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CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1946

W. W. Hastings and B. Irelan

Prepared in cooperation with the
United States Department of the Interior
Geological Survey
and others

July 1947

CONTENTS

	Page
Introduction	1
Chemical analyses	2
Brazos River near South Bend, Texas	2
Brazos River at Possum Kingdom Dam, Texas	4
Brazos River at Richmond, Texas	6
Colorado River at Colorado City, Texas	8
Colorado River at Wharton, Texas	9
Guadalupe River at Victoria, Texas	11
Neches River near Rockland, Texas	13
Nueces River near Three Rivers, Texas	15
Pecos River near Orla, Texas	17
Quitaque Creek near Quitaque, Texas	19
Red River near Gainesville, Texas	20
Red River at Donison Dam, Texas	24
Rio Grande at Mission Pumping Plant near Mission, Texas	26
Sabine River near Ruliff, Texas	28
San Antonio River at Goliad, Texas	30
San Jacinto River near Humble, Texas	32
San Jacinto River near Huffman, Texas	33
Trinity River at Romayer, Texas	34
Trinity River, Miscellaneous analyses in Lower Basin	36
Washita River near Durwood, Oklahoma	37
Miscellaneous analyses, single samples of stream waters	41

CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1946

by

W. W. Hastings and B. Irelan

Introduction

This report includes the analyses made by the Geological Survey of samples collected regularly from streams in Texas during the year ended September 30, 1946. Quality of water records for previous years have been compiled in a recent report, "Chemical Composition of Texas Surface Waters, 1933-1945," by W. W. Hastings and J. H. Rowley.

The analyses given herewith were made by the United States Geological Survey in cooperation with the Texas Board of Water Engineers, City of Denison, City of Sherman, Red Bluff Water Power Control District, and the Lower Colorado River Authority. Space for the Geological Survey laboratory was furnished at the University of Texas by the Bureau of Industrial Chemistry, Dr. E. P. Schoch, Director.

The methods are those regularly in use and described in United States Water-Supply Paper 596-H, pages 236-261, 1928: "Notes on practical water analysis" by W. D. Collins. On the basis of specific electrical conductance, daily samples of similar composition were mixed together for analysis. At least three composites were made for each month as follows: samples for the first ten days, next ten days and the remainder of the month. For streams showing large changes in the quality of the water, composites were made more frequently, depending on the total salt content as indicated by measurement of the conductivity of the daily samples.

Weighted average analyses are given for certain stations where sampling was considered adequate. The weighted average analysis approximates the composition of the water that would be stored in a reservoir holding all of the flow for the entire year. The analyses are reported in parts per million.

Brazos River near South Bend, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at gaging station at bridge on Texas Highway No. 67, 0.3 mile upstream from Wichita Falls and Southern Railroad Bridge, 1.6 miles downstream from Clear Fork of Brazos River, and 2.0 miles northeast of South Bend. Drainage area 21,600 square miles.

Analyzed by Geological Survey

Date of Collection	Mean discharge (second-feet)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Percent sodium carbonate
										Dissolved Parts per million	Solids Tons per acre foot	Hardness Total	Hardness Non-carbonate		
Oct. 1-4, 1945	1,422	411	302	44	561	91	749	920	2.8	2,620	3.56	10,100	934	860	57
Oct. 5-8	1,602	208	152	24	254	97	309	445	3.2	1,240	1.69	5,360	478	398	54
Oct. 9-10	3,635	278	198	28	364	96	452	602	2.8	1,690	2.30	16,600	609	530	57
Oct. 11-16	1,745	168	165	22	179	106	406	265	2.2	1,100	1.50	5,180	502	416	42
Oct. 17-18, 20	438	423	246	35	653	98	565	1,060	2.5	2,620	3.56	3,100	758	678	64
Oct. 21-25	192	423	227	31	677	122	560	1,050	1.8	2,610	3.55	1,350	694	594	68
Oct. 26-31	134	667	316	52	1,120	118	764	1,800	1.2	4,110	5.59	1,490	1,000	906	71
Nov. 1-9	72.2	545	266	52	872	127	627	1,430	1.8	3,310	4.50	645	878	774	68
Nov. 11-20	84.2	472	243	51	747	130	519	1,270	2.0	2,900	3.94	659	816	710	67
Nov. 21-30	37.0	624	324	69	991	140	718	1,690	.8	3,860	5.25	386	1,090	978	66
Dec. 1-10	38.6	509	268	55	805	136	563	1,380	2.2	3,140	4.27	327	895	784	66
Dec. 11-20	31.6	530	266	58	811	175	497	1,420	1.8	3,140	4.27	268	902	759	66
Dec. 21-27, 29-31	27.9	531	281	61	752	110	515	1,390	1.2	3,040	4.13	229	952	862	63
Jan. 1-5, 1946	41.8	559	277	59	840	144	545	1,470	1.8	3,260	4.43	368	934	816	66
Jan. 6-8	157	266	162	32	333	137	245	632	1.2	1,470	2.00	623	536	424	57
Jan. 9-10	47.0	390	217	44	552	144	440	955	.5	2,280	3.10	289	722	604	62
Jan. 12-20	91.1	454	220	52	659	131	379	1,200	2.0	2,580	3.51	635	763	656	65
Jan. 21-25	50.2	585	268	61	916	136	575	1,560	1.2	3,450	4.69	468	920	808	68
Jan. 26-31	33.7	818	508	80	1,140	137	754	2,260	1.5	4,820	6.56	439	1,600	1,480	61
Feb. 1-10	24.5	922	340	78	1,600	130	672	2,730	.5	5,480	7.45	363	1,170	1,060	75
Feb. 11-19	27.4	814	328	58	1,390	125	683	2,320	1.0	4,840	6.58	358	1,060	954	74
Feb. 20-28	26.2	767	330	85	1,260	120	716	2,170	4.0	4,620	6.28	327	1,170	1,070	70
Mar. 1-10	13.7	689	310	75	1,100	141	574	1,960	2.0	4,090	5.56	151	1,080	966	69
Mar. 11-20	14.0	808	370	88	1,280	128	584	2,380	1.5	4,770	6.49	180	1,290	1,180	68
Mar. 21-26	9.92	836	383	93	1,350	131	669	2,460	2.0	5,020	6.83	134	1,340	1,230	69
Mar. 27-31	56.8	562	280	69	858	128	519	1,560	2.0	3,350	4.56	514	982	878	65
Apr. 1-3, 5-10	39.0	687	336	76	1,080	128	675	1,900	2.0	4,130	5.62	435	1,150	1,050	67
Apr. 11-15, 17-20	11.2	680	370	107	1,030	123	783	1,900	2.5	4,250	5.78	129	1,360	1,260	62
Apr. 21-27, 29-30	48.0	808	414	117	1,250	128	807	2,290	1.5	4,940	6.72	640	1,460	1,360	65
May 1, 8-10	218	731	363	97	1,100	101	751	2,000	4.0	4,360	5.93	2,570	1,300	1,220	65
May 2-4, 7	174	343	180	45	496	172	204	960	5.2	1,970	2.68	926	634	493	63

Bravos River near South Bend, Texas, October 1, 1945 to September 30, 1946 (continued)

Analyzed by Geological Survey														
Date of collection	Mean charge (second - $\times 10^5$)	Specific conductance	Calcium (Ca) (Mg)	Magnesium and Sodium Bicarbonate (Mg) (Mg)	Sulfate (SO ₄) (Cl)	Chloride (NO ₃)	Dissolved Solids		Total Non-solids					
							Parts per million	Parts per million						
Per cent	Parts per million	Parts per million	Parts per million	Parts per million	Parts per million	Parts per million	Parts per million	Parts per million	Parts per million					
May 5-6, 1946	216	227	122	27	300	237	540	3.5	1,280	1.74	746	430	359	60
May 11, 12	148	839	402	92	1,370	94	1,080	2,240	12	7.13	2,090	1,380	1,300	68
May 13-18	348	713	417	93	1,160	80	1,110	1,930	7.0	6.47	4,470	1,420	1,360	64
May 19-20	212	259	192	29	316	107	431	522	6.5	1,560	2.12	893	598	53
May 21-23, 28-29	83.4	408	262	43	581	101	630	960	2.0	2,530	3.44	570	748	60
May 24-27	31.8	596	326	55	929	97	801	1,520	1.0	3,680	5.00	316	960	66
May 30, June 1	1,194	191	113	22	249	140	191	425	.8	1,070	1.46	3,450	372	59
June 7-10	128	423	149	31	719	121	367	1,120	3.0	2,450	3.33	847	500	76
June 11-20	24.1	624	242	55	1,040	97	612	1,690	.5	3,690	5.02	240	830	73
June 21, 25, 30	1,274	165	87	16	236	130	166	365	3.0	991	1.35	3,410	283	64
June 22-24, 29	1,917	468	214	36	770	134	545	1,190	.5	2,820	3.84	14,600	682	71
June 26-28	509	304	143	26	475	120	360	725	.2	1,790	2.43	2,460	464	69
July 1-2, 9-10	1,382	457	225	37	724	122	579	1,120	.2	2,750	3.74	10,300	714	69
July 3-4, 6-8	595	322	178	28	489	129	500	705	2.0	1,970	2.68	3,160	608	69
July 11-14, 19	82.2	653	249	51	1,110	116	658	1,740	2.0	3,870	5.26	859	454	66
July 15-18, 20	74.2	897	322	73	1,590	101	858	2,540	--	5,430	7.38	1,090	1,100	74
July 21-31	11.2	889	370	83	1,510	116	837	2,500	.5	5,410	7.36	164	1,260	72
Aug. 1-10	893	368	368	97	1,430	102	456	2,740	.5	5,140	6.99	4	1,320	70
Aug. 11-20	0	1,010	428	113	1,540	93	413	3,100	2.5	5,640	7.67	0	1,530	69
Aug. 21-22, 24, 28	970	142	86	15	193	116	140	320	4.0	893	1.21	2,340	181	60
Aug. 23, 29-30	3,461	55.7	42	6.3	64	103	30	108	2.5	.45	3,100	131	46	51
Aug. 25-27	18.7	252	144	23	364	112	356	555	1.5	1,500	2.04	76	454	54
Aug. 31	12,900	484	347	33	700	98	882	1,080	2.0	3,090	4.20	108,000	921	60
Sept. 1-4, 6	2,487	215	132	19	316	112	340	458	3.0	1,320	1.80	8,860	4108	63
Sept. 7-10	953	445	258	38	662	98	663	1,040	4.0	2,710	3.69	6,970	800	64
Sept. 11-12, 20	928	374	236	34	544	106	568	865	1.5	2,300	3.13	5,770	716	62
Sept. 13-19	5,531	124	116	12	139	98	239	220	1.5	850	1.16	12,700	339	47
Sept. 21-24	1,096	227	176	22	262	94	379	445	1.0	1,330	1.81	3,940	530	52
Sept. 25-26	504	516	293	54	747	73	520	1,400	2.0	3,050	4.15	4,150	893	63
Sept. 27-30	2,813	150	99	15	191	98	177	325	1.2	939	1.28	7,130	308	57

Weighted average

502.6

267

173

25

379

108

394

610

2.1

1,660

2.26

2,250

534

446

227	216	227	122	27	300	237	540	3.5	1,280	1.74	746	430	359	60
148	839	402	92	1,370	94	1,080	2,240	12	7.13	2,090	1,380	1,300	1,300	68
348	713	417	93	1,160	80	1,110	1,930	7.0	6.47	4,470	1,420	1,360	1,360	64
212	259	192	29	316	107	431	522	6.5	1,560	2.12	893	598	510	53
83.4	408	262	43	581	101	630	960	2.0	2,530	3.44	570	748	60	60
31.8	596	326	55	929	97	801	1,520	1.0	3,680	5.00	316	960	960	66
1,194	191	113	22	249	140	191	425	.8	1,070	1.46	3,450	372	258	59
128	423	149	31	719	121	367	1,120	3.0	2,450	3.33	847	500	400	76
24.1	624	242	55	1,040	97	612	1,690	.5	3,690	5.02	240	830	750	73
1,274	165	87	16	236	130	166	365	3.0	991	1.35	3,410	283	176	64
1,917	468	214	36	770	134	545	1,190	.5	2,820	3.84	14,600	682	176	64
509	304	143	26	475	120	360	725	.2	1,790	2.43	2,460	464	366	69
1,382	457	225	37	724	122	579	1,120	.2	2,750	3.74	10,300	714	608	69
595	322	178	28	489	129	500	705	2.0	1,970	2.68	3,160	559	608	69
82.2	653	249	51	1,110	116	658	1,740	2.0	3,870	5.26	859	454	454	66
74.2	897	322	73	1,590	101	858	2,540	--	5,430	7.38	1,090	1,100	736	74
11.2	889	370	83	1,510	116	837	2,500	.5	5,410	7.36	164	1,260	1,170	72
893	368	368	97	1,430	102	456	2,740	.5	5,140	6.99	4	1,320	1,230	70
0	1,010	428	113	1,540	93	413	3,100	2.5	5,640	7.67	0	1,530	1,460	69
970	142	86	15	193	116	140	320	4.0	893	1.21	2,340	276	181	60
3,461	55.7	42	6.3	64	103	30	108	2.5	.45	3,100	131	46	46	51
18.7	252	144	23	364	112	356	555	1.5	1,500	2.04	76	454	362	54
12,900	484	347	33	700	98	882	1,080	2.0	3,090	4.20	108,000	921	921	60
2,487	215	132	19	316	112	340	458	3.0	1,320	1.80	8,860	4108	921	60
953	445	258	38	662	98	663	1,040	4.0	2,710	3.69	6,970	800	720	64
928	374	236	34	544	106	568	865	1.5	2,300	3.13	5,770	716	630	62
5,531	124	116	12	139	98	239	220	1.5	850	1.16	12,700	339	258	47
1,096	227	176	22	262	94	379	445	1.0	1,330	1.81	3,940	530	452	52
504	516	293	54	747	73	520	1,400	2.0	3,050	4.15	4,150	893	893	63
2,813	150	99	15	191	98	177	325	1.2	939	1.28	7,130	308	228	57

Brazos River at Possum Kingdom Dam, near Graford, Texas, Oct. 1, 1945 to Sept. 30, 1946

Analyses of composites of daily samples collected immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek and 11.3 miles southwest of Graford. Discharge records reported for Palo Pinto gaging station at bridge on Palo Pinto-Graford highway, 300 feet downstream from Dark Valley Creek and 6-1/2 miles north of Palo Pinto. The gage is about 15 miles downstream from Possum Kingdom Dam. No appreciable inflow between dam and gaging station except during period of heavy local rains. Drainage area above dam 22,550 square miles; above gaging station 22,760 square miles.

