-----	.28	5.2	3.7	1.5	286	8	4.9	542	.8	895	1.22	.68	134	148	80	10	1,770	6.1				
Jan. 7-13-----	.36	4.8	3.7	1.9	36	7	4.4	60	1.2	115	.16	11.3	17	11	82	3.8	235	6.0				
Jan. 14-24-----	.164	5.3	1.1	1.3	6.5	1.4	8	5.6	.5	34	.05	15.1	8	1	59	1.0	63.1	6.5				
Jan. 25-31-----	.46	8.3	2.2	1.6	8.9	1.4	9	8.5	12	48	.07	5.96	12	5	58	1.1	82.8	6.6				
Feb. 1-7-----	.284	2.4	1.7	1.7	.9	60	15	12	.2	c99	.13	75.9	13	13	4.3	.8	65.9	4.1				
Feb. 8-19-----	.385	5.6	2.2	1.2	4.7	.7	7	3.6	8.0	30	.04	31.2	10	5	47	.6	49.1	6.3				
Feb. 20-28-----	.176	6.6	2.4	1.3	5.4	.7	8	3.1	9.5	34	.05	16.2	11	5	49	.7	54.3	6.1				
Mar. 1-15-----	.245	9.5	2.7	1.3	6.1	1.2	8	2.3	12	40	.05	2.65	12	6	49	.8	63.1	6.5				
Mar. 16-31, Apr. 1-8-----	.52	1.5	1.2	4.5	42	32	6.9	75	1.8	173	.24	.24	49	23	65	2.6	319	7.3				
Apr. 9-25-----	.447	8.6	3.2	1.7	10	10	1.9	18	2.2	51	.07	61.5	15	7	60	1.2	88.4	6.5				
Apr. 26-30-----	3.52	16	4.6	6.8	56	41	7.6	100	2.0	222	.30	2.11	62	28	66	3.1	419	7.3				
June 10-25-----	6.14	7.2	8.4	3.9	58	20	4.4	100	1.2	193	.26	3.20	27	21	77	4.1	383	6.4				
June 26-30, July 1-6-----	.39	9.0	3.8	58	20	4.2	101	1.2	194	.26	3.20	38	22	77	4.1	393	6.5					
July 7-17-----	.25	17	1.9	8.9	92	55	9.9	160	1.2	335	.46	.23	83	38	71	4.4	645	7.2				
July 18-31, Aug. 1-2-----	.83	8.8	.9	2.0	37	16	7.2	58	1.0	128	.17	.28	23	10	78	3.3	336	7.2				
Aug. 3-9-----	.71.4	5.6	2.7	1.5	15	10	1.9	24	1.2	58	.08	11.2	13	5	72	1.8	103	6.6				
Aug. 10-15-----	19.5	7.8	2.9	1.4	5.9	1.5	10	2.8	10	1.5	.39	.05	2.05	13	5	46	.7	59.9	6.6			
Aug. 16-27-----	.98	9.6	7.7	3.1	39	17	4.2	70	1.0	143	.19	.38	32	18	73	3.0	273	6.6				
Aug. 28-31-----	.52	5.0	3.8	1.6	31	8	2.2	52	1.0	101	.14	.14	16	9	81	3.4	188	6.3				
Sept. 1-15-----	116	7.3	3.0	1.1	5.5	1.6	11	1.9	9.2	1.5	.36	.05	11.3	12	3	46	.7	53.8	6.1			
Sept. 16-28-----	1.99	5.6	1.1	3.2	91	11	2.4	161	1.0	280	.38	1.50	32	83	6.2	.567	567	6.3				
Sept. 29-30-----	.45	6.1	4.4	1.2	25	15	2.6	38	1.5	86	.12	.10	16	4	77	2.7	158	6.5				
Weighted average-----	366.0	7.0	2.7	1.5	9.2	8	4.1	15	1.3	50	0.07	8.91	13	6	61	1.1	76.3	7.3				

<sup>a</sup> Includes days of less than 0.05 second-foot flow.<sup>b</sup> Free acid as H<sub>2</sub>SO<sub>4</sub>, 4 parts per million.<sup>c</sup> Residue on evaporation at 180°C.<sup>d</sup> Represents 96 percent of flow for water year October 1954 to September 1955.

## MECHES RIVER BASIN

ANGELINA RIVER NEAR LATKIN, 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 Lufkin, Angelina County.

DRAINAGE AREA.--1,575 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1955.

Water temperatures: October 1954 to September 1955.

EXTERNS, 1954-55.--Dissolved solids: Maximum, 412 ppm Nov. 4-18, 26-30; minimum, 53 ppm May 24-29.

Specific conductance: Maximum daily, 895 micromhos Nov. 10; minimum observed, 40<sup>9</sup>P Jan. 24.

Water temperatures: Maximum observed, 86<sup>9</sup>P Oct. 11; minimum observed, 40<sup>9</sup>P Jan. 24.

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 1954 to September 1955 given in Water Supply Paper 1392.

Records of discharge for water year October 1954 to September 1955 given in Water Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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)	Nitrate (NO <sub>3</sub> )	Fluoride (F)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>	Calcium, magnesium	Non-carbonate	Sodium-chloride ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-10, 1954-----	4.68	11	0.03	10	6.2	51	52	13	74	1.0	206	0.28	2.60	50	8	69	3.1	368	7.1		
Oct. 11-23-----	4.28	10	.06	9.4	6.1	51	50	13	74	1.2	203	.28	2.35	49	8	70	3.2	358	7.1		
Oct. 24-31-----	36.6	9.8	.16	7.2	4.6	37	39	12	51	1.0	159	.22	15.7	37	5	69	2.6	264	7.1		
Nov. 1-3-----	130	1.3	--	7.0	4.0	22	34	21	52	1.2	130	.18	45.6	34	18	59	1.7	184	7.2		
Nov. 4-18, 26-30-----	239	18	--	7.5	109	4	180	52	180	1.5	412	.56	288	76	72	76	5.4	710	5.5		
Nov. 19-22-----	266	17	--	14	5.9	81	4	49	127	.8	316	.43	227	59	56	75	4.6	316	5.6		
Nov. 23-25-----	316	16	--	10	4.6	62	5	36	98	.2	251	.36	214	45	41	75	4.0	416	6.1		
Dec. 1-10-----	137	18	.04	15	4.4	79	4	42	128	.8	489	.39	107	56	53	75	4.6	534	6.0		
Dec. 11-18-----	228	18	.06	15	4.4	79	6	35	132	.2	314	.43	193	56	51	75	4.6	534	6.2		
Dec. 19-31-----	733	14	.12	9.3	3.1	44	5	29	69	.5	171	.23	338	36	32	73	3.2	312	6.1		
Jan. 1-10, 1955-----	395	18	.08	11	5.0	60	7	31	100	.8	255	.35	272	49	43	73	3.7	430	6.4		
Jan. 11-20-----	509	17	.06	9.8	5.2	62	8	31	100	.5	252	.36	346	46	39	74	4.0	425	6.5		
Jan. 21-31-----	1,265	14	.09	4.9	4.8	36	5	25	57	.5	160	.22	546	32	28	71	2.8	264	6.1		
Feb. 1-6-----	1,081	14	.06	8.1	4.1	34	6	30	53	.5	169	.23	493	37	32	67	2.4	270	6.0		
Feb. 7-14-----	1,514	13	.12	6.3	3.2	23	5	22	32	1.2	111	.15	454	37	24	20	6.0	270	6.0		
Feb. 15-28-----	1,706	12	.06	7.1	3.7	27	6	26	42	.8	130	.18	599	33	28	64	2.0	211	6.3		
Mar. 1-10-----	1,501	12	.09	8.8	4.9	32	8	33	49	.8	161	.22	652	42	35	62	2.1	263	6.6		
Mar. 11-21-----	629	15	.19	12	5.7	46	14	36	74	.8	218	.30	370	54	43	65	2.7	360	6.6		
Mar. 22-31-----	1,327	14	.41	8.0	4.4	29	12	26	45	.8	160	.22	573	38	28	62	1.3	239	6.7		
Apr. 1-12, 22-----	1,705	16	.17	7.4	4.5	30	14	24	46	1.0	162	.22	746	37	26	64	2.1	243	7.2		
Apr. 13-21-----	2,314	16	.31	6.6	3.3	14	16	15	18	1.0	480	.11	500	25	12	54	1.2	171	6.9		
Apr. 22-29-----	2,694	17	.58	6.8	3.9	18	25	13	26	1.5	499	.13	774	33	12	54	1.4	171	6.9		
May 1-10-----	602	19	.36	11	5.7	37	28	20	61	1.5	195	.27	317	50	27	62	2.3	309	6.6		
May 11-20-----	290	20	.17	10	5.1	43	22	18	72	3.0	207	.26	162	47	29	67	2.7	332	6.5		
May 21-29-----	2,843	14	.44	3.1	2.5	7.2	16	9.3	6.8	1.5	453	.07	407	18	5	46	.7	80.2	6.3		
May 21-23, 30-31, June 1-4-----	1,849	16	.43	6.4	3.4	17	19	12	27	1.2	492	.13	459	30	14	55	1.4	155	6.6		
June 5-10-----	793	18	.29	9.7	4.8	38	27	15	62	1.2	185	.25	396	44	22	65	2.5	288	6.5		
June 11-20-----	310	20	.38	11	5.0	49	29	14	81	1.2	218	.30	182	48	24	69	3.0	351	6.9		
June 21-30-----	199	20	.35	11	4.6	49	29	13	81	1.2	217	.30	117	46	22	70	3.1	349	6.9		
July 1-10-----	83.8	21	.48	8.5	4.8	36	37	12	53	1.5	187	.25	42.3	41	11	65	2.4	276	7.3		
July 11-20-----	47	21	.38	9.8	5.5	44	38	12	69	1.5	207	.26	26.3	47	16	67	2.8	333	7.1		
July 21-31-----	436	15	.14	9.7	4.8	53	14	21	88	1.0	232	.32	286	44	33	72	3.4	380	6.7		
Aug. 1-9-----	243	17	.16	12	5.1	74	15	20	126	.5	298	.41	196	51	39	76	4.5	491	6.4		
Aug. 10-16-----	478	14	.24	6.8	3.2	41	17	11	66	1.2	175	.26	226	30	16	75	3.3	289	6.8		
Aug. 17-31-----	107	17	.29	9.9	4.7	59	28	13	96	1.0	234	.32	67.6	44	21	75	3.9	409	6.9		
Sept. 1-10-----	97.5	16	.16	12	5.2	81	32	8.9	136	1.5	287	.39	75.6	52	26	77	4.9	536	6.9		
Sept. 11-20-----	49.8	17	.20	11	4.7	73	35	9.1	118	1.0	263	.36	35.4	47	18	77	4.6	476	7.1		
Sept. 21-30-----	43.3	15	.20	12	4.8	77	30	10	129	.2	277	.38	32.4	50	25	77	4.7	503	6.8		
Weighted average-----	693	15	0.24	7.6	4.2	32	16	22	50	1.0	153	0.21	286	36	25	66	2.3	249	...		

a Sum of determined constituents.

## NECHES RIVER BASIN--Continued

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 Mill Creek, 15 miles upstream from Village Creek and at mile 55.

DRAINAGE AREA--7,308 square miles.

Water temperatures: October 1947 to September 1955.

RECORDS AVAILABLE--Chemical analyses: October 1947 to September 1955.

EXTERNS, 1954-55--Dissolved solids: Maximum, 203 ppm Oct. 1-10; minimum, 62 ppm Apr. 13-19, 21-26.

Hardness: Maximum, 56 ppm Oct. 1-10; minimum, 21 ppm Feb. 6-18, 21-22, 24, Apr. 13-19, 21-26.

Specific conductance: Maximum daily, 408 micromhos Oct. 26; minimum daily, 63.3 micromhos Apr. 19.

Water temperatures: Maximum observed, 42°F July 11.

EXTERNS, 1947-55--Dissolved solids: Maximum, 218 ppm Dec. 11-20, 1948; minimum, 36 ppm May 3-12, 26-27, 1953.

Hardness: Maximum, 70 ppm Sept. 22-25, 27, 1950; minimum, 16 ppm Sept. 29, 1952; minimum daily, 49.3 micromhos May 9, 1953.

Specific conductance: Maximum daily, 415 micromhos Nov. 29, 1952; minimum daily, 49.3 micromhos May 9, 1953.

Water temperatures: Maximum observed, 94°F June 29, 1953; minimum observed, 37°F Jan. 30-31, 1946.

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 1954 to September 1955 given in Water-Supply Paper 1392.

## Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Parts per million	Boiling point (B)	Dissolved solids (Residue at 180°C)		Hardness as CaCO <sub>3</sub>	Calcareous-magnesium	Non-carbonate	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per milliliter	Tons per acre-foot						
Oct. 1-10, 1954-----	191	26	14	5.2	4.6	86	9.7	52	0.4	2.8	203	0.28	105	56	0	64	2.4	330	7.6	
Oct. 11-20-----	137	26	13	4.5	4.0	81	7.2	43	.3	2.8	196	.27	83.1	51	0	63	2.4	300	7.5	
Oct. 21-31-----	161	24	13	4.5	39	75	7.6	45	.3	2.0	196	.27	85.2	51	0	62	2.4	290	7.6	
Nov. 1-10-----	101	25	12	3.6	32	71	7.1	32	.3	2.2	152	.21	41.5	45	0	60	2.0	236	7.6	
Nov. 11-20-----	136	22	11	2.8	26	54	9.4	28	.2	2.5	138	.19	73.0	39	0	59	1.8	205	7.5	
Nov. 21-30-----	542	16	11	2.8	42	47	19	49	.3	2.2	194	.26	284	39	0	70	2.9	287	7.5	
Dec. 1-10-----	445	17	12	2.2	35	32	25	43	.6	1.5	61.52	.21	183	39	13	66	2.4	264	7.2	
Dec. 11-20-----	610	16	12	2.2	29	26	25	37	.6	1.0	61.36	.18	224	39	18	62	2.0	229	7.2	
Dec. 21-31-----	1,604	18	10	2.2	31	21	28	38	.7	1.8	43.39	.19	602	35	18	66	2.3	229	7.0	
Jan. 1-10, 1955-----	768	16	7.0	4.0	37	20	29	46	.5	1.8	165	.22	788	34	18	70	2.7	258	6.8	
Jan. 11-20-----	2,142	17	6.4	3.9	35	16	24	48	.5	1.8	160	.22	925	32	19	70	2.7	247	6.9	
Jan. 21-31-----	3,406	16	7.0	3.5	32	17	23	44	.5	1.0	154	.21	1,420	32	18	69	2.5	236	6.8	
Feb. 1-5-----	3,520	16	11	2.8	27	18	24	40	.5	1.0	162	.22	1,540	40	26	59	1.8	230	6.7	
Feb. 6-10, 21-22, 24--	1,460	11	5.5	1.6	14	10	14	19	.4	1.8	472	.10	2,30	21	13	59	1.3	116	6.3	
Feb. 19-20, 23, 25-28-	7,154	13	6.8	2.7	18	13	20	24	.5	1.8	692	.13	1,780	28	18	59	1.5	155	6.6	
Mar. 1-10-----	5,029	15	7.8	3.3	25	14	26	33	.4	1.0	123	.17	1,670	33	22	62	1.9	202	7.0	
Mar. 11-20-----	3,528	15	9.0	3.7	26	16	26	36	.4	1.2	131	.18	1,250	38	24	61	1.9	220	7.0	
Mar. 21-31-----	3,873	13	11	4.0	28	21	29	40	.2	1.0	161	.22	1,680	44	27	58	1.8	235	7.3	
Apr. 1-12-----	5,424	11	9.8	3.7	24	26	24	31	.4	1.8	4118	.16	1,730	40	18	57	1.7	208	7.1	
Apr. 13-19, 21-26-----	1,903	8.6	5.0	2.0	12	16	11	14	.5	1.5	462	.08	319	21	8	55	1.7	101	6.8	
Apr. 20-27, 30-----	10,450	12	10	2.8	19	40	16	18	1.0	1.0	100	.14	2,840	36	4	54	1.4	158	6.9	
May 1-10-----	4,656	15	9.6	3.6	23	16	22	30	.2	1.8	144	.20	1,810	39	13	56	1.6	194	6.8	
May 11-20-----	7,751	14	12	3.7	22	38	15	30	.3	2.0	144	.20	681	44	13	52	1.4	203	7.5	
May 21-31-----	3,475	10	11	4.0	24	41	16	32	.2	1.5	140	.19	1,310	45	12	53	1.5	210	7.0	
June 1-10-----	5,746	15	8.4	3.4	19	27	17	24	.4	1.2	4101	.14	1,570	35	13	54	1.4	171	7.0	
June 11-20-----	2,326	16	3.3	1.8	26	15	24	28	.4	1.0	699	.13	621	34	12	53	1.3	169	7.0	
June 21-30-----	1,937	16	11	3.8	20	36	15	35	.3	1.5	4113	.15	304	42	12	51	1.4	193	7.2	
July 1-10-----	1,324	17	10	4.0	26	38	15	35	.3	1.5	136	.18	486	42	11	57	1.7	207	7.0	
July 11-20-----	865	18	12	4.1	26	44	14	36	.3	1.5	140	.19	327	46	10	56	1.7	219	7.0	
July 21-31---	441	19	12	4.3	27	50	12	37	.3	1.2	139	.19	166	48	7	55	1.7	227	7.1	
Aug. 1-10-----	757	17	11	3.3	26	41	13	34	.3	1.8	143	.19	292	40	6	59	1.8	203	7.1	
Aug. 11-20-----	1,659	16	11	3.6	30	45	11	41	.3	1.0	159	.22	729	43	6	60	2.0	238	7.6	
Aug. 21-31---	1,832	14	10	3.3	31	39	13	32	.3	1.8	159	.22	795	39	7	63	2.1	239	7.6	
Sept. 1-9-----	982	14	9.6	2.4	24	36	10	32	.4	1.2	131	.18	347	34	4	61	1.8	194	7.0	
Sept. 10-20-----	655	15	11	3.4	32	44	13	42	.4	1.0	152	.21	269	41	5	63	2.2	262	7.6	
Sept. 21-30-----	614	16	10	3.0	32	43	11	42	.3	0.8	151	.21	250	38	3	64	2.2	235	7.1	
Weighted average-----	3,149	13		7.8	21	22	17	27	0.4	1.0	107	0.15	910	31	13	59	1.6	169	--	

a Sum of determined constituents.

