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WATER BULLETIN NUMBER 2

Flow of the Rio Grande
and
Tributary Contributions

*From San Marcial, New Mexico to
the Gulf of Mexico*

For the Year 1932

Also

ANALYSES OF WATER SAMPLES

for

Silt, Salt, Chemical Constituents and Bacteria

and

Stored Water in Large Reservoirs of the Rio Grande Basin

1924 - 1932

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FOREWORD

This compilation of stream discharge measurements is the second unified publication of data relative to the cooperative determination of the flow of the international portion of the Rio Grande, the first such publication being Water Bulletin No. 1 issued in 1932. These data are published jointly by the United States and Mexican Sections of the International Boundary Commission and represent the results of stream flow measurements made on the Rio Grande and on certain tributaries near their confluence, from San Marcial, New Mexico, which is at the head of Elephant Butte reservoir, to the Gulf of Mexico, for the year 1932.

International stream gaging was begun in 1897, with the operation of the station at El Paso, Texas. A number of stations on the Lower Rio Grande and tributaries below El Paso were established in 1900 and operated until 1914. From 1914 to 1923 all such work was suspended except for a few months in 1919. In 1923 the work was resumed and carried on independently by the two countries until 1931 when the present cooperative work began.

The duties and functions of the United States Section of the International Water Commission were transferred to the United States Section of the International Boundary Commission by Act of June 30, 1932. On January 1, 1932, the Mexican Section of the International Boundary Commission similarly took over the duties of the Mexican Section of the International Water Commission.

This cooperative arrangement for obtaining hydrographic data is the result of the concurrence and agreement by both sections of the International Commission that a coordinated result should be insured and that an accurate and complete hydrographic record of international flow was necessary.

Of stream gaging stations on the Rio Grande, those at Laredo, Texas, and Matamoros, Tamaulipas, were operated in 1932 by the Mexican Section of the Commission, the others by the United States Section. Each section operated the gaging stations on tributaries entering the Rio Grande from its own country, or on floodways or diversions within its borders.

ACKNOWLEDGEMENTS

The United States Bureau of Reclamation has cooperated by furnishing data on the salt and silt content of Rio Grande water above Fort Quitman, and the record of stored water in Elephant Butte and Carlisbad reservoirs. Specific acknowledgement is made where the data appear herein.

The United States Department of Agriculture has assisted greatly by analyzing water samples for silt, salt and chemical constituents. Specific acknowledgement is likewise made where the data appear.

The Federal Board of Public Improvements of Nuevo Laredo, Tamps., furnished the results of chemical and bacteriological analyses of water of the Rio Grande taken by them at Nuevo Laredo.

The National Irrigation Commission of Mexico furnished the records relative to storage of water in the Don Martin reservoir of National Irrigation System No. 4, Coahuila—Nuevo Leon, Mexico.

The Cia. Agricola y de Fuerza Electrica del Rio Conchos, S. A., cooperated, giving the records pertaining to storage in Lake Toronto, La Boquilla dam, Chih., Mexico.

STREAM GAGING STATION RECORDS — 1932

The records of the various gaging stations appear in this publication in the same sequence as they naturally occur in passing down the river.

There is here reported the results of measurements at seventeen points along the Rio Grande and the contributing flow from twenty tributaries. The flow of the Rio Conchos was not measured directly, but its flow may be calculated by taking the difference in flow at the Upper Presidio and Lower Presidio stations and adding thereto the diversions between the Upper and Lower Presidio stations. These diversions are reported herein. Flood flows in the North and the South Floodways on the American side near McAllen, Texas, are also reported here.

UNUSUAL FLOODS

A very brief digest is presented here of full data and report on the greatest flood ever recorded on the Rio Grande—the 1932 flood.

SALT DETERMINATIONS AND CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES — 1932

Collected here are the available data with reference to the quality of the water of the Rio Grande and tributaries near their confluence for the year 1932, with reference to its use particularly for irrigation.

CHEMICAL AND BACTERIOLOGICAL ANALYSES OF RIO GRANDE WATER

For the year 1932 there is shown the chemical and bacteriological analyses of water from the Rio Grande at Nuevo Laredo, Tamaulipas, with reference to its use for domestic water supply purposes.

SILT SAMPLING OF RIO GRANDE WATER

Silt sampling data, in addition to that in Water Bulletin No. 1, for the years 1924 to 1931 for the Rio Grande are presented here, as well as that for the year 1932, together with deductions therefrom. They are of particular value when considering the probable life of storage reservoirs on the river.

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

For the Elephant Butte reservoir on the Rio Grande in New Mexico, the McMillan and Avalon reservoirs on the Pecos river in New Mexico, the Boquilla reservoir on the Rio Conchos in Chihuahua, and the Don Martin reservoir on the Rio Salado in Coahuila, there is shown here the quantity of water in storage on the last day of each month for the years 1924 to 1932 inclusive, except that storage began in the Don Martin reservoir in 1930.

RIO GRANDE AT SAN MARCIAL STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located at new railroad bridge about one mile below San Marcial, New Mexico. Zero of gage is 4,455.38 feet above United States Coast and Geodetic Survey sea level datum.

Records: Based upon 44 current meter measurements from highway bridge half a mile northeast of San Marcial and 163 current meter measurements at cable about 1,000 feet above new railroad bridge. Computations by shifting channel methods. 1932 records considered good.

Records Available: January, 1895 to December, 1932.

Remarks: January 25, 1895, gage at A. T. & S. F. railroad bridge $\frac{3}{4}$ mile below San Marcial with gage zero at 4,444.75. May 28, 1920, dike broke above gage resulting in establishment of gage June 14, 1929, on highway bridge $\frac{1}{2}$ mile above San Marcial with gage zero 4,452.33. Beginning July 23, 1920, old gage at railway used again. May 6, 1921, same dike broke and from May 10, 1921, two channels were metered until February 16, 1922, after which a new gage with zero at 4,461.53 on highway bridge $\frac{1}{2}$ mile above San Marcial was used. The zero of this gage changed to 4,463.33 on May 3, 1922, and to 4,462.33 on December 29, 1923. Gage zeros reported here are all in feet above United States Coast and Geodetic Survey mean sea level datum. March 13, 1932, gaging station moved to its present location. The elevation of gage zero reported for 1931, in Water Bulletin No. 1, was erroneous, and should have been reported as 4,462.33.

There are many irrigation diversions above this station in New Mexico and Colorado which modify the river flow. With all closed basins eliminated the drainage area above this station is 27,806 square miles, all in the United States.

Previous Extreme Flows: The greatest flow ever recorded occurred September 24, 1929, when the peak gage reading was 7.804 and the peak flow was estimated to have been 47,000 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	918	618	1,430	1,510	2,870	6,350	5,040	1,060	1,260	253	436	558
2	836	730	1,580	1,540	2,780	6,150	6,080	1,310	783	274	534	610
3	857	816	1,640	1,560	2,660	5,200	6,350	778	593	281	519	629
4	808	656	2,170	2,130	2,660	4,600	5,910	476	518	247	498	622
5	767	1,400	2,140	3,440	3,000	4,010	4,570	365	480	227	495	668
6	848	955	1,800	3,630	3,760	4,100	3,590	270	499	246	514	719
7	860	858	1,580	4,640	4,680	3,960	3,530	209	410	189	480	701
8	912	501	1,410	4,500	5,400	3,640	3,140	208	305	186	468	689
9	860	879	*1,240	4,060	5,450	3,240	2,810	239	247	179	466	636
10	831	974	1,370	3,600	5,080	3,030	2,460	278	224	179	411	604
11	630	1,310	1,660	3,590	5,460	2,720	2,290	91.6	165	195	384	602
12	559	1,100	1,940	3,260	6,480	2,420	1,900	91	129	212	389	593
13	577	1,700	2,010	3,160	6,540	2,470	3,910	45.7	76.8	243	522	647
14	588	1,610	1,700	3,610	6,930	2,450	2,720	34.8	54.1	206	529	742
15	300	1,220	1,530	3,370	6,920	2,350	2,350	28.9	52.0	187	558	610
16	661	1,140	1,260	4,490	6,830	2,180	1,900	* 2.6	20.7	178	488	588
17	1,100	1,430	1,220	4,670	6,960	2,340	1,550	0	10.6	183	520	634
18	700	1,260	1,210	4,600	7,390	2,580	1,830	15.6	* 5	169	523	622
19	524	1,500	1,260	5,580	7,930	3,260	1,660	1,660	* 2	161	536	642
20	587	1,410	1,230	5,730	8,860	3,880	1,320	1,250	0	160	633	748
21	652	970	1,410	4,840	9,480	3,680	1,020	2,740	0	186	583	† 710
22	709	1,140	1,820	5,370	10,470	3,460	900	2,400	0	222	597	† 650
23	592	1,180	2,660	6,300	12,420	3,320	795	1,160	0	232	603	† 668
24	244	1,590	1,920	5,780	11,750	3,170	1,350	842	0	265	647	† 658
25	922	1,470	1,580	5,420	11,190	3,170	1,990	1,290	0	216	665	† 608
26	1,030	1,210	1,460	4,000	10,830	3,100	1,670	732	17.0	291	612	† 578
27	856	690	1,480	3,370	10,570	3,190	1,810	654	73.8	694	607	† 548
28	778	1,190	1,680	3,370	9,410	3,620	1,740	304	55.0	725	602	† 518
29	649	786	1,210	3,560	7,780	4,350	1,370	4,340	66.7	574	565	† 413
30	426	-----	1,520	3,070	7,850	4,920	888	5,070	104.0	465	575	† 308
31	455	-----	1,410	-----	6,800	-----	782	2,660	-----	431	-----	† 269

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	3.11	2.15	1,510	134	711	43,710	
February.....	3.80	2.64	3,150	360	1,114	64,050	
March.....	5.53	4.13	3,130	994	1,598	93,240	
April.....	6.25	4.53	6,890	1,350	3,945	234,750	
May (23).....	7.31	4.34	12,800	2,540	7,008	430,920	
June.....	6.57	4.78	6,970	2,100	3,564	212,060	
July.....	6.69	4.00	8,730	423	2,556	157,140	
August.....	8.15	-----	8,250	0	987	60,700	
September.....	4.52	-----	1,810	0	205	12,200	
October.....	4.76	3.51	1,070	157	273	16,770	
November.....	4.82	4.07	660	340	532	31,650	
December.....	5.39	-----	817	† 269	606	37,270	
Yearly.....	8.15	-----	12,800	0	1,928	1,399,460	50.33

*Estimated †Partly estimated

‡Erroneously reported as 7.40 in Water Bulletin No. 1

RIO GRANDE AT EL PASO STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located in the pass opposite Courchesne quarry, four miles northwest of El Paso, Texas. Zero of gage is 3,720.65 feet above United States Coast and Geodetic Survey mean sea level datum.

Records: Based upon 145 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1932 records considered good.

Records Available: May, 1897 to December, 1932. Records are also available for station at old Fort Bliss, 1,500 feet above International Dam and three miles below present station, from May, 1889 to June, 1893, and for station at pump house of Smelter Company, one mile below present station, from January, 1895 to May, 1897.

Remarks: There are many irrigation diversions above this station in New Mexico and Colorado. The river flow is regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 32,819 square miles, all in the United States.

Previous Extreme Flows: The greatest flow ever recorded was on June, 12, 1905, when the mean daily flow reached 23,700 second feet. Prior to 1916 the river sometimes was dry. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	173	128	346	856	1,120	1,230	1,210	1,690	1,430	1,850	262	224
2	169	120	346	938	975	1,190	1,130	1,560	1,400	1,560	256	231
3	175	116	363	1,040	825	1,200	1,200	1,330	1,250	994	269	293
4	177	115	407	1,090	742	1,300	1,610	1,250	1,200	712	303	312
5	173	211	465	951	766	1,270	858	1,170	1,240	402	473	449
6	173	366	551	913	790	1,440	947	1,200	1,060	540	471	535
7	174	328	550	1,020	1,080	1,280	933	1,210	955	634	582	609
8	171	393	397	948	1,070	1,200	1,040	1,610	904	552	801	590
9	164	394	382	999	1,110	1,030	1,320	1,790	906	544	579	497
10	166	420	447	819	990	1,060	1,300	1,240	847	473	434	446
11	165	414	550	1,050	1,020	1,090	1,410	1,430	1,030	420	346	349
12	157	320	722	1,040	1,240	1,030	1,570	1,330	1,060	402	297	310
13	154	286	700	967	1,190	1,110	1,510	1,240	964	389	290	267
14	147	291	678	944	1,040	1,070	1,450	1,400	1,040	386	292	242
15	149	264	536	990	991	1,030	1,230	1,510	1,120	371	294	255
16	148	229	503	750	1,070	982	1,350	1,350	1,170	344	309	263
17	146	165	403	777	1,160	1,400	1,220	1,190	1,050	334	318	274
18	145	272	480	862	1,040	1,350	1,120	1,300	869	264	421	374
19	146	303	657	991	1,020	1,260	1,080	1,410	948	434	394	508
20	147	514	623	881	962	1,250	1,040	1,430	916	561	401	652
21	143	363	724	961	770	1,140	1,150	1,600	916	625	427	789
22	143	433	705	953	758	1,160	1,140	1,510	988	831	703	611
23	138	368	643	1,160	823	1,510	969	1,290	1,130	1,020	940	352
24	145	300	564	1,150	911	1,450	1,080	1,240	1,150	577	640	300
25	124	276	548	1,050	970	1,470	1,800	1,320	1,560	428	369	260
26	119	286	406	906	966	1,450	1,590	1,230	1,620	401	323	250
27	114	221	408	966	1,060	1,370	1,390	1,130	1,470	330	290	214
28	106	268	637	979	1,090	1,330	1,330	1,090	1,140	324	256	223
29	107	342	919	960	1,300	1,240	1,380	1,570	1,250	316	260	267
30	121	-----	819	947	1,400	1,230	1,620	1,620	1,420	283	256	264
31	126	-----	929	-----	1,240	-----	1,580	1,990	-----	274	-----	263

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January (28).....	1.15	0.84	187	99.2	148.5	9,130	
February.....	2.00	0.90	599	110	293	16,880	
March.....	2.35	1.37	1,020	198	562	34,530	
April.....	2.67	1.91	1,420	676	962	57,240	
May.....	2.80	2.02	1,500	651	1,016	62,460	
June.....	2.94	2.22	1,650	917	1,237	73,630	
July.....	3.52	1.81	2,180	500	1,276	78,460	
August (31).....	3.76	2.43	2,630	993	1,395	85,750	
September.....	3.71	2.28	2,430	784	1,133	67,440	
October.....	3.68	1.53	2,410	261	567	34,860	
November.....	2.57	1.39	1,060	227	410	24,370	
December.....	2.25	1.29	858	100	366	22,490	
Yearly.....	3.76	0.84	2,630	99.2	794	567,240	17.28

†Partly estimated

RIO GRANDE AT TORNILLO BRIDGE STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located at highway bridge 2 miles west of Tornillo, El Paso County, Texas. Zero of gage is 3,578.63 feet above sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 104 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1932 records considered good.

Records Available: October, 1927 to December, 1932. Station maintained for several years prior to October, 1927, by United States Bureau of Reclamation.

Remarks: The river flow is greatly modified at this station by irrigation diversions into Mexico and the United States and by Elephant Butte reservoir in the United States.

Previous Extreme Flows: The greatest flow ever recorded was on August 14, 1929, when the extreme gage height was 14.72 feet and the extreme flow was 3,440 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	32.1	105	† 132	83.7	191	205	149	604	852	1,340	248	248
2	24.6	110	† 89.4	70.3	354	130	135	427	634	1,390	245	223
3	19.9	101	† 15.1	100	176	137	227	334	420	1,520	240	215
4	144	103	† 15.7	257	45.4	186	330	218	396	1,420	225	212
5	152	106	16.2	258	20.0	407	384	194	391	901	218	240
6	109	112	71.7	160	14.6	408	62.7	153	341	652	249	300
7	139	207	158	58.2	20.0	510	16.9	331	137	631	226	189
8	142	251	177	132	359	302	19.6	538	73.9	592	196	258
9	142	196	225	156	314	194	114	821	73.6	531	338	278
10	144	125	251	310	272	98.0	295	937	63.3	476	285	266
11	139	105	247	166	208	52.9	295	654	93.3	471	173	291
12	135	139	165	163	469	188	399	572	162	380	150	298
13	133	122	230	142	558	200	458	374	107	423	148	257
14	123	104	320	172	514	94.0	488	533	69.9	387	199	242
15	128	116	227	157	459	47.9	445	605	70.9	352	224	240
16	123	172	168	47.9	354	24.6	331	485	277	349	209	241
17	124	167	137	31.7	325	21.2	500	323	379	372	210	260
18	118	163	60.3	69.3	342	219	282	509	275	294	195	274
19	124	137	24.9	15.5	215	309	126	531	205	204	* 186	288
20	129	163	42.2	15.1	122	210	75.8	454	131	231	* 183	412
21	137	447	210	21.9	70.5	202	52.1	516	112	357	* 171	462
22	121	416	259	39.7	43.9	145	109	586	130	417	* 162	380
23	118	387	62.0	103	37.4	192	186	392	300	561	* 156	327
24	114	314	20.8	295	11.1	456	217	206	347	624	* 192	196
25	115	258	14.1	270	8.8	427	247	177	623	368	281	92
26	120	200	23.6	40.4	16.6	444	565	184	825	256	160	93
27	113	154	19.6	17.9	32.2	494	477	74	930	256	239	170
28	107	165	26.1	14.3	22.3	360	439	196	888	288	281	226
29	103	134	25.1	70.2	122	386	460	167	1,140	285	278	230
30	105	-----	84.7	70.0	308	255	398	767	1,300	238	263	203
31	103	-----	58.2	-----	310	-----	581	785	-----	251	-----	210

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	10.21	8.81	170	17.6	115.5	7,100	
February.....	11.25	9.74	609	76.4	183	10,470	
March.....	11.07	8.79	419	6.1	115	7,100	
April.....	11.09	8.89	550	9.6	117	6,960	
May (7).....	11.39	8.92	686	0.9	204	12,530	
June.....	11.38	8.95	624	† 7.3	243	14,490	
July.....	11.61	8.88	701	1.4	287	17,640	
August.....	12.03	9.95	997	34	440	27,070	
September.....	12.63	9.25	1,350	30.2	392	23,300	
October (4).....	12.95	10.56	1,610	148	542	33,560	
November.....	11.23	10.28	431	112	218	12,950	
December.....	11.63	10.15	537	20	252	15,510	
Yearly.....	12.95	8.79	1,610	0.9	260	188,480	

*Estimated †Partly estimated

RIO GRANDE AT FORT QUITMAN STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located at lower end of El Paso Valley, 1½ miles below Old Fort Quitman and 11½ miles south of Finlay, in Hudspeth County, Texas. Zero of gage is 3,454.06 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 60 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1932 records considered good.

Records Available: January, 1923 to December, 1932.

Remarks: There are many irrigation diversions above this station in New Mexico, Colorado, Texas, and Mexico. The river flow is regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 34,450 square miles; 33,616 being in the United States and 834 in Mexico.