Analyzed by Geological Survey

Date of collection	Mean discharge (second feet)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Per cent sodium
										Dissolved Solids per Million	Tons per acre	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1945	300	217	126	29	303	138	219	525	2.2	1,280	1.74	1,040	434	320	59
Oct. 11-20	300	244	132	28	345	140	237	590	3.0	1,400	1.90	1,130	444	330	63
Oct. 21-24, 26-31	204	264	138	25	378	144	252	628	2.8	1,490	2.03	821	448	330	65
Nov. 1-10	188	265	143	26	381	147	259	638	3.2	1,520	2.07	772	464	344	64
Nov. 15-17, 19-20	131	261	144	26	369	138	268	620	1.8	1,500	2.04	531	466	354	63
Nov. 21-26, 28-30	173	266	148	26	375	132	280	630	3.5	1,530	2.08	715	476	382	63
Dec. 1-10	228	254	143	25	354	128	277	592	2.0	1,460	1.99	899	460	355	63
Dec. 11-16, 18-19	453	237	137	25	333	130	263	558	1.8	1,380	1.88	1,690	445	338	62
Dec. 21-22, 25-31	117	233	138	24	322	164	260	522	1.8	1,350	1.84	426	443	308	61
Jan. 1-10, 1946	893	230	135	23	311	126	256	522	2.0	1,310	1.78	3,160	432	328	61
Jan. 11-20	1,179	227	132	22	298	126	245	502	.8	1,260	1.71	4,010	420	316	61
Jan. 21-29, 31	861	227	132	23	299	128	246	505	1.0	1,270	1.73	2,950	424	319	61
Feb. 1-10	509	222	130	22	299	136	249	492	.2	1,260	1.71	1,730	415	304	61
Feb. 11-19	321	224	131	23	302	126	256	502	1.0	1,280	1.74	1,110	422	318	61
Feb. 20-28	171	220	132	24	302	133	255	502	2.0	1,280	1.74	591	428	319	61
Mar. 1-10	91.2	222	132	24	298	131	255	498	.5	1,270	1.73	313	428	320	60
Mar. 11-20	170	220	130	24	299	132	257	495	.8	1,270	1.73	583	423	315	61
Mar. 21-31	191	221	131	23	298	129	258	492	2.0	1,270	1.73	655	422	316	61
Apr. 1-10	276	222	131	22	303	133	253	498	2.0	1,270	1.73	946	418	308	61
Apr. 11-20	319	220	132	23	299	129	258	495	3.0	1,270	1.73	1,090	424	318	61
Apr. 21, 23-30	324	222	132	22	300	136	258	490	1.2	1,270	1.73	1,110	420	308	61
May 1-4, 6-10	228	221	129	23	302	132	256	495	2.0	1,270	1.73	782	416	308	61
May 11-20	241	219	130	24	299	133	256	492	4.0	1,270	1.73	826	423	314	61
May 21-30	470	220	130	22	298	125	253	492	2.5	1,260	1.71	1,600	415	312	61
June 1-7, 9-10	176	221	130	23	293	129	251	488	1.0	1,250	1.70	594	419	314	60
June 11-20	465	220	129	22	298	133	252	488	.2	1,250	1.70	1,570	412	304	61
June 21-30	474	220	130	23	293	133	249	488	1.0	1,250	1.70	1,600	419	310	60
July 1-10	512	218	130	22	293	132	249	485	1.5	1,250	1.70	1,730	415	307	61
July 11-20	978	218	131	22	292	134	251	482	1.0	1,240	1.69	3,270	418	308	60

Brazos River at Possum Kingdom Dam, near Dryland, Texas, October 1, 1945 to September 30, 1946

(Continued)

Analyzed by Geological Survey

Date of Collection	Mean discharge (second feet)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved Solids			Hardness as CaCO ₃		Percent sodium carbonate
										Parts per million	Tons per acre foot	Tons per day	Total	Non-carbonate	
July 21-31, 1946	617	218	132	23	285	142	255	468	1.0	1,230	1.67	2,050	424	303	59
Aug. 1-10	949	220	134	23	286	140	259	472	.5	1,240	1.69	3,180	429	314	59
Aug. 11-20	860	228	139	24	296	139	264	495	1.2	1,290	1.75	3,000	446	332	59
Aug. 21-31	694	230	140	24	308	138	263	518	1.5	1,320	1.80	2,470	448	335	60
Sept. 1-10	603	234	142	24	311	135	267	525	.8	1,340	1.82	2,180	453	342	60
Sept. 11-20	976	243	151	26	321	146	283	545	.2	1,400	1.90	3,690	484	364	59
Sept. 21-30	2,412	248	154	30	335	138	299	575	.8	1,460	1.99	9,510	508	395	59
Weighted average	501.8	230	137	24	310	135	262	519	1.3	1,320	1.80	1,790	440	330	61

Brazos River at Richmond, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at gaging station at bridge on U. S. Highway 90 in Richmond, about 1,500 feet downstream from Texas and New Orleans Railroad Bridge.

Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Percent sodium carbonate
										Dissolved solids per million	Tons per acre	Tons per day	Total	Non-carbonate	
Oct. 1-3, 1945	4,270	114	86	24	115	239	95	189	1.0	789	1.07	9,100	313	117	44
Oct. 4-10	6,944	59.5	56	11	49	156	49	78	2.0	389	.53	7,290	185	57	36
Oct. 11-20	12,900	48.3	52	9.8	36	152	39	53	2.2	298	.41	10,400	170	46	30
Oct. 21-29, 31	4,643	46.3	49	8.1	38	158	37	49	1.2	281	.38	3,520	156	26	35
Nov. 1-6, 8, 10	2,116	65.7	67	14	51	221	47	72	3.5	385	.52	2,200	224	44	33
Nov. 11-20	2,506	77.3	69	18	68	237	57	98	1.2	446	.61	3,020	246	52	37
Nov. 21-23, 26-30	2,029	68.7	66	14	58	213	53	83	.8	442	.60	2,420	222	47	36
Dec. 1-2, 5	9,103	78.0	73	15	68	248	48	97	1.0	458	.62	11,300	243	40	38
Dec. 3-4	6,610	184	63	12	294	172	46	465	1.5	966	1.31	17,200	206	66	76
Dec. 6-10	14,480	39.5	47	7.5	25	144	34	33	2.0	252	.34	9,850	148	30	27
Dec. 11-19	8,515	34.5	39	5.7	28	120	30	36	.8	230	.31	5,290	121	22	33
Dec. 21-24, 28	5,024	51.3	55	9.9	38	163	37	62	1.2	305	.41	4,140	178	44	32
Dec. 25-27, 29-31	4,022	98.3	72	13	112	201	60	176	1.2	571	.78	6,200	233	68	51
Jan. 1-5, 1946	2,922	95.5	81	17	90	240	79	133	1.5	558	.76	4,400	272	76	42
Jan. 6-10	5,596	53.6	50	9.3	46	150	40	68	1.8	318	.43	4,800	163	40	38
Jan. 11-14	8,500	80.0	71	16	69	196	74	110	2.0	468	.64	10,700	243	82	38
Jan. 17-20	27,900	38.6	43	7.4	28	128	38	38	2.0	228	.31	17,200	138	33	31
Jan. 21-24	15,280	41.9	48	8.0	20	132	19	47	2.0	268	.36	11,100	153	44	28
Jan. 25-31	9,270	62.9	52	9.7	63	147	56	90	.5	380	.52	9,510	170	50	45
Feb. 1-3, 7-10	9,663	74.0	69	13	69	186	69	106	.5	457	.62	11,900	226	73	46
Feb. 4-6	5,600	87.3	82	15	84	218	82	131	.5	552	.75	8,350	266	87	41
Feb. 11-19	14,140	49.7	54	7.9	36	152	45	52	2.0	312	.42	11,900	167	43	38
Feb. 20-28	25,500	50.3	55	8.1	36	165	39	51	2.5	299	.41	20,600	171	35	32
Mar. 2-6, 8-10	9,670	50.3	57	10	34	178	40	49	2.0	313	.43	8,170	184	38	29
Mar. 11-13	10,290	55.7	62	11	38	181	52	56	2.0	355	.48	9,860	200	51	30
Mar. 14-15, 18-20	48,410	32.3	44	6.7	16	143	26	19	1.8	208	.28	27,200	137	20	20
Mar. 21-31	17,750	41.6	53	8.0	24	166	34	30	3.2	248	.34	11,900	165	29	24
Apr. 1-10	10,260	46.5	53	8.9	29	163	39	40	2.8	277	.38	7,670	169	35	27
Apr. 11-20	5,705	65.2	64	14	52	207	56	70	3.2	382	.52	5,880	217	48	34
Apr. 21-29	9,809	57.3	60	12	41	193	50	54	3.0	340	.46	9,000	199	41	31
May 1-8	9,840	45.3	49	7.4	35	144	45	43	3.5	285	.39	7,570	153	35	33

James River at Richmond, Texas, October 1, 1945 to September 30, 1946
(Continued)

Date of collection	Mean discharge (second-feet) at 25°C	Specific conductance (Kx10 ⁵) at 25°C	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids per million feet	Hardness as CaCO ₃		Per cent sodium chloride
											Total	Non-carbonate	
May 11-13, 15-16, 1946	13,120	55.6	55	7.7	46	160	43	64	2.0	338	0.46	169	38
May 17-20	60,450	33.2	41	4.7	19	132	24	21	1.5	211	.29	122	13
May 21-31	32,590	30.4	39	5.3	15	124	19	21	1.8	195	.27	119	18
June 1-10	23,560	38.0	44	6.2	24	137	26	33	1.5	230	.31	135	23
June 11-19	12,430	36.9	41	6.1	25	129	25	35	1.0	221	.30	127	22
June 21-30	6,606	50.5	55	9.0	36	183	34	47	1.0	302	.41	174	24
July 1-3, 7-10	7,062	61.2	59	10	50	184	46	68	1.0	368	.50	188	37
July 11-17, 19-20	1,848	73.8	66	15	65	221	60	88	.5	450	.61	226	45
July 21-31	1,686	99.4	78	19	101	225	89	153	.2	630	.86	272	88
Aug. 1-10	1,221	132	89	21	151	213	125	235	1.0	814	1.11	308	134
Aug. 11-20	957	127	86	22	139	222	121	212	.5	761	1.03	305	123
Aug. 21-28, 30	1,214	149	96	24	179	203	156	282	.5	927	1.26	338	172
Sept. 1-10	2,741	134	95	20	152	175	149	250	.5	814	1.11	319	176
Sept. 11-13, 22, 27-30	3,110	62.7	58	9.4	59	150	56	92	1.2	394	.54	183	60
Sept. 14-20	2,126	95.9	78	14	101	187	95	156	.2	568	.77	252	98
Sept. 21, 23-24, 26	4,238	108	80	15	115	154	113	190	.2	653	.89	261	135
Weighted average	10,220	48.7	51	8.6	37	155	39	53	1.8	299	0.41	163	36

Colorado River at Colorado City, Texas, May 9, 1946, to September 30, 1946

Analyses of composites of daily samples collected at gaging station 3,517 feet upstream from U. S. Highway 80 bridge, 4,100 feet upstream from Texas and Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek.

Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids			Hardness as		Percent sodium
										Parts per million	Tons per acre foot	Tons per day	Total	Non-carbonate	
May 9, 1946	2.4	2,130	467	205	4,090	119	1,650	6,450	--	12,900	17.54	84	2,010	1,910	82
May 10	1,430	215	77	15	294	160	110	458	1.2	1,030	1.40	3,930	254	122	72
May 11-13, 17, 19	80.8	175	65	13	273	120	117	415	4.5	978	1.33	213	216	117	73
May 14-15, 20	20	356	108	31	627	113	241	1,000	7.0	2,070	2.82	112	397	304	77
May 16, 18	32	65.3	42	5.1	78	123	36	110	3.0	406	.55	35	126	25	57
May 21-24	5.25	634	174	53	1,160	125	398	1,880	6.0	3,730	5.07	53	652	550	79
May 25-29	.52	936	236	81	1,700	135	606	2,750	1.0	5,440	7.40	8	922	812	80
May 30-31, June 1-9	0	1,250	282	100	2,240	108	843	3,560	--	7,080	9.63	0	1,120	1,030	81
June 11-20	0	1,650	391	141	3,150	73	1,240	5,000	--	9,960	13.55	0	1,560	1,500	81
June 21-23, 26, 28	188	202	62	14	328	142	124	480	4.0	1,080	1.47	549	212	96	77
June 24-25, 29	4.7	613	146	45	1,080	117	367	1,720	3.0	3,420	4.65	43	550	454	81
June 27	70	60.1	38	5.5	71	108	26	111	.2	344	.47	65	118	29	57
June 30, July 1-10	.77	1,070	229	76	2,020	109	617	3,220	--	6,220	8.46	13	884	794	83
July 11-19	0	1,410	289	105	2,720	86	853	4,330	--	8,340	11.34	0	1,150	1,080	84
July 21-31	0	1,730	398	153	3,610	107	1,220	5,750	--	11,200	15.23	0	1,620	1,540	83
Aug. 1-8	0	2,660	657	215	5,590	75	1,920	8,940	--	17,400	23.66	0	2,520	2,460	83
Aug. 9-12	0	3,840	1,320	294	8,680	53	3,450	14,000	--	27,800	37.81	0	4,500	4,460	81
Aug. 13-20	0	1,210	493	146	2,210	132	1,400	3,590	--	7,900	10.74	0	1,830	1,720	72
Aug. 21, 23-31	0	1,160	498	157	2,020	101	1,370	3,380	--	7,470	10.16	0	1,890	1,810	70
Sept. 1-2	5.5	1,120	472	150	1,920	116	1,320	3,190	--	7,110	9.67	106	1,800	1,700	70
Sept. 3, 8-9	863	225	66	16	382	112	144	580	1.5	1,240	1.69	2,890	230	138	78
Sept. 4-7	587	66.2	34	6.4	95	111	45	122	9.3	394	.54	624	112	20	65
Sept. 10-13	46.3	421	116	33	734	104	247	1,190	1.5	2,370	3.22	296	425	340	79
Sept. 14, 18-20	146	208	53	15	350	107	125	522	1.5	1,120	1.52	442	194	106	80
Sept. 15-17	1,039	67.2	30	6.9	98	109	50	122	3.5	422	.57	1,180	104	14	67
Sept. 21-23	9.4	379	100	31	667	112	230	1,060	2.0	2,150	2.92	55	377	285	79
Sept. 24-30	3.2	589	140	47	1,050	118	353	1,680	2.0	3,330	4.53	29	543	446	81
Weighted average	83.4	154	53	12	243	120	97	360	3.9	847	1.15	191	182	84	74

Colorado River at Wharton, Texas, October 1, 1945, to September 30, 1946

Analyses of composites of daily samples collected at gaging station on bridge on U. S. Highway 96 in Wharton, Wharton County, 1,000 feet downstream from Texas and New Orleans Railroad bridge and 12 miles upstream from Jones Creek. Drainage area 41,150 square miles.