## TRINITY RIVER BASIN

## TRINITY RIVER NEAR ROSSER, KANSAS COUNTY, 8.5 miles downstream from East Fork and at mile 451.

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

DRAINAGE AREA -- 8,162 square miles.

RECORDS AVAILABLE -- Chemical analyses: October 1934 to September 1935.

Water temperatures: October 1934 to September 1935.

EXTERNS, 1934-55 -- Dissolved solids: Maximum, 1,020 ppm Dec. 11-20, 21-31; minimum, 320 ppm Apr. 12-15.

Hardness: Maximum, 198 ppm Oct. 1-2, 4-5, 10, minimum, 120 ppm Sept. 20-21, 26-27, 29.

Specific conductance: Maximum daily, 1,960 microhm Dec. 26; minimum daily, 385 microhm May 21.

Water temperatures: Maximum observed, 97°F July 1; minimum observed, 50°F Nov. 4.

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 1934 to September 1935 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1934 to September 1935

Date of collection	Chemical analyses										Dissolved solids				Hardness as CaCO <sub>3</sub>			Specific conductance (micro-mhos at 25°C)	pH
	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Magn- esium (Mg)	Po- tassium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluor- ide (F)	Ni- trate (NO <sub>3</sub> )	Bor- on (B)	Parts per mil- lion	Parts per mil- lion	Tons per day	Tons per day	Per- cent so- dium	So- dium absorp- tion ratio	
Oct. 1-2, 4-5, 10, 1934	543	16	64	9.5	192	142	160	215	36	507	1,06	1,150	783	198	82	68	5.9	1,300	7.7
Oct. 3, 6-9--	298	14	48	6.7	112	116	108	117	24	507	.69	408	148	52	62	4.0	1,846	7.8	
Oct. 11-20--	130	26	56	7.6	242	136	243	188	82	507	1.27	328	170	59	75	8.0	1,490	6.9	
Oct. 21-31--	319	20	63	8.8	222	122	202	170	72	907	1.23	781	193	93	71	6.9	1,490	7.8	
Nov. 1-5, 10-12, 17-22--	207	18	55	5.3	167	170	143	135	54	675	.92	377	160	20	69	5.7	1,100	8.0	
Nov. 6-9, 16--	308	14	59	4.0	102	139	118	86	35	516	.70	429	164	50	58	3.5	818	7.3	
Nov. 13-15, 23-30--	140	22	58	6.5	233	188	199	180	80	899	1.22	340	172	18	75	7.7	1,450	7.7	
Dec. 1-10--	129	26	58	8.3	259	154	237	208	94	4966	1.31	336	178	52	76	8.4	1,590	7.5	
Dec. 11-20--	159	26	58	8.8	273	132	254	218	118	1,020	1.39	438	180	72	77	8.8	1,660	7.2	
Dec. 21-31--	148	25	56	9.0	269	92	250	200	125	1,020	1.39	408	176	101	77	7.8	1,700	7.0	
Jan. 1-10, 1935--	158	26	56	9.0	246	98	261	175	134	991	1.35	423	172	91	76	8.2	1,680	7.1	
Jan. 11-12, 16-20--	245	24	57	8.5	238	76	286	175	108	981	1.33	649	177	114	74	7.8	1,500	6.8	
Jan. 13-15--	264	14	49	5.0	147	128	146	110	62	615	.84	438	142	37	69	7.5	975	7.2	
Jan. 21-31--	167	20	54	6.9	189	116	193	141	97	792	1.08	357	163	68	72	6.4	1,220	7.2	
Feb. 1-10--	381	19	55	6.4	180	105	207	126	95	775	1.05	797	164	78	71	6.1	1,200	7.0	
Feb. 11-19--	179	19	58	7.1	181	83	235	117	112	770	1.05	372	174	106	69	6.0	1,190	7.0	
Feb. 20-21, 24-28--	321	18	56	6.6	193	119	221	85	85	778	1.06	674	166	69	70	6.2	1,200	7.2	
Feb. 22-23--	536	19	52	5.6	96	172	94	67	23	466	.63	700	144	3	59	3.5	742	8.1	
Mar. 1-10--	168	17	56	5.8	162	146	168	114	74	727	.99	330	164	44	68	1.110	7.8		
Mar. 11-22--	288	18	57	6.2	214	110	236	147	112	911	1.24	708	168	78	74	7.2	1,380	7.8	
Mar. 23-31--	405	14	53	4.9	106	160	102	75	48	498	.68	545	152	21	60	3.7	783	7.6	
Apr. 1-11--	274	12	58	5.5	154	184	147	106	60	657	.89	486	167	0	67	5.2	1,040	7.5	
Apr. 12-15--	1,755	12	52	2.7	55	144	69	37	21	320	.44	1,320	140	22	46	2.0	535	7.8	
Apr. 16-30, May 1-12--	195	15	62	5.4	140	170	143	106	54	654	.90	350	176	37	63	4.6	1,020	7.5	
May 13-25--	1,315	9.6	56	3.4	49	157	64	36	16	322	.44	1,320	154	25	41	1.7	516	7.7	
May 26-31--	363	13	65	4.4	94	182	109	74	22	497	.68	487	180	31	53	3.0	801	7.4	
June 1-10--	334	21	66	5.9	174	134	198	133	78	6742	1.01	709	189	79	67	5.5	1,160	7.9	
June 11-13, 19-25--	916	15	54	4.0	58	146	70	52	15	352	.48	928	151	32	46	2.1	579	8.0	
June 14-18	267	16	60	4.8	126	175	122	106	28	560	.76	404	169	26	62	4.2	955	8.0	
July 1-10--	162	63	5.9	191	211	166	160	32	32	770	1.05	337	182	9	70	6.2	1,240	7.7	
July 11-18--	220	19	61	6.8	235	207	188	210	39	891	1.21	529	181	12	74	7.6	1,440	7.7	
July 19-22--	244	18	52	5.3	155	166	133	136	29	635	.86	418	152	16	69	5.3	1,030	7.8	
July 23-31--	154	22	58	6.8	248	197	227	197	44	4900	1.22	374	172	11	76	8.2	1,310	6.9	
Aug. 1-10--	159	26	56	6.1	218	215	159	195	20	819	1.11	352	160	0	75	7.5	1,310	8.0	
Aug. 11-20--	239	24	55	6.4	230	199	196	193	30	880	1.20	615	164	0	75	7.8	1,410	7.9	
Aug. 21-30--	145	19	52	6.2	216	178	180	190	27	829	1.13	325	155	9	75	7.5	1,320	7.7	
Aug. 31, Sept. 1-10--	180	21	52	6.2	192	137	178	27	76	746	1.01	363	156	0	73	6.7	1,210	7.7	
Sept. 11-19--	205	24	56	7.1	250	195	218	216	51	917	1.25	508	168	8	76	8.4	1,460	7.6	
Sept. 20-21, 26-27, 29--	231	16	41	4.3	148	120	126	125	45	585	.80	396	120	22	73	5.9	1,976	6.9	
Sept. 22-25, 28, 30--	232	20	59	7.1	246	49	291	198	109	985	1.34	617	176	136	75	8.1	1,570	6.6	
Weighted average-----	312	16	57	5.5	163	150	145	113	49	625	0.85	526	164	42	65	4.8	999	--	

a. Sum of determined constituents.



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

Date of collection	Chemical analyses, in Parts per million, water Year October 1954 to September 1955--Continued																					
	Dissolved solids					Dissolved solids																
Mean discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron ( $\text{Fe}$ )	Calcium ( $\text{Ca}$ )	Magnesium ( $\text{Mg}$ )	Sodium ( $\text{Na}$ )	Potassium ( $\text{K}$ )	Chloride ( $\text{Cl}$ )	Fluoride ( $\text{F}$ )	Nitrate ( $\text{NO}_3$ )	Boron (B)	Parts per milliliter	Tons per acre-foot	Tons per acre-day	Calcareous material	Non-carbonate	Hardness as $\text{CaCO}_3$	Calcareous material	Non-carbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
Aug. 1-10, 1955-----	395	16	57	5.8	145	122	53	200	4.3		576	0.78	614	166	25	66	6.9	1,020	8.0			
Aug. 11-20-----	443	17	60	6.6	246	186	87	332	1.0		4841	1.14	1,010	176	24	75	6.1	1,500	8.0			
Aug. 21-31-----	541	15	56	6.5	224	176	82	300	1.2		4772	1.04	1,130	166	22	75	7.6	1,380	7.9			
Sept. 1-10-----	601	18	63	7.2	316	194	88	440	1.5		1,030	1.40	1,670	186	27	79	10.1	1,840	7.9			
Sept. 11-18-----	498	18	53	6.3	219	164	72	300	2.2		4752	1.02	991	158	26	75	7.6	1,360	8.1			
Sept. 19-26, 25-30-----	425	16	45	5.0	130	152	64	157	2.0		506	0.69	576	132	8	68	4.9	880	7.9			
Sep. 22-24-----	406	16	65	7.3	254	191	99	405	3.3		4985	1.34	1,050	194	38	77	9.2	1,750	7.6			
Weighted average-----	2,935	14	29	36	64	81	36	83	4.9		296	0.40	2,350	86	20	62	3.0	487	--			

a Sum of determined constituents.

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

LOCATION.--At Devore 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 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 883 ppm Dec. 23-27; minimum, 144 ppm Apr. 9-13.

Hardness: Maximum, 173 ppm Aug. 1-11; minimum, 40 ppm Apr. 9-13.

Specific conductance: Maximum daily, 2,030 micromhos Aug. 23-24; minimum daily, 145 micromhos Apr. 13.

EXTREMES, 1949-55.--Dissolved solids: Maximum, 3,640 ppm Aug. 26-27, 1952; minimum, 2,030 micromhos Aug. 26-27, 1952; maximum, 40 ppm Oct. 9-13, 1955.

Hardness: Maximum, 782 ppm Aug. 26-27, 1952; minimum, 760 ppm Aug. 27, 1952; maximum daily, 127 micromhos Oct. 7, 1949.

Specific conductance: Maximum daily, 7,630 micromhos Aug. 27, 1952; minimum daily, 127 micromhos Oct. 7, 1949. Values reported for dissolved solids concentrations are residues on evaporation unless otherwise noted.

REMARKS.--Values reported for dissolved solids concentrations are residues on evaporation unless otherwise noted.

Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million. November 1946 to September 1955.

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- ta- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ri- do (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	So- dium adorp- tion ratio	Speci- fic conduct- ance (micro- mhos at 25° C.)	pH
														Parts per mil- lion	Tons per acre- foot				
Nov. 1-6, 15-21, 1954--	10	21	1.8	33	63	22	40	2.5	1.96	0.27	61	9	54	1.8	291	7.3			
Nov. 7-11-----	13	29	3.3	74	82	45	92	4.2	316	0.43	87	20	65	3.4	543	7.5			
Nov. 12-14-----	12	49	5.6	151	90	225	13	5.8	587	0.80	145	72	69	5.5	1,040	7.6			
Nov. 13-----	13	37	4.5	112	93	40	165	5.8	445	0.61	112	36	68	4.6	789	7.6			
Dec. 1-19-----	18	33	4.4	71	116	36	86	5.0	312	.42	100	6	61	3.1	543	7.6			
Dec. 20-22-----	16	43	5.4	126	96	62	182	7.0	495	.67	130	52	68	4.8	888	7.9			
Dec. 23-27-----	17	50	8.3	234	96	61	113	6.5	883	1.2	139	80	78	8.7	1,390	7.6			
Dec. 28-31-----	17	38	5.1	85	110	44	113	6.5	372	.51	116	26	61	3.4	647	7.7			
Jan. 1-10, 1955-----	20	40	107	104	54	147	6.0	458	121	36	66	4.2	769	7.7					
Jan. 11-19-----	19	35	6.8	92	42	127	4.8	386	.52	106	28	65	3.9	655	7.7				
Jan. 20-28-----	14	23	2.9	70	52	44	89	9.9	230	.45	69	26	69	3.7	496	7.3			
Jan. 29-31-----	26	47	6.7	171	142	52	241	7.5	633	.86	144	28	72	6.2	1,100	7.8			
Feb. 1-4-----	14	28	4.0	86	80	31	120	6.1	354	.48	86	20	68	4.0	612	7.4			
Feb. 5-8, 15-16-----	8.8	19	2.0	27	56	19	33	2.2	189	.26	55	9	52	1.6	246	7.3			
Feb. 9-14, 17-19-----	11	21	2.9	46	63	26	58	5.5	238	.32	65	13	61	2.5	374	7.2			
Feb. 20-28-----	13	26	3.8	46	62	37	60	6.5	257	.25	80	29	55	2.2	395	7.7			
Mar. 1-10-----	18	37	4.7	58	101	40	77	6.6	311	.42	112	29	53	2.4	517	7.7			
Mar. 11-20-----	18	45	5.9	77	123	55	100	5.8	381	.52	136	35	55	2.9	648	7.8			
Mar. 21-28-----	14	61	87	129	113	42	113	4.2	414	.56	143	38	57	3.2	711	7.7			
Mar. 29-31, Apr. 1-8-----	13	35	4.1	46	106	37	53	6.0	259	.35	104	17	49	2.0	436	7.0			
Apr. 9-13-----	9.6	15	6.6	15	39	9.0	20	3.8	144	.20	40	8	45	1.0	159	6.5			
Apr. 14-30-----	14	28	2.5	36	86	24	42	5.0	340	.33	80	10	50	1.8	345	7.2			
May 1-10-----	20	41	4.9	50	117	36	68	2.0	293	.40	122	26	47	2.0	488	7.3			
May 11-20-----	12	48	5.7	70	135	43	98	2.0	364	.40	143	32	52	2.5	634	7.4			
May 21-26, 28-31-----	12	38	3.9	69	100	41	94	3.0	131	.45	110	28	58	2.9	589	7.3			
May 27-----	20	41	4.9	203	125	89	256	11	686	.93	123	20	78	8.0	1,230	7.8			
June 1-15-----	15	44	3.9	66	123	38	90	2.8	332	.45	126	25	53	2.6	569	7.8			
June 16-30-----	12	47	4.7	91	136	42	126	3.0	406	.55	138	26	59	3.4	723	7.6			
July 1-16-----	17	56	5.1	82	166	59	97	5.0	428	.58	161	25	52	2.8	727	7.7			
July 17-31-----	13	34	5.4	72	167	34	98	1.0	374	.51	136	19	50	2.5	659	7.6			
Aug. 1-17-----	17	60	6.0	136	175	37	202	2.2	4546	.74	173	30	63	4.5	1,020	7.7			
Aug. 18-28-----	--	--	--	--	--	--	434	--	--	--	--	--	--	--	1,850	--			
Aug. 29-31-----	13	40	4.3	112	135	42	145	1.0	623	.58	117	6	67	4.5	780	7.6			
Sept. 1-16-----	22	55	6.2	198	175	72	265	1.0	706	.96	162	18	73	6.8	1,230	7.9			
Sep. 17-30-----	14	49	5.1	162	163	50	220	1.2	390	.80	144	10	71	5.9	1,050	7.7			

a Sum of determined constituents.