Previous Extreme Flows: The greatest flow ever recorded was on September 11, 1925, when the extreme mean daily gage height was 7.02 feet and the mean daily flow was 2,600 second feet. The smallest daily flow was 20 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	147	117	239	108	68.4	84.5	242	332	676	1,430	361	347
2	147	117	218	129	76.1	113	210	402	710	1,440	327	320
3	149	111	243	127	82.6	115	180	470	758	1,470	325	297
4	163	112	276	114	151	111	185	355	759	1,510	325	278
5	155	138	230	102	129	115	213	262	655	1,510	308	269
6	107	148	205	136	93.5	145	229	183	569	1,460	291	265
7	147	147	175	151	80.3	232	251	182	483	1,010	284	270
8	131	143	161	151	72.7	249	286	244	412	845	329	316
9	123	170	174	125	81.5	275	273	425	305	759	366	353
10	140	279	191	117	108	213	197	753	254	606	383	433
11	148	241	194	132	190	162	179	581	216	658	426	449
12	150	221	213	140	242	150	217	642	211	615	400	430
13	145	214	230	178	171	128	235	638	193	651	358	375
14	133	207	246	130	230	107	262	577	168	591	342	342
15	135	216	237	155	323	135	309	511	159	571	319	325
16	133	194	320	153	348	90.9	344	521	171	532	276	304
17	127	163	303	168	342	94.4	322	507	180	480	305	304
18	129	137	218	159	278	90.2	258	412	192	436	304	310
19	124	156	158	125	227	76.2	254	396	253	396	293	318
20	124	171	148	90	225	75.7	194	430	209	375	284	326
21	124	198	117	78.1	174	131	121	419	190	368	293	313
22	129	216	121	71.6	158	144	124	395	200	437	368	418
23	126	347	157	71.1	137	137	121	470	227	521	373	477
24	133	366	240	84.2	108	137	121	494	256	638	355	502
25	123	366	212	91.9	86	141	143	339	377	782	381	481
26	115	364	135	86.9	77.8	241	140	218	516	636	465	390
27	118	326	122	157	67.5	243	137	160	725	501	444	300
28	123	283	106	119	66.6	267	245	181	857	462	374	278
29	124	† 254	78.5	77.1	70.8	289	261	179	1,320	441	375	238
30	118	-----	69.5	71	87.7	254	259	422	1,620	429	363	270
31	113	-----	89.5	-----	75.2	-----	518	460	-----	398	-----	264

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	1.61	1.20	169	89	132	8,130	
February.....	2.51	1.27	364	85	211	12,140	
March.....	2.34	0.97	340	62.5	188	11,560	
April.....	1.74	0.92	205	66	119.9	7,130	
May (27).....	2.47	0.81	363	60.1	149	9,180	
June.....	2.18	0.92	313	68.1	158	9,410	
July.....	4.12	1.13	939	102	227	13,940	
August.....	4.71	1.47	1,200	137	405	24,910	
September (30).....	5.87	1.49	1,820	143	461	27,410	
October.....	5.34	2.60	1,530	358	743	45,720	
November.....	2.90	2.08	474	259	347	20,620	
December.....	3.02	1.94	511	211	341	20,970	
Yearly.....	5.87	0.81	1,820	60.1	291	211,120	6.13

†Partly estimated

RIO GRANDE AT UPPER PRESIDIO STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,579.40 feet above mean sea level, International Boundary Commission datum.

Records: Based on 59 current meter measurements during the year from cable car and by wading. Computations by shifting channel methods. 1932 records considered good.

Records Available: 1900 to 1912; August, 1923 to 1926; 1928 to 1932.

Remarks: River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,259 in Mexico.

Previous Extreme Flows: The greatest flow ever recorded was in August, 1928, with a peak of 11,250 second feet. The river is sometimes dry. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	202	103	324	68.7	6.2	7.92	99.1	141	1,690	2,280	484	367
2	205	100	298	62.2	5.6	7.13	239	129	1,170	† 2,840	459	326
3	208	95.3	270	53.6	4.6	6.95	264	253	769	† 2,330	439	322
4	212	96.3	240	50.5	4.1	6.07	29.6	271	893	† 1,720	420	315
5	190	94.7	223	45.3	3.7	5.30	† 183	619	2,150	1,550	413	312
6	183	89.4	224	37.0	3.7	4.82	† 110	579	1,290	1,410	409	315
7	177	92.6	218	33.3	4.1	3.61	† 98.5	569	897	1,320	414	300
8	167	91.0	230	30.8	3.6	3.26	186	635	710	1,300	401	282
9	166	81.2	210	31.8	3.1	3.18	181	487	506	† 1,170	387	279
10	159	81.2	191	30.9	2.6	2.46	149	563	455	† 992	377	284
11	155	83.7	177	25.8	3.4	1.63	216	1,500	430	† 833	359	283
12	154	88.2	164	32.0	45.2	1.55	222	884	362	† 848	380	314
13	155	88.6	161	27.7	33.0	1.48	† 160	810	320	830	394	350
14	141	100	163	15.3	90.7	1.40	† 73.6	694	315	958	426	401
15	130	153	166	15.4	73.7	4.27	† 35.2	578	286	1,090	440	411
16	127	176	151	21.5	45.3	.76	† 28.6	556	264	785	406	383
17	132	184	143	20.7	57.3	0	† 23.7	525	238	744	376	361
18	131	169	136	18.4	46.3	0	† 22.1	538	207	706	355	344
19	126	168	140	24.5	46.6	0	† 22.0	561	192	659	331	340
20	122	446	155	17.2	84.1	0	† 42.8	564	214	639	311	329
21	124	304	190	14.5	97.8	0	33.9	528	164	609	315	322
22	120	284	150	11.8	95.1	0	31.0	416	140	531	305	320
23	117	263	113	10.2	74.7	0	130	324	157	487	290	321
24	114	256	102	10.2	61.8	0	† 79.5	255	260	474	281	365
25	115	242	91	10.7	54.3	0	† 77.7	209	316	481	294	395
26	111	218	87	10.3	44.4	0	† 49.2	201	262	536	336	419
27	106	278	76.6	9.5	31.8	0	† 22.9	190	326	615	332	435
28	104	318	79.6	8.6	25.1	300	* 18.1	192	552	655	325	439
29	105	324	92	9.5	18.1	28.3	† 181	158	2,070	578	351	409
30	105	-----	86.3	7.8	14.6	28.6	202.7	3,030	2,260	525	392	370
31	102	-----	72.6	-----	11.7	-----	168	4,340	-----	503	-----	339

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	5.61	5.19	214	98.9	144	8,860		
February.....	8.52	5.04	1,360	76.8	175	10,040		
March.....	6.19	5.08	330	69.7	165	10,160		
April.....	5.10	† 4.40	71.5	† 6.7	25.5	1,520		
May.....	5.43	4.30	134	2.1	35.4	2,170		
June (17-27).....	9.61	-----	924	0	14.0	830		
July.....	8.42	† 4.31	494	† 2.8	118	7,230		
August (31).....	10.54	5.40	4,380	125	687	42,260		
September.....	11.02	5.43	2,370	125	662	39,400		
October (2).....	13.20	5.98	3,200	472	1,000	61,450		
November.....	6.10	5.67	493	281	373	22,220		
December.....	6.09	5.61	442	277	347	21,330		
Yearly.....	13.20	-----	4,380	0	313	227,500	6.07	

*Estimated †Partly estimated

RIO GRANDE AT LOWER PRESIDIO STATION

Description: Automatic water-stage recorder and cable with sit down cable car located about 2½ miles above the international highway bridge at Presidio, Texas, and 1½ miles below the confluence of the Rio Conchos with the Rio Grande. The 60-foot mark on the gage is 2,560 feet above mean sea level, International Boundary Commission datum.

Records: Based on 60 current meter measurements during the year by wading and from cable car, 33 at the old station and 27 at the present station. Computations by shifting channel methods. 1932 records considered fair.

Records Available: 1900 to 1912; August, 1923 to 1926; 1928 to 1932.

Remarks: Station moved to its present location on June 14, 1932. The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States, and by Boquilla reservoir on the Rio Conchos, as well as by irrigation diversions in Mexico. With all closed basins eliminated, the drainage area above this station is 60,109 square miles, of which 35,250 are in the United States and 24,859 in Mexico.

Previous Extreme Flows: The greatest flow ever recorded occurred October, 1904, with a mean daily flow of 149,210 second feet. The lowest recorded flow was 3.5 second feet in May, 1904. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,100	959	1,100	674	318	233	126	993	2,270	45,970	1,720	1,180
2	1,120	945	1,150	586	383	209	424	734	* 1,670	88,300	1,690	1,180
3	1,190	972	1,080	657	329	201	1,140	794	* 1,270	61,630	1,630	1,180
4	1,130	897	907	636	315	205	790	661	* 1,390	42,650	1,540	1,180
5	1,000	800	1,090	743	354	187	443	1,010	* 2,650	39,870	1,530	1,180
6	939	805	1,090	675	368	184	350	922	* 1,790	26,770	1,550	1,180
7	951	955	1,100	676	293	187	266	714	1,480	18,790	1,530	1,180
8	915	887	840	556	320	217	2,600	1,510	1,980	13,990	1,500	1,180
9	940	994	766	556	342	218	1,720	1,900	3,010	10,180	1,470	1,180
10	* 930	975	923	626	348	196	1,230	5,120	4,640	8,890	1,430	1,180
11	920	916	781	627	331	189	1,120	7,310	52,670	7,540	1,480	1,370
12	944	790	804	594	367	174	888	10,430	73,950	6,540	1,450	1,370
13	1,010	846	884	590	391	150	518	9,470	32,860	5,670	1,470	1,370
14	964	910	1,020	590	340	136	362	7,300	11,500	5,360	1,470	1,370
15	831	931	871	483	358	125	303	5,630	5,540	5,110	1,450	1,200
16	883	1,100	1,180	491	358	98.7	255	4,100	3,710	4,680	1,440	1,120
17	942	1,040	1,090	508	367	91.2	179	3,120	2,620	4,440	1,390	1,120
18	1,010	996	869	496	348	80.3	179	2,570	2,330	4,020	1,320	1,120
19	1,020	885	809	494	309	65.1	172	2,300	2,200	3,510	1,320	1,120
20	1,090	1,740	872	522	296	59.8	154	1,870	2,120	3,060	1,330	1,120
21	1,030	2,000	987	479	287	54.4	145	1,530	2,000	3,020	1,310	1,120
22	907	1,860	902	393	303	50.0	137	1,220	1,920	2,950	1,300	1,120
23	877	1,430	804	336	282	55.6	248	974	1,810	2,880	1,300	1,120
24	906	1,260	842	348	286	57.8	249	944	1,690	2,990	1,230	1,120
25	935	1,220	672	384	293	155	219	999	1,530	2,450	1,230	1,120
26	1,010	1,000	672	393	278	139	299	725	1,470	2,140	1,260	1,120
27	1,010	988	795	345	292	178	275	659	1,470	2,160	1,280	1,120
28	899	1,110	701	340	296	1,060	1,000	683	2,110	1,940	1,230	1,120
29	929	1,120	789	335	246	184	548	708	18,250	1,980	1,520	1,120
30	894	---	656	327	228	137	489	3,790	29,180	1,880	1,340	1,120
31	933	---	613	---	223	---	524	5,150	---	1,720	---	1,120

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	15.03	14.25	1,360	769	973	59,820	
February.....	16.90	14.09	3,120	675	1,080	62,140	
March.....	15.06	13.88	1,310	591	892	54,860	
April.....	14.32	13.38	847	287	515	30,660	
May.....	13.75	13.12	475	220	318	19,530	
June (22).....	65.01	60.58	2,810	46.7	176	10,470	
July.....	64.48	60.74	5,780	92.4	560	34,410	
August.....	67.23	61.72	11,410	524	2,769	170,260	
September.....	76.50	62.40	82,550	1,090	9,103	541,650	
October (2).....	78.21	63.74	106,450	1,670	13,970	859,010	
November.....	63.84	62.98	1,800	1,190	1,425	84,810	
December.....	63.33	62.62	1,420	971	1,170	72,200	
Yearly.....	78.21	± 60.58	106,450	45.7	2,755	1,999,820	33.27

*Estimated

±See Remarks

ALAMITO CREEK STATION NEAR PRESIDIO, TEXAS

Description: Automatic water-stage recorder, about 1,000 feet above confluence with the Rio Grande, and 6 miles below Presidio, Texas. Zero of gage is 2,545.00 feet above mean sea level, International Boundary Commission datum.

Records: Based upon 12 current meter measurements by wading during the year and by numerous estimates by the hydrographer at low flow. 1932 records considered poor.

Records Available: January 1, to December 31, 1932.

Remarks: The flow of this spring fed creek is modified by a small irrigation diversion ¼ mile above the station. The low flow is steady, being from springs. The high flow is erratic, being from storms. The drainage area above this station is 1,504 square miles all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	↑	↑	↑	3.0	0.87	.9	1.9	* 1.5	† 2.75	3.50	2.5	3.5
2				3.0	0.87	.9	1.9	† 54.6	† 2.50	2.50	2.5	3.5
3				3.0	0.87	.9	1.9	† 43.5	† 2.50	2.50	2.5	3.5
4				3.0	0.87	.9	1.9	* 2.5	† 2.50	2.50	2.5	3.5
5				3.0	0.87	.9	1.9	* 2.5	† 2.50	2.50	2.5	3.5
6				3.0	0.87	.9	1.9	* 2.5	† 823	2.50	2.5	3.5
7				3.0	0.87	.9	1.9	* 2.5	† 758	2.50	2.5	3.5
8				3.0	0.87	.9	1.9	† 974	† 8.50	2.50	2.5	3.5
9				3.0	0.87	.9	† 14.2	† 421	† 3.75	2.50	2.5	3.5
10				3.0	0.87	.9	† 206	1,210	† 2.25	2.50	2.5	3.5
11				3.0	0.87	.9	4.2	* 2.5	2.25	2.50	2.5	3.5
12				3.0	0.87	.9	1.9	† 21.9	2.25	2.50	2.5	3.5
13	†2.5			3.0	0.87	.9	1.9	* 3.0	2.50	2.50	2.5	3.5
14				3.0	0.87	.9	1.9	* 2.5	2.50	2.50	3.0	3.5
15		†3.0	†3.0	3.0	0.87	.9	1.9	* 2.5	2.50	2.65	3.0	4.0
16				3.0	0.87	.9	1.9	* 2.5	2.50	2.50	3.0	4.0
17				3.0	0.87	.9	1.9	* 2.5	2.50	2.50	3.0	3.5
18				3.0	0.87	.9	1.9	† 23.8	2.50	2.50	3.0	3.5
19				3.0	0.87	.9	1.9	* 2.5	2.50	2.77	3.0	3.5
20				3.0	0.87	.9	1.9	* 2.5	2.50	2.50	3.0	3.5
21				3.0	0.87	.9	† 10.4	* 2.5	2.50	2.50	3.0	3.5
22				3.0	† 0.87	.9	† 243	* 2.5	2.50	2.50	3.0	3.0
23				3.0	†74.5	.9	† 105	* 2.5	† 47.8	2.50	3.0	3.0
24				3.0	† 0.90	† 125.0	0.9	* 2.5	† 2.50	2.50	3.0	3.0
25				3.0	0.90	† 20.2	0.9	* 2.5	† 251	2.50	3.0	3.0
26				3.0	0.90	† 406	0.9	* 2.5	† 3.00	2.50	3.0	3.0
27				3.0	0.90	† 332	0.9	* 2.5	† 3.00	2.50	3.0	3.0
28				3.0	0.90	† 389	† 1,130	1,170	† 4.80	2.50	3.0	3.0
29				3.0	0.90	† 1,020	* 24.7	2,110	† 593	2.50	3.0	3.0
30				3.0	0.90	† 319	* 15.3	2,150	† 132	2.50	3.0	3.0
31				.....	0.90	.....	† 42.2	3.8	.....	2.50	.....	3.0

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	.....	.....	2.5	2.5	2.5	154	
February.....	.....	.....	3.0	3.0	3.0	173	
March.....	.....	.....	3.0	3.0	3.0	185	
April.....	.....	.....	3.0	3.0	3.0	179	
May.....	1.18	.....	† 294	† 0.87	† 3.2	† 200	
June.....	3.18	0.32	† 5,580	† 0.9	† 87.7	† 5,220	
July.....	2.22	0.20	† 2,390	† 0.9	† 61.0	† 3,750	
August.....	4.21	0.60	† 5,680	1.5	† 266.0	† 16,330	
September (6).....	5.93	.....	† 5,680	† 2.2	† 89.2	† 5,310	
October (2).....	† 8.33	.....	3.5	2.5	2.6	157	
November.....	1.93	.....	3.0	2.5	2.8	166	
December.....	.....	.....	4.0	3.0	3.4	207	
Yearly.....	† 8.33	.....	† 5,680	† 0.87	† 44.1	† 32,031	21.3

* Estimated † Partly estimated
 ‡ Backwater from Rio Grande

TERLINGUA CREEK STATION NEAR TERLINGUA, TEXAS

Description: Automatic water-stage recorder and cable with sit down cable car located about 12 miles south of Terlingua, Texas, and 2½ miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. Zero of gage is 2,191.04±.5 feet above mean sea level, United States Geological Survey datum.

Records: Based upon 10 current meter measurements, one slope-area measurement and several estimates by the hydrographer at low flows. 1932 records considered poor.

Records Available: January 1, to December 31, 1932.