Analyzed by Geological Survey

Date of collection	Mean discharge (Second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Percent sodium carbonate
										Dissolved solids per million	Tons per acre foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1945	2,554	48.5	44	18	39	192	27	52	3.8	314	0.43	2,170	184	26	30
Oct. 11-20	2,806	42.9	44	15	30	184	30	37	1.5	330	.45	2,500	172	20	27
Oct. 21-31	2,403	43.2	45	16	27	190	24	39	1.8	300	.41	1,950	178	22	25
Nov. 1-10	2,245	46.0	47	17	24	187	26	41	1.0	283	.38	1,720	187	34	22
Nov. 11-20	2,465	46.4	47	18	25	192	27	41	1.5	356	.48	2,370	191	34	22
Nov. 21-30	2,299	47.4	48	19	24	196	27	43	1.0	358	.49	2,220	198	37	21
Dec. 1-10	3,240	51.0	52	16	23	175	34	45	2.8	297	.40	2,600	196	52	20
Dec. 11-20	2,451	51.0	52	18	23	193	30	44	4.0	296	.40	1,960	204	46	20
Dec. 21-31	2,193	50.1	52	19	25	203	29	45	1.5	288	.39	1,710	208	41	20
Jan. 1-10, 1946	2,313	48.3	49	17	27	196	28	43	1.0	288	.39	1,800	192	32	23
Jan. 11-15	4,054	48.0	47	16	30	184	32	45	1.8	284	.39	3,110	183	32	26
Jan. 16-20	8,676	31.6	36	7.9	17	128	17	25	2.0	200	.27	4,690	122	17	23
Jan. 21-31	2,609	50.0	53	15	30	203	32	41	1.5	299	.41	2,110	194	28	25
Feb. 1-10	2,443	51.0	53	17	29	203	32	44	2.8	316	.43	2,080	202	36	23
Feb. 11-17	2,179	51.3	54	16	32	199	38	48	2.0	314	.43	1,850	201	38	26
Feb. 18-23	8,982	33.9	38	8.4	17	125	27	25	1.0	227	.31	5,510	129	27	22
Feb. 24-28	3,060	43.8	53	13	25	187	35	35	1.2	308	.42	2,540	186	32	23
Mar. 1-10	2,499	50.2	54	16	28	210	31	39	4.0	309	.42	2,080	201	29	23
Mar. 11-12, 18-20	3,162	46.6	51	13	26	178	32	39	3.0	290	.39	2,480	181	35	24
Mar. 13-17	15,810	30.2	37	6.7	17	125	26	18	2.2	190	.26	8,110	120	17	23
Mar. 21-26	2,572	53.3	54	16	33	209	33	45	5.2	335	.46	2,330	201	30	27
Mar. 27-31	4,508	38.3	43	11	23	155	28	32	2.0	245	.33	2,980	153	26	25
Apr. 1-10	1,789	52.3	53	17	31	211	35	42	2.5	322	.44	1,560	202	30	25
Apr. 11-20	1,746	52.3	50	18	32	207	32	45	2.2	303	.41	1,430	199	30	26
Apr. 21-30	4,894	44.7	47	13	24	171	29	35	3.0	268	.36	3,540	171	31	23
May 1-10	4,277	46.8	53	13	28	190	35	37	3.5	288	.39	3,330	186	30	25
May 11-17, 19-20	6,200	42.7	47	13	24	182	26	31	3.5	252	.34	4,220	171	22	23
May 21-26, 28-31	4,815	40.2	46	12	26	180	25	31	3.2	242	.33	3,150	164	17	25
June 1, 3-9	5,964	37.9	44	9.6	20	157	23	28	1.5	232	.32	3,740	149	21	23
June 2, 10	17,540	25.1	37	6.3	9.5	124	16	14	1.0	164	.22	7,770	118	17	15
June 11-20	3,308	43.5	46	13	24	176	22	37	.5	256	.35	2,290	168	24	23

Colorado River at Wharton, Texas, October 1, 1945, to September 30, 1946
(Continued)

Analyzed by Geological Survey

Date of collection	Mean discharge (Second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Percent sodium carbonate
										Dissolved solids per million	Tons per acre foot	Tons per day	Total	Non-carbonate	
June 21-25, 1946	5,980	32.3	36	9.6	19	142	15	27	0.5	202	0.27	3,260	129	13	24
June 26-30	2,260	48.4	55	15	23	195	30	40	1.0	288	.39	1,760	199	39	20
July 1-2, 7-10	3,605	46.6	49	14	24	189	19	39	4.0	272	.37	2,650	180	25	23
July 3-6	11,630	28.6	36	7.4	15	134	13	20	1.0	186	.25	5,840	120	10	21
July 11-20	1,446	51.3	50	17	31	209	27	44	.5	298	.41	1,160	195	24	26
July 21-31	1,387	50.5	47	17	30	200	25	45	.2	292	.40	1,090	188	24	26
Aug. 1-10	1,307	50.7	47	18	33	203	30	46	1.0	328	.45	1,160	192	25	27
Aug. 11-20	2,035	50.7	46	18	34	198	29	49	1.5	315	.43	1,730	189	26	28
Aug. 21-31	3,005	49.0	45	17	32	187	28	48	2.5	301	.41	2,440	182	29	28
Sept. 1-10	4,743	42.7	45	12	26	176	26	32	3.5	262	.36	3,360	162	17	26
Sept. 11-20	2,498	48.4	46	16	31	196	29	40	.5	305	.41	2,060	181	19	27
Sept. 21-30	4,124	43.8	44	14	25	173	25	37	1.0	273	.37	3,040	167	26	24
Weighted average	3,535	42.7	46	13	24	174	27	35	2.1	267	0.36	2,550	168	26	24

Guadalupe River at Victoria, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at bridge on U. S. Highway 96 in Victoria, Victoria County, 1,300 ft. upstream from Texas and New Orleans (Galveston, Harrisburg and San Antonio) Railroad bridge and 10 miles upstream from Coleta Creek.

Analyzed by Geological Survey

Date of collection	Mean discharge (second-foot)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million	
										Dissolved solids per million	Hardness as CaCO ₃ Total
Oct. 1-4, 7-8, 1945	1,460	146	66	32	181	184	59	350	4.5	951	346
Oct. 5-6, 9-10	1,420	84.8	70	22	80	236	26	148	.2	520	265
Oct. 11-12, 15, 18-20	1,412	75.0	68	18	60	208	33	117	3.5	489	244
Oct. 14, 16-17	1,585	145	96	27	154	177	49	344	4.6	978	350
Oct. 22, 24-26	958	72.5	68	17	62	218	33	112	3.0	450	240
Oct. 27-31	864	121	94	28	112	228	51	248	3.2	799	350
Nov. 1-4	805	128	98	30	114	236	50	262	1.8	809	368
Nov. 15-16, 18-20	832	134	98	30	125	229	49	283	2.2	838	368
Nov. 21-23, 25-29	769	126	95	20	135	242	53	253	2.8	779	319
Dec. 1-8	1,311	136	95	31	129	246	55	272	3.0	800	364
Dec. 9-10	1,265	79.8	76	21	57	250	32	112	3.2	468	276
Dec. 11-18, 20	958	105	84	23	87	248	43	172	2.8	596	304
Dec. 21-31	866	131	98	27	116	220	54	262	2.8	791	356
Jan. 1-10, 1946	897	131	95	28	129	248	51	265	3.0	796	352
Jan. 11-17	1,426	195	112	36	231	249	79	455	4.0	1,040	428
Jan. 18-20	2,140	53.2	55	13	31	164	33	62	3.5	331	191
Jan. 22-24, 27-31	1,167	95.2	82	23	88	244	47	169	4.5	584	299
Feb. 1-7, 9-10	1,072	132	98	29	126	246	56	264	6.7	815	364
Feb. 11-15, 17	1,068	146	98	31	154	234	61	315	8.3	849	372
Feb. 16, 18-19	2,200	117	68	27	128	197	50	240	8.3	710	280
Feb. 21-22, 27	4,116	43.1	44	9.1	31	131	34	49	3.5	261	147
Feb. 24, 26, 28	1,782	80.7	70	18	68	208	40	129	2.5	536	248
Mar. 1, 3-10	1,803	102	72	18	114	251	41	177	3.8	590	254
Mar. 12-14	3,143	67.1	68	13	51	197	32	96	5.0	406	223
Mar. 11, 15-18, 20	6,354	95.1	73	14	100	164	39	198	3.5	580	240
Mar. 21-29	2,156	102	89	21	91	238	54	179	3.8	628	308
Apr. 1, 4-8, 10	1,554	79.4	68	19	67	211	36	127	3.5	464	248
Apr. 11-15, 17-20	1,211	98.7	76	23	85	228	41	168	3.0	559	284

Guadalupe River at Victoria, Texas, October 1, 1945 to September 30, 1946

(Continued)

Date of collection	Mean discharge (second-foot)	Specific conductance (x10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids	Hardness as
										Parts per million	CaCO ₃ Total
Apr. 22-24, 28, 1946	1,311	125	85	24	125	220	56	241	3.2	704	310
Apr. 25-27	3,140	56.9	48	12	47	148	26	86	3.2	317	170
May 1-5, 7-10	2,239	78.3	63	15	77	197	43	126	3.0	472	218
May 11-13, 17-19	1,777	96.5	77	22	86	226	44	168	3.0	587	282
May 22-24	3,054	56.1	57	13	37	182	28	69	2.0	326	196
May 25-31	1,490	91.1	73	18	84	211	45	153	2.5	560	256
June 1-4, 8, 10	2,702	80.0	65	16	75	192	35	139	2.0	478	228
June 11-13, 17, 19-20	1,819	85.8	67	17	83	181	43	157	2.5	539	237
June 21-30	2,523	59.6	57	12	46	182	29	80	1.0	372	192
July 1-9	980	81.7	67	18	70	201	39	133	1.0	506	241
July 10-14, 16, 19-20	744	117	78	23	119	206	51	230	1.8	695	289
July 21-25, 27-31	731	131	80	27	142	203	56	276	2.0	796	310
Aug. 1-10	679	135	78	28	150	204	57	290	1.5	808	310
Aug. 11-20	557	144	83	31	172	202	62	348	1.5	895	347
Aug. 21-29	618	144	83	32	161	202	65	322	3.0	873	338
Aug. 30-31, Sept. 1-9	7,656	53.8	47	8.2	42	138	24	73	.5	307	151
Sept. 15-18, 20	4,558	45.8	45	8.3	38	140	19	66	1.5	294	146
Sept. 11-14, 19	1,892	69.0	62	13	63	175	36	116	1.0	448	208
Sept. 22-23, 25, 26, 29	2,856	93.0	72	18	89	194	37	176	1.0	570	254
Sept. 21, 24, 27-28, 30	4,222	61.6	50	11	59	143	27	108	1.5	376	170
Weighted average	1,823	88.1	69	18	83	191	39	160	2.6	532	246

Neches River near Rockland, Texas, October 1, 1945 to September 1946

Analyses of composites of daily samples collected near gaging station on U. S. Highway 69, one mile north of Rockland, 1/4 mile upstream from Texas and New Orleans Railroad Bridge.