## TRINITY RIVER BASIN--Continued

## OLD RIVER NEAR COVE, TEX.

LOCATION.--At Barber Hill Pumping Plant, 5 miles northeast of Cove, Chambers County.  
 RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949; daily records October 1949 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 5,680 ppm Oct. 8, 14; minimum, 183 ppm Jan. 15-26.

Specific conductance: Maximum daily, 10,000 micromhos Oct. 16; minimum daily, 260 micromhos Jan. 20, 22, 24.

Hardness: Maximum, 1,370 ppm Oct. 31, 1954; minimum, 156 ppm Jun. 26-31, Apr. 21-30, 1955.

Specific conductance: Maximum daily, 9,140 ppm Aug. 31, 1954; minimum, 55 ppm Jun. 25-26, 1955.

Hardness: Maximum, 1,780 ppm Aug. 31, 1954; minimum, 14,900 micromhos Aug. 31, 1954; maximum daily, 223 micromhos Dec. 21, 1953.

SPECIFIC CONDUCTANCE--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 1946 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- ta- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Flu- oro- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			So- dium ad- sorp- tion ratio as CdCO <sub>3</sub>	Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH
													Parts per mil- lion	Tons per acre- foot	Tons per day	Cal- cium, magni- um, sodium			
Oct. 1, 3-5, 11-12, 15-21, 1954-----	17	160	111	1,030	199	272	1,870	3.0	3,560	4.8			856	692	72	15	6,290	7.9	
Oct. 2, 6-7, 9-10, 13, 25-----	20	108	54	551	208	142	970	2.2	1,930	2.7			492	321	71	11	3,560	8.1	
Oct. 8, 14-----	22	187	1,660	1,76	426	3,080	--	5,680	7.7				1,320	1,180	73	9,510	8.0		
Oct. 22-24, 26-31-----	10	43	135	70	77	222	5	571	.78				157	100	65	4.7	596	7.2	
Nov. 1-3-----	11	66	16	163	105	78	260	2.8	636	.89			181	95	66	5.3	1,170	7.5	
Nov. 4-10-----	14	82	33	332	123	109	600	3.5	1,230	1.7			340	238	68	7.8	2,380	7.6	
Nov. 11-18-----	14	54	23	247	107	84	418	2.8	4896	1.2			229	142	70	7.1	1,660	7.6	
Nov. 19-30-----	14	46	14	148	112	60	240	2.0	5379	.79			172	80	65	6.9	1,070	7.4	
Dec. 1-10-----	13	54	17	192	120	65	322	1.8	768	1.0			206	106	66	5.8	1,310	7.7	
Dec. 11-20-----	16	56	186	136	60	308	1.5	749	1.0				206	96	66	5.6	1,360	8.1	
Dec. 21-31-----	14	53	13	136	54	260	2.0	645	.88				186	74	65	5.1	1,160	7.9	
Jan. 1-6, 1955-----	50	13	151	145	52	235	2.5	617	.86				179	60	63	4.9	1,100	7.8	
Jan. 7-14-----	19	19	3-7	41	50	24	60	2.5	210	.29			63	22	59	2.3	343	7.7	
Jan. 15-26-----	13	16	3-6	62	17	45	5	183	.25				55	4	58	2.1	290	7.2	
Jan. 27-31-----	14	25	4-8	53	82	26	73	1.0	252	.36			83	16	58	2.5	419	7.7	
Feb. 1-10-----	12	22	3-7	43	72	17	61	2.0	224	.30			71	12	57	2.2	360	7.3	
Feb. 11-19-----	10	21	4-1	46	69	17	66	1.2	228	.31			69	12	59	2.4	337	7.3	
Feb. 20-28-----	12	23	3-9	41	80	16	57	1.5	224	.30			74	8	55	2.1	351	7.5	
Mar. 1-10-----	12	25	4-5	44	93	16	59	1.0	250	.36			82	6	54	2.1	383	7.7	
Mar. 11-20-----	12	33	5-6	51	113	17	76	1.5	282	.38			105	12	51	2.2	466	7.6	
Mar. 21-31-----	12	44	8-8	96	125	37	149	2.2	432	.59			145	42	59	3.5	760	7.6	
Apr. 1-10, 15-19-----	15	39	6-5	75	104	45	108	4.0	375	.51			124	39	57	2.9	613	--	
Apr. 11-14, 20-----	14	39	7-5	79	65	28	53	2.0	4195	.27			76	21	53	2.0	367	6.9	
Apr. 21-30-----	13	26	3-5	38	83	23	49	3.0	4196	.27			80	12	51	1.9	344	7.4	
May 1-8-----	17	34	5-2	48	110	27	64	1.8	286	.26			106	16	50	2.0	449	7.5	
May 9-20-----	15	42	7-7	92	133	40	131	1.2	403	.55			137	28	59	3.4	716	7.6	
May 21-31-----	14	43	6-8	84	128	45	116	2.0	392	.53			135	30	57	3.1	676	7.9	
June 1-16-----	-	-	-	-	-	-	-	-	-	-			-	-	-	-	613	--	
June 17-20, 29-30-----	17	53	12	158	147	50	250	1.2	4613	.63			62	65	5.1	1,120	8.0		
June 21-26-----	14	54	12	169	58	232	1.3	672	.91			183	44	67	5.5	1,180	8.0		
June 27-28, July 9-14-----	16	51	6-0	101	157	63	126	5.2	463	.63			132	24	59	3.6	797	8.0	
July 1-8-----	15	50	12	163	168	61	228	6.1	4620	.84			174	37	67	5.4	1,150	7.5	
July 15-20-----	16	60	6-8	207	159	78	292	6.3	4744	1.0			178	47	72	6.8	1,380	7.4	
July 21-31-----	17	54	6-0	108	178	49	138	3.0	4653	.63			139	13	60	3.7	843	8.2	
Aug. 1-15-----	15	51	5-8	84	170	27	116	1.0	4384	.32			150	10	55	3.0	849	7.9	
Aug. 16-31-----	15	51	6-6	112	169	32	160	1.0	4461	.63			155	16	61	3.9	849	7.9	
Sept. 1-14-----	16	43	6-2	96	154	23	135	1.5	396	.54			133	7	61	3.6	726	8.2	
Sept. 15-30-----	16	57	5-5	138	173	34	204	6	345	.74			163	23	65	4.7	991	8.0	

\* Sum of determined constituents.

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

LOCATION.--At Lone Star Pumping Plant in Anahuac, Chambers County.

RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949; daily records December 1949 to September 1955.

EXTREMES: Maximum, 17,800 ppm Oct. 3-6; minimum, 140 ppm Apr. 12-19.

Hardness: Maximum, 3,460 ppm Oct. 3-6; minimum, 45 ppm Apr. 12-19.

Specific conductance: Maximum daily, 30,000 micromhos Oct. 4; minimum daily, 199 micromhos Apr. 15.

EXTRIMES: 1,949-55.--Dissolved solids: Maximum, 10,000 ppm Sep. 11-20, 1954; minimum, 140 ppm Apr. 12-19, 1955.

Hardness: Maximum, 3,350 ppm Oct. 21-31, 1952; minimum, 45 ppm Apr. 12-19, 1955.

Specific conductance: Maximum daily, 30,200 micromhos Sept. 17-18, 1954; minimum daily, 199 micromhos Apr. 15, 1955.

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 1954 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- no- sodium (Mg)	So- dium (Na)	Po- ta- sium (K)	Bi-car- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Nit- rate (NO <sub>3</sub> )	Fluo- ride (F)	Dissolved solids			Hardness as CaCO <sub>3</sub>	So- dium adsorp- tion ratio	So- dium per cent so- dium	Specific conduct- ance (micro- mhos at 25° C)	pH
												Parts per mil- lion	Tons per acre- foot	Tons per day					
Oct. 1-2, 7-11, 16, 19-23, 1954.....	16	165	320	2,880	196	718	5,020	--	--	9,210	12.5	1,720	1,570	.78	30	15,000	7.9		
Oct. 3-6.....	13	263	669	5,520	166	1,380	9,830	226	5,530	--	17,800	24.2	3,460	3,320	.78	41	26,700	7.7	
Oct. 12-15, 17-18, 24-27.....	16	142	136	5,510	408	206	5,570	--	4,860	6.61	41,370	1.86	232	63	.79	12	2,410	8.2	
Oct. 28.....	21	--	--	8.7	172	106	262	6.9	6.46	6.46	6.46	.88	141	.54	.73	6.3	1,130	7.8	
Oct. 29-31.....	14	42	5.2	86	65	35	129	2.8	344	344	87	.47	160	.90	.73	6.0	620	7.3	
Nov. 9-16, 28-29.....	12	26	41	14	197	85	310	5.0	b698	.95	b170	.23	57	1.59	.57	6.8	1,300	7.4	
Nov. 17-19.....	10	21	1.3	37	50	25	49	2.2	509	.69	120	.43	69	4.8	.81	7.1	300	7.6	
Nov. 20-27.....	10	39	5.4	121	94	53	175	3.5	3,000	4.08	595	.58	16	5.150	.58	5.58	7.9		
Nov. 30.....	23	77	98	914	107	249	1,580	8.5	3,000	4.08	246	1.56	162	.75	.93	2,140	7.9		
Dec. 1-6, 14-17, 27-31- Dec. 7-10, 12-13.....	14	56	26	336	104	105	532	5.9	1,150	1.56	1,240	3.5	398	.77	.15	4,370	7.6		
Dec. 11.....	13	68	734	102	206	1,290	3,700	--	6,960	9.47	1,360	1.260	77	.72	.25	11,500	8.2		
Dec. 18-26.....	17	129	232	2,150	116	565	70	220	5.0	560	1.50	7.72	.68	5.1	1.030	7.4			
Jan. 1-9, 15, 1955.....	13	44	9.7	145	95	70	113	128	680	7.3	298	205	75	10	2,530	7.5			
Jan. 10-13, 16-17-.....	15	60	36	611	113	128	86	410	6.6	922	1.25	210	126	72	7.6	1,620	7.5		
Jan. 14, 18-31-.....	16	53	19	232	103	86	181	5.9	450	.61	111	.50	69	4.6	.783	7.4			
Feb. 1-3.....	12	35	5.9	112	75	58	161	5.9	450	.61	111	.50	69	4.6	.783	7.4			
Feb. 4-5, 10-11-.....	14	71	1.1	170	95	67	245	8.5	608	.83	131	.53	74	6.4	1,090	7.6			
Feb. 6-9, 12-17, 19- Feb. 18-20-28-.....	17	2.5	39	52	21	50	2.2	2.2	b167	.23	53	1.10	61	2.3	2.29	7.3			
Feb. 19, 20-28-.....	10	20	4.2	55	50	30	2.5	127	1.8	358	.49	93	.42	67	3.9	624	7.3		
Mar. 1-15-.....	15	32	6.1	86	84	44	132	6.1	279	.38	68	.27	64	2.9	434	7.3			
Mar. 16-17, 19, 21-26-.....	15	49	15	197	116	80	305	5.8	370	.50	106	.37	64	3.6	644	7.8			
Mar. 18-.....	22	56	22	273	121	93	440	7.2	744	1.01	184	.89	70	6.3	1,330	7.6			
Mar. 19-.....	61	618	129	168	1,030	7.5	315	2.050	2,050	2.79	424	318	76	7.8	1,720	7.9			
Mar. 20-.....	17	69	10	248	117	76	315	1.00	1,00	1.37	97	14	64	3.5	3,630	7.9			
Mar. 21-31-.....	12	32	4.1	79	102	37	100	8.2	344	.47	97	1.4	64	3.5	582	7.6			
Apr. 1-3, 20-27-.....	16	33	3.6	55	98	34	70	4.0	294	.40	98	.18	55	2.4	467	7.5			
Apr. 4-6, 11, 28-30-.....	20	39	4.3	95	101	49	129	6.5	617	.57	114	.31	64	3.9	699	7.9			
Apr. 9-10-.....	18	45	18	225	98	70	362	4.0	854	1.16	186	1.06	72	7.2	1,480	7.7			
Apr. 12-19-.....	13	16	1.3	46	17	37	2.5	1.49	b140	.19	45	.8	59	1.9	248	7.4			
May 2-4, 9-.....	18	38	4.4	68	105	35	96	1.5	336	.46	112	26	57	2.8	561	7.6			
May 5-8, 10-15-.....	16	69	6.9	139	98	49	212	2.0	536	.73	129	.48	70	5.3	967	7.5			
May 16, 20-22, 26-.....	11	50	10	248	117	76	315	3.0	865	1.17	166	.70	76	8.4	1,580	7.6			
May 17-19-.....	13	36	37	473	120	121	760	1.5	1,540	2.09	292	194	.78	12	2,830	7.6			
May 23-25, 27-31-.....	11	45	4.9	127	115	57	178	5.0	498	.68	132	.38	68	4.8	894	7.4			
June 1-6-.....	18	45	4.6	136	115	53	195	5.5	520	.71	132	.38	69	5.2	920	7.8			
June 22-25-.....	13	62	16	344	134	86	538	2.0	1,120	1.52	212	1.02	78	10	2,060	7.9			
July 2-14-.....	14	75	79	125	231	1,350	4,480	4.0	512	4.10	77	.15	4,480	4.0	4,480	7.8			
July 15-20, 22-28-.....	14	104	145	1,390	138	359	2,400	4.0	4,480	4.09	742	.78	856	21	7,820	7.7			

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

Chemical analyses, in parts per million, water year October 1955 to September 1956--Continued

Date of collection	Mean discharge (cfs)	Silica ( $\text{SiO}_4$ )	Iron ( $\text{Fe}$ )	Cal-cium ( $\text{Ca}$ )	Mag-ne-sium ( $\text{Mg}$ )	So-dium ( $\text{Na}$ )	Po-tassium ( $\text{K}$ )	Bi-car-bonate ( $\text{HCO}_3$ )	Sal-fate ( $\text{SO}_4$ )	Chlo-ride ( $\text{Cl}$ )	Fluo-ride ( $\text{F}$ )	Ni-trato ( $\text{NO}_3$ )	Bo-ron ( $\text{B}$ )	Dissolved solids			Hardness as $\text{CaCO}_3$	So-dium adsorp-tion ratio	Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per mil-lion	Tons per acre-foot	Tons per day						
Aug. 10-15, 17-19, 21, 1955-----	17	102	127	1,270	164	307	2,180	4,000	1,100	4,0	--	4,080	5,35	776	642	78	20	7,110	7.8			
Aug. 20, 22-25, 30-----	18	77	58	651	161	153	2,140	2,140	2,140	2,140	2,140	4,310	2,98	77	14	3,870	7.6					
Sept. 20-23-----	14	120	185	1,960	156	657	3,320	6,110	8,31	1,060	1,060	1,060	1,060	1,060	1,060	932	80	26	10,390	7.6		
Sept. 24-30-----	14	74	43	672	160	160	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060	362	230	60	15	3,790	7.7	

a Residue on evaporation at 180° C.

b Sum of determined constituents.

TRINITY RIVER BASIN--Continued

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  $\frac{1}{4}$  miles southwest of Station 2. Station 6 - In Anahuac Channel at south end. Station 7 - In Trinity Bay about  $\frac{1}{4}$  miles west of Station 6.

Channel about  $\frac{1}{4}$  miles southwest of Station 2. Station 6 - In Anahuac Channel at south end. Station 7 - In Trinity Bay about  $\frac{1}{4}$  miles west of Station 6.

RECORDS AVAILABLE.--Chemical analyses: Bi-weekly October 1950 to September 1955.