Remarks: The flow of this spring fed creek is modified by small irrigation diversions above the station. The low flow is from springs. The high flows are erratic, being from storms. The drainage area above this station is 1,070 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	↑	↑	↑	* 2.5	* .95	1.00	4.5	5.0	271	† 184	↑	↑
2	↑	↑	↑	* 2.5	* .95	1.00	4.8	60.8	130	† 128	↑	↑
3	↑	↑	↑	* 2.5	* .95	1.00	8.7	67.7	320	† 202	↑	↑
4	↑	* 2.5	↑	* 2.5	* .95	1.00	7.2	106	† 182	86	↑	↑
5	↑	↑	↑	* 2.5	* .95	1.00	† 148	43.5	↑	29	↑	↑
6	↑	↑	↑	* 2.5	* .95	1.00	15.7	47.8	↑	8.0	↑	↑
7	↑	↑	↑	* 2.5	* .95	1.00	10.6	45.2	↑	6.0	↑	↑
8	↑	↑	↑	* 2.5	* .95	1.00	13.7	618	* 450	4.5	↑	↑
9	↑	↑	↑	* 2.5	* .95	1.00	15.7	628	↑	3.0	↑	↑
10	↑	↑	↑	* 2.5	* .95	1.00	25.2	101	↑	2.5	↑	↑
11	↑	↑	↑	* 2.5	* .95	1.00	24.6	886	↑	2.0	↑	↑
12	↑	↑	↑	* 2.5	* .95	1.00	11.3	149	↑	2.0	↑	↑
13	* 3.0	↑	↑	* 2.5	25	1.00	8.3	50.5	↑	2.0	↑	↑
14	↑	↑	↑	* 2.5	* .95	1.00	4.0	31.4	↑	5.2	↑	↑
15	↑	↑	* 2.5	* 2.5	* .95	1.00	4.0	10.0	5.0	6.0	↑	↑
16	↑	↑	↑	* 2.5	* .95	1.00	4.0	5.0	5.0	2.5	* 2.78	* 2.69
17	↑	↑	↑	* 2.5	* .95	1.00	4.0	5.0	5.0	2.0	↑	↑
18	↑	↑	↑	* 2.5	* .95	1.00	4.0	5.0	5.0	1.8	↑	↑
19	↑	↑	↑	* 2.5	* .95	1.00	4.0	† 406	5.0	1.8	↑	↑
20	↑	↑	↑	* 2.5	* .95	1.00	4.0	108	5.0	1.8	↑	↑
21	↑	↑	↑	* 2.5	* .95	1.00	4.0	38.6	10.9	1.8	↑	↑
22	↑	* 2.5	↑	* 2.5	* .95	1.00	13.3	33.5	66.1	1.8	↑	↑
23	↑	* 2.5	↑	* 2.5	* .95	1.00	19.3	5.0	† 291	1.8	↑	↑
24	↑	* 2.5	↑	* 2.5	* .95	1.00	13.1	5.0	† 227	1.8	↑	↑
25	↑	↑	↑	* 2.5	* .95	2.50	10.0	5.0	† 233	1.8	↑	↑
26	↑	↑	↑	* 2.5	* .95	30.0	9.4	126	† 188	1.8	↑	↑
27	↑	↑	↑	* 2.5	* .95	† 414	23.0	61.6	† 378	1.8	↑	↑
28	↑	↑	↑	* 2.5	† 1,056	15.2	29.8	5.0	† 169	1.8	↑	↑
29	↑	↓	↑	* 2.5	10.	7.1	44.6	114	† 1,420	1.8	↑	↑
30	↑	↑	↑	* 2.5	5.	5.3	16.1	8,180	† 681	1.8	↓	↓
31	↓	↑	↓	---	1.	---	30.8	1,500	---	1.8	↓	↓

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	---	---	---	---	* 3.0	* 185	
February.....	---	---	---	---	* 2.5	* 144	
March.....	---	---	---	---	* 2.5	* 154	
April.....	1.70	1.64	---	---	* 2.5	* 149	
May (28).....	15.3	1.25	24,080	† 1.0	† 36	† 2,220	
June.....	9.02	0.34	3,730	† 1.0	† 16.6	† 988	
July.....	5.72	0.68	740	† 3.9	17.4	1,070	
August.....	12.47	0.94	14,130	† 5.00	† 434	† 26,680	
September.....	---	1.53	* 1,800	5.0	† 303	† 18,040	
October.....	3.25	1.33	324	1.8	† 22.6	† 1,390	
November.....	---	---	---	---	---	* 160	
December.....	---	---	---	---	---	* 160	
Yearly.....	15.3	0.34	24,080	† 1.0	† 70.7	† 51,340	† 47.9

*Estimated

†Partly estimated

RIO GRANDE AT BOQUILLAS STATION

Description: Automatic water-stage recorder and cable with stand up cable car located 4 miles below mouth of Tornillo Creek and a quarter of a mile east of Boquillas, Brewster County, Texas. Zero of gage is 1,802.73 feet above mean sea level United States Geological Survey datum.

Records: Based on 20 current meter measurements during first 10 months of the year by wading and from cable car. Computations by shifting channel methods. During November and December daily flow estimated from Lower Presidio and Langtry daily discharges. 1932 records considered good to fair.

Records Available: From June, 1928 to December, 1932.

Remarks: Station not operated from October 21 to December 31 inclusive on account of sand bar at the gage well. The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 69,373 square miles; 39,734 being in the United States and 29,639 in Mexico.

Previous Extreme Flows: The greatest previous flow ever recorded was on September 11, 1929, when the extreme gage height was 11.90 feet and the extreme flow was 27,600 second feet. An extreme gage height of 32.4 was reported by local residents to have occurred in September, 1904, discharge unknown. The lowest flow ever recorded was on September 29, 1930, when the extreme gage height was 0.35 feet and the extreme flow was 123 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,020	834	1,090	623	339	308	840	* 800	5,150	† 14,080	* 1,800	* 1,300
2	973	858	1,080	582	338	296	501	* 700	3,070	† 27,560	* 1,790	* 1,250
3	990	863	1,060	580	338	285	829	* 1,050	1,570	† 46,480	* 1,750	* 1,230
4	1,020	911	1,060	569	331	268	652	* 750	1,430	† 87,290	* 1,680	* 1,220
5	1,120	909	1,010	537	365	263	1,640	* 985	* 8,000	† 44,370	* 1,600	* 1,230
6	1,060	923	913	564	341	252	1,450	866	* 18,000	† 31,690	* 1,580	* 1,250
7	1,060	870	997	608	337	241	* 750	1,080	* 17,000	23,860	* 1,580	* 1,250
8	974	808	1,070	582	340	231	* 1,150	1,650	* 15,000	15,280	* 1,570	* 1,220
9	919	924	1,020	581	355	225	* 750	3,260	* 10,000	11,400	* 1,550	* 1,230
10	917	912	861	566	332	272	* 1,050	3,060	* 8,000	8,990	* 1,500	* 1,250
11	889	970	760	513	315	250	* 1,100	6,050	* 15,000	8,360	* 1,480	* 1,220
12	911	993	847	512	522	228	* 1,000	7,150	* 25,000	* 7,760	* 1,450	* 1,300
13	952	948	795	549	596	234	* 900	7,100	* 55,000	* 7,170	* 1,480	* 1,300
14	949	886	752	533	404	224	* 830	7,240	48,770	* 6,570	* 1,450	* 1,300
15	938	858	815	524	661	219	* 710	6,230	29,250	* 5,980	* 1,450	* 1,300
16	927	948	889	516	486	219	* 630	4,940	14,690	* 5,380	* 1,480	* 1,220
17	873	963	827	494	372	215	* 600	3,970	11,370	* 4,780	* 1,470	* 1,220
18	871	1,060	960	442	361	195	* 640	3,130	8,810	* 4,190	* 1,420	* 1,150
19	885	1,050	950	441	344	175	* 570	2,590	7,120	† 3,590	* 1,350	* 1,150
20	917	1,110	845	449	353	161	* 560	2,740	6,430	† 2,450	* 1,340	* 1,150
21	940	1,060	727	433	348	152	* 540	2,150	6,080	* 2,390	* 1,360	* 1,170
22	989	1,570	772	439	338	139	* 510	1,890	4,620	* 2,230	* 1,350	* 1,140
23	951	1,880	778	461	716	207	* 480	1,520	4,860	* 2,270	* 1,350	* 1,120
24	880	1,530	809	438	1,120	140	* 470	1,270	4,170	* 2,210	* 1,350	* 1,150
25	810	1,310	716	396	685	146	* 490	1,140	4,800	* 2,140	* 1,320	* 1,140
26	842	1,230	754	369	384	164	* 570	1,120	4,220	* 2,080	* 1,280	* 1,110
27	881	1,210	672	438	342	1,050	* 620	1,460	5,480	* 2,020	* 1,290	* 1,140
28	922	1,090	610	623	338	1,700	* 800	992	4,770	* 1,960	* 1,300	* 1,140
29	944	1,050	660	348	1,140	1,150	* 640	922	4,820	* 1,900	* 1,300	* 1,140
30	898	-----	642	340	356	1,120	* 1,050	10,900	13,440	* 1,840	* 1,400	* 1,140
31	854	-----	655	-----	327	-----	* 850	14,640	-----	* 1,780	-----	* 1,140

Month	Gage Height		Second Feet				Acre Feet	
	Extreme--Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	1.83	1.50	1,140	784	958	57,680		
February.....	2.53	1.48	2,010	775	1,050	60,560		
March.....	1.88	1.29	1,150	600	852	52,360		
April.....	2.71	0.98	2,140	342	502	29,850		
May.....	†3.25	0.86	†2,300	284	449	27,620		
June (22).....	4.08	0.49	5,160	130	358	21,280		
July.....	3.32	1.00	3,360	415	† 780	† 47,950		
August.....	12.32	1.42	29,930	738	3,334	204,980		
September.....	-----	†2.42	*87,000	†1,350	†12,197	†725,800		
October (4).....	24.50	-----	†95,030	*1,780	†12,590	†774,060		
November.....	-----	-----	-----	-----	* 1,469	* 87,410		
December.....	-----	-----	-----	-----	* 1,202	* 73,930		
Yearly.....	24.50	0.49	†95,030	130	2,980	2,163,480	31.2	

*Estimated †Partly estimated

LOZIER CREEK STATION NEAR LANGTRY, TEXAS

Description: Automatic water-stage recorder and cable with sit down cable car located 21 miles west of Langtry, Texas, and about 1 mile above the confluence with the Rio Grande.

Records: Based upon 4 current meter measurements and three slope-area measurements. 1932 records considered poor.

Records Available: January 1 to December 31, 1932.

Remarks: This creek is dry except during storms. The drainage area above this station is 1,728 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	206	326	0	0
2	0	0	0	0	0	0	0	0	26.8	68.5	0	0
3	0	0	0	0	0	0	0	0	1.4	11.4	0	0
4	0	0	0	0	0	0	† 2,280	0	840	0	0	0
5	0	0	0	0	0	0	† 9.6	0	154	0	0	0
6	0	0	0	0	0	0	0	0	1,970	0	0	0
7	0	0	0	0	0	0	0	0	1,740	0	0	0
8	0	0	0	0	0	0	0	0	9,860	0	0	0
9	0	0	0	0	0	0	0	0	5,420	0	0	0
10	0	0	0	0	† 48	0	0	1,200	533	0	0	0
11	0	0	0	0	† 242	0	0	131	63	0	0	0
12	0	0	0	0	† 53	0	0	0.9	1.4	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	† 170	0	0	0	0	0	0	0
16	0	0	0	0	† 10	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	156	0	0	0
23	0	0	0	0	0	0	0	0	63.5	0	0	0
24	0	0	0	0	0	0	0	0	5.3	0	0	0
25	0	0	0	0	0	0	0	0	51.0	0	0	0
26	0	0	0	0	0	0	0	0	1.2	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	364	0	0	0
29	0	0	0	0	0	0	0	0	9,360	0	0	0
30	0	0	0	0	0	0	0	0	4,150	0	0	0
31	0	0	0	0	0	0	0	14.8	0	0	0	0

Month	Gage Height		Second Feet			Acre Feet	
	Extreme--Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	0	0	0	0	0	0	
February.....	0	0	0	0	0	0	
March.....	0	0	0	0	0	0	
April.....	0	0	0	0	0	0	
May.....	8.37	0	1,497	0	17	1,040	
June.....	0	0	0	0	0	0	
July.....	14.02	0	11,890	0	73.9	4,540	
August.....	12.18	0	7,380	0	43.4	2,670	
September (29).....	15.11	0	14,500	0	1,166	69,360	
October.....	7.40	0	675	0	13.1	805	
November.....	0	0	0	0	0	0	
December.....	0	0	0	0	0	0	
Yearly.....	15.11	0	14,500	0	108	78,415	45.4

†Partly estimated

RIO GRANDE AT LANGTRY STATION

Description: Automatic water-stage recorder and cable with stand up cable car, located at Langtry, Val Verde County, Texas. Zero of gage is 1,091.69 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 27 current meter measurements from cable car during the year. Computations by shifting channel methods. 1932 records considered good.

Records Available: May, 1900 to October, 1914; December, 1919 to March, 1920; and January, 1924 to December, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 77,518 square miles; 45,779 being in the United States and 31,739 in Mexico.

Previous Extreme Flows: The greatest flow ever recorded was on September 16, 1919, when the extreme gage height was 46.9 feet and the extreme flow was estimated by float measurement to be 152,000 second feet. An extreme gage height of 56.9 feet was reported on June 18, 1922, discharge unknown. The lowest flow ever recorded was in May, 1903 with an extreme of 270 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,420	1,150	1,290	930	715	1,240	1,420	1,660	20,390	13,200	2,890	1,850
2	1,300	1,120	1,220	898	657	928	1,410	1,220	8,400	15,720	2,860	2,170
3	1,220	1,100	1,290	930	630	796	1,380	1,140	6,260	26,790	2,780	1,970
4	1,170	1,080	1,300	882	625	689	5,900	971	6,630	38,620	2,700	1,770
5	1,180	1,080	1,280	849	627	643	1,500	1,370	5,270	70,930	2,640	1,680
6	1,180	1,120	1,320	863	614	614	1,140	1,230	5,890	49,570	2,610	1,590
7	1,280	1,160	1,280	822	625	584	2,080	1,200	25,970	35,700	2,500	1,580
8	1,240	1,160	1,180	813	649	569	1,820	1,180	*55,100	29,830	2,390	1,660
9	1,230	1,130	1,180	803	666	575	1,200	2,480	*48,600	20,220	2,880	1,690
10	1,180	1,040	1,270	850	785	559	2,030	6,210	*38,500	14,560	2,350	1,640
11	1,100	1,090	1,250	825	5,640	530	1,160	4,230	*20,680	11,860	2,320	1,660
12	1,110	1,100	1,160	824	2,440	515	1,760	3,880	*15,520	10,480	2,270	1,690
13	1,080	1,140	1,050	790	1,080	499	1,820	8,870	19,230	* 9,650	2,190	1,560
14	1,110	1,180	1,070	773	940	491	1,630	7,790	35,560	* 8,820	2,160	1,520
15	1,160	1,150	1,120	796	2,510	483	1,300	8,100	45,400	* 8,000	2,100	1,580
16	1,170	1,070	1,060	818	1,080	475	1,240	7,250	35,820	* 7,170	2,070	1,590
17	1,160	996	1,070	793	971	467	1,040	5,430	16,330	* 6,340	2,040	1,610
18	1,170	1,070	1,160	915	901	459	895	4,240	11,920	5,510	2,060	1,700
19	1,080	1,060	1,150	830	793	451	808	3,290	8,720	5,120	2,050	1,760
20	1,060	1,210	1,200	735	735	443	853	7,790	7,280	4,730	2,050	1,630
21	1,070	1,250	1,250	699	707	430	755	2,490	6,000	4,300	2,000	1,600
22	1,150	1,300	1,140	717	688	417	793	2,450	6,670	3,950	1,940	1,640
23	1,170	1,230	1,000	696	680	405	717	2,350	6,140	4,000	1,930	1,710
24	1,180	1,750	1,000	661	669	877	672	2,010	4,480	3,720	1,900	1,650
25	1,150	2,000	1,050	679	1,420	607	627	1,530	4,440	3,580	1,860	1,610
26	1,090	1,730	1,100	703	1,540	433	612	1,380	4,310	3,410	1,860	1,690
27	1,040	1,530	1,000	699	1,230	440	627	1,250	4,400	3,650	1,830	1,660
28	1,060	1,420	979	686	851	607	754	1,470	8,870	3,220	1,810	1,590
29	1,090	1,400	971	830	735	856	799	1,550	52,170	3,080	1,760	1,680
30	1,120	-----	913	1,000	2,170	1,780	1,150	1,130	19,690	2,950	1,780	1,690
31	1,150	-----	889	-----	2,290	-----	856	8,350	-----	2,940	-----	1,630

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	1.90	1.48	1,440	1,040	1,157	71,150		
February.....	2.40	1.38	2,050	979	1,240	71,070		
March.....	1.79	1.22	1,340	873	1,135	69,800		
April.....	1.69	0.94	1,280	646	804	47,820		
May.....	7.55	0.84	14,080	609	1,182	72,680		
June.....	2.42	0.46	2,200	391	627	37,310		
July.....	†7.90	0.71	15,370	556	1,312	80,700		
August.....	9.50	1.08	15,480	828	3,243	199,380		
September.....	25.67	3.30	64,070	3,480	18,488	1,100,130		
October (5).....	29.27	2.82	77,610	2,820	13,923	856,120		
November.....	2.90	1.80	2,930	1,740	2,203	131,070		
December.....	2.28	1.50	2,220	1,520	1,679	103,240		
Yearly.....	29.27	0.46	77,610	391	3,918	2,840,470	36.6	

*Estimated

†Partly estimated

PECOS RIVER STATION NEAR COMSTOCK, TEXAS

Description: Staff-gage and cable with sit down cable car located at the Pecos high bridge of the Southern Pacific Railroad 12 miles northwest of Comstock, Val Verde County, Texas, and 5½ miles above the confluence with the Rio Grande. Zero of gage is 1,058.01 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 21 current meter measurements during the year made from cable car and by wading and one slope-area measurement. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1932 records considered good.

Records Available: May, 1900 to December, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and by the reservoirs of the Carlsbad irrigation project in New Mexico. With all closed basins eliminated the drainage area above this station is 38,283 square miles, all in the United States.

Previous Extreme Flows: The greatest previous flow ever recorded was on May 28, 1925, when the extreme gage height was 23.6 feet and the extreme flow was 65,000 second feet. An extreme gage height of 35.75 feet was reported on April 6, 1900, discharge unknown. The lowest flow ever recorded was on August 31, 1930, when the extreme gage height was -0.15 feet and the extreme flow was 97 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	295	436	550	305	331	480	433	193	57,900	2,150	1,600	833
2	297	437	512	301	253	378	978	191	19,610	2,190	1,560	814
3	295	435	484	278	230	325	482	197	1,720	2,460	1,530	812
4	329	418	480	259	220	328	440	192	1,060	2,550	1,520	823
5	298	407	482	265	220	944	514	204	865	2,660	1,500	834
6	292	408	460	244	214	956	451	201	3,360	2,850	1,480	809
7	293	410	457	246	222	1,000	358	202	8,310	3,090	1,450	797
8	295	411	458	234	216	996	324	205	6,140	3,230	1,420	798
9	302	411	433	227	308	859	320	303	4,360	3,400	1,390	798
10	334	396	417	229	1,450	663	297	1,250	1,920	3,600	1,360	823
11	350	371	405	218	378	524	272	1,310	1,730	3,730	1,330	799
12	353	355	401	204	2,490	730	262	615	1,900	3,860	1,310	817
13	356	400	377	203	1,930	766	255	400	2,090	4,050	1,290	812
14	369	440	350	205	672	586	254	333	2,230	4,480	1,270	818
15	372	444	332	208	731	489	253	303	2,480	5,430	1,240	837
16	375	417	321	210	528	416	246	279	2,630	6,220	1,210	874
17	382	386	353	215	427	370	237	265	2,220	6,200	1,180	861
18	385	369	386	220	354	328	229	262	1,480	5,670	1,160	882
19	406	345	392	216	364	301	225	269	1,190	4,100	1,160	875
20	409	344	389	213	311	291	222	269	1,060	2,910	1,120	869
21	443	344	377	215	290	273	219	258	943	2,650	1,090	883
22	450	329	368	223	273	260	215	249	8,240	2,440	1,080	915
23	447	320	368	226	264	260	213	249	4,920	2,280	1,070	1,010
24	434	335	330	220	244	252	216	246	6,170	2,090	1,020	994
25	425	350	321	211	245	240	214	246	1,230	1,990	994	969
26	427	419	325	208	250	233	209	246	950	1,900	973	943
27	433	399	324	208	235	236	207	246	910	1,860	951	989
28	430	633	319	281	255	2,360	199	252	3,840	1,830	924	1,030
29	436	554	307	467	237	724	203	249	7,960	1,740	897	1,020
30	433	-----	315	557	235	463	200	293	4,140	1,680	858	1,040
31	434	-----	325	-----	232	-----	198	518	-----	1,630	-----	977

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	0.98	0.64	449	280	373	22,970	
February.....	1.30	0.62	644	317	404	23,250	
March.....	1.16	0.62	571	303	391	24,040	
April.....	1.42	0.26	700	205	250	14,890	
May.....	6.25	0.28	5,630	205	472	29,040	
June.....	6.30	0.32	6,020	227	568	33,780	
July.....	2.40	0.22	1,370	195	301	18,540	
August (2).....	2.90	0.20	1,780	191	338	20,820	
September (1).....	38.25	1.20	101,800	570	5,452	324,420	
October.....	6.50	2.66	6,360	1,610	3,130	192,240	
November.....	2.66	1.58	1,620	852	1,231	73,260	
December.....	1.88	1.50	1,050	797	882	54,260	
Yearly.....	38.25	0.20	101,800	191	1,145	831,510	21.4

†Partly estimated

GOODENOUGH SPRINGS STATION NEAR COMSTOCK, TEXAS

Description: Automatic water-stage recorder located $\frac{1}{2}$ mile above confluence with Rio Grande and $11\frac{1}{4}$ miles southwest of Comstock, Val Verde County, Texas.