Analyzed by Geological Survey

Date of collection	Specific conductance Kx10 ⁵ at 25°C	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potassium (Na+K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Ni- trate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as	
									Parts per million	Total	CaCO ₃	Non- car- bonate
Oct. 1-10, 1945	16.1	10	4.4	18	36	13	24	1.0	133	43	14	
Oct. 11-14, 16-17	12.5	8.2	3.9	10	21	14	19	.5	128	36	19	
Oct. 23, 27-29, 31	11.7	9.0	3.1	8.3	19	9	20	.5	127	35	20	
Nov. 1-10	15.0	9.0	4.4	13	22	16	24	.2	124	41	22	
Nov. 11,13-16,18-19	16.4	12	5.2	13	32	16	25	.5	134	51	25	
Nov. 23-25,27-28	18.7	9.8	4.3	22	29	24	29	.2	122	42	18	
Dec. 1, 3-5, 8-10	13.8	9.5	2.8	9.3	24	4	21	2.5	112	35	16	
Dec. 12,15-16,19-20	17.3	9.8	3.7	19	26	20	27	1.0	110	40	18	
Dec. 21, 27,29-31	21.6	10	4.8	23	20	28	35	.2	136	45	28	
Jan. 5-7, 10, 1946	10.6	7.3	2.8	13	22	18	14	.8	111	30	12	
Jan. 22-27, 29	12.9	6.0	5.5	7.5	16	16	17	.2	122	38	24	
Feb. 1, 3-6, 8	16.6	9.0	4.9	16	19	25	26	.2	140	43	27	
Feb. 11-19	7.7	4.6	1.9	11	25	10	8.0	.8	84	19	0	
Feb. 20-23	9.6	7.0	2.2	9.1	18	15	11	.5	97	26	12	
Feb. 24-27	12.1	7.3	3.1	13	23	19	15	.2	107	31	12	
Mar. 1-2,4-10	15.7	9.2	3.9	15	25	21	21	.8	119	39	18	
Mar. 11, 13-20	13.2	8.0	3.5	14	26	16	18	.8	109	34	13	
Mar. 21, 23-31	10.0	7.8	3.3	8.2	24	12	13	.5	101	33	13	
Apr. 1, 4-8, 10	13.2	9.1	3.8	11	29	15	15	1.2	112	38	15	
Apr. 11-19	15.2	9.3	6.1	10	32	13	21	1.0	121	48	22	
Apr. 21, 23-26, 28,30	17.4	11	5.4	16	40	17	23	1.2	134	50	17	
May 1-3,6,8-10	16.4	9.3	4.1	17	31	18	22	1.8	128	40	15	
May 11-12	16.8	22	4.5	13	62	20	21	1.2	152	73	23	
May 13-20	8.1	6.0	2.2	10	26	9.2	10	.8	106	24	3	
May 21-30	10.3	7.1	2.9	7.2	21	10	12	1.0	111	30	12	
June 1-10	10.8	8.0	2.9	8.6	27	9.1	13	.8	117	32	10	
June 11-13, 15-20	12.5	8.3	3.3	12	33	9.9	16	.5	126	34	7	
June 21-30	12.5	8.6	3.0	13	38	7.8	16	.4	105	34	3	
July 1-10	13.9	7.7	3.8	14	36	10	18	.4	111	35	5	
July 11-20	19.7	11	4.6	19	38	11	32	.8	134	46	15	
July 21-31	20.4	12	4.9	23	53	14	29	1.2	166	50	7	
Aug. 1-10	24.3	13	5.3	26	50	13	39	1.5	168	54	13	

Meches River near Rockland, Texas, October 1, 1945 to September 30, 1946
(Continued)

Analyzed by Date of collection	Geological Survey Specific conductance ($\times 10^5$ at 25°C)	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potassium (Na+K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Mi- trate (NO ₃)	Parts per million		Hardness as CaCO ₃
									Dissolved solids Parts per million	Total	
Aug. 11-16, 18-20, 1946	20.9	12	4.7	25	52	12	33	1.2	148	49	7
Aug. 21-29, 31	19.2	11	3.8	21	44	13	28	.8	144	43	7
Sept. 1-10	16.5	10	4.7	18	30	24	24	.5	146	44	20
Sept. 11-20	16.3	11	3.5	17	18	28	25	.5	140	42	27
Sept. 21-30	17.1	10	4.5	20	19	27	31	.8	142	43	28

Nueces River near Three Rivers, Texas, October 1, 1945, to September 30, 1946

Analyses of composites of daily samples collected at gaging station 100 feet downstream from San Antonio, Uvalde and Gulf Railroad Bridge, half mile downstream from Frio River and 2 miles southeast of Three Rivers.
Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃ Total	Percent sodium carbonate	
										Dissolved Parts per million	Solids Tons per acre foot	Solids Tons per day			
Oct. 1-6, 9-10, 1945	2,727	32.6	35	4.5	31	126	24	26	1.8	213	0.29	1,570	106	3	36
Oct. 11-21	8,114	28.4	38	4.3	16	142	16	9.0	.8	195	.27	4,270	113	0	23
Oct. 22-31	852	52.4	56	7.0	45	210	34	42	.8	338	.46	778	169	0	37
Nov. 1-9	27.2	79.6	72	9.8	84	257	62	90	.0	490	.67	36	220	9	45
Nov. 11-13, 15-20	35.2	118	75	13	158	298	81	181	.2	700	.95	67	240	0	59
Nov. 21-30	18.2	117	70	10.0	165	288	72	186	.5	694	.94	34	216	0	63
Dec. 1-10	14.4	111	70	13	159	291	97	166	.2	680	.92	26	228	0	60
Dec. 11-20	16.4	130	77	14	190	328	109	198	.2	757	1.03	34	250	0	62
Dec. 21-27, 29-31	25.7	163	87	16	242	315	127	296	1.0	950	1.29	66	283	24	65
Jan. 1-10, 1946	26.3	140	78	15	213	314	130	231	.0	865	1.18	61	256	0	64
Jan. 11-20	42.2	126	68	14	189	280	115	205	.5	740	1.01	84	227	0	64
Jan. 21-31	34.7	115	60	13	171	250	99	189	1.0	693	.94	65	203	0	65
Feb. 1-10	22.5	127	75	18	172	284	129	189	.5	754	1.03	46	261	28	59
Feb. 11, 13-19	35.4	140	75	18	210	321	143	216	.5	827	1.12	79	261	0	64
Feb. 20-22	92.5	68.7	38	6.4	101	173	66	92	1.0	405	.55	101	122	0	64
Feb. 24-28	36.8	188	64	16	328	334	133	372	1.2	1,080	1.47	107	226	0	76
Mar. 1-7	82.1	151	66	15	245	303	145	254	2.0	888	1.21	197	226	0	70
Mar. 9-12	81.2	81.4	56	7.2	107	195	75	115	2.0	473	.64	104	170	10	58
Mar. 13-16	1,140	53.4	40	4.4	70	157	48	64	1.2	336	.46	1,030	118	0	56
Mar. 18-20	71.8	225	72	8.3	392	205	64	588	2.5	1,230	1.67	238	214	46	80
Mar. 21-31	29.5	180	74	12	290	305	125	342	2.5	997	1.35	79	234	0	73
Apr. 1-10	13.0	157	72	14	244	295	132	274	.5	923	1.26	32	237	0	69
Apr. 11-20	18.7	157	78	16	242	323	157	254	.5	956	1.30	48	260	0	67
Apr. 22, 26-27	1,590	68.6	51	6.4	86	158	56	107	2.5	392	.53	1,680	154	24	55
Apr. 23-25, 28-30	2,420	34.0	36	3.7	33	141	23	24	3.0	205	.28	1,340	105	0	40
May 1-10	3,138	38.6	48	3.9	27	168	26	21	.8	257	.35	2,180	136	0	30
May 11-12, 16-20	1,682	37.2	42	3.5	33	155	26	26	1.0	240	.33	1,090	119	0	38
May 21-31	2,541	37.2	40	3.7	30	140	25	27	1.5	237	.32	1,630	115	0	36
June 1-10, 11-12	4,190	30.0	37	3.3	20	132	19	15	1.2	206	.28	2,330	106	0	29
June 13-19	375	49.2	47	5.2	48	158	36	53	1.5	318	.43	322	139	9	43
June 21-22, 24-30	1,110	40.0	43	4.4	36	153	31	32	1.2	262	.36	785	125	0	38

Mueces River near Three Rivers, Texas, October 1, 1945, to September 30, 1946
(Continued)

Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃		Percent sodium carbonate
										Dissolved solids per million	Tons per acre foot	Tons per day	Total	Non-carbonate	
July 1, 3-10, 1946	169	42.8	56	6.1	45	193	41	44	0.8	338	0.46	154	165	7	37
July 11-12, 14-18, 20	17.2	76.5	70	10	78	238	70	83	.5	470	.64	22	216	20	44
July 21-31	8.52	90.4	74	11	107	257	85	115	.5	556	.76	13	230	19	50
Aug. 1-2, 16-20	3.30	94.4	66	9.7	117	212	70	150	.5	600	.82	5	204	30	55
Aug. 4, 10-15	44.2	70.5	51	6.0	91	173	40	117	1.0	440	.60	53	152	10	57
Aug. 5-9	36.5	39.5	37	3.6	43	134	31	40	1.8	256	.35	25	107	0	46
Aug. 21-28	1.49	99.7	70	11	122	220	66	167	.5	606	.82	2	220	39	55
Aug. 29-30, Sept. 1-5	12,204	27.3	40	3.6	16	139	15	12	3.0	197	.27	6,490	115	8	23
Sept. 6-10	474	69.0	67	9.8	61	198	80	66	.5	446	.61	571	208	45	39
Sept. 11-15	525	93.0	81	14	94	228	121	106	1.5	626	.85	387	260	72	44
Sept. 16-20	3,536	33.7	42	4.4	24	128	40	19	2.8	235	.32	2,240	123	18	30
Sept. 21-27	3,991	33.0	43	4.3	23	154	21	18	1.0	224	.30	2,410	125	0	28
Sept. 28	4,860	66.6	--	--	--	204	52	66	2.0	---	.59	5,690	---	--	--
Sept. 29-30	8,510	15.5	--	--	--	74	20	6	1.5	---	.14	2,410	---	--	--
Weighted Average	1,281	34.1	41	4.2	27	144	25	22	1.6	229	0.31	792	120	2	33

-16-

Analyses of composites of daily samples collected at gaging station about 600 feet downstream from Salt (Screwbean) Draw, and 19 miles downstream from Red Bluff Dam.

Analyzed by Geological Survey

Date of collection	Mean discharge (second feet)	Specific conductance $K \times 10^5$ at 25°C	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)
Oct. 1-10, 1945	9.66	834	21	0.08	580	198	1,130	23	132
Oct. 11-16, 18-20	4.48	978	26	.08	656	230	1,430	36	126
Oct. 21-31	2.65	1,100	15	.15	746	273	1,670	44	124
Nov. 1-10	41.8	966	12	.15	680	239	1,300	33	111
Nov. 11-20	21.0	883	8.0	.15	630	212	1,180	27	117
Nov. 21-30	27.7	895	8.0	.10	614	216	1,210	30	119
Dec. 1-10	60.3	859	22	.10	560	197	1,210	27	130
Dec. 11-20	16.2	883	20	.20	576	202	1,250	24	136
Dec. 21-31	33.8	883	15	.10	582	211	1,210	27	140
Jan. 1-10, 1946	5.24	914	10	.02	580	224	1,310	41	118
Jan. 11-20	5.04	1,010	11	.02	636	248	1,430	30	111
Jan. 21-31	5.01	1,090	14	.02	664	262	1,560	29	115
Feb. 1-10	3.53	1,290	16	.05	738	298	1,950	33	119
Feb. 11,13,16-19	65.4	1,360	17	.05	773	320	2,150	36	116
Feb. 12, 14-15	8.00	815	20	.05	522	200	1,110	34	102
Feb. 20-28	220	778	16	.05	514	194	1,060	39	135
Mar. 1-10	45.3	824	22	.02	538	196	1,150	34	129
Mar. 11-20	99.3	797	16	.02	530	170	1,160	37	132
Mar. 21-31	268	784	15	.02	528	163	1,120	32	144
Apr. 1-10	327	790	18	.05	514	193	1,070	27	96
Apr. 11-20	419	794	13	.05	518	194	1,080	26	112
Apr. 21-30	396	806	19	.05	520	196	1,090	33	113
May 1-10	237	828	--	--	532	198	1,180		128
May 11-20	274	844	--	--	552	200	1,180		128
May 21-31	62.4	886	--	--	586	213	1,250		122
June 1-10	28.4	918	--	--	600	221	1,300		112
June 11-20	72.9	918	--	--	594	220	1,330		118
June 21-30	104	927	--	--	600	222	1,350		112
July 1-10	86.3	972	--	--	602	227	1,370		104
July 11-20	310	972	--	--	610	227	1,360		100
July 21-31	330	980	--	--	604	229	1,380		108
Aug. 1-10	71.4	1,030	--	--	622	230	1,550		130
Aug. 11, 13-20	53.0	1,150	--	--	631	237	1,810		120
Aug. 21-31	42.5	1,150	--	--	633	239	1,820		113
Sept. 1-10	14.4	1,140	--	--	668	252	1,780		117
Sept. 11-19	1.86	1,200	--	--	711	266	1,810		102
Sept. 20-30	41.8	534	--	--	494	83	657		72
Weighted average	105.2	869	--	--	559	204	1,240		117

-18-

October 1, 1945 to September 30, 1946
 upstream from Pasotex pipe line crossing, 6 miles southeast of Orla, 16 miles

Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Dissolved solids			Hardness as		Per cent sodium
				Parts per million	Tons per acre foot	Tons per day	CaCO ₃		
							Total	Non- carbon- ate	
1,900	1,880	1.0	1.8	5,800	7.89	151	2,260	2,150	52
2,180	2,380	1.2	.8	7,000	9.52	85	2,580	2,480	55
2,520	2,790	1.4	.5	8,120	11.04	58	2,980	2,880	55
2,140	2,290	1.8	1.2	6,750	9.18	762	2,680	2,590	52
1,980	2,040	1.6	.8	6,140	8.35	348	2,440	2,350	52
1,990	2,060	1.8	1.0	6,190	8.42	463	2,420	2,320	52
1,880	1,990	1.4	1.2	5,950	8.09	969	2,210	2,100	55
1,940	2,040	1.4	1.8	6,120	8.32	268	2,270	2,160	55
1,930	2,020	1.6	1.5	6,070	8.26	554	2,320	2,210	53
2,010	2,160	1.2	2.5	6,400	8.70	91	2,370	2,270	55
2,210	2,340	1.4	1.5	6,970	9.48	95	2,610	2,520	55
2,270	2,630	1.3	2.0	7,490	10.19	101	2,730	2,640	56
2,470	3,300	1.2	2.0	8,870	12.06	85	3,070	2,970	58
2,630	3,620	1.2	1.5	9,610	13.07	1,700	3,240	3,150	59
1,830	1,860	.4	3.5	5,630	7.66	122	2,120	2,040	54
1,790	1,770	1.0	3.0	5,450	7.41	3,240	2,080	1,970	53
1,850	1,860	1.2	6.0	5,720	7.78	700	2,150	2,040	54
1,840	1,820	1.2	5.0	5,640	7.67	1,510	2,020	1,910	56
1,820	1,780	1.4	4.0	5,530	7.52	4,000	1,990	1,870	55
1,820	1,740	--	5.0	5,430	7.38	4,790	2,080	2,000	53
1,830	1,750	--	5.5	5,470	7.44	6,190	2,090	2,000	53
1,850	1,770	--	5.0	5,540	7.53	5,920	2,100	2,010	53
1,880	1,880	--	.5	5,730	7.79	3,670	2,140	2,040	55
1,920	1,890	--	3.0	5,610	7.90	4,300	2,200	2,100	54
2,040	2,010	--	1.0	6,160	8.38	1,040	2,340	2,240	54
2,110	2,090	--	3.0	6,380	8.68	489	2,410	2,310	54
2,090	2,130	--	1.0	6,420	8.73	1,260	2,390	2,290	55
2,130	2,150	--	1.0	6,510	8.85	1,830	2,410	2,320	55
2,110	2,220	--	3.0	6,580	8.95	1,530	2,440	2,350	55
2,110	2,220	--	3.0	6,580	8.95	5,510	2,460	2,370	55
2,110	2,240	--	4.0	6,620	9.00	5,900	2,450	2,360	55
2,140	2,500	--	3.0	7,110	9.67	1,370	2,500	2,390	57
2,170	2,920	--	2.0	7,830	10.65	1,120	2,550	2,450	61
2,200	2,930	--	1.0	7,880	10.72	904	2,560	2,470	61
2,300	2,900	--	4.0	7,960	10.83	309	2,700	2,610	59
2,430	3,070	--	1.0	8,340	11.34	42	3,020	2,930	57
1,350	1,090	--	2.0	3,710	5.05	419	1,570	1,520	48
1,940	1,980	--	3.5	5,990	8.15	1,700	2,230	2,140	55

Quitague Creek near Quitague, Texas, November 1, 1945 to November 30, 1946
 Analysis of composites of daily samples during November and December 1945 with individual samples on one day each month from January to November 1946, collected at road crossing about 4 miles below gaging station about 3/4 mile upstream from W. F. Saul's ranch house and about a mile downstream from Wilson Creek.

Analyzed by Geological Survey

Parts per million

Date of collection	Mean dis-charge (second-feet)	Specific conductance (K+10 ⁵ at 25°C)	Cal-cium (Ca)	Magne-sium (Mg)	Sodium and Potas-sium (Na+K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Ni-trate (NO ₃)	Dissolved solids		Hardness as CaCO ₃		
										Parts per million	Tons per acre-foot	Total	Non-car-bon-ate	Per-cent sod-ium
Nov. 14-20, 1945	4.6	68.0	32	39	66	324	43	51	0.0	419	.61	240	0	37
Nov. 21-30	4.72	71.7	28	36	67	304	42	50	.5	420	.57	218	0	40
Dec. 1-10	4.94	68.1	26	36	67	292	42	52	3.0	412	.56	213	0	41
Dec. 11-19	4.87	72.4	35	36	52	284	42	52	.0	429	.58	236	3	33
Dec. 21-31	4.85	71.9	40	36	70	330	42	49	.0	447	.61	248	0	34
Jan. 16, 1946	6.6	66.6	15	38	68	272	44	51	.5	403	.55	194	0	43
Feb. 15	6.3	77.8	27	38	79	294	57	67	.2	466	.63	224	0	43
Mar. 18	5.4	67.5	19	37	67	281	42	50	.2	404	.55	200	0	42
April 15	5.6	68.1	18	37	70	287	42	50	.0	416	.57	197	0	44
May 15	4.5	70.2	23	38	69	299	42	52	.2	426	.58	214	0	41
June 15	3.2	80.0	29	40	81	337	45	63	.0	485	.66	237	0	43
July 15	3.6	79.1	20	39	98	314	50	78	4.0	491	.67	210	0	50
August 15	2.8	74.7	40	35	65	314	40	60	.8	436	.59	244	0	37
Sept. 15	4.3	75.3	26	37	81	315	40	66	.8	442	.60	217	0	45
Oct. 12	—	50.8	37	16	42	214	20	34	5.6	298	.41	158	0	36
Oct. 15	—	75.1	37	35	67	312	40	60	.8	445	.61	236	0	38
Nov. 15	—	80.9	38	39	65	335	35	60	.2	452	.61	256	0	35

Red River near Gainesville, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at gaging station at bridge on U. S. Highway 77, a quarter of a mile downstream from Gulf, Colorado and Santa Fe Railway bridge, 5 miles downstream from Wish Creek, and 7 miles North of Gainesville. Drainage area 29,460 square miles.

Analyzed by Geological Survey

Date of collection	Specific conductance K x 10 ⁵ at 25° C	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as CaCO ₃	
									Parts per million	Total	Non-carbonate	
Oct. 1-3, 1945	40.3	36	7.3	36	94	31	62	1.2	250	120	127	
Oct. 4-5, 8	70.8	51	12	78	112	64	133	1.3	420	177	243	
Oct. 6-7, 9-10	112	71	19	129	129	86	240	1.2	626	255	371	
Oct. 11-20	248	148	44	330	216	238	590	5.3	1,470	550	920	
Oct. 21-31	306	153	59	404	202	293	730	3.5	1,740	624	1116	
Nov. 1-4, 6-10	326	164	68	423	228	308	780	1.2	1,860	689	1171	
Nov. 11-20	332	180	75	417	248	317	800	2.2	1,910	758	1152	
Nov. 21-30	361	198	80	484	264	380	895	.8	2,170	823	1347	
Dec. 1-3, 5-10	372	218	76	446	278	349	875	2.0	2,100	856	1244	
Dec. 11-20	379	211	80	479	280	373	905	2.8	2,190	856	1334	
Dec. 21-31	390	216	80	550	296	446	960	2.2	2,400	868	1532	
Jan. 1-4, 1946	413	185	76	599	222	420	1,030	6.8	2,430	774	1656	
Jan. 5-8	85.0	52	15	98	128	58	168	3.0	491	132	359	
Jan. 9-10	188	102	35	230	186	143	420	6.2	1,030	398	632	
Jan. 11-13, 19-20	213	112	36	273	203	181	470	4.0	1,180	428	752	
Jan. 14, 16-18	138	74	21	157	141	101	275	4.0	750	271	479	
Jan. 21-22	312	161	48	444	220	312	750	3.0	1,830	600	1230	
Jan. 23-30	551	248	75	866	237	521	1,440	2.5	3,290	928	2362	
Feb. 1-10	433	203	76	630	267	398	1,100	5.4	2,540	819	1721	
Feb. 11-12	406	194	79	586	264	379	1,040	5.4	2,410	809	1601	
Feb. 13-16	225	116	41	287	198	182	515	4.0	1,240	458	782	
Feb. 17-20	86.4	50	12	84	114	53	147	1.2	452	174	278	
Feb. 21-25	137	79	24	164	162	124	274	4.5	847	296	551	
Feb. 26-28	360	175	58	504	235	347	860	6.2	2,070	676	1394	
Mar. 1-10	374	174	66	524	247	338	912	5.0	2,140	706	1434	
Mar. 11-20	310	151	65	393	265	265	712	4.0	1,720	644	1076	
Mar. 21-26	296	145	61	380	245	263	680	6.4	1,660	613	1047	
Mar. 27-31	108	57	20	122	152	74	202	3.0	654	224	430	
Apr. 1-2, 4	222	113	39	297	201	130	520	3.5	1,250	442	808	
Apr. 3, 5-10	475	222	74	732	222	497	1,240	1.5	2,380	858	1522	
Apr. 11-17	393	188	68	545	267	330	970	3.8	2,240	748	1492	
Apr. 18-20	252	121	48	345	224	207	602	1.5	1,430	500	930	
Apr. 21-24, 26-30	264	130	49	361	213	225	638	3.8	1,510	526	984	

Red River near Gainesville, Texas, October 1, 1945 to September 30, 1946

Analyzed by Geological Survey

(Continued)

Parts per million

Date of collection	Specific conductance (K x 10 ⁵ at 25° C)	Chloride (Cl)	Date of collection	Specific conductance (K x 10 ⁵ at 25° C)	Chloride (Cl)
May 1, 1946	263	630	June 6, 1946	98.0	
May 2	278		June 7	144	
May 3	323		June 8	144	
May 4	308		June 9	172	
May 5	308		June 10	187	370
May 6	308		June 11	193	375
May 7	399	1,000	June 12	194	
May 8	556	1,400	June 13	194	
May 9	377		June 14	206	
May 10	377		June 15	207	400
May 11	398	990	June 16	217	
May 12	395		June 17	224	
May 13	387		June 18	241	
May 14	379		June 19	241	505
May 15	338		June 20	234	
May 16	347		June 21	244	
May 17	347		June 22	249	
May 18	335		June 23	288	665
May 19	379	790	June 24	267	
May 20	379		June 25	257	
May 21	430		June 26	171	370
May 22	453		June 27	209	
May 23	453	1,040	June 28	274	
May 24	---		June 29	237	
May 25	349		June 30	288	
May 26	423		July 1	322	
May 27	316	730	July 2	413	990
May 28	118		July 3	405	
May 29	167		July 4	352	
May 30	131		July 5	350	
May 31	47.7	72	July 6	315	760
June 1	45.9	70	July 7	332	
June 2	91.1		July 8	510	
June 3	83.7		July 9	543	
June 4	99.6		July 10	594	1,470
June 5	143	284	July 11	518	1,290

Red River at Gainesville, Texas, October 1, 1945 to September 30, 1946

Analyzed by Geological Survey

(Continued)

Parts per million

Date of collection	Specific conductance (K x 10 ³ at 25° C)	Chloride (Cl)	Date of collection	Specific conductance (K x 10 ³ at 25° C)	Chloride (Cl)
July 12, 1946	495		Aug. 17, 1946	534	
July 13	438		Aug. 18	534	
July 14	419		Aug. 19	534	
July 15	440	1,100	Aug. 20	524	
July 16	442		Aug. 21	---	
July 17	396		Aug. 22	432	
July 18	396		Aug. 23	429	
July 19	392		Aug. 24	429	
July 20	392	850	Aug. 25	472	
July 21	389	940	Aug. 26	444	1,100
July 22	470		Aug. 27	259	
July 23	470		Aug. 28	151	340
July 24	638		Aug. 29	370	
July 25	641	1,640	Aug. 30	374	
July 26	558		Aug. 31	267	590
July 27	558		Sept. 1	267	580
July 28	477		Sept. 2	326	
July 29	467	1,160	Sept. 3	327	
July 30	467		Sept. 4	390	
July 31	467		Sept. 5	987	
Aug. 1	484		Sept. 6	999	2,850
Aug. 2	469		Sept. 7	999	
Aug. 3	469		Sept. 8	785	
Aug. 4	463		Sept. 9	752	
Aug. 5	463	1,170	Sept. 10	757	2,000
Aug. 6	469		Sept. 11	708	
Aug. 7	525		Sept. 12	720	
Aug. 8	517		Sept. 13	720	2,420
Aug. 9	539	1,370	Sept. 14	720	
Aug. 10	512		Sept. 15	300	540
Aug. 11	520	1,320	Sept. 16	381	
Aug. 12	531		Sept. 17	369	
Aug. 13	530		Sept. 18	254	520
Aug. 14	530		Sept. 19	254	
Aug. 15	538	1,350	Sept. 20	284	
Aug. 16	537		Sept. 21	305	685

Red River near Gainesville, Texas, October 1, 1945 to September 30, 1946
(Continued)

Analyzed by Geological Survey			Parts per million		
Date of collection	Specific conductance (K x 10 ⁵ at 25° C)	Chlo- ride (Cl)	Date of collection	Specific Conductance (K x 10 ⁵ at 25° C)	Chlo- ride (Cl)
Sept. 22, 1946	370		Sept. 27, 1946	377	870
Sept. 23	431		Sept. 28	323	
Sept. 24	431		Sept. 29	329	
Sept. 25	540	1,310	Sept. 30	323	
Sept. 26	458				

Red River at Denison Dam near Denison, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected immediately below dam on Red River, 1.7 miles upstream from Sand Creek and 5 miles north of Denison. Discharge records reported are for gaging station at old highway toll bridge 1.3 miles down stream from Sand Creek, 2 miles south of Colbert, Oklahoma. No appreciable inflow between dam and gaging station except during periods of heavy local rains. Drainage area 38,700 square miles above gaging stations.

Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			Hardness as CaCO ₃ Total	Non-carbonate	Percent sodium
										Dissolved solids per million	Tons per acre foot	Tons per day			
Oct. 1-5, 8-10, 1945	29,730	94.9	72	17	105	145	116	160	1.0	586	0.80	47,000	250	130	44
Oct. 11-12, 15-19	36,430	76.2	62	17	63	134	86	115	.5	478	.65	47,000	224	114	38
Oct. 22-26, 29-31	16,980	76.9	66	18	61	137	92	115	1.0	464	.63	21,300	238	126	36
Nov. 1-2, 5-9	2,754	80.5	80	17	56	139	96	125	.8	482	.66	3,580	270	156	31
Nov. 13-16, 19-20	2,496	82.2	75	17	63	140	99	124	.8	472	.64	3,180	257	142	35
Nov. 21, 23, 26-30	1,843	82.2	78	18	60	140	98	128	1.0	486	.66	2,420	268	154	33
Dec. 1, 3-8, 10	76.2	82.2	80	17	57	132	99	127	4.6	490	.67	101	270	162	32
Dec. 11-15, 17-19	1,215	82.0	76	17	64	138	98	129	1.0	510	.69	1,670	260	146	35
Dec. 21-22, 26-29, 31	1,664	83.1	63	16	80	136	98	130	.8	482	.66	2,170	223	111	44
Jan. 1-10, 1946	2,995	83.2	64	17	95	142	99	152	2.8	514	.70	4,160	230	113	47
Jan. 11-20	4,580	84.2	63	16	83	136	99	133	1.5	527	.72	6,520	223	112	45
Jan. 21-31	5,033	85.4	64	18	77	136	98	132	1.5	496	.67	6,740	234	122	42
Feb. 1-10	2,707	81.4	64	18	75	138	95	129	2.2	492	.67	3,600	234	120	41
Feb. 11-19	4,982	81.4	64	19	75	144	96	129	1.0	490	.67	6,590	238	120	41
Feb. 20-28	21,440	84.6	64	18	80	144	97	134	.2	526	.72	30,400	234	116	43
Mar. 1-10	5,194	83.3	65	18	78	149	97	129	.0	525	.71	7,360	236	114	42
Mar. 11-20	4,928	83.7	65	19	78	153	97	129	.2	515	.70	6,850	240	114	41
Mar. 21-31	4,167	85.0	64	20	82	158	99	132	1.0	548	.75	6,170	242	112	42
Apr. 1-10	5,134	86.7	66	19	87	164	102	135	.8	538	.73	7,460	242	108	44
Apr. 11-20	2,667	87.3	66	20	89	168	103	138	.8	558	.76	4,020	247	109	44
Apr. 21-30	4,489	86.9	66	20	85	166	103	133	1.5	538	.73	6,520	246	110	43
May 1-10	5,001	89.2	67	21	83	167	102	134	2.5	517	.70	6,980	254	116	42
May 11-20	4,204	90.6	68	20	89	164	103	143	1.0	555	.75	6,300	252	117	43
May 21-31	2,189	93.6	69	22	89	173	103	146	.2	561	.76	3,320	262	120	42
June 1-10	15,060	94.4	67	22	96	184	103	147	1.2	589	.80	23,900	258	106	45
June 11-20	9,525	95.2	68	22	91	175	105	145	1.0	567	.77	14,600	260	116	43
June 21-30	2,016	98.1	67	23	97	171	105	157	1.0	585	.80	3,180	262	122	45
July 1-10	5,260	99.4	68	24	98	168	106	165	.5	615	.84	8,730	268	130	44
July 11-20	5,162	99.4	67	23	102	172	105	165	.5	611	.83	8,520	262	120	46

Red River at Denison Dam near Denison, Texas, October 1, 1945 to September 30, 1946

(Continued)

Date of collection	Analyzed by Geological Survey									Parts per million					
	Mean discharge (second-feet)	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved Parts per million	Solids Tons per acre foot	Total Hardness as CaCO ₃	Non-carbonate Hardness	Percent sodium carbonate	
July 21-31, 1946	3,027	102	69	23	109	178	107	175	0.2	616	0.84	5,030	266	120	47
Aug. 1-10	2,194	106	72	23	112	173	108	185	1.0	660	.90	3,910	274	132	47
Aug. 11-20	2,043	105	71	23	115	165	106	195	1.0	668	.91	3,680	272	136	48
Aug. 21-31	2,202	103	70	22	118	170	105	192	1.0	668	.91	3,970	265	126	49
Sept. 1-10	1,613	104	70	23	115	169	105	190	2.5	655	.89	2,850	269	130	48
Sept. 11-20	2,218	104	71	23	109	174	106	180	1.0	655	.89	3,920	272	129	47
Sept. 21-30	2,146	101	70	23	112	168	108	185	1.0	636	.86	3,690	269	132	47
Weighted average	6,199	87.4	67	19	84	152	100	139	0.9	538	0.73	9,000	245	120	43

Rio Grande at Mission Pumping Plant near Mission, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at Mission Pumping Plant 3 miles south of Mission, Texas

Analyzed by Geological Survey

Date of collection	Specific conduc- tance (Kx10 ⁵ at 25°C)	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potassium (Na+K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Ni- trate (NO ₃)	Parts per million	
									Dissolved solids	
									Parts per million	Hardness as CaCO ₃ Total
Oct. 1-4, 8, 1945	142	99	31	154	133	305	194	12	954	374
Oct. 5-7, 9-10	66.7	60	12	61	127	136	60	3.0	419	199
Oct. 11, 16-20	71.7	70	10	66	140	151	58	7.5	468	216
Oct. 12-15	43.9	49	8.6	30	124	73	29	6.0	284	158
Oct. 21-31	86.7	77	14	85	154	150	104	6.0	546	250
Nov. 1-10	122	90	24	128	165	215	169	3.0	789	323
Nov. 11-20	133	88	26	147	150	241	192	2.5	848	326
Nov. 21-30	140	90	29	158	160	251	207	3.0	896	344
Dec. 1-10	146	94	30	164	157	251	228	2.2	914	358
Dec. 11-20	134	92	29	149	171	240	198	2.5	838	348
Dec. 21-31	139	94	30	156	180	242	209	2.8	855	358
Jan. 1, 3-10, 1946	151	101	35	166	173	265	238	3.0	995	396
Jan. 11-20	151	98	34	176	176	268	242	2.8	908	384
Jan. 21-31	151	105	33	167	184	269	232	3.2	900	398
Feb. 1-10	168	102	35	203	178	300	264	10	1,000	398
Feb. 11-19	179	103	38	220	183	323	285	3.0	1,060	413
Feb. 20-28	177	102	38	218	185	317	284	2.8	1,050	410
Mar. 1-10	171	95	37	224	148	316	300	3.2	1,050	389
Mar. 11-20	185	104	40	235	154	340	320	3.8	1,120	424
Mar. 21-31	200	106	44	275	153	374	372	4.5	1,250	446
Apr. 1-10	180	102	40	225	156	338	302	4.0	1,090	419
Apr. 11-20	210	122	47	248	148	440	322	4.0	1,260	498
Apr. 21-30	116	84	23	125	153	203	166	5.9	740	304
May 1-3, 8-10	96.0	83	18	101	160	174	127	12	642	281
May 4-7	172	135	37	190	143	464	208	10	1,110	489
May 11-13, 15	108	90	19	124	150	193	165	18	719	302
May 12, 16-20	68.5	57	12	66	139	119	67	5.2	434	192
May 21, 23-28	73.3	65	11	68	135	126	78	5.1	454	208
May 22, 29-31	45.4	49	7.4	34	133	60	37	4.0	319	153
June 1-11	53.1	51	8.1	40	130	72	46	2.5	348	160
June 12-21	80.1	61	12	75	122	115	100	4.0	502	202
June 22-30	55.6	52	9.6	43	135	73	52	2.5	356	170
July 1-10	60.0	61	9.9	45	151	86	52	4.3	411	192

Rio Grande at Mission Pumping Plant near Mission, Texas, October 1, 1945, to September 30, 1946
(Continued)

Analyzed by Geological Survey	Parts per million										
	Date of collection	Specific conduc- tance (Kx10 ⁵ at 25°C)	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potassium (Na+K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Ni- trate (NO ₃)	Dissolved solids	Hardness as
										Parts per million	CaCO ₃ Total
July 11-20, 1946	76.7	69	13	70	154	126	83	3.5	545	226	
July 21-31	91.9	76	15	89	143	187	93	2.2	628	251	
Aug. 1-10	87.3	72	14	91	136	172	100	3.0	581	237	
Aug. 11-20	90.4	66	19	100	137	174	117	.5	604	242	
Aug. 21-31	91.4	67	18	95	144	165	111	1.5	596	241	
Sept. 1-2, 10	83.1	74	15	89	156	156	93	22	565	246	
Sept. 3-7, 9	48.7	50	9.0	41	126	84	35	14	330	162	
Sept. 11-20	71.1	63	11	74	164	113	71	14	460	202	
Sept. 21-30	56.7	54	8.0	55	136	99	46	8.5	374	168	

Analyses of composites of daily samples collected at bridge on State Highway 235, 2.4 miles north of Bullitt, Newton County, and 4.5 miles downstream from Cypress Creek. Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ⁵)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)		Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids per million	Hardness as CaCO ₃	Total	Non-carbonate
				mg/l	mg/l								
Oct. 1-5, 10, 1945	20.7	11	3.9	32	40	7.0	44	0.5	151	44	11	53	14
Oct. 6-9	35.5	14	4.3	61	34	11	90	.5	264	53	25	38	14
Oct. 11-18	21.5	10	3.1	28	29	9.2	46	.8	173	38	14	35	13
Oct. 22-31	17.3	8.5	3.4	22	27	11	34	.8	143	35	13	35	13
Nov. 1-5, 7, 9	24.4	11	3.7	33	32	12	54	.2	178	43	16	34	16
Nov. 11, 13-15	19.5	10	2.3	25	24	9.9	42	.2	168	34	15	34	15
Nov. 16, 18-20	34.0	13	4.5	50	29	17	84	.2	242	51	27	51	27
Nov. 21-23	41.0	12	5.4	62	27	15	105	.2	272	52	31	52	31
Nov. 25, 27-29	29.8	11	5.5	42	31	21	67	.2	221	50	25	50	25
Dec. 1-10	17.0	8.2	2.4	18	21	4	34	.5	128	30	13	34	13
Dec. 12-14, 16-19	21.5	9.2	2.6	28	20	17	43	.2	144	34	17	34	17
Dec. 21, 30, 31	26.8	13	3.7	31	24	18	55	.0	168	48	28	48	28
Dec. 27, 29	16.0	9.4	2.0	23	16	33	33	.0	125	32	14	32	14
Jan. 1-3, 1946	27.1	13	3.9	38	27	24	60	.2	180	48	26	48	26
Jan. 5-10	11.5	5.4	1.4	22	29	9	24	.2	109	19	0	19	0
Jan. 11-20	7.8	3.8	2.0	10	18	7.4	12	.2	86	18	3	18	3
Jan. 21-27, 29-31	11.6	6.0	3.9	15	28	12	20	1.0	104	31	8	31	8
Feb. 1-7, 10	16.2	8.1	4.8	19	25	17	30	.2	131	40	15	40	15
Feb. 11-13	15.7	9.4	2.8	19	18	18	30	.2	126	35	20	35	20
Feb. 14-19	8.0	4.5	2.1	8.3	14	7.7	13	.0	76	20	8	20	8
Feb. 20-26	10.5	6.1	2.9	11	18	11	17	.2	94	27	12	27	12
Mar. 1, 3-9	15.4	7.8	3.7	17	28	14	23	.8	123	35	12	35	12
Mar. 11-20	15.4	8.5	3.6	18	35	13	23	.8	119	36	12	36	12
Mar. 21-23, 25-30	18.5	8.8	4.6	18	25	15	31	.2	134	41	20	41	20
Apr. 2-6, 8-9	13.7	7.4	4.2	13	25	11	22	1.0	116	36	15	36	15
Apr. 11-20	19.0	11	4.9	19	19	15	41	1.2	177	48	15	48	15
Apr. 21-30	24.2	10	3.7	34	36	15	48	2.2	169	48	15	48	15
June 3-7, 10	8.8	12	1.6	6.1	21	13	13	.8	91	37	19	37	19
June 11-13, 16, 18-19	11.7	8.0	3.3	13	27	11	19	.8	128	34	11	34	11
June 22-29	12.0	9.6	3.2	10	37	8.2	14	1.0	113	37	18	37	18
July 3-10	17.0	13	4.0	11	38	8.1	24	1.5	126	49	18	49	18
July 11-16, 18-19	21.0	11	3.4	23	40	7.0	34	0.5	151	44	10	44	10

Sabine River near Suliff, Texas, October 1, 1945 to September 30, 1946

(Continued)

Analyzed by Geological Survey Date of collection	Specific conductance (Kx10 ⁵ at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as CaCO ₃	
									Parts Per million	Total	Non-carbonate	
July 23, 26, Aug. 2-5, 9, 10, 12, 15, 19, 1946	20.4	9.6	3.1	24	38	8.6	34	1.0	141	37	6	
Aug. 22, 25-28, Sept. 3, 7, 24-26	24.2	10	3.6	34	46	12	44	1.0	160	40	2	
Sept. 12	39.9	--	--	--	27	12	99	.5	---	--	--	

San Antonio River at Goliad, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at gaging station at bridge on State Highway 29, 1.3 miles southeast of courthouse in Goliad and 10 miles upstream from Manahuilla Creek.

Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million		
									Dissolved solids		Hardness as CaCO ₃
									Parts per million	Total	Non-carbonate
Oct. 4-6, 8-10, 1945	50.6	57	11	30	184	40	40	4.5	303	188	36
Oct. 11-15, 20	58.1	69	13	39	235	41	51	2.8	369	226	33
Oct. 22-23, 25-26, 28-29, 31	73.4	84	19	46	267	62	70	6.0	480	288	68
Nov. 1-8, 10	75.3	86	21	43	270	67	70	6.0	469	301	80
Nov. 11-12, 15-16, 18	72.6	86	21	31	267	47	67	6.8	462	301	82
Nov. 22, 24-30	74.1	90	22	38	269	68	72	6.5	481	315	94
Dec. 1-2, 4-9	77.7	88	22	46	276	68	74	8.5	482	310	84
Dec. 13, 15-20	78.6	90	20	49	275	69	77	8.0	483	306	81
Dec. 21-26, 28-31	79.4	94	21	46	277	71	79	8.6	481	321	94
Jan. 1-10, 1946	78.2	88	20	51	270	71	77	9.4	469	302	80
Jan. 11-20	75.3	75	17	58	256	61	72	10	458	257	47
Jan. 21-23, 26-29	80.0	85	20	48	245	70	81	13	487	294	93
Feb. 1-4, 6-10	79.0	87	22	51	276	76	77	7.0	487	308	82
Feb. 11-13, 15-18	79.9	86	19	50	260	74	74	8.5	506	293	80
Feb. 20-22	56.4	61	11	39	182	55	50	6.9	344	197	48
Feb. 23-28	68.5	68	14	55	218	55	72	11	412	227	48
Mar. 1, 3, 5-6, 9, 12, 16-17, 19	74.2	84	17	46	248	66	72	7.4	516	280	76
Mar. 7, 10-11, 13-14, 20	43.9	51	8.1	24	160	32	32	3.2	283	161	29
Mar. 21-25, 27-28, 30-31	74.9	82	18	50	254	65	76	5.3	504	278	70
Apr. 1-4, 6-10	76.6	80	18	53	259	63	76	5.0	520	274	61
Apr. 11, 14-20	77.2	80	17	57	249	73	78	4.2	521	270	66
Apr. 23-24, 26-29	43.7	49	8.6	26	154	34	34	5.6	301	158	31
May 2, 5-6, 8-10	52.8	57	11	37	183	49	42	8.8	332	188	38
May 11-13, 16	55.1	60	11	33	191	36	48	6.6	334	194	38
May 17-18, 20	24.8	36	4.0	13	122	15	11	3.0	175	106	6
May 21-25, 27-29	55.7	60	9.7	35	190	43	44	4.0	322	190	34
June 2-4	26.4	37	4.5	20	126	20	21	1.0	184	111	8
June 7-10	49.2	54	8.6	35	181	40	38	4.0	297	170	22
June 11, 22, 24	33.2	42	5.4	20	143	24	20	.2	212	127	10
June 12-14, 25-29	50.8	58	10	32	183	47	38	2.5	320	186	36

San Antonio River at Colliad, Texas, October 1, 1945 to September 1946
(Continued)

Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ⁵ 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids Parts per million	Hardness as CaCO ₃		
									Total	Non-carbonate		
June 20-21, 30, 1946	71.0	76	16	44	242	60	63	2.5	436	256	57	
July 1-3, 5-10	76.2	82	18	52	260	67	75	2.5	476	278	66	
July 11-16, 18, 20	82.3	84	20	58	265	77	83	4.0	513	292	74	
July 21-23, 25-30	79.2	77	19	59	250	75	81	2.0	506	270	65	
Aug. 1-10	74.1	74	17	55	233	68	77	4.0	484	254	64	
Aug. 11-20	80.0	78	19	63	248	73	88	6.4	529	272	69	
Aug. 21, 23-28	72.3	74	17	51	227	68	75	4.0	477	254	68	
Sept. 3-6	36.9	49	6.6	20	159	27	24	.5	246	149	19	
Sept. 7-10	73.7	84	14	53	259	65	70	4.0	473	267	54	
Sept. 11, 12, 28	80.1	91	17	57	280	75	77	6.2	560	297	68	
Sept. 29	28.1	--	--	--	127	23	12	2.2	---	---	--	

San Jacinto (West Fork) River near Humble, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at bridge on U. S. Highway 59, about $\frac{1}{2}$ mile downstream from Spring Creek and $2\frac{1}{2}$ miles north of Humble.

Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ³ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as CaCO ₃	
									Parts per million	Total	Non-carbonate	
Oct. 1-3, 5, 7-10, 1945	39.7	21	4.9	58	64	7	88	0.8	256	73	20	
Oct. 13, 15-18, 20	51.9	24	4.8	71	71	6.1	119	1.0	328	80	22	
Oct. 22-23, 25-30	55.3	28	4.5	76	84	5.9	126	.5	329	88	20	
Nov. 1-7, 9-10	55.6	32	5.2	70	90	7.3	122	.8	347	101	28	
Nov. 11-15, 17, 19	54.1	34	2.6	74	105	6.7	116	.8	333	96	10	
Dec. 1-2, 7-9	56.3	39	5.5	65	121	8.7	109	.2	320	120	21	
Dec. 12-13, 15-17, 20	50.0	30	5.2	66	95	16	102	.5	285	96	18	
Dec. 23-24, 26-31	25.2	18	4.0	44	91	17	46	.8	209	61	0	
Jan. 1-3, 5, 1946	25.1	17	6.8	34	87	18	38	.8	244	70	0	
Jan. 4, 6-10	15.2	18	3.8	16	64	14	19	1.0	166	60	8	
Jan. 11-20	14.4	16	3.1	13	56	8	19	.2	161	53	7	
Jan. 26-31	31.4	30	4.5	28	82	7.6	56	1.0	232	93	26	
Feb. 1, 3, 6-8	35.7	31	4.7	34	83	8.5	66	.8	255	97	29	
Feb. 11-12, 14-16	21.1	23	4.5	12	71	2.3	29	.2	163	76	18	
Feb. 18-28	47.2	38	4.7	45	101	6.3	87	.5	283	114	32	
Mar. 1-9	45.6	38	5.2	47	105	5.7	89	.5	269	116	30	
Mar. 13-16, 18-19	13.4	15	4.1	8.5	53	4.4	17	1.0	138	54	11	
Mar. 21-26, 31	35.6	30	3.9	38	94	6.7	63	.2	238	91	14	
Mar. 27-30, Apr. 1-2	17.0	20	3.1	6.9	54	4.4	20	.8	141	63	18	
Apr. 6-10	48.1	36	5.2	53	99	8.4	96	2.0	302	111	30	
Apr. 11-20	48.0	35	4.5	57	105	6.6	95	2.5	293	106	20	
Apr. 21-27, 30	45.0	32	4.8	53	97	6.8	89	2.2	280	100	20	
May 1-5, 10	31.7	23	3.1	36	64	7.3	62	2.0	228	70	18	
May 14-19	18.4	19	2.1	25	50	5.7	25	35	155	56	15	
May 21-23, 25-26	9.5	6.8	2.1	11	34	5.3	11	.2	110	26	0	
June 1-6	13.5	17	2.3	8.3	54	4.1	15	.5	162	52	8	
June 8-15	27.3	17	3.0	35	53	8.6	55	1.5	236	55	11	
June 16-19	43.2	30	3.8	56	103	7.1	85	1.0	306	90	0	
June 21-23, 26	37.0	20	3.3	53	88	5.1	72	.8	243	64	0	
June 24-25, July 1-3	21.7	16	2.4	23	63	3.2	32	.8	159	50	0	
July 12-14, 17	21.2	20	2.4	21	60	5.7	35	1.2	168	60	11	
July 15-16, 18-20	41.1	26	4.1	48	65	2.2	91	1.8	298	82	28	
July 21-28, 30-31	45.0	29	4.2	53	84	3.9	93	.8	278	90	21	
Aug. 1-4, 14-15	43.3	35	4.9	49	92	4.3	94	1.2	282	108	32	
Aug. 16-20, 22-25, 28-29	43.2	33	4.6	54	111	4.8	87	1.2	271	101	10	
Sept. 1-6, 8-10	53.8	31	4.7	68	95	7.0	113	.8	311	97	19	
Sept. 11-14, 16-20, 28-30	54.3	29	4.6	70	85	7.7	118	.5	310	91	22	

San Jacinto River near Huffman, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at the Sheldon Pumping Plant of the City of Houston, 5½ miles downstream from the Huffman gaging station, located at Beaumont, Sour Lake and Western Railway Bridge, 0.4 mile downstream from confluence of East and West Forks of San Jacinto River and 3.4 miles southwest of Huffman.

Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as CaCO ₃	
									Parts per million	Total	Noncarbonate	
Oct. 2, 4-6, 8, 1945	31.6	17	3.5	50	50	6	70	1.2	208	57	16	
Oct. 11-17, 19-20	30.3	18	4.1	38	53	5.3	67	.8	210	62	18	
Oct. 21-27, 29-31	43.6	22	4.0	54	65	5.3	92	.8	262	71	18	
Nov. 1-3, 5-8, 10	41.7	24	3.0	54	69	5.5	90	.5	256	72	16	
Nov. 12-17, 19-20	40.8	23	4.0	50	62	4.6	90	.5	248	74	23	
Nov. 21, 23-25, 27-29	45.2	24	3.6	58	65	4.9	101	.8	278	75	21	
Dec. 1-4, 6, 8-10	17.8	14	2.2	16	39	3	30	1.2	146	44	12	
Dec. 13-16, 19-20	29.8	20	2.4	44	58	6	71	.8	222	60	12	
Dec. 21, 23-24, 26, 28-29	22.6	15	2.1	28	44	4	46	2.8	182	46	10	
Jan. 2-6, 1946	20.0	13	7.6	11	35	4.1	38	2.5	184	64	35	
Jan. 21-25	12.2	12	5.2	11	53	4.4	18	1.0	140	51	8	
Jan. 26, 28-31	28.2	19	5.3	29	46	9.1	58	3.0	218	69	32	
Feb. 3-5, 7-10	16.2	12	3.9	20	40	13	30	.2	152	46	13	
Feb. 11, 13-15, 19, 25-27	19.2	13	2.9	22	47	3.8	34	1.0	155	44	6	
Feb. 17-18, 20-23	10.9	10	2.7	7.9	35	1.5	16	.5	113	36	7	
Mar. 1-2, 4-9	25.2	19	4.3	28	61	5.1	50	1.0	171	65	15	
Mar. 11, 13-16, 18-20	20.8	18	4.1	21	69	4.7	32	1.8	156	62	5	
Mar. 21-23, 25-30	24.1	20	4.0	21	64	5.3	37	2.5	170	66	14	
Apr. 1-4, 17-18	20.2	18	4.1	15	51	5.6	33	1.5	159	62	20	
Apr. 5-6, 8-11, 19-20	38.7	28	3.9	43	79	6.6	76	.8	234	86	21	
Apr. 22-25	39.1	26	3.9	47	76	6.4	80	2.2	237	81	19	
May 1-4, 6-8	26.9	17	3.1	33	55	5.3	53	.8	187	55	10	
July 11-16, 20	27.1	18	2.8	31	58	4.2	50	.8	177	56	9	
July 21-22, 25-31	35.1	20	3.3	49	61	4.1	81	.8	245	64	13	
Aug. 1-5, 7-10	49.4	22	3.9	69	77	5.1	108	1.2	299	71	8	
Aug. 11-20	43.7	23	3.7	59	74	5.0	96	.8	260	73	12	
Aug. 21-23, 25-29	38.4	25	4.0	50	74	4.6	86	.5	248	79	18	
Sept. 1-3, 5-6, 9-10	48.2	23	4.4	71	80	5.3	112	1.2	294	76	10	
Sept. 11-16, 18-20	47.1	25	4.3	60	73	6.1	102	1.2	277	80	20	
Sept. 21-26, 28, 30	43.7	20	3.6	60	52	5.1	103	1.5	267	65	22	

Trinity River at Romayer, Texas, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at bridge of Gulf, Colorado and Sante Fe Railway, 1/4 mile west of Romayer and 2-1/2 miles downstream from Big Creek.

Analyzed by Geological Survey

Date of collection	Mean discharge (second-feet)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million		
										Dissolved solids per million	Hardness as CaCO ₃ Total	Non-carbonate
Oct. 1-9, 1945	2,833	68.3	45	6.2	98	126	38	134	2.0	397	138	34
Oct. 11-20	13,730	36.6	40	4.6	27	123	23	37	.8	230	119	18
Oct. 21-31	7,482	40.1	45	4.6	33	142	30	38	1.8	256	131	15
Nov. 1-10	2,852	52.5	49	6.1	47	146	31	67	3.2	310	147	28
Nov. 11-20	4,761	53.9	53	5.9	44	148	39	63	2.8	315	157	36
Nov. 21-30	2,564	52.7	55	5.7	39	143	44	56	5.1	312	161	44
Dec. 1-10	8,752	37.0	31	4.3	36	96	29	45	.8	239	95	16
Dec. 11-20	4,376	43.7	41	5.5	37	110	38	52	2.8	260	125	35
Dec. 21-31	2,889	51.0	44	6.1	50	120	37	75	1.8	305	135	37
Jan. 1-2, 4-5, 1946	3,122	62.6	51	7.4	68	142	48	97	2.0	369	158	42
Jan. 6-10	12,580	32.6	28	4.1	29	70	26	46	1.0	242	87	29
Jan. 11-15	14,580	37.0	32	6.3	33	84	30	54	2.2	268	106	37
Jan. 17-20	29,540	23.7	25	4.1	18	76	22	23	.0	177	79	17
Jan. 21-22, 24	18,350	29.4	30	4.5	16	84	26	22	2.0	206	93	24
Jan. 25-29	7,777	41.3	47	6.6	27	118	38	42	8.6	284	144	48
Feb. 1-9	10,630	49.4	51	6.9	39	123	48	59	8.0	312	156	53
Feb. 11-15	40,450	20.2	23	3.5	14	79	14	16	1.5	144	72	14
Feb. 17-19	27,020	32.3	37	3.8	25	115	30	26	1.5	212	108	28
Feb. 20-28	24,000	34.4	42	3.8	23	113	35	25	6.6	221	120	28
Mar. 1-7, 9-10	22,490	37.2	48	5.0	23	139	38	24	5.0	234	140	26
Mar. 11-12, 14-15, 20	22,100	38.9	44	5.5	26	115	37	35	7.5	238	132	38
Mar. 16-19	30,200	22.9	25	3.7	16	76	20	20	1.5	159	78	15
Mar. 21-26	15,080	44.9	52	5.8	34	140	51	40	3.0	282	154	39
Apr. 1-10	10,960	43.0	44	4.8	37	128	41	43	3.5	263	130	25
Apr. 11-12, 14-17, 20	3,778	50.7	55	6.9	44	164	46	54	4.5	315	166	30
Apr. 21-23, 25-30	4,584	64.5	54	7.1	67	149	52	93	3.5	382	164	42
May 1-5, 9	11,850	51.2	45	6.0	50	124	43	67	6.3	318	137	35
May 11-14	14,390	44.1	46	4.8	34	119	36	43	17	257	135	37
May 15-17, 20	40,600	18.5	14	6.7	12	57	12	21	1.0	146	62	16
May 23-31	22,680	35.7	43	4.4	24	125	32	29	1.0	221	125	23
June 2-4, 6-10	27,910	21.5	27	3.1	13	84	17	15	.5	157	80	11
June 11-16, 18-20	31,290	28.6	39	3.5	15	123	22	14	1.0	180	112	11
June 21-30	2,672	33.3	41	3.6	28	128	23	34	1.0	210	117	12

174

Trinity River at Romayor, Texas, October 1, 1945 to September 30, 1946
(Continued)