Station Number	Specific conductance			Specific conductance (electromhos at $25^{\circ}\text{C}$ ) and chloride in parts per million water year October 1954 to September 1955			Specific conductance			Specific conductance			Specific conductance			Specific conductance		
	Conductance	Chloride	Conductance	Specific Conductance	Chloride	Conductance	Specific Conductance	Chloride	Conductance	Specific Conductance	Chloride	Conductance	Specific Conductance	Chloride	Conductance	Specific Conductance	Chloride	
Oct. 1, 1954	Oct. 1, 1954	Oct. 1, 1954	Oct. 1, 1954	Nov. 26, 1954	Nov. 26, 1954	Nov. 26, 1954	Jan. 21, 1955	Jan. 21, 1955	Mar. 18, 1955	Apr. 15, 1955	May 4, 1955	Apr. 15, 1955	May 4, 1955	Apr. 15, 1955	May 4, 1955	May 23, 1955		
2	21,100	7,300	873	200	877	178	1,320	298	211	220	29	657	124	1,190	255	1,190	255	
3	21,500	7,600	874	192	804	158	1,930	492	220	220	29	787	157	4,050	1,180	4,320	1,180	
6	24,000	8,680	859	190	836	168	9,820	3,220	207	207	29	2,210	600	4,210	1,320	4,320	1,320	
7	24,900	8,730	890	194	814	161	10,200	3,270	229	229	29	2,330	610	--	--	--	--	
Oct. 8, 1954	Oct. 8, 1954	Oct. 8, 1954	Oct. 8, 1954	Dec. 3, 1954	Dec. 3, 1954	Dec. 3, 1954	Jan. 28, 1955	Jan. 28, 1955	Mar. 25, 1955	Apr. 18, 1955	May 6, 1955	Apr. 18, 1955	May 6, 1955	Apr. 18, 1955	May 6, 1955	May 25, 1955		
2	28,300	10,500	2,010	535	698	139	877	161	230	230	32	1,060	232	1,030	215	1,030	215	
3	30,900	11,600	8,040	2,600	612	121	905	174	232	232	34	1,070	242	2,470	640	2,470	640	
6	31,800	12,000	21,600	7,940	640	129	5,420	1,640	227	227	32	1,640	420	3,990	1,140	3,990	1,140	
7	32,000	12,100	22,200	7,940	619	125	5,540	1,630	226	226	33	1,630	415	4,670	1,360	4,670	1,360	
Oct. 15, 1954	Oct. 15, 1954	Oct. 15, 1954	Oct. 15, 1954	Dec. 10, 1954	Dec. 10, 1954	Dec. 10, 1954	Feb. 4, 1955	Feb. 4, 1955	Apr. 1, 1955	Apr. 1, 1955	Apr. 1, 1955	Apr. 20, 1955	Apr. 20, 1955	Apr. 20, 1955	May 9, 1955	May 27, 1955		
2	6,730	2,650	6,420	1,960	542	107	457	58	353	60	841	175	902	188	902	188		
3	8,800	2,750	9,380	3,040	498	93	514	60	368	62	1,640	420	876	185	876	185		
6	32,600	12,500	11,400	3,790	515	97	496	60	364	61	2,020	530	7,610	2,410	7,610	2,410		
7	32,100	12,300	11,600	3,840	523	96	490	65	368	61	2,120	550	7,840	2,430	7,840	2,430		
Oct. 22, 1954	Oct. 22, 1954	Oct. 22, 1954	Oct. 22, 1954	Dec. 17, 1954	Dec. 17, 1954	Dec. 17, 1954	Feb. 11, 1955	Feb. 11, 1955	Apr. 4, 1955	Apr. 4, 1955	Apr. 4, 1955	Apr. 22, 1955	Apr. 22, 1955	Apr. 22, 1955	May 11, 1955	May 30, 1955		
2	31,800	12,000	1,490	348	257	43	607	100	474	57	2,570	670	728	116	728	116		
3	32,800	12,400	1,390	318	266	43	1,610	390	426	57	3,060	850	713	155	713	155		
6	33,300	12,700	1,330	300	255	41	1,490	352	450	59	2,110	540	682	114	682	114		
7	33,500	12,800	1,340	295	298	45	1,520	348	506	60	2,310	610	636	116	636	116		
Oct. 29, 1954	Oct. 29, 1954	Oct. 29, 1954	Oct. 29, 1954	Dec. 24, 1954	Dec. 24, 1954	Dec. 24, 1954	Feb. 18, 1955	Feb. 18, 1955	Apr. 6, 1955	Apr. 6, 1955	Apr. 6, 1955	Apr. 25, 1955	Apr. 25, 1955	Apr. 25, 1955	May 13, 1955	June 1, 1955		
2	1,030	195	962	215	494	89	701	120	406	78	892	191	270	122	270	122		
3	1,030	195	5,090	1,580	464	80	913	186	511	78	1,190	282	764	131	764	131		
6	23,100	8,180	19,600	7,010	498	85	15,400	5,380	5,810	59	1,270	295	758	131	758	131		
7	22,600	8,040	19,600	6,960	474	78	15,900	5,350	6,300	60	1,260	300	779	133	779	133		
Nov. 5, 1954	Nov. 5, 1954	Nov. 5, 1954	Nov. 5, 1954	Dec. 31, 1954	Dec. 31, 1954	Dec. 31, 1954	Feb. 25, 1955	Feb. 25, 1955	Apr. 8, 1955	Apr. 8, 1955	Apr. 8, 1955	Apr. 27, 1955	Apr. 27, 1955	Apr. 27, 1955	May 16, 1955	June 3, 1955		
2	604	124	19,300	6,590	--	--	12,600	4,090	548	92	1,360	388	824	155	824	155		
3	583	122	20,500	7,010	527	97	13,900	4,610	540	92	1,630	413	816	155	816	155		
6	651	136	24,700	8,820	531	98	16,600	5,650	540	92	1,660	422	2,160	575	2,160	575		
7	582	118	24,900	8,770	535	100	16,600	5,620	537	90	1,630	422	2,210	570	2,210	570		
Nov. 12, 1954	Nov. 12, 1954	Nov. 12, 1954	Nov. 12, 1954	Jan. 7, 1955	Jan. 7, 1955	Jan. 7, 1955	Mar. 4, 1955	Mar. 4, 1955	Apr. 11, 1955	Apr. 11, 1955	Apr. 11, 1955	Apr. 29, 1955	Apr. 29, 1955	Apr. 29, 1955	May 18, 1955	June 6, 1955		
2	4,580	1,400	2,240	558	--	--	834	165	723	147	4,680	1,390	1,080	240	1,080	240		
3	7,360	2,200	2,120	535	883	188	820	162	631	116	4,480	1,310	3,320	322	3,320	322		
6	26,400	9,850	2,290	582	908	185	5,240	1,590	613	102	4,280	1,250	7,670	2,400	7,670	2,400		
7	26,100	9,650	2,280	585	908	186	5,370	1,580	588	103	4,270	1,240	7,950	2,500	7,950	2,500		
Nov. 19, 1954	Nov. 19, 1954	Nov. 19, 1954	Nov. 19, 1954	Jan. 16, 1955	Jan. 16, 1955	Jan. 16, 1955	Mar. 11, 1955	Mar. 11, 1955	Apr. 13, 1955	Apr. 13, 1955	Apr. 13, 1955	May 2, 1955	May 2, 1955	May 2, 1955	May 20, 1955	June 8, 1955		
2	394	70	15,300	5,230	--	--	253	39	437	63	2,150	570	1,050	228	1,050	228		
3	298	48	17,900	6,090	2,650	730	217	38	437	63	2,820	760	1,220	290	1,220	290		
6	351	58	23,000	8,190	9,630	3,120	911	246	517	79	5,740	1,730	4,600	1,370	4,600	1,370		
7	361	59	22,900	8,040	9,230	2,900	889	211	533	82	5,840	1,760	4,630	1,360	4,630	1,360		

## TRINITY RIVER BASIN--Continued

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

Station Number	Specific Conductance	Chloride	Specific conductance (micromhos at 25°C) and chloride in parts per million, water year October 1954 to September 1955--Continued			Sept. 12, 1955	Sept. 30, 1955
			Specific Conductance	Chloride	Specific Conductance	Chloride	
June 10, 1955	June 29, 1955	July 18, 1955	Aug. 5, 1955	Aug. 24, 1955	Sept. 12, 1955	Sept. 30, 1955	
2 1,280   280	1,400   278	14,300   4,740	11,600   3,790	12,700   3,720	12,700   4,210	7,950   2,480	
3 1,240   295	1,350   262	15,100   5,030	13,900   4,660	14,200   4,460	14,200   4,790	12,700   4,290	
6 1,930   570	3,110   820	5,230   17,700	15,900   5,400	17,600   6,140	19,300   6,810	20,300   7,250	
7 1,930   522	3,090   850	15,700   5,200	15,900   5,380	17,900   6,220	19,200   6,760	20,200   7,250	
June 13, 1955	July 1, 1955	July 20, 1955	Aug. 8, 1955	Aug. 26, 1955	Sept. 14, 1955		
2 1,240   288	2,380   570	15,300   5,100	5,510   1,640	17,400   6,020	9,180   2,900		
3 1,480   362	6,380   1,900	15,800   5,280	6,580   2,010	18,100   6,320	12,700   4,240		
6 3,470   990	13,100   4,340	15,600   5,180	15,700   5,430	18,700   6,510	23,300   8,350		
7 3,540   1,000	13,400   4,340	15,600   5,200	15,700   5,400	18,700   6,460	23,500   8,480		
June 15, 1955	July 4, 1955	July 22, 1955	Aug. 10, 1955	Aug. 29, 1955	Sept. 16, 1955		
2 2,070   528	9,970   3,100	13,200   4,260	12,400   4,110	7,570   2,350	16,200   5,500		
3 3,610   1,030	12,400   4,040	14,400   4,740	14,200   4,440	8,870   2,820	20,200   7,160		
6 5,310   1,600	13,500   4,440	16,400   5,500	14,300   4,860	16,700   5,820	23,500   8,430		
7 5,370   1,590	13,600   4,440	16,400   5,530	14,400   4,880	17,100   5,870	23,500   8,430		
June 17, 1955	July 6, 1955	July 25, 1955	Aug. 12, 1955	Aug. 31, 1955	Sept. 19, 1955		
2 5,360   1,600	11,700   3,740	10,600   3,340	12,400   4,110	10,700   3,420	17,400   6,020		
3 6,060   1,840	12,100   3,920	12,500   4,070	14,100   4,760	13,400   4,460	20,000   7,160		
6 8,680   2,880	13,100   4,310	16,400   5,550	16,100   5,530	17,300   6,000	22,600   8,640		
7 8,700   2,750	12,900   4,190	16,500   5,530	16,100   5,550	17,700   6,090	22,600   8,190		
June 20, 1955	July 8, 1955	July 27, 1955	Aug. 15, 1955	Sept. 2, 1955	Sept. 21, 1955		
2 5,150   1,520	9,080   2,820	10,100   3,200	15,800   5,450	7,170   2,170	18,400   6,270		
3 8,560   2,770	10,400   3,300	12,400   4,070	16,500   5,750	10,000   3,250	22,500   8,180		
6 10,900   3,570	13,200   4,340	16,900   5,720	16,500   5,700	12,500   4,190	24,200   8,820		
7 11,000   3,540	13,300   4,340	17,000   5,720	17,000   5,720	17,700   4,140	24,200   8,730		
June 22, 1955	July 11, 1955	July 29, 1955	Aug. 17, 1955	Sept. 5, 1955	Sept. 23, 1955		
2 4,840   1,400	6,770   2,030	8,580   2,680	16,700   5,700	12,100   3,990	18,000   6,370		
3 4,910   1,430	7,890   2,410	9,800   3,120	19,600   6,860	14,300   4,830	20,200   7,160		
6 9,140   2,900	13,900   4,640	16,800   5,770	21,400   7,650	20,600   7,300	23,000   8,430		
7 11,100   3,570	14,100   4,660	16,900   5,720	21,700   7,700	20,600   7,250	23,000   8,380		
June 24, 1955	July 13, 1955	Aug. 1, 1955	Aug. 19, 1955	Sept. 7, 1955	Sept. 26, 1955		
2 3,870   1,080	12,600   4,040	8,080   2,480	9,480   3,020	13,100   4,310	17,500   6,090		
3 5,850   1,750	9,580   3,000	9,830   3,120	10,600   3,440	11,100   5,950	20,100   7,200		
6 11,300   3,720	10,500   3,320	13,900   4,560	17,400   6,040	21,800   7,850	22,000   7,750		
7 11,300   3,650	10,500   3,340	13,800   4,590	17,500   6,070	22,200   7,890	22,000   7,750		
June 27, 1955	July 15, 1955	Aug. 3, 1955	Aug. 22, 1955	Sept. 9, 1955	Sept. 28, 1955		
2 1,080   225	8,660   2,700	15,800   5,230	7,320   2,260	18,400   6,370	16,300   5,600		
3 1,150   250	11,800   3,820	15,700   5,250	11,200   3,670	19,300   6,810	18,200   6,460		
6 8,010   2,520	15,400   5,180	15,800   5,200	16,400   6,510	23,800   8,680	23,000   8,380		
7 8,190   2,550	15,500   5,180	15,300   5,180	18,500   6,510	23,900   8,680	22,900   8,380		

## BRAZOS RIVER BASIN

## HUBARD 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 northeast 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 temperatures: April 1955 to September 1955.

EXTREMES: 1955.--Dissolved solids: Maximum, 1,930 ppm April, 26-28; minimum, 153 ppm Sept. 25-30.

Hardness: Maximum, 616 ppm July 18; minimum, 92 ppm Sept. 25-30.

Specific conductance: Maximum daily, 5,200 micromhos April, 24; minimum daily, 174 micromhos Sept. 25.

Water temperatures: Maximum observed, 84°F July 29, 31, Aug. 24; minimum observed, 60°F June 10.

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 period April to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, April to September 1955

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>			Specific conductance (micromhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Cal-chlorum-magnesite	Non-carbonate	Percent sodium		
Apr. 15-16, 1955	1,225	6.2	53	7.9	95	129	15	176	0.1	1.2	.2	5.4	0.62	458	0.62	1,55	164	59	3.2	812	7.8
Apr. 23--	538	16	63	4.6	34	116	12	62	.2	1.20	0	6.0	1,350	2.62	431	125	30	37	1.3	420	8.0
Apr. 24-28--	15.5	11	169	46	497	112	16	34	1,120	1.20	310	--	5.0	1,350	80.8	540	610	64	6.8	3,660	7.4
May 11-18--	106	9.4	72	12	147	112	16	310	--	5.0	1,326	1.20	171	229	137	58	4.2	1,240	7.6		
May 19-22--	2,859	11	35	3.3	20	106	9.2	31	.3	4.5	1,320	1.20	120	102	15	29	.8	301	7.9		
May 23-28--	164	11	63	5.0	34	106	18	66	.3	4.0	259	1.20	115	128	41	37	1.3	438	7.6		
May 29-31, June 1-6, 10	50	7.3	62	103	16	129	.3	2.0	129	.3	370	.50	29.9	155	66	46	2.2	641	7.5		
June 9, 11-14--	168	12	40	4.7	26	116	13	46	.3	2.8	4,02	.27	91.6	120	25	32	1.0	392	7.4		
June 15-24--	758	10	36	3.9	22	109	9.6	36	.3	2.5	181	.25	370	105	16	31	.9	305	7.8		
June 25-30, July 1-4--	2,666	13	63	4.9	30	131	17	46	.4	1.5	226	.30	1,61	127	20	34	1.2	403	6.1		
July 18--	64	13	198	31	316	115	18	840	.4	2.5	1,470	2.00	254	616	520	53	5.5	2,800	8.2		
July 19-20--	198	9.8	46	6.1	36	140	20	57	.4	1.8	252	.34	135	140	25	36	1.3	436	8.1		
July 21-31, Aug. 1--	19.4	8.6	38	4.9	33	106	13	58	.5	2.0	221	.30	11.6	114	27	36	1.3	398	7.9		
Aug. 4-20--	262	14	38	3.9	21	113	9.8	34	.5	3.2	196	.27	139	110	17	29	.8	321	7.9		
Aug. 21-30--	10.6	11	40	4.6	25	116	9.0	46	.5	2.5	210	.29	6,01	118	23	32	1.0	361	7.8		
Sept. 11-13--	48	7.8	47	6.2	77	84	15	158	.3	3.5	51.3	.34	144	75	34	2.8	695	7.6			
Sept. 14-16--	7.26	11	42	4.5	35	127	9.7	58	.4	1.8	234	.32	4.59	123	19	38	1.4	414	8.1		
Sept. 23-24--	378	9.6	41	4.7	34	121	9.5	59	.4	3.2	236	.32	261	122	23	38	1.3	414	8.1		
Sept. 25-30--	2,212	9.4	33	2.6	17	107	7.5	22	.4	3.0	153	.21	916	92	6	29	.6	254	8.2		
Weighted average	b249	11	37	3.7	25	109	9.5	41	0.4	3.4	192	0.26	129	103	18	34	1.1	331	--		

a Sum of determined constituents.

b Represents 100 percent of flow Apr. 15 to Sept. 30. No flow on many days.