Records: Based upon 19 current meter measurements during the year by wading. Computations by shifting channel methods. 1932 records considered good.

Records Available: February, 1929 to December, 1932.

Remarks: The flow of this spring channel is very uniform and is not modified by diversions or storage. The surface drainage area above this station is one square mile, all in the United States.

Previous Extreme Flows: The highest previous gage height ever recorded was on April 28, 1930, when the extreme gage height was 2.98 feet, discharge unknown. The lowest flow ever recorded was on April 4, 1930, when the extreme gage height was 0.27 feet and the extreme flow was 93 second feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	135	133	131	112	111	138	132	124	* 790	* 455	381	345
2	135	133	131	112	110	139	134	123	* 940	* 453	378	345
3	135	133	132	112	111	139	143	123	* 790	* 450	376	344
4	135	132	132	111	111	140	172	123	* 730	* 448	374	342
5	135	132	131	111	111	141	157	122	* 680	* 446	397	342
6	136	133	132	111	113	139	149	121	* 790	* 444	385	341
7	136	133	133	111	110	140	148	121	* 940	* 442	385	339
8	135	132	131	111	115	139	144	121	* 790	* 440	382	338
9	136	133	129	112	128	138	142	121	* 780	* 439	380	339
10	136	133	128	111	136	138	140	123	* 760	* 437	380	339
11	136	133	128	111	154	137	138	121	* 750	* 435	375	338
12	136	133	126	111	188	137	136	121	* 740	* 433	371	336
13	135	133	126	112	198	138	135	121	* 730	431	370	336
14	134	133	125	112	200	138	133	122	* 710	428	368	335
15	134	133	124	112	197	137	133	122	* 700	423	369	333
16	133	133	124	112	190	137	132	124	* 690	417	368	332
17	132	132	123	113	175	137	132	124	* 690	413	365	333
18	131	131	121	113	164	135	131	124	* 680	410	363	331
19	130	131	120	113	156	134	130	124	* 660	405	362	330
20	131	131	120	114	150	135	129	124	* 650	407	363	328
21	131	131	119	114	146	136	129	124	* 640	411	362	327
22	131	130	117	114	143	136	128	123	* 630	411	360	328
23	130	129	117	114	141	136	128	123	* 620	406	357	328
24	129	129	116	114	138	135	128	123	* 610	405	353	326
25	131	129	116	113	137	135	127	123	* 600	403	354	325
26	130	130	116	113	137	134	126	124	* 590	399	352	323
27	131	130	114	113	136	134	125	124	* 580	396	348	324
28	133	130	113	113	136	133	125	126	* 570	394	348	324
29	131	131	115	113	137	132	125	126	* 550	390	346	324
30	131	-----	115	111	137	132	125	128	* 540	387	345	324
31	130	-----	113	-----	138	-----	124	128	-----	385	-----	320

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	0.74	0.61	139	128	133	8,180		
February.....	.63	.52	134	129	132	7,570		
March.....	.54	.44	133	113	123	7,570		
April.....	.43	.41	115	110	112	6,680		
May (8).....	3.05	.42	524	109	144	8,830		
June.....	.72	.55	144	131	137	8,130		
July.....	2.30	.50	379	123	135	8,290		
August.....	.78	.48	147	121	123	7,580		
September (1).....	17.30	.54	-----	-----	* 697	* 41,460		
October.....	*2.67	2.35	*455	383	† 421	† 25,870		
November.....	3.85	2.12	742	345	367	21,850		
December.....	2.13	1.91	347	319	333	20,470		
Yearly.....	17.30	.41	-----	109	238	172,510	172.510	

*Estimated

†Partly estimated

DEVILS RIVER STATION NEAR DEL RIO, TEXAS

Description: Automatic water-stage recorder 2,200 feet above Southern Pacific Railroad bridge and Sells Creek, and 12 miles northwest of Del Rio. Zero of gage is 935.63 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 20 current meter measurements during the year by wading and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: May, 1900 to March, 1914, at a point 1 mile below present station. December, 1923 to December, 1932 at present site.

Remarks: Recorder and gage was washed out by flood of September 1, 1932. Records for remainder of year by temporary staff-gage readings at locations near the highway crossing 1.8 miles upstream. The weekly flow of this spring fed river is not modified, but the hourly flow is modified by power dams. The drainage area above this station is 4,063 square miles, all in the United States.

Previous Extreme Flows: The highest previous gage height ever recorded was in October, 1914, when the extreme gage height was 30.15 feet. The lowest flow ever recorded was on September 2, 1930, when the extreme gage height was 1.17 feet and the extreme flow 82 second feet. Numerous records of previous extreme flows may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	484	242	373	387	291	272	333	382	221,980	1,640	965	850
2	415	402	447	394	318	317	608	306	129,960	1,490	952	849
3	308	429	394	306	310	310	678	332	11,970	1,430	939	836
4	317	406	325	271	253	338	680	339	3,470	1,340	948	835
5	467	369	480	298	233	274	662	343	1,310	1,250	2,000	833
6	439	283	338	260	337	634	304	1,280	1,200	1,420	822	
7	490	230	397	401	327	465	468	10,130	1,180	998	799	
8	450	352	384	477	330	520	352	6,030	1,180	963	725	
9	475	270	387	857	296	451	548	2,360	1,150	939	785	
10	312	278	286	798	296	396	377	1,500	1,140	937	784	
11	378	357	253	622	326	429	473	1,270	1,100	903	793	
12	490	488	287	532	274	414	364	1,130	1,070	901	792	
13	485	342	328	460	265	396	303	1,090	1,060	899	801	
14	488	282	365	466	323	397	470	1,050	1,100	897	800	
15	502	371	383	449	296	407	473	1,010	1,140	907	798	
16	506	* 400	418	365	305	330	411	279	986	†1,220	872	807
17	326	426	261	432	338	489	266	973	1,200	871	805	
18	380	361	243	442	345	449	285	968	1,190	880	804	
19	491	362	294	275	279	328	334	953	1,180	868	802	
20	481	355	314	274	256	329	334	931	1,290	877	801	
21	501	298	220	285	257	375	415	864	1,200	865	800	
22	489	290	436	444	257	356	404	987	1,180	863	799	
23	487	318	377	407	259	356	318	11,190	1,170	884	830	
24	318	338	252	261	328	421	334	† 334	18,340	1,160	860	829
25	288	390	219	272	357	367	* 312	11,040	1,170	†38	817	
26	450	376	400	296	301	304	313	* 402	1,950	1,130	846	774
27	469	460	297	302	321	267	326	* 385	1,420	1,100	845	794
28	457	288	264	321	302	278	399	* 312	1,500	1,080	812	794
29	447	231	331	360	321	316	331	* 319	2,030	1,060	832	803
30	426	355	369	305	305	328	314	* 2,150	2,050	1,070	830	813
31	295	378	310	310	310	457	*13,030	1,060	1,060	830	813	791

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme.		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	1.58	0.91	644	97	429	26,400		
February.....					† 386	† 22,220		
March.....	1.65	.92	666	134	350	21,520		
April (21).....	1.58	.87	608	121	323	19,230		
May.....	2.10	.92	1,180	136	386	23,770		
June.....	1.97	1.11	1,060	238	303	19,010		
July.....	2.29	1.04	1,440	230	435	26,760		
August.....	* 14.50	0.92	* 48,020	170	† 829	† 51,000		
September (1).....	48.40	1.84	557,500	832	15,057	895,990		
October.....	2.78	1.94	1,850	1,040	1,192	73,310		
November.....	2.82	0.90	3,160	469	947	56,350		
December.....	1.47	0.79	1,010	349	805	49,520		
Yearly.....	48.40	0.79	557,500	97	1,769	1,284,080	316.0	

*Estimated

†Partly estimated

CIENEGAS CREEK STATION NEAR DEL RIO, TEXAS

Description: Staff-gage 900 feet above confluence with Rio Grande, 3 miles southwest of Del Rio, Texas, and 1½ miles above the Del Rio gaging station on the Rio Grande.

Records: Based upon 15 current meter measurements during the year. Computations by averaging discharge between measurements. 1932 records considered fair.

Records Available: September 1, 1931 to December 31, 1932.

Remarks: The flow of this spring fed creek is modified by diversions for irrigation above this station. The drainage area above this station is 18 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
2												
3												
4	7.94	7.64		1.23	1.50	5.70						
5												12.7
6								1.75			13.9	
7	*				50.0							
8					40.0							*
9		*		*	50.0	*		*			*	
10			4.73		30.0							
11					15.0							
12					↑							
13	7.44	5.29										
14												
15							*1.00					
16		*			9.0			2.35	*14.0	14.0		11.7
17												
18			*		*	2.10						
19				1.52								
20					*							
21											12.7	
22	*	2.78	4.10					*				
23				*								
24												
25					5.70							*
26								2.20				11.9
27				1.50								
28	7.64	↓										
29			↓									
30			1.23	↓				*25.0				
31	↓		1.23		↓			*25.0				

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	7.6	468		
February.....	4.9	282		
March.....	4.3	263		
April.....	1.4	85		
May.....	10.8	663		
June.....	3.2	189		
July.....	* 1	* 61.5		
August.....	36	222		
September.....	* 14	* 861		
October.....	14	861		
November.....	13.1	780		
December.....	11.7	738		
Yearly.....	7.5	5,470	304	

*Estimated

RIO GRANDE AT DEL RIO STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located 900 feet upstream from international highway bridge at Del Rio, Val Verde County, Texas. Zero of gage is 864.80 feet above mean sea level United States Coast and Geodetic Survey datum.

Records: Based upon 33 current meter measurements during the year from cable car and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: December, 1923 to December, 1932. Records are also available for station 11 miles upstream from May, 1900 to April, 1915; and for station 7½ miles upstream at McKees Switch from December, 1919 to March, 1920. Several springs but no important tributaries enter the river between the various station sites.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 123,318 square miles; 88,539 being in the United States and 34,779 in Mexico.

Previous Extreme Flows: The highest previous gage height ever recorded was on June 18 or 19, 1922, when the extreme gage height was 32.8 feet, discharge unknown. The lowest flow ever recorded was in May, 1930, when the extreme gage height was 1.42 feet and the extreme flow 938 second feet. Numerous records of previous extreme flows may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,500	2,240	2,620	*1,900	2,120	3,170	2,660	1,810	206,770	24,760	7,670	5,200
2	2,590	2,350	2,760	*1,850	1,670	2,380	2,710	2,200	241,620	25,720	7,550	5,220
3	2,450	2,400	2,640	1,800	1,590	2,000	3,090	1,990	55,890	27,840	7,440	5,510
4	2,230	2,310	2,510	1,720	1,490	1,860	5,940	1,950	24,770	38,790	7,260	5,280
5	2,400	2,260	2,630	1,680	1,420	1,860	5,720	1,840	15,850	61,980	9,540	5,020
6	2,380	2,290	2,540	1,740	1,980	2,280	3,270	2,050	15,260	80,820	7,570	4,870
7	2,410	2,300	2,390	1,750	2,890	2,380	2,660	2,160	58,470	61,750	7,120	4,700
8	2,480	2,150	2,430	1,720	2,810	2,270	3,230	2,090	65,060	49,620	6,800	4,510
9	2,450	2,350	2,350	1,700	4,460	2,250	2,920	2,380	72,760	35,860	6,660	4,750
10	2,390	2,360	2,250	1,670	2,990	2,020	2,270	4,250	56,500	27,250	6,600	4,750
11	2,200	2,240	2,390	1,580	8,200	1,870	2,980	7,680	37,750	22,970	6,470	4,660
12	2,310	2,250	2,510	1,560	6,510	1,770	2,320	5,170	20,140	20,200	6,340	4,660
13	2,360	2,240	2,400	1,620	6,300	1,780	2,620	5,800	22,370	18,730	6,310	4,680
14	2,310	2,230	2,100	1,640	3,580	1,870	2,760	8,830	29,860	17,770	6,180	4,550
15	2,330	2,220	2,150	1,670	3,100	1,790	2,490	9,060	49,540	17,140	6,150	4,490
16	2,400	2,380	2,260	1,700	3,920	1,640	2,220	8,400	57,510	16,830	5,930	4,570
17	2,290	2,300	2,170	1,720	2,560	1,580	2,200	7,450	36,160	16,630	5,890	4,590
18	2,160	2,240	2,180	1,610	2,330	1,520	2,050	6,120	21,680	16,170	5,870	4,640
19	2,380	2,310	2,210	1,700	2,000	1,500	1,860	5,080	17,080	14,750	5,860	4,750
20	2,530	2,200	2,240	1,780	1,850	1,370	1,730	4,340	14,310	12,830	5,810	4,800
21	2,340	2,410	2,190	1,620	1,760	1,370	1,780	3,940	12,660	11,680	5,770	4,640
22	2,420	2,250	2,130	1,640	1,800	1,360	1,700	3,570	13,090	10,790	5,690	4,620
23	2,440	2,420	2,140	1,690	1,830	1,350	1,660	3,800	38,320	9,950	5,620	4,740
24	2,380	2,400	1,990	1,640	1,620	1,370	1,670	3,660	34,700	9,970	5,520	4,920
25	2,240	2,900	2,000	1,480	1,610	1,650	1,650	3,180	20,100	9,300	5,480	4,870
26	2,370	3,220	2,050	1,510	2,120	1,590	1,490	2,830	12,100	8,780	5,400	4,660
27	2,400	3,050	2,050	1,630	2,400	1,360	1,500	2,680	11,120	8,750	5,360	4,860
28	2,370	2,810	1,970	1,590	2,150	1,350	1,580	2,580	12,570	8,730	5,290	4,780
29	2,370	2,590	1,840	1,610	1,840	3,110	1,590	2,640	40,580	8,240	5,280	4,780
30	2,360	.....	1,880	1,820	1,710	1,800	1,610	2,850	74,160	7,930	5,210	4,880
31	2,370	.....	*1,700	.....	2,850	.....	1,950	5,740	.....	7,840	.....	4,860

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	2.68	2.28	2,840	2,040	2,368	145,610		
February.....	2.94	2.13	3,440	1,960	2,404	138,310		
March.....	2.73	.....	2,950	*1,700	2,247	138,190	
April.....	2.42	1.65	2,390	1,390	1,678	99,850		
May.....	6.17	1.63	13,900	1,360	2,755	169,390		
June (27).....	3.36	1.53	4,470	1,310	1,852	110,200		
July.....	5.34	1.61	10,860	1,420	2,445	150,510		
August.....	11.00	1.74	34,490	1,550	4,143	254,720		
September (1).....	34.50	5.24	604,590	9,590	46,292	2,754,590		
October.....	17.23	4.61	86,520	7,760	22,920	1,409,020		
November.....	5.49	3.63	11,780	4,860	6,320	376,150		
December.....	3.86	3.34	5,570	4,130	4,800	295,180		
Yearly.....	34.50	1.53	604,590	1,310	8,328	6,041,720	49.0	

*Estimated

SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

Description: Automatic water-stage recorder at Silos farm road bridge 1¾ mile south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande, and 4 miles below the Del Rio gaging station on the Rio Grande. Zero of gage is \$75.05 feet above mean sea level United States Coast and Geodetic Survey datum.

Records: Based upon 26 current meter measurements from bridge and by wading during the year. Computations by shifting channel methods. 1932 records considered fair.

Records Available: September 1, 1931 to December 31, 1932.