Date of collection	Mean discharge (second-foot)	Specific conductance (K x 10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids per million	Hardness as CaCO ₃	
											Total	Non-carbonate
July 1, 8-10, 1946	3,175	37.0	41	4.5	26	120	25	37	1.0	229	121	22
July 2-7	9,720	23.7	27	3.0	17	88	14	20	1.0	166	80	8
July 11-20	1,592	55.5	51	5.7	50	150	35	71	1.0	329	151	28
July 21-31	1,386	54.1	48	5.3	52	146	33	72	.8	320	142	22
Aug. 1-10	1,003	64.0	55	6.2	67	164	36	96	1.0	382	163	28
Aug. 11-14, 16-20	910	76.2	55	6.8	94	170	44	130	.8	451	166	26
Aug. 21, 23-31	1,459	74.1	45	6.2	101	156	37	134	1.2	422	138	10
Sept. 3-10	7,500	37.9	39	2.8	33	118	24	40	1.8	227	109	12
Sept. 11-20	1,497	46.5	45	4.9	42	138	28	57	1.5	272	132	19
Sept. 21-29	993	54.6	53	5.9	52	159	32	73	2.5	320	157	26
Weighted average	11,590	34.5	37	4.6	27	110	29	34	2.7	223	111	21

Analyses of samples collected in Lower Trinity River basin, 1945-1946

Trinity River at Devers Pumping Plant near Moss Bluff, Texas

Analyzed by Geological Survey

Date of collection	Specific conduc- (Kx10 ⁵ at 25°C)	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potassium (Na+K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Ni- trate (NO ₃)	Parts per million	
									Dissolved solids Parts per million	Hardness as CaCO ₃ Total
Aug. 21-31, 1946	76.3	56	8.0	94	183	42	130	0.8	454	173
Sept. 1-4	74.5	50	8.1	91	169	40	124	2.5	432	158
Sept. 5-10	35.7	36	4.6	34	116	24	43	3.0	226	109
Sept. 11-20	42.6	45	5.4	35	134	29	48	3.5	265	134
Sept. 21-30	50.4	52	6.2	44	153	27	67	4.0	302	156
Oct. 1-8	55.7	53	6.5	59	162	29	88	1.5	342	159

Trinity River at Barber Hill Pumping Plant on Old River near Cove, Texas

Aug. 23-31	88.7	55	11	109	159	44	172	2.0	518	182
Sept. 1-6	86.4	54	11	109	164	42	169	2.0	500	180
Sept. 7-11	42.6	40	5.1	44	121	26	63	1.5	259	121
Sept. 12-20	64.1	49	8.4	68	130	40	111	1.0	381	157
Sept. 22-23	36.1	32	3.9	36	100	15	54	.5	214	96
Sept. 21	72.1	--	--	--	140.	40	133	2.5	---	---
Oct. 1-10	47.4	44	7.3	45	161	11	66	.5	280	140
Oct. 11-16	51.0	47	7.2	48	162	17	71	1.0	296	147

Trinity River at Lone Star Pumping Plant in Anahuac, Texas

Aug. 22-31	75.8	58	8.1	82	176	35	124	1.8	426	178
Sept. 1-5	67.5	44	8.4	82	147	31	119	1.2	378	144
Sept. 6-10	40.8	41	4.6	36	123	27	49	3.0	246	121
Sept. 11, 15-20	36.5	39	3.5	31	114	28	38	3.5	220	112
Sept. 12, 14	69.3	46	11	74	128	39	122	3.0	392	160
Sept. 13	139	54	28	189	138	71	335	2.0	870	250
Sept. 21-22	36.0	32	4.7	44	128	24	44	2.8	226	99

Washita River near Durwood, Oklahoma, October 1, 1945 to September 30, 1946

Analyses of composites of daily samples collected at gaging station at Mulkey Bridge on State Highway 18, 1½ miles downstream from Caddo Creek and 4 miles north of Durwood. Drainage area 7,310 square miles.

Analyzed by Geological Survey

Date of collection	Specific conductance (Kx10 ⁵ at 25°C)	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Parts per million			
									Dissolved solids		Hardness as CaCO ₃	
									Parts per million	Total	Non-carbonate	
Oct. 1-3, 1945	21.9	31	8.9	1.2	104	20	7.0	0.8	140	114	29	
Oct. 4-7	50.0	63	20	16	186	85	22	2.5	328	239	86	
Oct. 8-10	69.3	82	34	20	250	121	38	3.0	456	344	140	
Oct. 11-20	89.6	94	47	34	312	160	54	3.2	610	428	172	
Oct. 21-31	82.4	52	52	48	197	187	63	3.7	554	344	182	
Nov. 1-10	105	85	59	59	315	196	83	3.0	696	454	196	
Nov. 11-20	113	98	62	55	334	221	80	1.8	747	500	226	
Nov. 21-30	105	86	59	51	262	226	81	2.5	694	456	241	
Dec. 1-8, 10	108	96	62	44	283	234	80	3.0	724	494	262	
Dec. 11-20	118	129	61	43	368	244	77	3.5	816	573	271	
Dec. 21-31	121	128	62	45	355	255	81	3.0	840	574	284	
Jan. 1-4, 1946	114	102	59	59	302	256	77	4.1	734	497	250	
Jan. 5-6	28.0	35	7.7	12	119	21	17	.8	172	119	21	
Jan. 7-10	63.4	71	21	36	231	80	48	2.2	407	264	74	
Jan. 11, 14-15, 18-20	76.3	84	31	44	269	137	48	2.8	516	337	116	
Jan. 12-13, 16-17	55.6	60	21	35	214	73	42	2.2	350	236	60	
Jan. 21-31	101	98	46	60	320	195	69	2.5	667	434	171	
Feb. 1-10	95.1	76	52	62	249	221	71	4.5	680	404	200	
Feb. 11-12, 17	105	85	51	78	335	209	68	4.0	719	422	147	
Feb. 13-16	71.0	80	31	33	257	114	48	3.0	468	327	116	
Feb. 18-19	36.6	43	17	7.1	145	40	22	1.5	240	177	58	
Feb. 20-22	59.8	59	21	29	207	78	31	3.0	367	234	64	
Feb. 23-27	90.5	81	41	53	233	203	57	4.0	609	370	180	
Mar. 1-10	98.7	80	49	63	264	210	71	3.5	730	401	184	
Mar. 11, 17-20	97.2	87	44	64	315	173	64	3.0	697	398	140	
Mar. 12-14, 16	72.4	71	26	41	242	97	51	2.5	465	284	86	
Mar. 21-23, 24-25, 31	92.0	68	42	64	233	184	68	2.5	576	342	151	
Mar. 27-30	54.3	55	20	27	199	60	36	2.5	331	220	56	
Apr. 1-10	89.9	74	44	63	266	180	68	2.2	592	366	148	
Apr. 11-15, 18-20	102	90	49	68	318	201	73	1.8	712	426	166	
Apr. 16-17	49.3	39	19	42	188	64	32	2.2	351	176	22	
Apr. 21-23, 25-30	89.9	77	37	60	269	151	67	2.8	575	344	124	
May 1	87.3	---	---	---	---	---	54	---	---	---	---	
May 2	104	---	---	---	---	---	---	---	---	---	---	

37

Washita River near Turwood, Oklahoma, October 1, 1945 to September 30, 1946
(Continued)

Analyzed by Geological Survey

Analyzed by Geological Survey			Parts per million		
Date of collection	Specific conductance (Kx10 ⁵ at 25° C)	Chloride (Cl)	Date of collection	Specific conductance (Kx10 ⁵ at 25° C)	Chloride (Cl)
May 3, 1946	100		June 7, 1946	70.8	
May 4	97.8		June 8	70.5	
May 5	104		June 9	71.8	
May 6	114	76	June 10	77.2	36
May 7	113		June 11	80.0	38
May 8	104		June 12	83.9	
May 9	114		June 13	89.2	
May 10	101		June 14	89.2	
May 11	97.0		June 15	91.9	50
May 12	101		June 16	95.6	
May 13	99.8		June 17	97.4	
May 14	101		June 18	98.0	
May 15	90.1		June 19	98.0	56
May 16	109	122	June 20	---	
May 17	50.2		June 21	84.0	
May 18	87.6	54	June 22	85.0	62
May 19	80.2		June 23	102	60
May 20	76.7	58	June 24	101	
May 21	70.5		June 25	100	
May 22	89.0	54	June 26	98.1	
May 23	87.2		June 27	98.1	
May 24	53.8		June 28	97.8	
May 25	35.4		June 29	95.5	
May 26	44.4	16	June 30	46.8	20
May 27	59.7		July 1	36.6	12
May 28	67.6		July 2	42.3	
May 29	69.9		July 3	44.6	
May 30	48.6		July 4	46.3	
May 31	30.5	8	July 5	46.3	
June 1	33.4		July 6	50.7	
June 2	30.4	10	July 7	49.0	16
June 3	42.0		July 8	53.8	
June 4	46.2	18	July 9	58.5	
June 5	61.3		July 10	61.0	18
June 6	67.7		July 11	69.8	22

Washita River near Durwood, Oklahoma, October 1, 1945 to September 30, 1946
(Continued)

Analyzed by Geological Survey

Analyzed by Geological Survey			Parts per million		
Date of collection	Specific conductance (Kx10 ⁵ at 25 °C)	Chloride (Cl)	Date of collection	Specific conductance (Kx10 ⁵ at 25 °C)	Chloride (Cl)
July 12, 1946	72.6		Aug. 16, 1946	105	
July 13	76.0		Aug. 17	105	
July 14	80.6		Aug. 18	102	
July 15	73.8		Aug. 19	95.0	
July 16	86.5		Aug. 20	25.3	12
July 17	90.8		Aug. 21	91.0	
July 18	96.2		Aug. 22	99.0	60
July 19	97.8		Aug. 23	65.9	
July 20	95.4	46	Aug. 24	66.7	
July 21	98.6		Aug. 25	85.9	
July 22	96.6	48	Aug. 26	53.4	30
July 23	96.6		Aug. 27	44.8	
July 24	103		Aug. 28	43.5	
July 25	100		Aug. 29	46.5	
July 26	98.6		Aug. 30	35.5	22
July 27	96.6		Aug. 31	47.5	
July 28	99.6		Sept. 1	71.1	36
July 29	102		Sept. 2	63.0	
July 30	105		Sept. 3	54.3	
July 31	105	64	Sept. 4	49.4	
Aug. 1	91.7		Sept. 5	60.3	32
Aug. 2	89.2	68	Sept. 6	70.8	
Aug. 3	97.2		Sept. 7	85.7	
Aug. 4	100		Sept. 8	74.9	
Aug. 5	100		Sept. 9	82.0	
Aug. 6	90.7		Sept. 10	84.4	52
Aug. 7	97.2		Sept. 11	76.5	
Aug. 8	98.1		Sept. 12	79.3	48
Aug. 9	104	74	Sept. 13	81.6	
Aug. 10	103		Sept. 14	84.9	
Aug. 11	101		Sept. 15	84.9	
Aug. 12	103		Sept. 16	84.0	
Aug. 13	95.0		Sept. 17	83.2	
Aug. 14	105	72	Sept. 18	86.7	64
Aug. 15	102		Sept. 19	75.6	52

Washita River near Durwood, Oklahoma, October 1, 1945 to September 30, 1946
(Continued)

Analyzed by Geological Survey			Parts per million		
Date of Collection	Specific conductance (Kx10 ³ at 25°C)	Chloride (Cl)	Date of collection	Specific conductance (Kx10 ³ at 25°C)	Chloride (Cl)
Sept. 20, 1946	84.0		Sept. 26, 1946	59.3	
Sept. 21	98.7	78	Sept. 27	50.2	28
Sept. 22	81.8		Sept. 28	59.3	
Sept. 23	70.6	52	Sept. 29	70.6	
Sept. 24	-----		Sept. 30	81.3	
Sept. 25	69.3				

MISCELLANEOUS ANALYSES, SINGLE SAMPLES OF STREAM WATERS

No.	Date of Collection	Specific conductance (Kx10 ⁵ at 25°C)	Analyzed by Geological Survey								Parts per million	
			Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)	Dissolved solids	Total hardness as CaCO ₃	
1	8-16-46	228	--	--	--	117	273	518	--	--	--	
2	9-16-46	60.8	--	--	--	110	50	91	--	--	--	
3	8-11-46	233	--	--	--	120	280	520	--	--	--	
4	9-18-46	98.7	--	--	--	109	99	180	--	--	--	
5	8-19-46	220	--	--	--	99	261	492	--	--	--	
6	9-7-46	84.9	--	--	--	136	81	139	--	--	--	
7	8-20-46	195	--	--	--	--	--	405	--	--	--	
8	5-24-46	310	208	73	373	113	848	455	0.8	2,100	819	
9	9-19-46	83.6	76	20	70	152	161	88	.4	508	272	
10	5-8-46	--	--	--	--	114	762	1,070	--	--	--	
11	4-18-46	--	74	46	109	214	144	196	1.2	785	374	
12	5-23-46	44.6	58	7.1	20	110	81	28	.2	264	174	
13	6-5-46	151	59	18	192	128	7.1	360	.5	778	221	
14	1-16-46	30.3	28	12	18	130	15	21	.8	180	119	
15	9-21-46	59.5	63	11	51	194	98	45	.0	375	202	

DESCRIPTION OF SAMPLING POINTS

1. Brazos River near Glen Rose, Texas.
2. Brazos River near Glen Rose, Texas.
3. Brazos River near Whitney, Texas.
4. Brazos River near Whitney, Texas.
5. Brazos River at Waco, Texas.
6. Brazos River at Waco, Texas.
7. Brazos River near Bryan, Texas.
8. Clear Fork Brazos River near Breckenridge, Texas.
9. Clear Fork Brazos River near Stamford, Texas.
10. Colorado River near Bronte, Texas.
11. Concho River near Concho, Texas.
12. Keeche Creek near Graford, Texas.
13. Little Wichita River near Henrietta, Texas.
14. Llano River at Llano, Texas.
15. West Fork Trinity River near Bridgeport, Texas.

111