## BRAZOS RIVER BASIN--Continued

LOCATION.--Immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, 11.3 miles southeast 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 non-contributing.

RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1955.

Water temperatures: October 1949 to September 1955.

EXTREMES, 1949-55.--Dissolved solids: Maximum, 1,550 ppm May 1-31; minimum, 1,130 ppm Sept. 26-30.

Hardness: Maximum, 460 ppm May 1-31; minimum, 376 ppm Sept. 26-30.

Specific conductance: Maximum daily, 2,940 micromhos Sept. 23; minimum observed, 457 on several days during February and March.

Water temperatures: Maximum observed, 74°F on several days in August; minimum observed, 45°F on several days during February and March.

EXTREMES, 1942-55.--Dissolved solids: Maximum, 2,940 ppm Feb. 2-9; minimum, 829 ppm Sept. 1-10, 1942.

Hardness: Maximum, 661 ppm Feb. 2-9; minimum, 318 ppm Dec. 21-31, 1942.

Specific conductance: Maximum daily, 3,750 micromhos Feb. 11, 1942; minimum daily, 1,100 micromhos June 20, 1942.

Water temperatures (1949-55): Maximum observed, 76.7° Sept. 16-30, 1950; minimum observed, 45.7° on several days in February 1951.

NOTES.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance available in district office at Austin, Tex. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Chemical analyses, in parts per million, water year October 1954 to September 1955										Dissolved solids				Hardness as CaCO <sub>3</sub>				Weighted average
	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Magnesium (Mg)	Sodium (Na)	Po- tassium (K)	Bicar- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Phos- phate (P)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Parts per mil- lion	Tons per acre- foot	Tons per day	Cal- cium, magni- um, alum	Non- carbon- ate	Per- cent so- dium	Speci- fic conduc- tance (micro- mhos at 25° C)
Oct. 1-31, 1954-----	116	12	133	21	295	116	296	465	0.8	1.280	1.74	401	418	324	6.3	6.3	2,170	7.5	
Nov. 1-30-----	47.7	13	130	19	312	117	288	485	1.2	1.310	1.78	169	402	306	6.8	6.8	2,220	7.4	
Dec. 1-31-----	29.5	12	130	19	307	113	291	478	1.2	1.290	1.75	1.03	402	310	6.7	6.7	2,160	7.7	
Jan. 1-31, 1955-----	217	8.6	132	20	300	111	289	475	1.2	1.280	1.74	750	412	320	6.1	6.4	2,180	7.5	
Feb. 1-28-----	72.6	12	131	21	304	114	291	480	.8	1.300	1.77	235	414	320	6.1	6.5	2,130	7.6	
Mar. 1-31-----	64.2	8.2	135	20	323	116	293	510	.8	1.350	1.84	234	419	324	6.9	6.9	2,320	7.4	
Apr. 1-30-----	69.2	9.4	144	21	383	116	326	600	1.5	1.540	2.09	371	446	351	7.9	7.9	2,650	7.5	
May 1-31-----	699	14	148	22	379	118	333	595	1.0	1.550	2.11	2,930	460	364	6.4	7.7	2,620	7.6	
June 1-30-----	3,376	9.6	142	21	327	110	315	520	1.2	1.390	1.89	12,670	441	351	62	6.8	2,440	7.5	
July 1-31-----	621	14	143	22	342	117	319	540	1.0	1,440	1.96	3,190	440	352	62	7.0	2,440	7.5	
Aug. 1-31-----	598	11	138	20	312	120	478	.8	1,340	1.82	2,160	426	328	61	6.6	2,250	7.9		
Sept. 1-30-----	637	16	140	18	295	120	317	450	1.0	1,300	1.77	2,240	424	325	60	6.2	2,160	7.6	
Sept. 26-30-----	41,280	15	126	16	253	115	286	378	1.0	1,130	1.54	125,900	376	282	59	5.7	1,850	7.5	
	1,120	13	133	18	291	116	301	446	1.0	1,260	1.71	3,810	406	312	61	6.3	2,120	..	

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER NEAR WHITNEY, TEX.

LOCATION.--At Whitney Dam on State Highway 22, 3.4 miles upstream from gauging station which is 1.0 mile downstream from Coon Creek, 7.5 miles south of Whitney, Hill County, and at mile 439.

DRAINAGE AREA.--26,190 square miles, approximately above gauging station, of which 9,240 square miles is probably non-contributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948, October 1948 to September 1953.

Water temperatures: October 1947 to May 1948, October 1948 to September 1953.

EXTRAKES, 1944-55.--Dissolved solids: Maximum, 1,200 ppm Jan. 1-10; Feb. 1-28; Apr. 1-30; minimum, 850 ppm June 11-30.

Hardness: Maximum, 1,200 ppm Jan. 1-31; minimum, 277 ppm June 17-30.

Specific conductance: Maximum daily, 2,140 micromhos May 15; minimum daily, 988 micromhos June 21.

Water temperatures: Maximum observed, 90°F July 24, Aug. 7, 29; minimum observed, 38°F Feb. 11.

EXTRAKES, 1947-55.--Dissolved solids: Maximum, 1,360 ppm Oct. 1, 1948; minimum, 183 ppm June 11-20, 1952.

Hardness: Maximum, 342 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.

Specific conductance: Maximum observed, 2,060 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.

Water temperatures: Maximum observed, 98°F July 6, 1954; minimum observed, freezing point Jan. 28-29, 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 1936 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1936 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Pot- as- si- um (K)	Bicar- bonate (HCO <sub>3</sub> )	Sal- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Flu- oride (F)	Ni- trate (NO <sub>3</sub> )	Be- ron (B)	Dissolved solids (Sum)		Cal- cium, magnesium as CaCO <sub>3</sub>	Non- carbo- nate solids	Per- cent di- mu- mum adorp- tion ratio	Spec- ific conduc- tance (micro- mhos at 25°C)	pH
													Parts per mil- lion	Tons per acre- foot					
Oct. 1-10, 1936-----	332	17	11.4	20	274	127	223	442	2.2	1,150	1,350	366	262	62	6.2	1,980	7.9		
Oct. 11-20-----	218	14	11.6	20	281	124	232	452	1.8	1,180	1,60	695	372	62	6.3	2,040	7.9		
Oct. 21-31-----	427	15	11.6	22	279	124	236	452	1.0	1,180	1,60	380	278	61	6.2	2,040	7.9		
Nov. 1-10-----	103	12	11.6	20	284	123	239	452	1.0	1,180	1,60	328	372	62	6.4	2,040	7.8		
Nov. 11-20-----	52.8	11	11.7	20	283	122	232	455	1.0	1,180	1,62	170	274	62	6.4	2,040	7.9		
Nov. 21-30-----	34.5	11	11.7	20	287	124	237	460	.8	1,190	1,62	111	374	62	6.4	2,050	7.8		
Dec. 1-10-----	40.5	10	11.8	19	290	125	240	460	1.8	1,200	1,63	131	375	62	6.6	2,050	7.9		
Dec. 11-20-----	30.1	11	11.9	19	284	125	237	455	1.2	1,190	1,62	96.7	372	62	6.4	2,040	7.9		
Dec. 21-31-----	33.9	9.2	11.8	19	287	126	240	455	1.2	1,190	1,62	109	372	62	6.5	2,050	8.1		
Jan. 1-31, 1935-----	31.7	13	12.2	20	282	129	231	462	1.5	1,190	1,62	102	386	61	6.2	2,050	7.8		
Feb. 1-28-----	47.1	8.8	12.0	20	285	127	261	458	1.0	1,200	1.63	153	382	62	6.4	2,070	7.8		
Mar. 1-31-----	62.9	7.2	12.0	19	286	128	228	465	1.2	1,190	1,62	202	378	62	6.4	2,080	7.5		
Apr. 1-30-----	78.3	8.0	12.0	18	289	130	248	450	2.8	1,200	1.63	254	374	63	6.5	2,080	7.7		
May 1-31-----	2,298	9.2	120	18	286	130	243	450	1.0	1,190	1.62	7,380	374	62	6.4	2,040	7.7		
June 1-16-----	3,421	10	102	17	238	120	205	375	2.0	1,010	1.37	9,470	324	61	5.7	1,800	7.9		
June 17-20-----	4,408	9.0	88	14	190	113	188	298	2.0	4850	1.16	10,120	277	60	5.0	1,470	7.8		
July 1-31-----	971	11	98	14	218	120	192	338	2.2	932	1.27	2,440	302	61	5.2	1,640	7.4		
Aug. 1-31-----	671	12	100	15	239	128	193	355	1.8	41,000	1.36	1,610	311	62	5.6	1,680	7.8		
Sep. 1-30-----	2,488	10	104	16	233	127	202	365	2.2	41,040	1.41	9,790	326	61	5.6	1,720	7.6		
Weighted average-----	997	10	104	16	238	124	205	374	1.8	1,030	1.40	2,770	326	61	5.7	1,760	--		

a Baseline on evaporation at 180°F.

BRAMOS 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.--44,050 square miles, approximately, of which 9,200 square miles is probably non-contributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1955.

Water temperatures: November 1950 to September 1955.

Specific conductance: Maximum, 324 ppm May 29-31, June 1, 9-11; minimum, 82 ppm Apr. 22-30.

Water temperatures: Maximum daily, 1.870 microhos May 31; minimum daily, 217 microhos April 23.

Water temperatures: Maximum observed, 65°F Aug. 9, 13, 15; minimum observed, 45°F Feb. 11-12.

EXTRAPOLATED, 1945-55.--Disolved solids: Maximum, 1,460 ppm Sept. 1-10, 1951; minimum, 1,133 ppm Aug. 27-31, 1947.

Hardness: Maximum, 468 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-20, 1950.

Specific conductance: Maximum daily, 2,540 microhos Sept. 4, 1951; minimum daily, 187 microhos Aug. 31, 1947.

Water temperatures (1950-55): Maximum observed, 91°F Aug. 5, 1951; minimum observed, 40°F Dec. 24, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance for water year October 1954 to September 1955 given in Water-Supply Paper 1392.

Records of discharge for water year October 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- ci- um (Ca)	Mag- ne- si- um (Mg)	So- dium (Na)	Po- ta- so- dium (K)	Bicar- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Sul- fate (SO <sub>4</sub> )	Flu- o- ride (F)	Ni- trate (NO <sub>3</sub> )	Be- ro- ron (B)	Dissolved solids (Residues at 180°C)			Hardness as CaCO <sub>3</sub>			Specific conduct- ance (micro- mhos at 25°C)	pH
														Parts per mil- lion	Tons per acres- foot	Tons per day	Cal- cium, mag- nesium	Non- carbo- nate	Per- cent so- dium		
Oct. 1-10, 1946-----	685	18	86	23	269	6.6	160	172	335	0.1	2.0	0.28	0.59	1.30	1,770	309	178	59	5.2	1,620	8.0
Oct. 11-19-----	582	17	92	20	212	6.3	162	173	332	.1	1.2	.19	0.973	1.32	1,530	312	179	59	5.2	1,630	8.0
Oct. 20-31-----	534	17	64	13	66	4.0	196	123	202	.2	1.2	.26	0.486	.66	1,710	213	52	46	825	8.0	
Nov. 1-7, 22-23-----	1,084	17	73	16	124	4.8	199	118	21	.2	1.5	.21	0.654	.89	1,910	248	85	51	3.4	1,100	8.0
Nov. 8-21-----	712	15	92	17	186	5.7	189	156	285	.1	1.5	.16	0.872	1.19	1,680	300	144	57	4.7	1,480	8.1
Nov. 26-30-----	894	15	42	6.4	54	4.0	141	40	75	.3	3.0	.15	0.322	.44	777	140	24	45	2.0	554	8.0
Dec. 1-6-----	468	15	58	11	74	3.8	178	47	112	.3	2.0	.12	0.626	.57	533	190	44	45	2.3	726	8.1
Dec. 7-16-----	390	15	73	16	127	4.3	225	52	202	.3	1.5	.17	0.606	.82	638	248	64	52	3.5	1,070	8.2
Dec. 17-27-----	490	16	72	16	96	4.1	240	62	135	.3	1.2	.13	0.522	.71	691	246	49	45	2.7	912	8.2
Dec. 28-31-----	586	12	43	7.3	34	3.5	156	74	74	.4	2.8	--	0.422	.42	15	44	549	8.1			
Jan. 1-10, 1955-----	381	17	63	13	114	4.2	211	47	168	.2	1.2	.22	0.348	.75	564	210	38	53	3.4	941	8.2
Jan. 11-19-----	423	16	55	16	113	4.0	190	68	158	.2	1.5	.22	0.330	.72	605	203	48	54	3.4	911	8.0
Jan. 20-21, 29-31-----	791	16	49	8.8	63	3.5	160	47	86	.2	2.2	.16	0.559	.49	767	156	25	46	2.2	610	8.2
Jan. 22-28-----	925	15	62	13	94	4.2	205	71	127	.3	2.0	.20	0.505	.69	1,260	208	40	49	2.8	845	8.2
Feb. 1-7-----	3,562	13	50	8.1	70	3.7	159	52	92	.5	3.5	.16	0.385	.32	3,700	158	28	48	2.4	661	7.8
Feb. 8-18-----	7,281	11	31	3.4	23	3.3	104	21	25	.5	3.5	.09	0.192	.26	3,770	91	6	34	1.0	303	7.6
Feb. 19-28-----	1,887	13	38	5.4	67	4.3	111	29	104	.5	3.5	.09	0.192	.46	1,440	117	26	34	2.7	587	7.5
Mar. 1-3-----	1,134	17	53	7.0	68	4.3	143	57	128	.3	3.5	.26	0.630	.58	1,320	167	50	53	3.0	756	7.8
Mar. 4-7-----	1,122	14	42	6.0	52	3.7	125	37	70	.2	2.5	.14	0.308	.42	933	129	26	46	2.0	512	7.9
Mar. 11-20-----	550	16	57	9.1	86	4.4	173	39	128	.3	1.8	.20	0.327	.63	634	179	37	76	8.0	764	8.0
Mar. 21-31-----	1,175	16	64	9.3	76	4.2	178	64	105	.3	2.8	.18	0.430	.58	1,360	197	51	45	2.4	736	7.9
Apr. 1, 6-12-----	1,669	14	48	7.0	72	4.5	147	42	101	.5	2.8	.18	0.464	.50	1,640	149	28	30	2.6	656	8.0
Apr. 1-5, 13-----	4,033	14	45	5.6	38	3.6	130	48	44	.5	3.0	.10	0.270	.37	2,940	136	29	37	1.4	466	7.6
Apr. 14-21-----	9,624	12	21	4.5	16	4.2	105	18	18	.6	2.5	.12	0.161	.22	4,180	95	9	26	2.7	267	7.6
Apr. 22-30-----	2,736	14	28	3.0	22	5.2	96	17	28	.6	2.5	.12	0.190	.26	1,400	82	4	35	1.1	286	7.5
May 1-10-----	645	15	48	7.2	50	5.3	151	46	68	.4	1.5	.20	0.329	.45	573	267	164	57	4.5	546	8.0
May 11-19, 22-----	1,246	14	57	8.5	62	--	175	34	84	.4	1.5	.14	0.382	.52	1,290	178	34	43	2.0	643	7.8
May 20-21, 23-28-----	9,879	10	48	5.0	23	--	142	29	30	.4	4.5	.12	0.232	.22	6,190	140	24	26	.8	389	7.8
May 29-31, June 1, 9-11-----	9,837	12	103	15	225	6.9	124	20	310	.4	2.2	.16	1,050	1.43	2,890	324	222	60	5.4	1,740	7.9
June 2-8-----	3,994	15	77	10	169	5.6	120	115	123	.3	2.0	.13	0.711	.97	7,670	238	134	57	4.2	1,230	7.9
June 12-22, 29-30-----	6,121	13	72	10	140	5.5	115	106	215	.2	2.5	.19	0.667	.91	11,020	220	126	57	4.1	1,160	7.8
June 23-28-----	6,068	14	68	9.4	87	12	169	149	125	.2	2.5	.12	0.573	.78	9,390	208	106	34	3.4	997	7.9
July 1-13-----	2,420	12	87	13	86	13	166	132	275	.5	1.8	.14	0.340	.11	5,340	267	164	57	4.5	4,360	7.6
July 14-27-----	1,136	13	107	5.0	147	91	159	.6	1.2	.12	0.818	.11	2,500	.267	159	57	4.4	1,360	7.6		
July 28-31-----	1,340	10	64	12	107	5.0	147	91	159	.6	1.2	--	0.556	.76	2,010	208	88	52	3.2	931	7.6
Aug. 1-3-----	1,085	18	59	10	96	5.2	143	79	141	.0	3.0	.08	0.512	.70	1,500	189	72	32	3.0	867	7.8
Aug. 4-16, 18-20-----	1,081	18	14	176	8.2	87	127	132	268	.1	1.5	.14	0.814	.61	2,380	153	58	4.7	1,400	8.0	
Aug. 17, 21-31-----	1,419	13	58	1.2	130	5.1	163	112	195	.2	2.5	.10	0.446	.61	1,710	179	71	50	2.8	781	7.8
Sept. 1-6-----	817	17	77	11	130	157	146	166	275	.1	1.5	.13	0.637	.67	1,410	237	104	34	3.7	1,100	8.1
Sept. 9-22-----	934	13	84	15	180	5.8	146	166	130	.2	2.0	.10	0.817	.11	2,060	222	112	26	4.8	1,410	7.7
Sept. 23-30-----	922	13	78	13	150	5.2	166	130	220	.1	1.2	.11	0.728	.99	1,810	248	112	26	4.1	1,230	7.7
Weighted average-----	2,168	13	60	8.9	95	4.9	132	83	165	0.4	2.6	0.14	0.98	0.68	2,920	186	78	32	3.0	842	7.7

a Sum of determined constituents.