Remarks: The flow of this spring fed creek is greatly modified by irrigation and municipal diversions above this station. All diversions are practically constant except Del Rio City pump. The drainage area above this station is 62 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	↑	↑	61.1	43.8	41.4	36.5	41.6	41.1	†132	117	84.5	88.4
2			75.3	42.9	40.5	37.1	295	41.2	†148	111	83.9	88.5
3	†58.55	†57.55	88.4	42.9	38.3	37.2	40.2	41.3	137	111	82.0	89.9
4			91.6	44.6	34.7	37.8	34.5	43.8	†189	110	82.7	90.0
5			91.3	45.4	34.0	40.5	33.6	45.1	†312	115	150	90.1
6			91.1	46.3	431	38.2	37.5	44.0	†207	190	94.6	91.4
7	*		88.7	46.3	667	38.6	36.6	46.5	†476	108	92.7	88.9
8	†63.20		66.8	46.7	356	39.0	34.5	51.2	†174	107	89.6	87.7
9	*	↓	62.9	46.1	302	39.4	34.8	64.0	†117	106	90.3	87.6
10		58.6	58.8	45.6	152	40.2	35.1	168	102	105	91.1	87.5
11		61.9	58.6	46.8	114	40.9	36.6	101	98.9	105	91.8	87.4
12		64.0	58.4	47.1	112	41.7	36.2	64.0	98.6	*104	92.6	87.3
13		65.9	58.1	47.4	107	42.2	35.9	60.2	98.3	*101	94.7	88.5
14		65.4	56.7	48.6	103	43.2	35.6	59.9	98.0	* 98.2	96.7	89.7
15	†62.50	66.5	56.4	48.0	† 78.3	43.9	37.6	53.0	99.1	96.7	92.3	89.6
16		*66.0	56.2	48.3	† 78.3	44.5	37.2	44.5	96.2	96.5	93.0	89.5
17		*65.5	63.0	48.7	† 78.3	45.4	39.3	43.0	88.3	96.3	95.1	89.4
18		*65.0	59.3	46.2	† 78.3	46.2	37.8	42.7	88.0	98.3	95.8	88.0
19		69.9	53.3	42.5	50.6	45.6	38.6	47.2	86.9	97.7	96.6	88.0
20		74.7	53.2	43.5	46.0	46.1	38.2	40.9	82.6	95.8	95.4	87.9
21		76.6	51.9	42.5	42.4	47.4	40.3	41.8	80.0	95.2	95.5	87.8
22		84.9	51.8	42.8	41.2	44.4	41.2	49.7	351	95.8	94.2	89.0
23	*	83.6	49.6	43.1	40.7	44.0	43.2	51.9	135	96.4	94.3	95.4
24		83.8	48.8	44.0	41.5	43.5	44.0	50.8	249	95.9	93.1	108
25		84.1	47.8	41.2	42.3	43.5	43.7	56.3	138	95.3	90.6	110
26	†62.55	82.7	47.7	40.4	42.7	43.1	43.4	66.1	112	96.0	90.7	108
27		67.6	47.6	41.7	39.7	42.5	47.8	66.9	246	95.4	92.0	114
28		61.7	48.4	42.2	35.9	41.7	41.9	65.7	213	89.6	90.8	113
29		60.8	48.3	42.0	38.6	40.9	42.0	66.9	305	83.8	89.6	112
30			49.1	41.1	36.3	39.1	40.9	161	180	87.1	88.4	112
31			47.3		35.9		42.2	996		86.5		112

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....					60.8	3,730	
February.....	0.98	0.68	99.3	52.6	66.5	3,820	
March.....	1.01	.63	100	43.8	60.9	3,750	
April.....	.72	.46	56	35.8	44.6	2,660	
May (6).....	14.40	.39	2,270	30.4	109	6,700	
June.....	1.42	1.02	51.8	35.9	41.8	2,490	
July.....	8.58	.98	1,650	26.7	47.3	2,910	
August.....	12.84	1.08	3,030	35.8	90.8	5,590	
September (1).....	† 15.05	1.46	1,490	72.6	165	9,790	
October.....	2.75	1.63	256	81.2	103	6,320	
November.....	4.38	1.64	554	78.8	93.5	5,560	
December.....	1.88	1.60	120	84.7	94.7	5,820	
Yearly.....	15.05	0.89	3,030	26.7	81.4	59,140	954

†High gage reading caused by backwater from Rio Grande flood.
 *Estimated †Partly estimated

SYCAMORE CREEK STATION NEAR DEL RIO, TEXAS

Description: Automatic water-stage recorder 2 miles above the confluence with the Rio Grande, 11 miles southeast of Del Rio, Texas, and just above the highway between Del Rio and Eagle Pass, Texas.

Records: Based upon 25 current meter measurements during the year by wading and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: January to December, 1932.

Remarks: The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 524 square miles all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.98	4.33	4.39	3.71	.93	1.99	0.6	5.14	7,680	95.5	14.0	14.6
2	3.73	4.32	4.39	3.25	.87	2.26	545	5.14	8,960	77.3	13.8	14.0
3	3.71	4.30	3.91	2.97	.83	2.26	439	6.16	569	64.0	12.7	14.0
4	3.69	4.06	3.91	2.61	.79	2.26	57.5	6.16	294	54.7	11.6	13.2
5	3.68	4.28	4.37	2.61	.74	2.52	8.6	6.16	202	48.2	19.0	13.2
6	3.91	4.28	4.63	2.20	.70	2.52	10.0	5.82	834	42.6	21.4	13.9
7	3.65	4.27	4.90	2.61	.87	2.52	11.4	5.82	1,140	38.1	22.8	14.4
8	3.44	*4.98	5.16	2.61	.65	2.52	10.0	5.82	268	35.9	21.7	14.4
9	3.70	*4.74	5.42	2.61	1.92	2.52	9.6	5.82	145	33.9	19.5	14.5
10	3.73	*4.73	5.44	2.97	4.02	2.52	9.1	5.82	102	31.9	18.7	14.6
11	4.00	4.73	5.23	2.61	2.69	2.52	8.6	5.48	94.7	29.9	18.0	15.4
12	4.03	4.72	5.01	2.61	2.67	2.52	7.9	5.48	75.3	28.7	17.4	16.0
13	4.29	4.48	4.79	2.20	2.65	2.52	7.5	5.48	62.6	25.6	17.5	16.1
14	4.55	4.23	4.57	1.99	2.63	2.78	7.5	5.14	53.6	24.5	16.7	16.2
15	4.54	4.23	4.13	1.86	2.61	2.78	7.5	5.14	46.5	24.2	16.8	17.1
16	4.52	4.46	3.91	1.75	2.59	2.52	7.5	5.14	42.2	23.9	16.9	17.2
17	4.51	4.46	4.15	1.66	2.55	2.52	7.5	5.14	38.0	24.5	16.2	17.3
18	4.50	4.69	4.15	1.66	2.52	2.52	7.5	4.80	35.2	23.4	16.2	17.3
19	4.49	4.21	4.16	1.58	2.48	2.26	7.5	4.80	31.6	21.6	16.3	17.4
20	4.48	4.44	4.16	1.51	2.44	1.99	7.9	4.57	29.7	21.3	16.3	17.5
21	4.23	4.68	4.39	1.39	2.40	1.99	7.9	4.34	28.0	21.0	16.2	16.8
22	4.22	4.91	4.39	1.34	2.36	1.99	7.9	4.34	33.4	19.9	15.6	17.6
23	3.97	4.91	4.40	1.34	2.33	†1.86	7.9	4.34	42.2	18.9	15.6	18.4
24	3.96	4.90	4.17	1.30	2.29	†1.72	7.5	4.11	244	17.8	15.5	19.1
25	4.19	5.14	4.17	1.21	2.25	†1.62	7.5	3.88	250	18.3	14.8	18.3
26	4.40	4.89	4.17	1.17	2.22	†1.44	7.2	3.47	147	16.4	15.5	17.5
27	4.39	4.89	4.41	1.10	2.18	†1.37	5.5	3.65	94.3	15.4	15.4	16.7
28	4.38	4.64	4.41	1.03	2.14	†1.24	5.5	3.19	85.8	15.1	14.7	16.1
29	4.14	4.64	3.94	1.03	2.10	†1.14	5.1	3.19	125	14.9	14.7	15.4
30	4.12	.....	4.18	.97	2.06	†1.05	5.1	3.43	125	14.6	14.1	16.6
31	4.11	.....	3.95	.....	2.03	.....	5.1	12,230	.....	14.3	.....	16.0

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	0.71	0.66	4.8	3.4	4.1	252		
February.....	.74	.69	5.1	4.1	4.6	262		
March.....	.79	.68	6.3	3.7	4.4	272		
April.....	†.70	.43	†4.4	1.0	2.0	118		
May (8).....	.90	.33	13.6	0.6	2.0	124		
June.....	.71	.55	2.8	†1.1	2.1	127		
July.....	6.24	.54	4,410	0.6	40.3	2,480		
August.....	16.85	.58	44,150	0.8	399	24,500		
September (2).....	17.10	.48	44,800	27.2	729	43,400		
October.....	1.10	.41	108	14.1	30.8	1,900		
November.....	0.57	.36	25.5	13.4	16.5	983		
December.....	.44	.36	19.9	13.2	16.0	985		
Yearly.....	17.10	.33	44,800	0.6	104	75,400	144	

*Estimated

†Partly estimated

PINTO CREEK STATION NEAR DEL RIO, TEXAS

Description: Automatic water-stage recorder, cable with sit down cable car, and concrete control dam, 500 feet above Del Rio-Eagle Pass highway and 5½ miles above confluence with Rio Grande.

Records: Based upon 17 current meter measurements during the year by wading and from cable car and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: November, 1928 to December, 1932.

Remarks: The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 229 square miles, all in the United States.

Previous Extreme Flows: The greatest previous flow ever recorded was on April 28, 1930, when the extreme gage height was 6.50 feet and the extreme flow 2,000 second feet. The highest gage height ever recorded was on July 3, 1929, when the extreme gage height was 9:77 feet, discharge unknown. The creek is often dry.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10.80	7.84	6.92	4.89	2.96	0.54	428	*0.25	2,350	51.1	36.0	34.5
2	10.69	7.91	8.21	5.00	2.47	0.60	300	*0.25	177	47.3	36.0	33.1
3	10.58	7.98	7.69	5.17	2.24	0.66	89.7	*0.25	78.6	43.5	36.0	34.5
4	10.47	8.05	6.93	5.33	2.28	0.66	37.0	*0.25	81.2	41.6	36.0	34.5
5	10.36	7.62	7.76	5.30	2.40	0.72	15.8	0	146	39.7	51.2	36.0
6	9.25	7.68	7.00	5.26	2.42	0.54	12.0	0	2,080	37.8	41.7	36.0
7	9.14	7.75	6.63	4.82	2.43	0.30	6.55	0	1,980	35.9	37.9	34.5
8	9.03	7.82	6.67	4.49	14.5	+0.25	5.10	0	193	37.8	36.0	34.5
9	8.91	7.89	6.40	4.30	47.8	+0.20	4.10	0	89.0	37.8	36.0	34.5
10	8.80	7.96	6.44	3.67	7.06	+0.15	3.35	0	69.1	37.8	36.0	34.5
11	8.69	7.53	6.48	3.33	5.32	+0.10	3.09	0	59.9	35.9	36.0	36.0
12	8.58	7.10	6.51	3.29	7.64	+0.10	2.54	0	53	35.9	34.5	36.0
13	8.47	6.86	6.55	3.10	6.30	+0.10	2.32	0	49.2	35.9	34.5	36.0
14	8.36	7.23	6.58	2.96	5.12	+0.10	2.21	0	47.3	35.9	34.5	36.0
15	8.25	7.80	6.62	2.92	5.13	+0.10	2.10	0	43.5	34.0	34.5	36.0
16	8.32	7.87	6.60	3.00	3.89	+0.10	1.83	0	41.6	34.0	34.5	36.0
17	8.39	8.44	6.58	3.26	3.31	+0.10	1.74	0	39.7	35.9	34.5	36.0
18	7.46	8.42	6.55	3.25	3.02	+0.10	2.01	0	37.8	34.0	36.0	36.0
19	7.53	8.41	6.53	3.09	2.81	+0.10	1.74	0	35.9	32.5	36.0	36.0
20	7.00	8.39	6.21	3.38	2.50	+0.10	1.29	.80	35.9	32.5	36.0	36.0
21	7.67	8.37	5.69	3.67	2.18	+0.10	1.38	30.0	35.9	32.5	36.0	36.0
22	8.74	8.36	5.16	3.66	2.09	+0.10	1.29	2.3	64.7	31.1	36.0	36.0
23	7.81	7.84	5.44	3.35	1.90	+0.10	1.08	1.2	89	31.1	36.0	39.8
24	7.88	7.82	5.62	2.78	1.46	+0.10	.96	1.4	402	31.1	36.0	37.9
25	7.95	7.31	5.60	2.55	1.30	+0.10	.72	1.5	120	31.1	34.5	36.0
26	7.42	6.99	5.57	2.64	1.31	+0.10	.15	76.8	57.6	31.1	34.5	34.5
27	7.49	6.97	5.15	4.75	1.08	0	0	28.0	53	31.1	34.5	34.5
28	7.56	6.96	4.83	3.89	.92	0	0	4.4	57.6	34.0	34.5	34.5
29	7.63	6.94	4.81	3.73	.81	0	0	3.1	78.6	34.0	34.5	34.5
30	7.20	.....	4.58	3.57	.71	0	0	22.2	73.7	34.0	34.5	34.5
31	7.27	.....	4.46	.....	.60	.....	0	24,380	.....	34.0	.....	33.1

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	3.55	3.51	11.5	6.9	8.5	523		
February.....	3.52	3.46	8.9	6.6	7.7	444		
March.....	3.55	3.34	12.3	4.2	6.2	383		
April.....	3.55	3.25	11.7	2.3	3.8	227		
May.....	4.32	2.99	202	0.5	4.7	290		
June.....	3.04	0.78	0	0.84	0	+0.2	† 12.3	
July.....	6.91	0	2,570	0	29.9	1,840		
August (31).....	21.08	0.62	54,650	0	792	48,700		
September.....	11.07	3.70	10,930	34.0	291	17,300		
October.....	3.82	3.68	37.6	31.1	35.9	2,210		
November.....	3.96	3.69	93.6	34.5	36.2	2,150		
December.....	3.72	3.68	39.8	33.1	35.4	2,180		
Yearly.....	21.08	0	54,650	0	105	76,260.0	333	

*Estimated

†Partly estimated

RIO SAN DIEGO STATION AT JIMENEZ, COAHUILA

Description: Automatic water-stage recorder and cable with sit down cable car located 4.4 miles west of Jimenez, Coahuila, and 5 miles above the confluence with the Rio Grande.

Records: Based upon 14 current meter measurements in November and December, 1932, from cable car. Computations by shifting channel methods. Records for November and December considered good and those of October only fair.

Records Available: 1924 to 1932.

Remarks: From 1924 to 1932 there were made daily 3 staff-gage readings at Paso del Salto, 3.1 miles upstream from the present station. This station was constructed by the Mexican Section of the Commission and completed in November, 1932. Current meter measurements began November 3, and continuous water-stage record began November 16. The flow of this spring fed stream is modified by small storage reservoirs at San Miguel and Centenario on the National Irrigation System No. 6 at San Carlos, Coahuila, and by irrigation of Dolores Hacienda. One fourth mile upstream from this gaging station water is diverted for the Jimenez Community. The drainage area above this station is 840 square miles, entirely in Mexico.

Previous Extreme Flows: From reports by local inhabitants the water level in 1905 reached a height of 20.67 feet on the present gage scale, the discharge being unknown. The stream never runs dry although its flow at times gets below 35 second feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8,120	1,340	893
2	7,060	1,340	893
3	6,110	1,340	869
4	5,190	1,320	812
5	4,340	1,380	812
6	3,710	1,410	812
7	3,000	1,320	812
8	2,440	1,270	788
9	1,910	1,270	759
10	1,480	1,270	759
11	1,480	1,200	731
12	1,490	1,180	731
13	1,480	1,180	731
14	1,480	1,165	731
15	1,490	1,170	731
16	1,480	1,130	731
17	1,480	1,130	731
18	1,490	1,100	731
19	1,480	1,070	703
20	1,480	1,050	681
21	1,490	1,050	682
22	1,480	1,020	681
23	1,460	1,020	682
24	1,470	1,020	681
25	1,470	982	682
26	1,410	982	682
27	1,410	953	682
28	1,380	922	657
29	10,590	922	632
30	9,360	1,410	632
31	1,380	.....	632

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	.....	.....	.....	.....	.....	.....	.....
February.....	.....	.....	.....	.....	.....	.....	.....
March.....	.....	.....	.....	.....	.....	.....	.....
April.....	.....	.....	.....	.....	.....	.....	.....
May.....	.....	.....	.....	.....	.....	.....	.....
June.....	.....	.....	.....	.....	.....	.....	.....
July.....	.....	.....	.....	.....	.....	.....	.....
August.....	.....	.....	.....	.....	.....	.....	.....
September (29).....	8.10	.....	*10,590	.....	.....	.....	.....
October.....	7.32	3.67	8,120	1,380	2,380	146,640	.....
November.....	3.71	3.15	1,410	922	1,150	68,290	.....
December.....	3.12	2.79	893	632	735	45,160	.....
Yearly.....	8.10	.....	10,590	.....	.....	.....	.....

*Estimated

LAS MORAS CREEK STATION NEAR EAGLE PASS, TEXAS

Description: Automatic water-stage recorder 0.6 mile above the confluence with the Rio Grande, 25 miles northwesterly from Eagle Pass, 0.1 mile above the main Eagle Pass-Del Rio highway, at the Las Moras Creek siphon on the Maverick County Canal.

Records: Based upon 25 current meter measurements during the year by wading. 1932 records considered good.

Records Available: January to December, 1932.

Remarks: The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 166 square miles, all in the United States. The Maverick County Canal siphon forms a fixed control for this station.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	†13.51	† 9.73	10.9	2.60	10.6	0	298	7.05	3,300	124	2.6	2.3
2		*10.0	12.3	1.90	8.7	0	713	7.05	† 608	84.5	2.6	2.0
3		*10.2	13.4	1.20	6.75	0	1,470	8.60	124	58.2	2.6	2.3
4		*10.4	13.7	1.73	6.75	0	256	10.28	71	49.2	2.6	2.6
5		†10.6	16.7	2.07	6.10	0	69.6	10.28	433	46.4	2.9	2.6
6			12.3	15.9	2.07	5.75	0	53.6	895	42.2	2.6	2.6
7		10.72	12.3	15.8	1.73	5.40	0	39.4	1,470	8.4	2.3	2.6
8			11.8	16.4	1.38	5.75	0	34.5	766	2.3	2.0	2.6
9			10.0	16.3	.85	21.4	0	29.7	171	2.3	2.3	2.3
10		*	10.0	15.5	1.73	74.9	0	27.6	† 58.2	2.6	2.3	2.6
11			11.4	14.7	2.25	39.7	0	26.6	48.2	2.6	2.0	2.6
12			11.4	14.6	3.65	23.1	0	25.6	42.2	2.6	2.3	2.6
13			12.4	13.9	4.70	15.7	0	25.6	40.5	2.6	2.3	2.6
14		11.41	12.9	13.1	4.00	12.0	0	24.5	39.7	2.6	2.0	2.9
15			13.8	11.7	2.95	11.3	0	24.5	39.7	2.6	2.0	2.6
16			13.8	11.7	1.73	10.0	0	23.4	38.0	2.6	2.0	2.6
17			14.5	11.8	1.20	8.7	0	23.4	36.4	2.6	2.0	2.6
18			13.8	10.9	.78	8.05	0	23.4	35.6	2.6	2.3	2.3
19		*	13.8	9.5	.64	6.75	0	22.5	34.8	2.6	2.3	2.3
20			13.8	9.0	.57	6.10	0	21.6	† 33.1	2.9	2.3	2.3
21			13.8	8.6	.71	5.40	0	20.7	† 27.2	2.9	2.0	2.3
22			13.8	8.1	.43	5.05	0	18.9	† 26.4	2.9	2.0	2.0
23		11.51	13.8	7.2	.14	4.35	0	18.9	† 94.0	2.6	2.0	2.0
24			13.2	7.2	.08	4.00	0	17.3	† 467	2.6	2.0	2.0
25			12.8	7.3	.05	2.95	0	12.8	449	2.9	1.8	1.8
26			12.8	7.8	0	2.25	0	11.5	8.07	2.11	2.6	1.8
27			12.3	8.3	48.2	1.90	0	12.8	20.70	129	2.6	2.0
28		*	10.9	9.0	38.5	1.02	0	11.5	11.50	171	2.6	2.3
29			10.4	11.3	26.9	.64	0	10.3	8.6	198	2.3	2.0
30				12.2	14.2	.36	0	8.07	8.07	151	2.6	2.0
31	† 9.14		13.6	-----	.15	-----	-----	7.55	4,590	2.6	-----	1.8

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	-----	-----	13.5	9.1	11.2	688	
February.....	1.32	-----	15.1	† 9.7	12.2	700	
March.....	1.37	1.11	17.6	7.0	11.9	730	
April.....	1.92	0	116	0	5.6	355	
May.....	1.89	.89	105	.1	10.4	638	
June.....	0	0	0	0	0	0	
July.....	3.45	.36	3,160	0	109	6,710	
August (31).....	7.07	1.04	8,860	1.3	154	9,490	
September.....	6.38	1.41	7,320	20.4	340	20,260	
October.....	2.09	1.02	139	2.0	15.3	943	
November.....	1.06	1.01	3.2	1.8	2.2	131	
December.....	1.05	1.00	2.9	1.5	2.3	141	
Yearly.....	7.07	0	8,860	0	56.2	40,770	246.

*Estimated

†Partly estimated

RIO SAN RODRIGO STATION AT PASO DE LAS MULAS

Description: Automatic water-stage recorder and cable with sit down cable car located 11.2 miles west of the town of Moral, Coahuila, 19.9 miles northward from Piedras Negras and 11.8 miles above the confluence with the Rio Grande.

Records: Based upon 31 current meter measurements from August to December, 1932, by wading and from cable car. Computations by shifting channel methods. 1932 records considered fair.

Records Available: 1922 to 1932.

Remarks: From 1922 to 1932 there were made daily 3 staff-gage readings at this station. This station was constructed by the Mexican Section of the Commission and completed in October, 1932. Meter measurements began August 4, 1932. The automatic water-stage record began November 8, the same year. The flow of this spring fed river is modified by irrigation diversions at El Remolino, 27.3 miles upstream. At Casa Roja, 7.5 miles downstream, some water is diverted for irrigation. The drainage area above this station is 750. square miles, entirely in Mexico.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	106	25.4	73.5	57.2	147	49.4	89	84	106	5,650	586	325
2	106	25.4	73.5	57.2	148	49.4	89	65.3	572	1,254	572	325
3	107	17.0	84.0	57.2	147	49.4	89	73.5	* 6,570	4,238	554	325
4	106	17.0	84.0	57.2	148	49.4	89	73.5	106	1,201	519	314
5	106	17.0	84.0	57.2	53	106	89	69.2	1,910	378	501	302
6	107	17.0	73.5	57.2	53	106	120	69.2	* 5,650	378	484	314
7	106	17.0	73.5	57.2	53	101	148	69.2	*27,900	2,154	470	335
8	106	17.0	84.0	57.2	53	101	235	69.2	*23,310	2,154	452	335
9	107	17.0	84.0	57.2	53	49.4	235	69.2	* 7,490	1,448	452	364
10	106	17.0	84.0	57.2	53	49.4	106	69.2	4,170	1,660	438	378
11	106	17.0	84.0	57.2	53	49.4	106	69.2	4,160	1,554	438	378
12	107	17.0	84.0	57.2	84	49.4	106	69.2	2,330	1,413	424	378
13	106	17.0	84.0	57.2	84	49.4	106	69.2	1,910	1,254	410	335
14	106	17.0	84.0	57.2	84	49.4	106	69.2	1,730	1,254	399	325
15	107	57.2	84.0	53.0	84	49.4	106	69.2	2,790	1,201	378	302
16	106	57.2	84.0	53.0	84	49.4	106	69.2	1,830	1,130	364	302
17	106	57.2	84.0	53.0	84	57.2	106	69.2	1,250	1,042	350	302
18	20.8	57.2	84.0	53.0	84	57.2	95	69.2	1,250	1,042	350	302
19	20.8	57.2	84.0	53.0	84	57.2	95	69.2	724	989	350	302
20	20.8	57.2	84.0	53.0	84	65.3	95	73.5	646	989	364	302
21	20.8	57.2	84.0	53.0	84	65.3	95	78.4	646	953	378	290
22	20.8	57.2	84.0	57.2	84	65.3	95	73.5	625	918	378	290
23	20.8	57.2	84.0	57.2	84	65.3	95	65.3	2,680	918	364	290
24	20.8	57.2	84.0	57.2	84	84	95	84	957	865	335	279
25	20.8	57.2	57.2	57.2	84	84	95	84	2,790	848	335	279
26	20.8	57.2	57.2	57.2	49.4	84	95	84	4,170	812	335	279
27	20.8	73.5	57.2	57.2	49.4	84	95	148	1,250	724	325	267
28	20.8	73.5	57.2	57.2	49.4	84	84	57.2	3,530	724	335	279
29	20.8	73.5	57.2	147	49.4	84	84	57.2	7,490	643	350	279
30	20.8	-----	57.2	148	49.4	84	84	57.2	7,490	625	335	267
31	20.8	-----	57.2	-----	49.4	-----	84	410	-----	607	-----	267

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	1.74	.98	113.0	20.8	67.8	4,160	
February (3-14).....	1.51	.92	73.5	17.0	39.9	2,300	
March.....	1.57	1.38	84.0	57.2	76.6	4,710	
April.....	1.90	1.35	148	53	62.2	3,710	
May.....	1.90	1.31	148	49.4	78.4	4,830	
June.....	1.71	1.31	106	49.4	67.5	4,020	
July.....	2.23	1.57	235	84	107	6,580	
August.....	2.69	1.38	410	57.2	84	5,170	
September (7).....	16.08	1.71	81,220	106	4,268	†253,960	
October.....	6.56	2.62	5,650	378	1,323	81,360	
November.....	3.05	2.43	586	302	411	24,450	
December.....	2.62	2.33	378	267	310	19,060	
Yearly.....	16.08	.92	81,220	17	575	414,310	638

*Estimated

†Partly estimated

RIO GRANDE AT EAGLE PASS STATION

Description: Automatic water-stage recorder and cable with stand up cable car, located ½ mile above the international highway bridge at Eagle Pass, Texas. Zero of gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 28 current meter measurements during the year from cable car and one side-area measurement. Computations by shifting channel methods, 1932 records considered good, except during the flood peak and fair at that time.

Records Available: May, 1900 to April, 1916; November, 1923 to December, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 126,962 square miles; 90,043 being in the United States and 36,919 in Mexico.

Previous Extreme Flows: The highest previous gage height ever recorded was in June, 1922, when the extreme gage height was 45.09 feet, at the present gage, discharge unknown. The lowest flow ever recorded was on May 26, 1930, when the extreme gage height was 2.51 feet and the extreme flow 940 second feet. Numerous records of extremes may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,430	2,570	2,800	1,870	1,930	2,850	3,070	1,780	72,960	70,280	9,830	6,240
2	2,620	2,500	2,790	2,190	2,100	3,020	3,640	1,850	†376,930	33,180	9,640	6,180
3	2,710	2,630	3,030	2,100	1,600	2,380	6,800	2,120	143,600	32,240	9,640	6,350
4	2,600	2,530	2,750	2,020	1,790	2,070	4,660	2,020	33,600	35,330	9,670	6,540
5	2,540	2,510	2,670	1,940	1,650	1,800	7,230	1,890	19,700	41,800	10,320	6,280
6	2,620	2,480	2,750	1,890	1,570	1,840	4,450	1,780	21,550	67,610	10,970	6,120
7	2,540	2,500	2,650	1,960	2,990	2,340	3,360	1,900	33,370	75,000	9,510	5,980
8	2,620	2,460	2,560	1,920	3,720	2,390	2,760	2,070	88,090	50,310	9,170	5,830
9	2,670	2,370	2,530	1,910	6,150	2,350	3,260	1,940	69,160	44,420	8,930	5,830
10	2,680	2,530	2,430	1,840	4,840	2,290	2,950	2,210	61,260	33,140	8,930	6,150
11	2,620	2,490	2,420	1,800	5,880	2,050	2,300	5,560	44,420	26,840	8,740	6,050
12	2,490	2,330	2,580	1,680	7,860	1,870	2,850	6,920	25,890	23,340	8,520	6,110
13	2,620	2,390	2,660	1,670	6,440	1,720	2,260	5,130	17,730	21,040	8,400	6,190
14	2,630	2,390	2,450	1,710	5,590	1,680	2,570	8,530	22,220	19,580	8,270	6,120
15	2,560	2,390	2,210	1,690	3,680	1,820	2,610	8,220	30,360	18,900	8,110	6,050
16	2,580	2,370	2,250	1,720	3,660	1,780	2,490	8,560	43,000	18,990	7,930	6,160
17	2,630	3,600	2,340	1,700	3,620	1,700	2,290	7,980	44,140	19,130	7,680	6,100
18	2,500	*2,750	2,320	1,630	2,680	1,620	2,300	6,790	23,670	38,740	7,620	6,020
19	2,490	*2,470	2,330	1,540	2,500	1,550	2,110	5,910	15,880	†17,620	7,530	6,010
20	2,650	*2,500	2,230	1,610	2,180	1,560	1,900	4,980	12,160	15,260	7,470	6,100
21	*2,400	2,200	1,700	2,000	1,470	1,710	4,430	9,730	13,770	13,770	7,390	6,020
22	2,700	*2,600	2,380	1,570	1,900	1,450	1,790	4,240	9,150	12,860	7,270	5,910
23	2,730	*2,500	2,300	1,570	1,810	1,440	1,700	4,140	21,800	12,240	7,160	6,030
24	2,720	*2,600	2,340	1,670	1,840	1,440	1,600	3,630	30,430	11,950	6,990	6,000
25	2,640	*2,600	2,320	1,590	1,760	1,420	1,600	3,310	31,670	11,560	6,880	5,960
26	2,570	*3,100	2,260	1,500	1,650	1,650	1,650	3,200	13,170	11,000	6,760	5,800
27	2,660	*3,500	2,300	1,760	1,710	1,660	1,510	3,070	9,880	10,690	6,650	5,740
28	2,690	*3,300	2,320	1,670	2,160	1,450	1,470	2,880	12,600	10,820	6,520	5,710
29	2,580	*3,000	2,230	1,660	2,190	1,610	1,500	2,670	24,430	10,520	6,400	5,670
30	2,570	.....	2,210	1,870	1,940	2,870	1,530	2,770	77,840	10,290	6,320	5,610
31	2,610	.....	2,220	.....	1,700	.....	1,540	38,880	.....	9,960	.....	5,560

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	3.82	3.46	2,900	2,250	2,610	160,480	
February.....	5.00	3.23	5,700	2,210	† 2,636	† 151,640	
March.....	3.81	3.07	3,140	2,090	2,446	150,410	
April.....	3.42	2.62	2,640	1,400	1,765	105,030	
May (3).....	6.94	2.50	12,130	1,340	3,005	184,760	
June (29).....	4.09	2.45	3,730	1,380	1,995	113,340	
July.....	6.44	2.63	10,050	1,460	2,695	165,700	
August.....	18.83	2.69	84,210	1,530	5,205	320,060	
September (2).....	49.00	7.03	568,630	8,440	48,020	2,857,410	
October.....	21.00	6.57	104,310	9,830	26,078	1,603,480	
November.....	7.23	5.48	12,220	6,300	8,174	486,390	
December.....	5.60	5.16	6,600	5,460	6,014	369,760	
Yearly.....	49.00	2.45	568,630	1,340	9,188	6,668,460	52.6

*Estimated

†Partly estimated

RIO ESCONDIDO STATION AT VILLA FUENTE, COAHUILA

Description: Automatic water-stage recorder and cable with sit down cable car located 3.1 miles southwest of the city of Piedras Negras on the outskirts of Villa de Fuente, 5 miles above the confluence with the Rio Grande and 5.6 miles below the confluence of the Rio San Antonio.

Records: Based upon 33 current meter measurements from August to December, 1932, from cable car and small bridge 600 feet upstream from the cable. Computations by shifting channel-methods. 1932 records considered fair.

Records Available: 1922 to 1932.

Remarks: From 1922 to 1932 there were made daily 3 staff-gage readings 2,300 feet downstream from the present station. The zero of this old gage is 0.79 foot above the zero datum of the gage at the present station, but the water surface is practically level between the two gages. The present station was constructed by the Mexican Section of this Commission and completed in September, 1932. Meter measurements began in July and the continuous water-stage records began October 5. The flow of this spring fed stream is modified by irrigation diversions in the drainage basin of the San Antonio and the Escondido. The drainage area above this station is 1,170 square miles, entirely in Mexico.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	64.6	49.4	37.8	29.7	68.9	29.7	17.0	29.7	134	* 692	551	332
2	64.6	49.4	37.8	29.7	68.9	29.7	17.0	29.7	* 226	756	558	332
3	64.6	43.1	37.8	29.7	68.9	17.0	17.0	29.7	339	* 745	551	350
4	68.9	43.1	29.7	29.7	68.9	138	17.0	29.7	134	* 735	540	364
5	68.9	43.1	29.7	29.7	71.3	109	29.7	34.6	124	713	519	378
6	68.9	43.1	68.9	29.7	71.3	101	29.7	34.6	109	699	516	378
7	68.9	43.1	68.9	29.7	71.3	91.8	25.1	12.0	113	699	512	364
8	68.9	43.1	68.9	29.7	71.3	71.3	25.1	12.0	124	699	494	357
9	72.7	43.1	68.9	29.7	71.3	58.6	25.1	12.0	124	699	487	350
10	72.7	43.1	68.9	29.7	71.3	49.4	23.0	12.0	124	699	484	350
11	72.7	43.1	68.9	27.5	272	32.1	23.0	12.0	138	699	466	350
12	72.7	43.1	68.9	27.5	107	29.7	20.8	12.0	177	682	445	350
13	68.9	43.1	40.3	27.5	84.8	29.7	17.0	12.0	182	671	417	339
14	68.9	43.1	37.8	27.5	68.9	23.0	15.2	12.0	182	664	413	314
15	68.9	49.4	37.8	23.0	68.9	23.0	12.0	15.2	194	664	406	321
16	68.9	49.4	40.3	23.0	68.9	23.0	12.0	17.0	194	664	396	332
17	68.9	49.4	37.8	23.0	68.9	23.0	15.2	17.0	201	629	395	332
18	68.9	53.0	29.7	23.0	68.9	23.0	17.0	17.0	206	625	396	332
19	23.0	53.0	29.7	23.0	68.9	23.0	17.0	17.0	206	622	395	330
20	20.8	55.4	29.7	20.8	68.9	23.0	17.0	17.0	206	614	388	339
21	29.7	53.0	29.7	20.8	68.9	23.0	17.0	17.0	206	607	381	339
22	20.8	53.0	29.7	20.8	55.4	23.0	23.0	17.0	194	607	378	339
23	49.4	49.4	29.7	20.8	49.4	23.0	25.1	17.0	194	593	364	332
24	43.1	49.4	29.7	20.8	43.1	23.0	29.7	12.0	194	590	357	314
25	43.1	49.4	29.7	20.8	43.1	23.0	39.9	12.0	* 314	586	356	304
26	43.1	43.1	29.7	20.8	55.4	20.8	53.0	12.0	431	583	350	314
27	43.1	43.1	29.7	848	55.4	17.0	65.3	55.4	* 485	572	349	321
28	43.1	40.3	29.7	378	49.4	17.0	37.8	960	* 538	565	350	332
29	43.1	37.8	29.7	155	23.0	17.0	29.7	417	* 591	565	349	332
30	43.1	-----	29.7	73.1	29.7	17.0	29.7	182	* 644	565	339	314
31	43.1	-----	29.7	-----	29.7	-----	29.7	155	-----	558	-----	304

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	1.25	.66	72.7	20.8	55.8	3,430	
February.....	1.08	.89	55.4	37.8	46.3	2,670	
March.....	1.21	.79	68.9	29.7	40.6	2,510	
April.....	5.77	.66	848	20.8	70.6	4,210	
May.....	2.46	.69	272	23.0	69.6	4,270	
June.....	1.94	.59	170	17.0	43.4	2,590	
July.....	1.18	.49	65.3	12.0	24.7	1,530	
August (28).....	6.46	.49	961	12.0	72.4	4,440	
September.....	4.53	1.54	643	109	241	14,340	
October.....	5.22	4.04	756	558	647	39,790	
November.....	4.99	2.72	713	339	430	25,590	
December.....	2.62	2.59	378	304	337	20,720	
Yearly.....	6.46	.49	961	12.0	173	126,090	102

*Estimated

Note: On September 2, the backwater of the Rio Grande caused a maximum gage height of 9.91 feet.

RIO GRANDE AT LAREDO STATION

Description: Automatic water-stage recorder and cable with sit down cable car. Cable and car located at Fort McIntosh about 2½ miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo. Zero of gage at the recorder is 351.45 feet, and that at the cable is 353.15 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based on 103 current meter measurements from cable car from January 1 to September 2, and from December 5 to 31. The interruption was due to the large flood on September 3 and 4 which wrecked the cable structure, the same being repaired in October. Computations by shifting channel methods up to a gage height of 20.9 feet and by cross-section and slope for the greater heights. 1932 records considered good excepting during the flood, and fair at that time.

Records Available: 1904 to 1913; from October, 1922 to 1926; 1928, 1929 and August 25, 1930 to 1932.

Remarks: The river flow at this station is modified by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States and by many irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 132,915 square miles, of which 91,516 are in the United States and 41,399 in Mexico. Prior to September, 1925, gage was at cable, 1½ miles above railroad bridge, and zero of this old gage was 351.35 feet above mean sea level, United States Coast and Geodetic Survey datum.