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

Date of collection	Water dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Po- tes- tial (K)	So- dium (Na)	Bicar- bonate (HCO <sub>3</sub> )	Sal- fate (SO <sub>4</sub> )	Chemical analyses, in parts per million, water year October 1954 to September 1955		Dissolved solids (Residue at 180°C)	Hardness as CaCO <sub>3</sub>	Cal- cium carbo- nate atmos- phere dissolved in water	Per- cent so- dium	So- dium adorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH			
										Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Parts per mil- lion	Tons per acre- foot						
Jan. 18, 1955-----	1.98	48	--	--	43	--	--	64	23	--	1.0	--	--	--	--	--	612	--			
Jan. 18, 1955-----	2.22	44	--	--	43	--	--	44	24	--	.5	--	--	--	--	--	780	--			
WHITE RIVER AT COUNTY ROAD CROSSING 4½ MILES EAST OF CROSSTON																					
Sep. 15, 1955-----	--	3.1	0.00	66	9.9	93	122	86	150	0.3	.0	503	0.09	199	99	50	2.9	645	7.6		
Apr. 15, 1955-----	--	.7	.01	50	6.6	12	8.6	186	7.2	20	.4	1.5	0.06	205	.28	152	0	14	.4	364	7.6
Sept. 9, 1955-----	--	6.4	.01	44	4.4	16	159	9.2	15	.2	.5	196	.27	128	0	21	.6	319	7.3		
LAKE MINERAL WELLS NEAR MINERAL WELLS																					
LAKE LEON NEAR EASTLAND																					

COLORADO RIVER BASIN

COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION.—At gaging station on U. S. Highway 190, 5.2 miles downstream from San Saba River, 9.2 miles east of San Saba, San Saba County, and at mile 474.

DRAINAGE AREA.—30,000 square miles, approximately, of which 11,900 square miles is probably non-contributing.

RECORDS AVAILABLE.—Chemical analyses: September 1947 to September 1955.

Water temperatures: September 1950 to September 1955.

Sediment records: December 1950 to September 1955.

Hardness: Maximum, 438 ppm Oct. 2-4; minimum, 102 ppm Sept. 23-25.

Specific conductance: Maximum daily, 2,530 micromhos Oct. 2; minimum daily, 170 micromhos Sept. 24.

Water conductance: Maximum observed, 34°F Dec. 14.

ENTRANCE, 1947-55.—Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 1,02 ppm Sept. 23-25, 1955.

Hardness: Maximum, 522 ppm Oct. 1-19, 1947; minimum, 71 ppm June 21-30, 1949.

Water temperature: Maximum observed, 93°F June 19, 1953; minimum observed, freezing point Jan. 20, 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 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica ( $\text{SiO}_2$ )	Iron ( $\text{Fe}$ )	Calcium ( $\text{Ca}$ )	Magnesium ( $\text{Mg}$ )	Potassium ( $\text{K}$ )	Bicarbonate ( $\text{HCO}_3^-$ )	Sulfate ( $\text{SO}_4^{2-}$ )	Chloride ( $\text{Cl}^-$ )	Fluoride ( $\text{F}^-$ )	Nitrate ( $\text{NO}_3^-$ )	Boron (B)	Parts per milliliter	Tons per acre-foot	Parts per milliliter	Tons per acre-foot	Disolved solids		Hardness as $\text{CaCO}_3$	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH
																	(Residue at 100°C)	Cal-calcium-magnesium-alum				
Oct. 1, 5-10, 28, 1954-	259	14	108	70	28	147	208	98	238	432	2.2	1.00	736	1.00	515	290	119	53	3.6	1,270	6.1	
Oct. 2-4-----	198	15	48	40	264	188	233	23	22	1.62	636	434	280	2.0	32	15.4	2,050	5.5	2,050	7.9		
Oct. 11-21-----	15.1	16	61	22	61	237	25	86	2.2	1.32	210	2.1	39	1.8	672	1.6	114	10	424	8.1		
Oct. 28-31-----	213	11	32	8.4	40	128	11	58	3.8	238	32	175	11.6	43	1.6	130	120	1.6	357	7.7		
Rev. 1-13-----	63.7	11	34	11	21	146	10	31	2.5	193	.27	33.5	120	10	26	14	14	.8	278	7.6		
Rev. 14-23-----	768	9.6	32	6.4	13	113	8.6	22	3.0	136	.21	323	106	14	21	1.6	1.6	2.6	276	7.6		
Rev. 24-30-----	42	12	51	14	45	196	17	73	2.2	313	.43	35.5	184	24	35	1.5	1.5	566	7.8			
Dec. 1-10-----	33.6	13	61	21	52	273	15	78	1.8	4376	.31	34.1	238	15	32	1.4	1.4	682	8.0			
Dec. 11-20-----	30.0	12	66	25	51	313	17	73	1.5	4600	.54	32.4	268	11	29	1.3	1.3	718	8.0			
Dec. 21-31-----	31.7	13	67	29	44	334	13	67	1.0	4398	.56	36.1	286	12	25	1.1	1.1	723	7.9			
Jan. 1-10, 1955-----	37.0	11	60	23	49	277	18	74	1.0	3600	.52	38.0	244	17	30	1.4	1.4	669	8.0			
Jan. 11-20-----	49.8	14	62	24	44	289	16	67	1.2	376	.51	50.6	253	16	28	1.2	1.2	660	7.9			
Jan. 21-31-----	38.0	12	63	26	44	297	19	67	1.2	390	.53	40.0	264	20	26	1.2	1.2	679	7.8			
Feb. 1-10-----	46.6	10	47	17	60	204	27	87	2.0	356	.48	446	188	22	41	1.9	1.9	635	7.9			
Feb. 11-19-----	9.6	12	46	12	47	176	32	61	3.0	304	.41	164	20	38	1.6	1.6	516	7.7				
Feb. 20-28-----	52.4	12	63	10	43	228	24	58	2.5	391	.43	46.8	203	16	31	1.3	1.3	566	7.9			
Mar. 1-10-----	28.7	7.8	56	22	43	261	22	61	1.0	348	.47	27.0	230	16	29	1.3	1.3	618	7.7			
Mar. 11-20-----	11.6	7.8	55	25	48	274	22	68	.8	a362	.49	11.3	240	16	30	1.2	1.2	654	7.6			
Mar. 21-22, 27-31-----	60.3	10	62	22	65	255	32	101	1.0	439	.58	69.8	245	36	37	1.8	1.8	769	8.0			
Mar. 23-26-----	91.2	10	47	12	50	178	26	73	1.8	314	.43	77.3	168	22	39	1.7	1.7	566	7.8			
Apr. 1-10-----	139	9.6	62	23	68	237	31	108	1.0	439	.58	161	249	38	37	1.9	1.9	793	7.8			
Apr. 11-15, 26-30-----	217	11	45	11	34	180	17	46	2.2	a235	.35	149	158	10	32	1.2	1.2	470	7.8			
Apr. 16-25-----	63.5	40	7.8	21	152	13	26	3.5	a196	.27	33.6	132	7	26	.8	.8	357	7.7				
May 1-10-----	5.53	11	48	17	36	14	51	1.8	296	.40	190	10	29	1.1	1.1	523	8.1					
May 11-13, 13-----	5,490	23	48	6.6	27	134	30	33	2.0	248	.34	3,680	145	20	29	1.0	1.0	418	7.5			
May 14-16, 18-----	6,220	15	64	9.3	126	158	67	192	1.8	587	.80	1,985	68	58	3.9	1.0	1,040	7.7				
May 19-27-----	2,920	16	42	4.6	11	138	12	14	3.2	185	.25	10,920	123	10	17	1.4	1.4	300	8.0			
May 28-31, June 1-4-----	1,086	16	54	9.2	69	160	39	105	4.5	393	.54	1,160	173	42	4.6	2.3	683	8.1				
June 5-13-----	1,091	16	41	3.6	12	135	10	14	2.8	a165	.22	486	116	5	19	.5	.5	280	7.8			
June 14-20-----	4,039	15	50	7.6	25	176	25	51	2.8	209	.28	2,290	138	18	21	2.1	2.1	356	7.9			
June 21-30-----	601	15	49	10	30	176	22	42	4.0	236	.35	415	156	20	26	1.9	1.9	423	8.2			
July 1-10-----	816	18	48	8.1	20	168	18	26	4.3	240	.33	529	154	10	22	.7	.7	389	8.0			
July 11-20-----	5,432	17	47	8.6	21	164	17	31	2.5	240	.33	3,520	152	18	23	.7	.7	398	8.2			
July 21-31-----	2,259	16	44	6.9	19	153	17	25	3.0	222	.30	1,330	139	14	23	.7	.7	372	8.0			
Aug. 1-10-----	434	10	56	11	40	188	32	59	3.0	337	.46	395	185	31	32	1.3	1.3	552	8.0			
Aug. 11-20-----	673	13	49	10	30	176	22	42	4.0	239	.35	331	166	20	29	1.0	1.0	462	8.0			
Aug. 21-31-----	7,988	13	44	7.7	21	120	21	29	3.5	214	.29	4,510	142	19	25	.9	.9	377	7.7			
Sep. 1-10-----	239	13	46	9.2	26	163	20	36	3.5	242	.33	169	152	16	27	.9	.9	417	7.9			
Sep. 11-22, 26-27-----	913	14	50	33	188	47	22	47	2.2	285	.39	703	174	20	29	1.3	1.3	486	7.8			
Sep. 22-25-----	2,030	8.8	26	3.2	6.0	94	22	5.5	2.5	a102	.14	6,070	78	1	14	.3	.3	174	7.6			
Sep. 26-30-----	2,443	10	37	6.3	15	125	9.5	20	3.0	166	.23	1,090	111	9	22	.6	.6	276	7.6			
Weighed average-----	1,660	15	43	5.9	21	142	16	30	2.9	24	2.2	939	132	15	26	0.8	0.8	361	--			

a Sum of determined constituents.

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

LOCATION.--At raw-water intake at Austin City Water Plant,  $\frac{4}{5}$  miles upstream from gaging station which is at Montopolis bridge on U. S. Highway 183, at southeast edge of Austin, Travis County, 2.6 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, 5 miles downstream from Barton Creek, and at mile 290.

DRAINAGE AREA.--38,160 square miles, approximately, of which 11,900 square miles is probably non-contributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 262 ppm Jan. 1-30; minimum, 232 ppm July 1-31.

Hardness: Maximum, 168 ppm Dec. 1-31; minimum, 147 ppm Aug. 1-31.

Specific conductance: Maximum daily, 503 micromhos Mar. 28; minimum daily, 410 micromhos Oct. 5.

Water temperatures: Maximum observed, 82°F Aug. 27-29; minimum observed, 52°F Dec. 30, Feb. 11-12.

EXTREMES, 1947-55.--Dissolved solids: Maximum, 340 ppm May 1-30, 1951; minimum, 214 ppm July 1-31, 1953.

Hardness: Maximum, 214 ppm Jan. 1-31, 1954; minimum, 164 ppm June 1-30, 1953.

Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 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 1954 to September 1955 given in Water-Supply Paper 1392. 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 1954 to September 1955

Date of collection	Mean 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> )	Chlo- ri- do (Cl)	Fluo- rido (F)	Ni- trate (NO <sub>3</sub> )	Bio- ron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>	So- dium adorp- tion ratio	Per- cent so- dium	Specific conduc- tance (micro- mhos at 25°C)	pH
													Parts per mil- lion	Tons per acre- foot	Tons per day					
Oct. 1-31, 1954-----	288	10	.43	12	26	178	18	34	.3	.8	.8	.238	0.32	185	1157	11	27	0.9	426	7.7
Nov. 1-30-----	309	11	.45	13	27	184	20	36	.2	.8	.2	.252	.34	210	166	15	26	.9	432	7.8
Dec. 1-31-----	271	9.6	.44	14	26	183	21	36	.2	.8	.2	.248	.34	181	168	18	25	.9	440	8.1
Jan. 1-31, 1955-----	287	9.4	0.01	.45	13	30	180	22	.3	1.2	.2	.262	.36	203	167	20	28	1.0	444	7.9
Feb. 1-28-----	530	9.4	.42	15	31	185	24	40	.3	1.0	.3	.254	.35	363	167	16	29	1.1	457	7.9
Mar. 1-31-----	437	7.8	.34	6.7	31	180	23	40	.3	.8	.3	.260	.35	321	163	16	29	1.0	451	8.2
Apr. 1-30-----	960	8.4	.42	13	31	174	22	41	.3	.8	.3	.264	.33	632	158	16	30	1.1	441	8.2
May 1-31-----	1,811	7.6	.42	12	31	174	22	39	.3	.8	.3	.264	.33	1,190	154	12	30	1.1	427	8.2
June 1-30-----	4,203	9.0	.41	12	31	164	22	42	.3	1.0	.3	.241	.33	2,730	152	18	30	1.1	429	8.2
July 1-31-----	2,805	7.2	.42	11	29	162	21	40	.3	1.0	.3	.232	.32	1,760	149	16	30	1.0	428	8.2
Aug. 1-31-----	2,226	8.8	.41	11	32	160	21	43	.3	1.5	.2	.252	.36	1,520	147	16	32	1.1	428	8.1
Sep. 1-30-----	1,659	9.6	.43	9.7	32	162	23	43	.2	.8	.2	.260	.33	1,090	148	16	32	1.2	430	8.2
Weighted average-----	1,322	8.6	.42	12	31	167	22	41	.3	1.0	.3	.243	0.33	667	154	18	30	1.1	431	--

a. Sum of determined constituents.

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

LOCATION.--At bridge on U. S. Highway 59 in Wharton, Wharton County, 1,000 feet downstream from Texas & New Orleans Railroad bridge, 12 miles downstream from Jones Creek and at mile 67.  
DRAINAGE AREA.--41,150 square miles, approximately, of which 11,900 square miles is probably non-contributing.  
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1955.

Water temperatures: October 1945 to September 1948, March 1950 to September 1955.

EXTREMES, 1944-55.--Dissolved solids: Maximum, 310 ppm Mar. 1-31; minimum, 182 ppm Feb. 6-15.

Hardness: Maximum, 196 ppm Dec. 1-31; minimum, 104 ppm Feb. 6-15.

Specific conductance: Maximum daily, 621 microhos. Mar. 21; minimum daily, 207 microhos. Feb. 6.

Specific conductance: Maximum observed, 937<sup>o</sup> July 6, 27, 31; minimum observed, 627<sup>o</sup> Jan. 26.

EXTREMES, 1944-55.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 144 ppm Feb. 26-28, 1949.

Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 87 ppm Feb. 24-28, 1949.

Specific conductance: Maximum daily, 721 microhos. Oct. 3, 1952; minimum daily, 179 microhos. Oct. 30, 1953.

Water temperatures (1945-48, 1950-55): Maximum observed, 95°F July 26, 1954; minimum observed, 42°F Dec. 26, 1953, Jan. 26, 1955.

Water temperatures (1945-48, 1950-55): Maximum observed, 721 microhos. Oct. 3, 1952; minimum observed, 179 microhos. Oct. 30, 1953.

Water temperatures (1945-48, 1950-55): Maximum observed, 42°F Dec. 26, 1953, Jan. 26, 1955.

REMARKS.--Values reported for dissolved solids are reaches 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 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Po- ta- si- um (K)	Bio- car- bonate (HCO <sub>3</sub> )	Chlo- ri- de (Cl)	Flu- oride (F)	Ni- trate (NO <sub>3</sub> )	Bor- on (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	So- dium absorp- tion ratio	Par- cen- tage so- dium	Speci- fic conduct- ance (micro- mhos at 25° C)	pH			
												Parts per mil- lion	Tons per acre- foot								
Oct. 1-31, 1954-----	370	16	48	14	29	4.5	204	21	40	0.4	1.0	0.08	276	178	10	26	0.9	485	8.1		
Nov. 1-30-----	345	10	51	15	29	4.3	215	23	40	.0	.22	.28	.39	268	198	12	25	.9	499	7.8	
Dec. 1-31, 1955-----	348	7.8	54	15	30	3.9	221	25	42	.3	1.0	.14	.39	272	196	15	24	.9	509	8.2	
Jan. 1-31, 1956-----	403	9.5	52	14	35	4.1	208	28	48	.3	1.2	.14	.298	326	187	16	28	1.1	529	8.1	
Feb. 1-5, 1956-----	509	12	50	11	29	4.7	188	29	37	.4	3.0	.11	.270	371	170	16	26	1.0	472	8.2	
Feb. 6-15-----	2,840	16	32	5.9	16	3.7	116	18	20	.5	4.5	.10	.182	1,000	104	10	24	.7	298	7.9	
Mar. 1-31-----	360	8.6	54	14	36	4.8	223	29	47	.4	1.3	.14	.310	301	192	10	26	1.1	539	8.0	
Apr. 1-30-----	701	7.6	45	12	29	4.8	182	23	39	.4	1.2	.12	.252	477	162	13	27	1.0	454	8.1	
May 1-19, 21-31-----	1,120	11	46	11	26	4.8	168	23	38	.3	1.2	.17	.248	750	159	22	26	.9	432	8.0	
May 20-26-----	4,250	13	38	5.3	14	--	126	17	18	.3	3.6	.17	.165	2,120	117	14	21	.6	307	7.6	
June 1-30-----	3,444	12	40	11	26	5.0	155	24	40	.2	2.0	.09	.4236	.32	2,190	145	18	27	.9	422	8.1
July 1-31-----	2,304	10	44	11	28	5.2	164	24	46	.2	1.2	.11	.4251	.34	1,560	134	20	28	1.0	448	8.2
Aug. 1-31-----	1,779	12	42	11	29	5.1	164	23	42	.0	2.2	.07	.247	.34	1,190	149	14	29	1.0	447	7.6
Sept. 1-30-----	1,168	13	43	12	31	5.1	170	24	46	.0	1.0	.09	.259	.35	817	136	16	29	1.1	459	7.9
Weighted average-----	1,196	12	43	11	27	6.8	165	23	39	0.2	1.9	0.11	244	0.33	768	132	18	27	0.9	431	--

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 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica ( $\text{SiO}_4$ )	Iron ( $\text{Fe}$ )	Cal-chlorine ( $\text{Ca}$ )	Magnesium ( $\text{Mg}$ )	Sodium ( $\text{Na}$ )	Potassium ( $\text{K}$ )	Bicarbonate ( $\text{HCO}_3$ )	Sulfate ( $\text{SO}_4$ )	Chloride ( $\text{Cl}$ )	Fluoride (F)	Nitrate ( $\text{NO}_3$ )	Boron (B)	Dissolved solids (Residue at 180°C)		Hardness as $\text{CaCO}_3$	Specific conductance (micro-mhos at 25°C)	pH			
														Parts per million	Tons per acre-foot	Tons per day	Cal-chlorine, magnesium-sodium	Non-carbonate			
LAKE J. B. THOMAS NEAR SNEYDER																					
Mar. 7, 1955-----	2.7	0.00	35	6.6	44	154	52	20	0.7	0.5	--	242	0.33		114	0	46	1.8	418	7.2	
LAKE EUBERIANA NEAR EUBERT																					
Feb. 8, 1955-----	4.6	.02	38	10	37	5.4	141	30	56	.3	1.0	0.09	260	.35		136	20	36	1.4	476	8.2
Jan. 18, 1955-----	7.0	.02	38	12	23	4.5	161	19	35	.2	.2	.04	225	.31		144	12	25	.8	395	8.1

## GUADALUPE RIVER BASIN

## GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION--At bridge on U. S. Highway 59 in Victoria, Victoria County, 1300 feet upstream from Texas & New Orleans Railroad bridge, 10 miles upstream from Coletto Creek, and at mile 51.  
DRAINAGE AREA--3,311 square miles.

RECORDS AVAILABLE--Chemical analyses:

October 1945 to September 1946, October 1948 to September 1955.

Water temperatures: November 1930 to September 1955.

EXTREMES, 1934-55.--Dissolved solids: Maximum, 410 ppm Oct. 21-31, Nov. 11-20; minimum, 223 ppm June 11-20.

Specific conductance: Maximum, 221 ppm Dec. 1-10; minimum, 130 ppm June 11-20.

Hardness: Maximum, 221 ppm Dec. 1-10; minimum, 130 ppm June 11-20.

Specific conductance: Maximum daily, 876 micromos June 22; minimum daily, 308 micromos June 14.

Water temperatures: Maximum observed, 86°F on several days during July and August; minimum observed, 46°F Dec. 23.

EXTREMES, 1945-46, 1948-55.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 168 ppm Oct. 26-31, May. 1-2, 1953.

Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 104 ppm Oct. 26-31, Nov. 1-2, 1953.

Specific conductance: Maximum daily, 201 micromos Sept. 1, 1953.

Water temperatures (1930-55): 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 1934 to September 1955 given in Water-Supply Paper 1392.

Chemical analytes, in parts per million, water year October 1934 to September 1955

Date of collection	Mean dis- charge (cfs)	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- mhos at 25° C)	pH				
		Iron (Fe)	Silica (SiO <sub>2</sub> )	Cali- um (Ca)	Magni- esium (Mg)	Po- ta- sium (Na)	So- dium (Na)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Ni- trato (NO <sub>3</sub> )	Flu- oro- ide (F)	Bar- ium (B)	Tons per mi- cro- foot	Tons per mi- cro- foot	Cal- cium magne- sium	Non- carbon- ate					
Oct. 1-10, 1954-----	112	21	48	17	58	3.4	221	29	79	0.4	1.2	0.22	367	0.50	111	190	9	39	1.8	648	8.2	
Oct. 11-20-----	102	20	50	18	66	3.5	220	31	88	.4	1.5	0.19	410	.56	110	190	18	41	2.0	692	8.2	
Oct. 21-31-----	148	17	50	19	68	3.5	226	34	97	.4	1.5	0.18	408	.55	164	203	18	42	2.1	727	8.2	
Rev. 1-10-----	170	23	48	20	69	3.4	224	36	96	.2	1.5	0.23	487	.55	187	202	18	42	2.1	704	8.1	
Rev. 11-20-----	238	22	44	21	70	3.5	210	36	102	.2	1.2	0.16	410	.56	263	196	24	43	2.2	710	8.1	
Rev. 21-30-----	193	18	48	19	54	3.5	219	33	77	.2	1.8	0.21	367	.50	191	198	18	37	1.7	636	8.0	
Dec. 1-10-----	211	16	54	21	53	3.4	235	35	78	.4	1.0	0.16	380	.52	216	221	28	34	1.6	669	8.2	
Dec. 11-20-----	303	16	51	20	54	3.0	226	35	77	.3	1.2	0.28	389	.50	302	209	24	36	1.6	651	8.1	
Dec. 21-31-----	213	15	49	21	54	3.1	223	35	76	.3	1.2	0.21	365	.50	210	209	26	36	1.6	645	8.2	
Jan. 1-10, 1955-----	239	15	45	19	56	3.0	208	32	76	.3	1.0	0.18	350	.48	226	190	20	39	1.8	631	8.2	
Jan. 11-20-----	242	17	57	19	54	2.9	252	31	70	.3	1.8	0.18	380	.52	246	220	14	34	1.6	662	8.2	
Jan. 21-31-----	291	16	41	19	53	2.9	207	33	70	.3	1.8	0.18	340	.46	267	180	11	38	1.7	601	8.2	
Feb. 1-6-----	1,237	18	41	17	50	2.8	194	31	64	.5	2.2	0.16	324	.44	1,080	172	14	38	1.7	573	8.0	
Feb. 7-21-----	1,141	16	41	17	57	2.6	3.5	151	24	32	.4	3.5	0.08	233	.32	718	134	10	29	1.0	396	7.9
Feb. 22-28-----	296	15	54	13	37	3.3	199	34	49	.4	5.2	0.12	312	.42	249	188	25	30	1.2	538	7.8	
Mar. 1-10-----	280	16	56	14	42	3.2	206	33	63	.3	3.2	0.24	346	.47	262	196	27	31	1.3	575	8.0	
Mar. 11-20-----	259	7.8	47	16	50	3.1	190	36	71	.3	1.8	0.26	366	.47	242	184	28	37	1.6	586	7.9	
Mar. 21-31-----	438	16	52	14	44	3.5	203	35	60	.3	2.8	0.17	340	.46	402	187	20	33	1.4	563	8.0	
Apr. 1-10-----	467	14	54	15	40	3.6	215	28	54	.5	1.7	0.17	438	.43	401	196	20	30	1.2	561	8.2	
Apr. 11-20-----	222	15	53	16	45	3.4	216	30	60	.4	2.5	0.16	431	.45	198	198	21	33	1.4	579	8.2	
Apr. 21-30-----	182	15	50	14	35	3.5	202	33	56	.5	2.2	0.19	431	.43	156	182	17	34	1.5	557	8.2	
May 1-10-----	118	19	47	16	49	--	198	32	69	.3	1.2	0.22	361	.46	109	183	21	37	1.6	586	7.9	
May 11-20-----	631	20	48	16	48	--	208	29	67	.3	1.0	0.28	340	.46	579	187	16	36	1.5	600	8.2	
May 21-31-----	1,492	17	45	6.7	22	--	150	25	26	.5	3.8	0.17	231	.31	931	140	17	26	.8	383	7.9	
June 1-10-----	1,378	21	47	9.1	23	3.8	176	21	30	.3	3.5	0.21	426	.33	915	155	11	26	.8	417	8.2	
June 11-20-----	722	18	41	6.5	24	4.6	136	23	55	.2	2.5	0.13	423	.30	435	130	18	28	.9	378	8.2	
June 21-30-----	292	20	47	9.3	35	4.6	165	24	52	.2	2.5	0.12	282	.38	222	156	20	32	1.2	489	8.1	
July 1-10-----	163	21	46	8.8	35	4.9	163	23	52	.3	2.5	0.23	427	.37	121	150	16	33	1.2	471	8.2	
July 11-20-----	152	22	52	12	44	4.4	206	27	61	.2	1.0	0.22	4325	.44	133	180	11	34	1.4	559	8.2	
July 21-31-----	317	17	49	16	52	3.8	209	29	71	.2	0.8	0.23	4362	.47	293	188	17	37	1.6	606	8.2	
Aug. 1-10-----	186	21	40	14	39	3.6	186	21	51	.1	1.0	0.03	4262	.38	142	158	6	34	1.4	492	8.2	
Aug. 11-20-----	207	21	43	13	37	3.8	188	21	50	.1	1.0	0.13	4282	.38	158	161	7	33	1.3	483	8.1	
Aug. 21-31-----	237	18	40	8.8	33	4.0	163	17	64	.1	1.8	0.05	4247	.34	158	135	2	36	1.2	422	8.0	
Sept. 1-10-----	218	18	43	12	36	3.9	189	20	45	.4	1.2	0.25	4273	.37	161	157	2	33	1.3	473	8.2	
Sept. 11-20-----	142	18	40	8.5	34	4.1	169	17	41	.5	2.3	0.23	230	.34	95.8	136	0	34	1.3	431	7.6	
Sept. 21-30-----	114	18	47	11	38	3.9	199	21	46	.4	2.5	0.23	264	.39	87.4	163	0	33	1.3	493	7.6	
Weighted average-----	376	18	46	12	38	3.6	184	27	51	0.3	2.5	0.17	293	0.40	296	164	14	33	1.3	507	8.2	

a Sum of determined constituents.

## GUADALUPE RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN THE GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water, year October 1934 to September 1935

Date of collection	Water discharge (cfs)	Silica ( $\text{SiO}_4$ )	Iron ( $\text{Fe}$ )	Calcium ( $\text{Ca}$ )	Magnesium ( $\text{Mg}$ )	Sodium ( $\text{Na}$ )	Potassium ( $\text{K}$ )	Bicarbonate ( $\text{HCO}_3$ )	Sulfate ( $\text{SO}_4$ )	Chloride ( $\text{Cl}$ )	Fluoride (F)	Nitrate ( $\text{NO}_3$ )	Boron (B)	Dissolved solids		Hardness as $\text{CaCO}_3$	Calclim, non-carbonate aluminum	Tons per acre-foot	Tons per milliton	Parts per million	Percent sodium	Percent carbonate ratio	Specific conductance (micro-mhos at 25° C)	pH		
														Boiling (B)	Parts per milliton											
GUADALUPE RIVER AT COUNTY ROAD ABOVE U. S. HIGHWAY 281																										
Jan. 24, 1935-----	51.5									268	24									240	20				516	8.2
GUADALUPE RIVER, 500 FEET ABOVE SPRING BRANCH CREEK																										
Jan. 24-----	49.0									271	24									246	24				516	8.0
SPRING BRANCH CREEK AT MOUTH																										
Jan. 24-----	1.0									285	15									244	10				489	8.1
GUADALUPE RIVER, 0.9 MILE ABOVE U. S. HIGHWAY 281																										
Jan. 24-----	46.1									272	25									247	24				516	8.1
GUADALUPE RIVER, 1.0 MILE BELOW U. S. HIGHWAY 281																										
Jan. 24-----	44.5									276	25									251	25				526	8.1
GUADALUPE RIVER AT GAGING STATION NEAR SPRING BRANCH																										
Jan. 24-----	--									278	26									252	24				527	8.2
GUADALUPE RIVER, 1/4 MILES BELOW GAGING STATION NEAR SPRING BRANCH																										
Jan. 24-----	44.3									278	26									252	24				532	8.2
GUADALUPE RIVER AT COUNTY ROAD CROSSING 4.3 MILES BELOW GAGING STATION NEAR SPRING BRANCH																										
Jan. 25-----	28.0									279	26									251	22				528	8.2
GUADALUPE RIVER 6.8 MILES BELOW GAGING STATION NEAR SPRING BRANCH																										
Jan. 25-----	22.0									274	26									245	20				517	8.1
GUADALUPE RIVER 1.3 MILES UPSTREAM FROM REBECCA CREEK																										
Jan. 25-----	13.2									275	26									248	22				525	8.0

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

Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal. chlor. (Ca)	'Mag.-ne-dium' (Mg)	Soc. chlor. (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	C.L. chl., mg/l.	Per-cent carbo-nate	Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH	
													Parts	Tons per mil.	Tons per day								
GUADALUPE RIVER, 100 FEET BELOW MOUTH OF REBECCA CREEK																							
Jan. 25, 1955-----	11.4												274	26							249	23	
Jan. 26-----	9.2												274	26							256	31	
GUADALUPE RIVER, 1.6 MILES DOWNSTREAM FROM REBECCA CREEK																							
Jan. 27-----	11.1												274	26							252	27	
GUADALUPE RIVER, 4.2 MILES UPSTREAM FROM COUNTY ROAD CROSSING NEAR CRANES MILL																							
Jan. 26-----	27.1												275	26							254	28	
GUADALUPE RIVER, 2.5 MILES BELOW CRANES MILL																							
Jan. 27-----	31.9												277	24							254	27	
GUADALUPE RIVER, 1.5 MILES ABOVE TOM CREEK																							
Jan. 27-----	35.8												280	24							256	26	
GUADALUPE RIVER, 200 FEET ABOVE TOM CREEK																							
Jan. 27-----	39.1												279	24							254	25	
GUADALUPE RIVER, 2 MILES BELOW TOM CREEK																							
Jan. 28-----	41.9												282	24							260	29	
GUADALUPE RIVER, 2.5 MILES BELOW TOM CREEK																							
Jan. 28-----	37.8												280	24							254	24	
GUADALUPE RIVER AT TRAVERSE RANGE ABOUT 2 MILES ABOVE CANTON DAM SITE																							
Jan. 28-----	41.8												276	24							248	22	
GUADALUPE RIVER, 3/4 MILE BELOW CANTON DAM SITE																							
Jan. 28-----	40.8												267	24							240	21	
																					513	50	