Previous Extreme Flows: The greatest previous flow was on June 20, 1922, when the peak gage reading was 49.0 feet, the flow being unknown. On May 31, 1925 the peak gage height was 34.51 and the peak flow was 200,020 second feet. In 1910 a minimum flow of 939 second feet was reached. Numerous records of extreme flows may be seen in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,540	2,270	2,555	1,710	1,800	1,610	2,160	1,130	77,020	73,000	12,180	7,100
2	2,470	2,290	2,370	1,750	1,700	1,480	7,063	1,120	91,990	88,990	11,800	7,100
3	2,400	2,280	2,360	1,600	1,670	2,100	4,344	1,200	*212,030	54,980	11,510	7,100
4	2,550	2,250	2,400	1,590	1,820	2,325	5,474	1,500	*200,020	43,010	11,300	6,990
5	2,690	2,280	2,540	1,650	1,600	2,020	6,000	1,530	79,490	41,990	11,190	6,600
6	2,600	2,290	2,300	1,590	1,520	1,760	5,190	1,630	31,220	49,960	11,580	6,600
7	2,380	2,250	2,200	1,501	1,520	1,820	7,490	1,520	25,810	79,990	13,210	6,220
8	2,500	2,200	2,290	1,480	1,520	1,610	4,132	1,500	31,710	88,990	11,900	5,900
9	2,500	2,170	2,220	1,500	2,130	1,950	2,980	1,530	88,990	60,990	11,300	5,690
10	2,540	2,040	2,170	1,560	2,330	2,020	2,430	1,580	87,020	48,490	10,490	5,510
11	2,580	1,970	2,110	1,470	10,210	2,000	2,800	1,550	75,010	38,990	10,380	5,510
12	2,640	2,070	2,080	1,450	13,385	1,980	2,460	1,950	52,020	31,010	9,890	5,790
13	2,540	2,080	2,000	1,440	8,300	1,770	2,020	7,590	43,010	26,490	9,710	5,600
14	2,410	1,930	2,190	1,400	6,990	1,640	2,540	6,220	28,990	25,000	9,220	5,510
15	2,540	1,950	2,250	1,380	6,740	1,470	2,000	6,110	26,590	25,000	9,040	5,510
16	2,540	1,970	2,100	1,380	5,690	1,480	2,160	8,515	35,000	21,580	9,010	5,400
17	2,580	1,970	1,910	1,410	3,400	1,500	2,390	8,020	46,010	21,290	8,930	5,400
18	2,610	2,250	1,870	1,410	3,520	1,470	2,080	7,800	46,510	21,610	8,930	5,300
19	2,600	3,855	1,950	1,450	3,020	1,300	1,903	6,740	38,000	21,400	8,900	5,300
20	2,460	2,710	1,890	1,410	2,380	1,180	1,850	8,050	24,010	20,310	8,690	5,190
21	2,360	2,280	1,910	1,390	2,190	1,140	1,700	6,500	17,690	19,710	8,510	5,300
22	2,500	2,220	1,820	1,350	1,920	1,120	1,530	4,910	16,700	19,490	8,760	5,400
23	2,470	2,170	1,730	1,390	1,720	1,120	1,400	4,240	19,320	15,500	8,090	5,400
24	2,520	2,170	1,850	1,400	1,600	1,060	1,370	3,960	29,210	14,690	7,950	5,400
25	2,490	2,080	1,770	1,280	1,480	1,010	1,370	3,440	38,000	14,510	7,910	5,400
26	2,520	2,090	1,830	1,330	1,640	990	1,230	2,920	36,020	14,580	7,700	5,410
27	2,380	2,150	1,770	1,330	1,670	870	1,180	2,750	17,690	13,490	7,590	5,300
28	2,290	2,520	1,680	1,400	1,760	870	1,230	2,790	12,710	12,780	7,490	5,190
29	2,390	2,750	1,700	3,820	1,700	1,200	1,170	2,760	15,010	12,290	7,420	5,190
30	2,410	-----	1,750	3,400	2,000	1,100	1,080	2,600	28,500	12,180	7,200	5,300
31	2,290	-----	1,630	-----	1,880	-----	1,100	6,820	-----	12,400	-----	5,190

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	4.89	4.69	2,680	2,290	2,490	153,300		
February.....	5.61	4.49	4,410	1,930	2,260	129,930		
March.....	4.86	4.27	2,550	1,630	2,040	125,350		
April.....	5.91	4.00	5,300	1,280	1,610	95,640		
May.....	8.99	4.07	17,800	1,480	3,250	199,950		
June (27).....	4.63	3.61	2,320	870	1,500	89,190		
July.....	6.96	3.67	10,310	1,080	2,700	166,270		
August.....	14.60	3.64	44,000	1,060	3,890	238,940		
September (3).....	52.20	8.07	*402,590	11,300	52,380	3,116,670		
October.....	22.47	8.20	*152,350	12,010	33,690	2,071,590		
November.....	8.60	7.09	17,200	8,970	9,590	570,800		
December.....	7.09	6.46	7,100	5,190	5,740	352,680		
Yearly.....	52.20	3.61	*402,590	870	10,090	7,310,310	55.0	

Original data in English units to Nov. 30. Then changed to metric system.

*Computed with cross-section and slope using the value of the coefficient of roughness (N) deduced from current meter measurements.

DOLORIS CREEK STATION NEAR SAN IGNACIO, TEXAS

Description: Automatic water-stage recorder and cable with sit down cable car, located about 3.2 miles above the confluence with the Rio Grande, and 14 miles north of San Ignacio, Zapata County, Texas. Zero of gage is 317.66 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 3 current meter measurements during the year from the cable. Computations by shifting channel methods. 1932 records considered poor.

Records Available: January to December, 1932.

Remarks: This creek is dry except during storms. The drainage area above this station is 606 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	16	0	427	0		0	0	0
2	0	0	0	0	4	0	22.4	0		0	0	0
3	0	0	0	0	4	0	.6	0	Small	0	0	0
4	0	0	0	0	4	0	0	0	Flow	0	0	0
5	0	0	0	0	4	0	4	0		0	0	0
6	0	0	0	0	4	0	1.6	0	0	0	0	0
7	0	0	0	0	3	0	0	0	0	0	0	0
8	0	0	0	0	3	0	0	0	0	0	0	0
9	0	0	0	0	3	0	0	0	0	0	0	0
10	0	0	0	0	74	0	0	0	0	0	0	0
11	0	0	0	0	652	0	0	0	0	0	0	0
12	0	0	0	0	455	0	0	0	0	0	0	0
13	0	0	0	0	66	0	0	0	0	0	0	0
14	0	0	0	0	140	0	0	0	0	0	0	0
15	0	0	0	0	1,855	0	0	0	0	0	0	0
16	0	0	0	0	554	0	0	0	0	0	0	0
17	0	0	0	0	28	0	0	0	0	0	0	0
18	0	0	0	0	6	0	0	0	0	0	0	0
19	0	0	0	0	4	0	0	0	0	0	0	0
20	0	0	0	0	3	0	0	0	0	0	0	0
21	0	0	0	0	2	0	0	0	0	0	0	0
22	0	0	0	0	1	0	0	1.4		0	0	0
23	0	0	0	0	1	6	0	0	Large	0	0	0
24	0	0	0	0	1	181	0	0	Flow	0	0	0
25	0	0	0	0	1	20	0	0		0	0	0
26	0	0	0	0	1	0	0	0		0	0	0
27	0	0	0	0	1	0	0	0		0	0	0
28	0	0	0	0	1	0	0	0	Large	0	0	0
29	0	0	0	408	1	0	0	0	Flow	0	0	0
30	0	.....	0	383	1	1,505	0	0		0	0	0
31	0	.....	0	.....	1	.....	0	0		0	.....	0

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	.....	.....	0	0	0	0	
February.....	.....	.....	0	0	0	0	
March.....	.....	.....	0	0	0	0	
April.....	2.37	.....	1,036	0	26	1,570	
May.....	4.55	.....	3,910	0	123	7,726	
June.....	5.71	-0.74	7,114	0	56	3,374	
July.....	1.74	.....	830	0	14.6	897	
August.....	0.04	.....	10	0	.04	2.8	
September.....	.....	.....	.....	.....	.....	*20,000	
October.....	0	0	0	0	0	0	
November.....	.....	.....	0	0	0	0	
December.....	.....	.....	0	0	0	0	
Yearly.....	5.71	.....	.....	0	†46.2	†33,600	†55.5

Note: On September 4, Rio Grande backwater reached a gage height of 25.4 feet at this station.
*Estimated †Partly estimated

RIO SALADO STATION AT CD. GUERRERO, "EL CABLE"

Description: Automatic water-stage recorder and cable with sit down cable car, located about 6.2 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southeast of Ciudad Guerrero, Tamaulipas, at a point called "El Cable".

Records: Based on 142 current meter measurements during the year from cable car and by wading. Computations by shifting channel methods. 1932 records considered fair.

Records Available: 1901 to 1912; 1923 to 1932.

Remarks: The flow of the Rio Salado is greatly modified by the Don Martin reservoir, which forms a part of National Irrigation System No. 4, Coahuila-Nuevo Leon, and by irrigation. This station was entirely rebuilt by the Mexican Section of this Commission in December, 1932, when an automatic water-stage recorder was installed. The drainage area above this station is 21,830 square miles, entirely in Mexico.

Previous Extreme Flows: The greatest previous flow ever recorded at this station was on September 18, 1924, when a mean daily gage height of 17.65 feet was reached with a corresponding discharge of 35,630 second feet. The stream has not been dry since irrigation commenced in System No. 4 in 1931. Numerous extremes may be seen in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	44.1	28.3	38.8	74.2	423.8	63.6	750	8.83	97	17,130	5,830	2,910
2	40.6	24.7	35.3	74.2	155.4	53.0	58.3	7.06	173	17,130	6,180	3,110
3	45.9	21.2	44.1	68.9	91.8	45.9	42.4	7.06	918	20,480	5,470	3,440
4	47.7	21.2	93.6	53.0	74.2	44.1	30.0	5.30	1,660	25,430	4,770	2,930
5	45.9	26.5	83.0	37.1	70.6	38.8	28.3	3.53	11,300	25,690	5,830	2,910
6	44.1	26.5	75.9	28.3	63.6	35.3	111	3.53	12,360	21,010	5,830	4,770
7	40.6	31.8	75.9	21.2	58.3	28.3	117	0.0	6,000	18,190	5,010	2,930
8	45.9	67.1	60.0	19.4	53.0	28.3	79.5	0.0	2,830	11,650	4,410	4,240
9	44.1	60.0	37.1	15.9	40.6	24.7	53.0	0.0	2,260	12,360	4,410	4,590
10	44.1	53.0	31.8	15.9	33.5	24.7	45.9	0.0	1,340	15,190	4,480	2,470
11	38.8	47.7	72.4	10.6	26.5	24.7	40.6	0.0	750	11,480	4,240	3,530
12	38.8	58.3	79.5	14.1	953.5	23.0	38.8	0.0	583	6,000	4,590	4,240
13	44.1	54.7	75.9	40.6	582.7	21.2	28.3	0.0	441	7,240	4,310	3,250
14	40.6	60.0	72.4	49.4	353.1	19.4	24.7	0.0	371	8,120	3,960	2,400
15	40.6	47.7	63.6	49.4	194.2	17.7	19.4	0.0	335	8,480	3,880	865
16	37.1	44.1	75.9	45.9	86.5	17.7	14.1	0.0	265	7,590	3,320	812
17	37.1	38.8	75.9	49.4	58.3	15.9	10.6	0.0	208	4,590	3,710	848
18	35.3	40.6	54.7	58.3	105.9	14.1	8.83	0.0	187	5,650	3,590	812
19	37.1	49.4	49.4	47.7	74.2	14.1	7.06	0.0	166	4,590	3,000	777
20	45.9	44.1	47.7	44.1	61.8	12.4	6.36	0.0	148	5,650	3,530	1,410
21	44.1	40.6	38.8	38.8	47.7	10.6	5.30	0.0	138	8,830	3,780	3,140
22	47.7	45.9	35.3	58.3	38.8	8.8	5.30	936	318	8,650	3,960	2,090
23	49.4	49.4	31.8	67.1	35.3	44.1	4.59	406	1,590	9,010	3,880	1,590
24	58.3	120.1	28.3	60.0	28.3	318	3.53	208	4,770	8,120	3,210	4,060
25	75.9	104.2	28.3	74.2	24.7	122	0.0	127	4,590	9,540	3,180	4,590
26	63.6	83.0	24.7	70.6	21.2	75.2	0.0	173	3,180	10,590	3,250	6,890
27	47.7	63.6	21.2	653	19.4	54.7	8.83	335	3,000	10,060	4,840	8,480
28	38.8	53.0	37.1	2,066	17.7	40.6	14.1	161	9,890	5,470	3,320	5,300
29	35.3	44.1	98.9	1,200	15.9	33.5	14.1	93.6	9,460	4,660	2,720	4,060
30	31.8	.....	93.6	795	15.9	5,050	12.4	75.9	12,010	5,300	2,930	4,060
31	30.0	.....	79.5	.....	31.8	.....	10.6	45.9	.....	5,540	.....	2,400

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	2.43	1.80	75.9	30.0	43.8	2,700	
February.....	2.92	1.64	148	21.2	50.1	2,880	
March.....	2.66	1.64	106	21.2	56.9	3,490	
April.....	8.60	1.41	6,360	14.1	197	11,700	
May.....	5.18	1.48	1,020	15.9	124	7,650	
June.....	9.02	1.21	7,130	8.83	211	12,540	
July.....	5.58	.82	1,450	0	51.2	3,160	
August (16).....	5.31	.52	1,200	0	83.7	5,150	
September.....	11.55	1.90	13,420	35.3	3,040	181,170	
October (5).....	15.94	7.61	26,130	4,170	10,950	673,070	
November.....	8.79	6.27	6,780	2,120	4,180	248,590	
December.....	9.58	4.69	8,650	777	3,220	198,160	
Yearly.....	15.94	.52	26,130	0	1,850	1,350,260	61.9

Note: The correct total acre feet for the months of Jan., Feb., Mar., Apr., May and June for this station for the year 1931 as shown in Water Bulletin No. 1 were shown as the totals for April, May, June, January, February and March respectively.

RIO GRANDE AT ZAPATA STATION

Description: Automatic water-stage recorder and cable with stand up cable car located about 3 miles by river below the town of Zapata, Zapata County, Texas, and 1.3 mile below the confluence of the Rio Salado with the Rio Grande. Zero of the gage is at mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 41 current meter measurements during the year from cable car and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: January, 1932 to December, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 156,714 square miles; 92,613 being in the United States and 64,101 in Mexico.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,950	2,630	3,280	2,160	3,880	2,310	3,990	1,230	†31,050	59,690	15,780	10,060
2	3,060	2,490	3,160	2,020	2,320	1,900	5,710	1,330	68,510	94,370	16,080	10,120
3	2,920	2,490	3,400	1,880	2,090	1,720	4,800	1,260	76,870	66,660	15,310	10,150
4	2,920	2,480	2,950	1,750	2,030	2,990	4,900	1,350	210,580	60,000	14,350	10,220
5	3,230	2,400	3,200	1,930	2,180	2,920	5,750	1,920	183,030	61,640	14,870	10,250
6	3,250	2,400	3,180	1,990	1,750	2,460	4,870	1,800	63,950	62,460	16,120	11,350
7	3,020	2,400	2,850	1,970	1,780	2,120	6,590	2,050	36,200	71,620	15,690	11,040
8	2,960	2,420	2,770	1,900	1,720	2,060	5,470	1,680	31,020	81,290	15,000	10,320
9	3,070	2,370	2,840	1,860	1,520	1,900	3,690	1,560	53,330	70,920	13,930	10,770
10	2,980	2,370	2,770	1,870	2,820	2,340	2,960	1,400	75,120	61,810	13,440	9,730
11	3,000	2,360	2,780	1,870	9,830	2,390	2,620	1,610	65,530	48,210	13,180	9,300
12	2,970	2,360	2,750	1,850	13,040	2,380	2,800	1,700	51,680	37,550	13,020	9,980
13	2,960	2,360	2,540	1,800	8,350	2,320	2,140	3,070	36,510	31,410	12,140	9,150
14	2,960	2,380	2,580	1,790	7,520	2,040	1,820	6,990	22,770	28,860	11,760	8,470
15	2,960	2,380	2,630	1,800	7,970	1,830	2,530	5,370	22,740	27,790	11,750	7,320
16	3,010	2,380	2,890	1,830	8,260	1,620	2,120	7,640	27,150	26,370	11,300	7,080
17	2,950	2,380	2,770	1,860	5,610	1,440	2,450	7,880	37,430	24,460	11,150	6,980
18	3,030	2,380	2,470	1,890	4,030	1,610	2,720	8,090	42,740	24,360	11,140	6,920
19	3,050	3,820	2,410	1,900	4,340	1,580	2,400	7,690	33,080	24,210	10,710	6,820
20	3,050	4,290	2,450	1,910	3,350	1,350	2,110	7,350	21,750	28,850	11,530	7,420
21	2,790	3,180	2,440	1,860	2,850	1,200	2,120	8,620	17,050	24,780	11,520	9,780
22	2,810	2,610	2,400	1,800	2,630	1,100	1,940	5,730	17,730	23,180	11,610	8,490
23	2,890	2,500	2,270	1,720	2,280	1,210	1,670	4,990	22,990	22,960	11,310	7,920
24	2,890	2,440	2,190	1,740	2,040	2,020	1,500	4,530	28,280	21,060	10,570	9,960
25	2,940	2,490	2,300	1,750	1,870	1,840	1,370	4,680	39,710	21,920	10,290	*11,500
26	2,820	2,410	2,300	1,610	1,800	1,290	1,420	3,970	37,280	22,510	10,480	*12,900
27	2,790	2,440	2,290	4,620	1,880	1,210	1,470	3,660	26,910	21,610	11,410	*13,200
28	2,780	2,710	2,210	5,600	1,890	1,150	1,470	3,400	21,450	17,150	11,410	*11,000
29	2,780	3,220	2,200	3,710	2,070	1,130	1,450	3,230	25,240	15,120	10,180	10,380
30	2,700	.....	2,170	7,720	2,020	8,370	1,350	2,970	32,030	15,040	10,090	10,500
31	2,690	.....	2,230	.....	2,550	.....	1,200	2,720	.....	15,830	.....	9,070

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	220.20	219.96	3,460	2,670	2,941	180,820		
February.....	220.80	219.86	5,410	2,360	2,605	149,830		
March.....	220.48	219.67	4,200	2,150	2,635	161,990		
April.....	222.27	219.43	10,800	1,570	2,332	138,770		
May.....	224.65	219.39	15,310	1,400	3,316	234,650		
June (23).....	225.22	219.18	17,130	992	2,060	122,580		
July.....	222.12	219.22	8,710	1,130	2,884	177,320		
August.....	222.75	219.22	9,880	1,160	†3,918	†240,940		
September (4).....	262.07	220.00	261,160	5,540	48,657	2,895,330		
October.....	239.90	223.58	97,380	14,780	38,974	2,396,440		
November.....	224.04	222.16	16,460	9,590	12,570	748,020		
December.....	223.38	221.75	*13,500	6,760	9,618	591,380		
Yearly.....	262.07	219.18	261,160	992	11,072	8,038,070	51.3	

*Estimated

†Partly estimated

EL TIGRE ARROYO STATION NEAR ZAPATA, TEXAS

Description: Automatic water-stage recorder located 21 miles southeast from Zapata, Zapata County, Texas, and about 2.7 miles above the confluence with the Rio Grande. Zero of gage is 212.99 feet above mean sea level, United States Coast and Geodetic Survey datum. Meter measurements at flood stages are to be made from highway bridge 6,400 feet below the recorder. Zero of gage at highway bridge 208.13 feet above same datum.

Records: Based upon one slope-area measurement. 1932 records considered very poor.

Records Available: January to December 31, 1932.

Remarks: This creek is dry most of the time and carries only storm flow. The drainage area above this station is 261 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	Small Flow	0	0	0
2	0	0	0	0	0	0	0	0	Flow	0	0	0
3	0	0	0	0	0	0	0	0	Prob-	0	0	0
4	0	0	0	0	0	0	0	0	able	0	0	0
5	0	0	0	0	0	0	0	0		0	0	0
6	0	0	0	0	0	0	†7.0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	Large	0	0	0
24	0	0	0	0	0	0	0	0	Flow	0	0	0
25	0	0	0	0	0	0	0	0		0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	Large	0	0	0
29	0	0	0	0	0	0	0	0	Flow	0	0	0
30	0	0	0	0	0	0	0	0		0	0	0
31	0	0	0	0	0	0	0	0		0	0	0

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	0	0	0	0	0	0	
February.....	0	0	0	0	0	0	
March.....	0	0	0	0	0	0	
April.....	0	0	0	0	0	0	
May.....	0	0	0	0	0	0	
June.....	0	0	0	0	0	0	
July.....	1.29	.....	68	0	0.4	13.9	
August.....	0	0	0	0	0	0	
September.....	.....	.....	.....	.....	.....	*9,000	
October.....	.....	.....	.....	.....	.....	*0	
November.....	0	0	0	0	0	0	
December.....	0	0	0	0	0	0	
Yearly.....					†12.4	†9,010	†34.5

Note: On September 5, Rio Grande backwater reached a gage height of 27.64 feet at this station.