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

Date of collection	Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued										Dissolved solids				Hardness as CaCO <sub>3</sub>	Specific conductance (micro- mhos at 25° C)	pH
	Water discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Magn- esium (Mg)	Sodium (Na)	Bicar- bonate (HCO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bor- on (B)	Parts per mil- lion	Tons per acre- foot	Cal- cium margi- nium	Non- carbon- ate	Per- cent solu- tion adop- ratio
GUADALUPE RIVER, 1½ MILES BELOW CASTOR DAM SITE																	
Jan. 29, 1955-----	37.9								267	24					240	21	
GUADALUPE RIVER, ABOUT 1 MILE ABOVE SATTLER																	
Jan. 29-----	40.8								269	24					246	25	
GUADALUPE RIVER, 1 MILE ABOVE LOWER CROSSING AT SATTLER																	
Jan. 29-----	38.1								265	25					242	25	
GUADALUPE RIVER, ABOUT 2 MILES BELOW SATTLER																	
Jan. 29-----	35.4								265	25					240	23	
GUADALUPE RIVER ABOUT 3 MILES BELOW SATTLER																	
Jan. 29-----	43.0								262	24					236	21	
GUADALUPE RIVER, ABOUT 7 MILES ABOVE HUECO SPRINGS																	
Jan. 30-----	41.6								262	24					238	23	
GUADALUPE RIVER, ABOUT 4.5 MILES ABOVE HUECO SPRINGS																	
Jan. 30-----	40.7								260	24					238	25	
GUADALUPE RIVER, 1 MILE ABOVE HUECO SPRINGS																	
Jan. 30-----	35.7								253	24					230	23	
GUADALUPE RIVER, 3/4 MILE BELOW HUECO SPRINGS																	
Jan. 30-----	39.4								253	24					230	23	
GUADALUPE RIVER, 3/4 MILE ABOVE GUERZ																	
Jan. 31-----	35.9								252	23					230	23	
GUADALUPE RIVER, 3/4 MILE ABOVE GAGING STATION ABOVE COAL RIVER AT NEAR BRANTELS																	
Jan. 31-----	38.8								259	23					232	29	

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

Date of collection	Chemical analyses, in parts per million, water year October 1955 to September 1956								Dissolved solids				Hardness as CaCO <sub>3</sub>	Specific conductance (micro-mhos at 25° C)	pH		
	Mater- ial- charge (cfb)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Magnesium (Mg)	Po- tassium (K)	Bicar- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Flu- lide (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Parts per mil- lion	Tons per acre- foot	Cal- cium mag- nesium ratio	Non- carbon- ate	Per- cent sil- icate	SPECI- FIC CONDU- CTANCE (micro- mhos at 25° C)
LITTLE BLANCO RIVER ABOUT 3 MILES ABOVE MOUTH																	
Jan. 24, 1955-----	0.2													296	14		549 8.0
Jan. 24-----	0.1													262	24		523 7.8
Jan. 25-----	2.68													314	14		
Jan. 25-----	.36													302	58		584 8.0
Jan. 25-----	.11													298	15		
Jan. 25-----	7.50													244	15		499 8.1
Jan. 26-----	7.25													302	14		572 8.0
Jan. 26-----	7.30													263	15		545 8.1
Jan. 26-----	7.13													260	15		509 8.1
Jan. 26-----	7.84													238	15		
Jan. 26-----	2.39													236	15		479 8.2
														326	14		563 8.0
														296	27		

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

Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cali. chlum (Ca <sub>2+</sub> )	Magnesium (Mg <sup>2+</sup> )	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>	Cal-chlor., Cal-magn., Non-carbonate	Per cent sodium	Soil-sodium adsorption ratio	Specific conductance (micro-mhos at 25° C.)	pH
														Parts per million	Tons per acre-foot	Tons per day						
<b>CYPRESS CREEK AT MOUTH AT WIMBERLEY</b>																						
Jan. 26, 1955-----	2.55																	247	16		488	6.1
Jan. 27-----	10.5																	247	50		476	6.2
<b>BLANCO RIVER AT FARM TO MARKET ROAD 12, 1/4 MILE EAST OF WIMBERLEY</b>																						
Jan. 27-----	11.0																	241	14		247	50
<b>BLANCO RIVER AT BRIDGE ON COUNTY ROAD 3.0 MILES DOWNSTREAM FROM WIMBERLEY</b>																						
Jan. 27-----	11.1																	225	16		231	46
<b>BLANCO RIVER AT BRIDGE ON COUNTY ROAD 5.6 MILES DOWNSTREAM FROM WIMBERLEY</b>																						
Jan. 27-----	11.1																	222	14		222	40
<b>BLANCO RIVER 1/2 MILE BELOW SALT CREEK</b>																						
Jan. 27-----	10.6																	216	16		216	39
<b>BLANCO RIVER, 1.0 MILE ABOVE HALIFAX CREEK</b>																						
Jan. 28-----	10.6																	217	16		219	41
<b>BLANCO RIVER, 0.4 MILE BELOW HALIFAX CREEK</b>																						
Jan. 28-----	1.36																	205	16		212	44
<b>BLANCO RIVER ABOUT 1 MILE BELOW HALIFAX CREEK</b>																						
Jan. 28-----	.16																	203	14		204	38
<b>ESCONDIDO RESERVOIR NO. 1 NEAR KEDRON</b>																						
Jan. 11-----	--																	110	4.9	3.5	125	74
June 1-----	--																	120	2	3.5	89	0
July 13-----	--																	114	2.9	2.0	123	0.17
																				10	0.2	230
																					229	7.5
																					241	7.2
																					230	7.9

## NUANCES RIVER BASIN

## NUANCES RIVER NEAR MARTIS, TEX.

LOCATION.--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on U. S. Highway 59, 200 feet downstream from Texas & New Orleans Railroad bridge and 4 miles southeast of Mathis, San Patricio County.

DRAINAGE AREA--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1955.

Water temperatures: October 1947 to September 1955.

EXTRAKS, 1954-55.--Dissolved solids: Maximum, 419 ppm May 1-31; minimum, 297 ppm Sept. 1-30.

Hardness: Maximum, 157 ppm Apr. 1-30; minimum, 120 ppm June 1-30.

Specific conductance: Maximum daily, 817 micromhos May 18; minimum daily, 426 micromhos Sept. 27.

Water temperature: Maximum observed, 84°F on several days during summer months; minimum observed, 51°F Feb. 13.

EXTRAKS, 1947-55.--Dissolved solids: Maximum, 348 ppm June 1-30, 1948; minimum, 175 ppm Apr. 27-30, 1949.

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

Specific conductance: Maximum daily, 1,040 micromhos July 1, 1948; minimum observed, 233 micromhos 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 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses, in parts per million, water year October 1954 to September 1955.

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- ta- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Chlo- ride (Cl)	Flu- oride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Cal- cium, mag- nesium	Per- cent so- dium	So- dium ad- eption ratio	So- dium con- cen- tration (micro- mhos at 25°C)	pH	
													Tons per acre- foot	Tons per day	Tons per milli- lion							
Oct. 1-31, 1944-----	72.4	27	54	4.4	8.6	215	26	.2	3.0	0.34	318	62.2	156	0	34	1.4	501	7.8				
Nov. 1-30-----	129	26	50	4.9	52	8.1	201	.33	.45	.2	2.0	.30	330	.65	115	0	42	1.9	520	7.9		
Dec. 1-31-----	58.4	24	48	4.8	53	7.7	200	.34	.42	.5	1.8	.20	318	.63	50.1	140	0	43	1.9	513	8.0	
Jan. 1-31-----	48.5	25	51	5.4	61	8.0	207	.40	.58	.3	2.0	.22	360	.49	47.1	149	0	45	2.2	585	8.2	
Feb. 1-28-----	54.4	22	52	4.5	64	7.7	217	.39	.52	.5	2.0	.25	354	.68	52.0	148	0	47	2.3	573	7.7	
Mar. 1-31-----	69.2	18	51	4.5	73	8.2	228	.40	.59	.5	2.0	.20	378	.51	70.6	146	0	50	2.6	623	8.0	
Apr. 1-30-----	76.1	23	56	5.5	81	8.2	244	.40	.66	.5	2.2	.27	401	.55	80.2	157	0	51	2.8	669	8.5	
May 1-31-----	281	20	52	4.5	83	8.8	229	.46	.73	.5	4.0	.31	419	.57	318	148	0	53	3.0	682	7.8	
June 1-30-----	255	22	42	3.7	61	7.4	180	.39	.51	.3	4.2	.19	320	.44	220	120	0	51	2.4	530	8.2	
July 1-31-----	90.3	24	46	3.9	60	7.0	192	.39	.48	.4	3.2	.22	324	.44	79.0	126	0	49	2.3	536	8.2	
Aug. 1-31-----	99.6	24	50	3.2	63	7.0	206	.40	.48	.2	3.5	.20	347	.47	93.3	137	0	48	2.3	560	8.1	
Sep. 1-30-----	385	23	46	3.0	53	6.5	176	.35	.42	.2	2.8	.35	297	.40	309	122	0	47	2.1	484	7.9	
Weighted average-----	135	23	48	4.1	63	7.6	201	.38	.52	.3	3.1	.27	343	.67	125	137	0	48	2.3	559	--	

a Includes equivalent of 10 ppm carbonate (CO<sub>3</sub><sup>2-</sup>).

b Sum of determined constituents.

## RIO GRANDE RIVER

## PECCO RIVER BELOW RED BLUFF DAM NEAR OILA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Oila, Reeves County, and 14 miles upstream from BeGing station near Oila.

DRAINAGE AREA.--20,720 square miles, approximately (contributing areas).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1955.

Water temperatures: March 1953 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 10,800 ppm Oct. 4-8; minimum, 2,730 ppm Apr. 1-30.

Hardness: Maximum, 2,010 ppm Oct. 4-8; minimum, 952 ppm Apr. 23.

Specific conductance: Maximum daily, 17,400 micromhos Oct. 5; minimum daily, 3,850 micromhos Apr. 23.

Water temperatures: Maximum observed, 80°F on many days during August; minimum observed, 46°F Jan. 25.

EXTREMES, 1937-55.--Dissolved solids: Maximum, 15,600 ppm Sept. 1-30, 1953; minimum, 1,090 ppm June 1-2, 1948.

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

Specific conductance: Maximum daily, 15,555 ppm July 1-31, 1953; minimum daily, 3,430 ppm Sept. 28, 1953.

Water temperatures (1953-55): Maximum observed, 80°F on many days during July and August; minimum observed, 40°F on several days during December 1953.

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 BeGing station near Oila for water year October 1954 to September 1955 given in Water-Supply Paper 1392. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analysis, in parts per million, water year October 1954 to September 1955

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- ci- um (Ca)	Mag- ne- si- um (Mg)	So- di- um (Na)	Po- ta- si- um (K)	Bi-car- bo- nate (HCO <sub>3</sub> )	Chlo- ri- de (Cl)	Ni- trate (NO <sub>3</sub> )	Fluo- ride (F)	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	Per- cent so- dium	So- dium con- duc- tance (micro- mhos at 25° C)	pH	
													Parts per mil- lion	Tons per acre- foot					
Oct. 1-31, 1954-----	13.9	14	358	131	1,880	120	1,210	2,820	--	--	6,390	8.69	240	1,430	1,330	73	21	9,970	7.5
Oct. 4-8-----	15.1	13	467	206	3,220	96	1,790	5,020	4.0	4.570	10,800	14.7	440	2,010	1,930	78	31	16,200	7.4
Nov. 1-30-----	26.3	14	354	108	1,130	148	1,140	1,750	--	6,22	300	1,330	1,210	65	13	6,940	7.5		
Dec. 1-31-----	28.0	13	352	114	1,030	151	1,150	1,680	3.0	4,340	5,90	328	1,220	62	12	6,480	8.0		
Jan. 1-31, 1955-----	30.5	12	370	125	1,060	152	1,1230	1,630	3.0	4,520	6,15	372	1,440	1,310	62	12	6,790	7.9	
Feb. 1-28-----	29.3	12	374	124	932	154	1,220	1,500	2.5	4,260	5.79	337	1,440	1,220	59	11	6,360	7.7	
Mar. 1-31-----	28.6	10	316	89	781	144	98	1,200	3.5	3,470	4.72	270	1,150	1,040	60	10	5,110	7.7	
Apr. 1-30-----	399	10	268	69	593	134	826	900	1.8	2,730	3.71	952	842	58	8.4	4,280	7.5		
May 1-31-----	210	10	298	75	722	138	919	1,100	1.5	3,190	4.34	1,810	1,050	939	60	9.7	4,840	7.7	
June 1-30-----	377	13	303	80	722	133	927	1,120	2.5	3,230	6.39	3,290	1,180	976	59	9.5	5,090	7.6	
July 1-31-----	528	16	306	79	656	131	930	1,020	2.0	3,070	4.18	4,380	1,090	981	57	8.6	4,890	7.6	
Aug. 1-31-----	507	14	340	91	752	121	1,050	1,180	1.5	3,490	4.75	4,780	1,220	1,120	57	9.4	5,320	7.7	
Sep. 1-12-----	320	18	406	94	889	116	1,210	1,400	2.5	4,080	5.55	3,530	1,300	1,300	58	10	6,010	7.7	
Sep. 13-30-----	43.1	17	500	174	1,930	138	1,670	3,140	--	7,580	10.3	880	1,960	1,850	69	19	11,200	7.6	
Weighted average-----	217	13	317	84	783	132	978	1,150	--	3,350	4.56	1,960	1,140	1,030	59	9.6	5,160	--	

## RIO GRANDE BASIN--Continued

LOCATION.--At gaging station at bridge on State Farm-to-Market Road 11 between Grandfalls and Imperial, 7.1 miles southeast of Grandfalls, Ward County, and 10 miles downstream from Chacatora Draw.

DRAINAGE AREA.--27,820 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: April 1939 to June 1942, October 1946 to September 1955.

EXTREMES, 1934-55.--Hardness: Maximum, 3,590 ppm Jan. 1-31; minimum, 840 ppm Oct. 7.

Specific conductance: Maximum daily, 20,600 micromhos June 22; minimum daily, 4,760 micromhos Oct. 7.

EXTREMES, 1938-62, 1946-55.--Hardness: Maximum, 4,660 ppm Mar. 1-31, 1953; minimum, 246 ppm June 14, 1954.

Specific conductance: Maximum daily, 35,700 micromhos Feb. 9-10, 15, 19-20, 1953; minimum daily, 9,044 micromhos June 14, 1954.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1954 to September 1955 given in Water-Supply Paper 1392.

Chemical analyses. In parts per million. Water year October 1954 to September 1955

Date of collection	Mean 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> )	Chlo- ride (Cl)	Flo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids			So- dium adsorp- tion ratio	So- dium conduct- ance (micro- mhos at 25° C.)	pH			
												Parts per mil- lion	Tons per acre- foot	Tons per day						
Oct. 1-5, 1954-	10.8							2,810	147	3,070	4,600				3,500	3,380	21	16,100	7.3	
Oct. 6, 8-13-----	49.0	1.5		1,460	127	1,570	2,380	677	1,180	4,0		3,150			1,860	1,760	15	9,070	7.5	
Oct. 7-----	58			703	85	677	1,180								840	770	63	11	4,760	7.9
Nov. 1-10-----	10.6			2,740	162	2,930	4,520								3,380	3,250	62	20	16,000	7.6
Dec. 1-31-----	12.9			2,870	174	2,980	4,720								3,460	3,320	63	21	16,200	8.0
Jan. 1-31, 1955-----	17.9			3,130	186	3,020	5,140								3,390	3,440	66	23	17,600	7.6
Feb. 1-28-----	23.2			2,690	160	2,700	4,370								3,140	3,010	65	21	15,200	7.7
Mar. 1-31-----	17.5			2,590	145	2,680	4,080								3,160	3,040	64	20	14,800	7.5
Apr. 1-30-----	13.7			2,910	140	2,930	4,690								3,570	3,460	64	21	16,600	7.5
May 1-31-----	12.4			2,740	136	2,830	4,380								3,280	3,170	64	21	15,600	7.5
June 1-30-----	11.1														3,480	3,370	64	21	16,300	7.4
July 1-20-----	15.2														2,980	2,890	64	19	13,900	7.7
July 21-31-----	42.5														1,740	1,630	62	14	8,340	7.6
Aug. 1-31-----	17.2														2,470	2,380	63	17	11,800	7.8
Sep. 1-30-----	29.6														2,370	2,230	62	16	10,900	7.5
Weighted average----	17.6							2,380	140	2,500	3,850				2,320	2,810	64	19	13,800	--