*Estimated †Partly estimated

RIO ALAMO STATION AT CD. MIER, ("EL PASO DEL CANTARO")

Description: Automatic water-stage recorder and cable with sit down cable car, located about 3 miles from the confluence of the Rio Alamo with the Rio Grande and 2/3 of a mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Cantaro." Zero of gage is 187.04 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 91 current meter measurements from May to December from cable car and by wading. Water stage by 3 daily gage readings from January 1 to May 8. 1932 records considered good.

Records Available: July 5, 1923, to 1926; 1928 and 1930 to 1932.

Remarks: This station was rebuilt in December by the Mexican Section of this Commission. The drainage area above this station is 1,840 square miles, all in Mexico.

Previous Extreme Flows: The greatest previous flow occurred on June 12, 1930, with a mean daily gage height of 11.48 feet and a corresponding flow of 11,300 second feet. The river is often dry. Numerous records of extreme flows may be seen in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	17.7	7.06	3.53	3.53	30.0	0.0	12.4	0.0	10.6	6,000	138	109
2	14.1	5.30	3.53	3.53	21.2	0.0	7.06	0.0	12.4	2,470	138	84.8
3	10.6	5.30	1.77	3.53	17.7	0.0	7.06	0.0	918	1,620	138	84.8
4	10.6	5.30	1.77	3.53	14.1	0.0	5.30	0.0	1,410	1,100	138	84.8
5	10.6	3.53	1.77	3.53	12.4	244	8.83	0.0	3,500	812	138	74.2
6	10.6	3.53	15.9	3.53	10.6	152	44.1	0.0	54.7	706	152	81.2
7	12.4	5.30	8.83	3.53	10.6	38.8	10.6	0.0	84.8	600	152	81.2
8	10.6	5.30	5.30	3.53	8.83	17.7	7.06	0.0	33.5	512	131	70.6
9	10.6	7.06	3.53	3.53	8.83	8.83	7.06	0.0	30.0	424	131	81.2
10	10.6	5.30	3.53	3.53	8.83	7.06	5.30	0.0	10.6	344	138	84.8
11	10.6	5.30	3.53	3.53	304	5.30	5.30	0.0	7.1	293	138	84.8
12	10.6	3.53	3.53	3.53	286	3.53	3.53	0.0	5.3	244	131	91.8
13	10.6	3.53	3.53	3.53	113	3.53	3.53	0.0	3.5	208	131	91.8
14	10.6	3.53	5.30	3.53	47.7	0.0	1.77	0.0	120	201	125	91.8
15	10.6	1.77	5.30	3.53	24.7	0.0	0.0	0.0	44.1	177	125	91.8
16	12.4	1.77	5.30	3.53	17.7	0.0	0.0	0.0	12.4	145	113	70.6
17	15.9	1.77	5.30	1.77	17.7	0.0	0.0	0.0	5.30	120	125	58.3
18	15.9	1.77	5.30	1.77	12.4	0.0	0.0	0.0	3.53	109	120	58.3
19	17.7	1.77	5.30	1.77	10.6	0.0	0.0	0.0	1.8	106	120	63.4
20	19.4	1.77	3.53	1.77	8.83	0.0	0.0	14.1	0.0	91.8	120	63.4
21	17.7	3.53	3.53	1.77	7.06	0.0	0.0	265	7.1	95.3	120	67.1
22	15.9	3.53	3.53	1.77	7.06	0.0	0.0	636	1,310	304	113	67.1
23	15.9	3.53	3.53	1.77	7.06	17.7	0.0	115	1,520	226	109	58.3
24	8.83	3.53	3.53	0.0	5.30	275	0.0	40.6	2,080	244	109	54.7
25	8.83	3.53	3.53	0.0	5.30	77.7	0.0	208	954	200	113	54.7
26	8.83	3.53	3.53	0.0	5.30	24.7	0.0	31.8	215	159	113	63.6
27	8.83	3.53	3.53	7,946	3.53	12.4	0.0	41.1	2,290	159	113	51.2
28	7.06	3.53	5.30	901	3.53	7.06	0.0	24.7	8,830	152	113	47.7
29	7.06	3.53	5.30	120	1.77	7.06	0.0	26.5	12,180	138	113	54.7
30	7.06	-----	5.30	54.7	1.77	67.1	0.0	12.4	14,130	145	113	40.6
31	7.06	-----	3.53	-----	1.77	-----	0.0	8.83	-----	138	-----	38.8

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile.
	High	Low	High	Low			
January.....	.92	.59	19.4	7.06	11.7	725	
February.....	.59	.39	7.06	1.77	3.88	221	
March.....	.85	.39	15.9	1.77	4.59	277	
April.....	13.45	.30	11,160	0	303	18,030	
May.....	4.49	.33	1,450	1.77	33.5	2,050	
June.....	4.72	0	1,780	0	32.5	1,920	
July.....	1.64	-.39	91.8	0	4.24	256	
August.....	6.69	-.72	3,390	0	45.2	2,770	
September (30).....	19.36	.36	*20,060	0	1,660	98,750	
October.....	12.34	1.64	9,750	91.8	589	36,180	
November.....	1.97	1.74	152	109	126	7,480	
December.....	1.74	1.21	109	38.8	71.0	4,370	
Yearly.....	19.36	-.72	20,060	0	240	173,040	94.0

Note: On September 5, backwater from the Rio Grande caused a maximum gage height of 8.27 feet.

*Estimated

RIO GRANDE AT ROMA STATION

Description: Automatic water-stage recorder at international bridge at Roma, Starr County, Texas. Zero of gage is 145.93 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 42 current meter measurements during the year from bridge. Computations by shifting channel methods. 1932 records considered good.

Records Available: August, 1900 to March, 1914. November, 1922 to December, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 160,014 square miles; 93,645 being in the United States and 66,369 in Mexico. After March, 1929 the station was operated by the United States, and previously by Mexico. Datum at present gage is 1.1 ft. lower than that used prior to 1922.

Previous Extreme Flows: The greatest previous flow ever recorded was on June 22, 1922, when the extreme gage height was 35.0 feet and the extreme flow 240,000 second feet as computed by United States Geological Survey engineers. The lowest flow ever recorded was on May 29, 1925, when the extreme flow was 975 second feet. Records of other extreme flows may be found in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,660	2,550	3,230	2,000	5,760	2,210	7,510	1,230	10,420	75,850	15,510	9,450
2	2,730	2,520	3,200	1,910	3,340	2,030	3,760	1,240	60,410	89,370	16,600	9,500
3	2,750	2,520	3,150	1,860	2,460	1,820	6,560	1,270	78,740	86,140	16,040	9,440
4	2,730	2,530	3,150	1,850	2,200	1,720	5,200	1,250	125,310	63,240	14,220	9,420
5	2,760	2,470	2,950	1,700	2,060	3,200	5,160	1,360	193,730	62,000	14,460	9,390
6	2,900	2,480	3,040	1,800	2,070	2,750	6,670	1,580	121,430	60,590	16,140	9,730
7	2,950	2,560	2,930	1,820	1,670	2,280	5,460	1,690	58,420	63,900	14,950	11,960
8	2,710	2,550	2,760	1,760	1,590	2,090	7,080	1,710	41,140	75,170	15,430	9,000
9	2,700	2,530	2,680	1,710	1,460	1,940	4,900	1,620	46,620	73,490	13,720	10,970
10	2,740	2,500	2,750	1,650	1,320	1,920	3,640	1,560	76,340	61,240	13,510	10,610
11	2,720	2,520	2,550	1,660	4,560	2,120	2,990	1,510	72,690	51,630	12,640	7,890
12	2,730	2,430	2,640	1,660	14,840	2,140	2,820	1,630	63,210	40,160	12,630	10,210
13	2,730	2,440	2,580	1,660	10,620	2,070	2,860	1,560	49,260	31,670	11,780	10,120
14	2,730	2,540	2,500	1,640	6,530	1,950	2,430	4,020	38,940	29,420	10,830	9,320
15	2,620	2,490	2,540	1,620	6,240	1,810	2,390	5,080	24,360	27,860	11,500	7,480
16	2,640	2,440	2,630	1,570	11,100	1,660	2,460	4,860	24,410	26,310	11,010	6,700
17	2,710	2,450	2,650	1,580	6,210	1,560	2,170	7,380	37,740	24,530	10,910	6,640
18	2,720	2,430	2,500	1,720	4,200	1,520	2,400	7,340	43,410	22,590	10,660	6,660
19	2,750	2,430	2,290	1,700	3,600	1,620	2,450	7,090	41,770	23,600	10,510	6,610
20	2,790	3,730	2,250	1,750	3,540	1,620	2,160	6,530	*27,190	22,470	10,760	6,550
21	2,770	3,610	2,260	1,740	2,790	1,490	2,030	7,590	19,140	23,360	11,250	8,450
22	2,580	2,990	2,200	1,680	2,500	1,440	1,970	8,610	18,890	22,830	11,290	8,450
23	2,630	2,720	2,170	1,630	2,310	1,450	1,810	5,350	25,300	22,980	11,310	7,740
24	2,690	2,680	2,090	1,630	2,050	1,880	1,660	4,510	25,450	19,790	10,720	7,810
25	2,690	2,730	2,050	1,680	1,876	2,100	1,530	4,650	39,470	19,960	10,370	10,300
26	2,740	2,710	2,130	1,670	1,770	1,760	1,510	4,420	38,570	20,440	10,200	11,070
27	2,720	2,650	2,070	6,560	1,700	1,400	1,460	4,000	36,330	20,510	10,380	12,820
28	2,700	2,740	2,070	6,560	1,750	1,280	1,380	3,800	38,980	18,720	12,460	12,300
29	2,560	2,860	2,060	4,170	1,730	1,210	1,350	3,610	46,090	15,150	9,900	9,520
30	2,550	-----	2,040	5,290	1,820	2,750	1,380	3,570	73,520	15,510	9,450	9,490
31	2,500	-----	2,010	-----	1,960	-----	1,320	3,370	-----	15,840	-----	9,290

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	3.98	3.52	3,023	2,523	2,714	166,910	
February.....	4.84	3.28	4,420	2,410	2,643	152,330	
March.....	4.21	3.03	3,460	1,980	2,522	155,070	
April.....	7.64	2.60	11,290	1,550	2,243	133,470	
May.....	8.80	2.61	18,940	1,220	3,797	233,460	
June (29).....	7.74	2.26	13,120	1,200	1,894	112,700	
July.....	7.83	2.40	14,600	1,260	3,178	195,410	
August.....	8.02	2.38	15,340	1,220	3,709	228,050	
September (5).....	35.40	3.97	203,420	2,880	53,209	3,166,220	
October.....	23.30	7.64	95,760	14,750	39,559	2,432,240	
November.....	8.15	5.45	16,670	8,780	12,568	735,960	
December.....	7.09	4.80	12,950	6,550	9,191	565,140	
Yearly.....	35.40	2.26	203,420	1,200	11,401	8,276,990	51.7

†Partly estimated

RIO SAN JUAN STATION AT SANTA ROSALIA

Description: Automatic water-stage recorder and cable with sit down cable car, located about 17½ miles above the mouth of the San Juan River and 15 miles south of Ciudad Camargo, Tamaulipas, Mexico, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station. Zero of gage is 205.15 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 203 current meter measurements during the year from cable car. Computations by shifting channel methods. 1932 records considered good.

Records Available: May 1, 1900 to 1913; 1923 to 1932.

Remarks: Daily gage readings began May 1, 1900, and meter measurements Oct. 3, 1900 at La Quemada Ranch (now Ochoa settlement). The station was moved 2½ miles upstream to its present location July 14, 1902. The datum of the gage at La Quemada is not known. The gage zero at Santa Rosalia was raised on Oct. 1, 1909, an unknown amount and on May 27, 1912, the same gage was lowered 11 feet. Whether the gage zero has been moved at other times is not known.

When the river at this station rises above a gage height of 36.1 feet, water overflows the left river bank above the station and returns to the river below the station. At a gage height of 42.6 feet, water submerges the right river bank at the station but follows the main river. The river flow is modified at this station by irrigation diversions, and other uses along the San Juan River basin. The drainage area above this station is 13,000 square miles, entirely in Mexico.

Previous Extreme Flows: On August 30, 1900, there occurred a flood which reached a height estimated at 15 meters on the present scale, according to records of the residents of the region. In Water Bulletin No. 1, the mean daily flow for this flood was given as 30,000 second feet which was copied from the records. New slope-area computations supported by measurements during recent floods, show the 1900 flood peak to have been 353,000 second feet without considering the water which overflowed the river channel to a width of nearly 2 miles. The river runs dry at times. In Water Bulletin No. 1 may be seen numerous records of extreme flows.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	247	170	48.7	19.8	141	40.6	122	5.6	851	20,840	2,400	918
2	219	161	48.7	17.7	98.9	33.5	321	0	2,260	16,600	2,210	918
3	219	152	48.7	17.7	73.5	27.2	494	0	3,390	16,240	2,150	777
4	207	141	44.1	17.7	59.0	24.4	346	0	5,120	9,890	1,870	777
5	219	122	48.7	17.7	44.1	21.9	325	0	6,150	7,060	1,840	653
6	219	117	44.1	17.7	36.4	17.6	1,340	0	3,280	6,530	1,870	653
7	180	109	40.6	19.8	30.0	318	1,100	0	1,520	5,650	2,510	653
8	170	109	40.6	19.8	27.2	42.4	530	0	1,060	4,940	2,330	653
9	157	98.9	36.4	19.8	21.9	293	689	0	5,010	4,310	1,940	636
10	170	95.3	33.5	17.7	19.8	177	353	0	3,710	3,880	1,660	636
11	180	95.3	33.5	17.7	19.8	104	177	0	2,300	3,450	1,570	636
12	191	90.1	33.5	15.9	36.4	73.5	122	0	1,320	3,120	1,550	600
13	170	90.1	33.5	15.9	33.5	54.0	81.2	0	1,020	2,830	1,410	600
14	157	86.5	30.0	14.1	48.7	36.4	54.0	0	1,080	3,210	1,340	671
15	148	81.2	30.0	14.1	24.4	36.0	40.6	0	1,130	3,710	1,270	671
16	148	77.7	27.2	14.1	161	19.8	27.2	0	689	6,180	1,290	653
17	148	73.5	33.5	14.1	104	15.9	19.8	0	556	3,710	1,240	618
18	148	73.5	33.5	14.1	86.5	14.1	14.1	0	452	3,210	1,150	636
19	138	68.9	30.0	14.1	73.5	12.7	14.1	0	380	2,700	1,080	653
20	127	67.1	30.0	14.1	67.1	9.9	12.7	0	321	2,750	1,080	671
21	148	67.1	30.0	14.1	59.0	8.8	9.9	3,180	293	3,110	1,040	671
22	148	67.1	30.0	15.9	48.7	7.4	12.7	1,890	2,080	23,450	1,020	653
23	138	61.8	27.2	17.7	48.7	8.8	9.9	1,010	4,080	7,880	1,010	618
24	127	61.8	24.4	17.7	44.1	12.7	9.9	4,590	11,650	5,190	989	600
25	127	59.0	24.4	17.7	40.6	177	9.9	3,670	10,060	4,700	936	494
26	111	59.0	21.9	17.7	36.4	226	9.9	851	5,300	4,030	918	512
27	106	59.0	21.9	117	33.5	109	9.9	353	6,890	3,430	918	530
28	111	54.0	19.8	40.6	30.0	98.9	11.3	353	38,850	3,210	918	459
29	120	48.7	19.8	24.4	27.2	86.5	11.3	353	155,380	2,980	918	459
30	111	-----	17.7	226	27.2	258	9.9	244	107,710	2,750	883	441
31	106	-----	19.8	-----	40.6	-----	11.3	212	-----	2,580	-----	424

Month	Gage Height		Second Feet				Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile	
	High	Low	High	Low				
January.....	3.08	2.66	247	106	159	9,750		
February.....	2.59	1.84	170	48.7	90.1	5,190		
March.....	1.84	1.51	48.7	17.7	32.5	2,000		
April.....	4.07	1.44	547	14.1	27.9	1,670		
May.....	2.95	1.54	244	19.8	60.0	3,690		
June.....	3.67	1.28	424	7.42	91.5	5,430		
July.....	6.56	1.35	1,670	9.89	203	12,490		
August (16).....	16.14	.79	14,480	0	539	33,140		
September (29).....	41.01	3.18	*187,170	293	12,800	761,520		
October.....	23.46	8.10	*51,910	2,580	6,260	385,100		
November.....	8.01	4.53	2,510	883	1,440	85,910		
December.....	4.56	3.67	918	424	630	38,770		
Yearly.....	41.01	.79	187,170	0	1,860	1,344,660	103	

*Estimated

LOS OLMOS CREEK STATION NEAR RIO GRANDE CITY, TEXAS

Description: Automatic water-stage recorder attached to pile of lower side of highway bridge about 1 mile north of Rio Grande City and 3¼ miles above confluence with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 3 current meter measurements during the year. 1932 records considered poor.

Records Available: January 1 to December 31, 1932.

Remarks: This creek is dry except during storms. The drainage area above this station is 535 square miles, all in the United States.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	3	0	0	0	667	2,680	0	0
2	0	0	0	0	1	0	0	0	1,050	1,160	0	0
3	0	0	0	0	0	0	0	0	1,960	144	0	0
4	0	0	0	0	0	0	0	0	2,190	139	0	0
5	0	0	24.0	0	0	0	0	0	* 643	200	0	0
6	0	0	14.0	0	0	0	0	0	† 142	19.5	0	0
7	0	0	6.5	0	0	0	0	0	19.0	0	0	0
8	0	0	3.5	0	0	0	0	0	10.4	0	0	0
9	0	0	1.0	0	0	0	0	0	6.4	0	0	0
10	0	0	0	0	1	0	0	0	3.6	0	0	0
11	0	0	0	0	720	0	0	0	0	0	0	0
12	0	0	0	0	420	0	0	0	0	0	0	0
13	0	0	0	0	46	0	0	0	0	0	0	0
14	0	0	0	0	11	0	0	0	0	12.0	0	0
15	0	0	0	0	8	0	0	0	0	4.2	0	0
16	0	0	0	0	5	0	0	0	0	0	0	0
17	0	0	0	0	1	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	† 59.4	0	0	0	0
23	0	0	0	0	0	10	0	0	0	674	0	0
24	0	0	0	0	0	22	0	† 499	0	958	0	0
25	0	0	0	0	0	3	0	† 249	0	1,070	0	0
26	0	0	0	0	0	0	0	177	0	606	0	0
27	0	0	0	4.0	0	0	0	49.9	0	200	0	0
28	0	0	0	30.0	0	0	0	19.5	0	408	0	0
29	0	0	0	16.0	0	0	0	11.2	0	837	0	0
30	0	0	0	7.0	0	0	0	0	0	1,350	0	0
31	0	0	0	0	0	0	0	118	0	0	0	0

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	-----	-----	-----	-----	-----	* 0	
February.....	-----	-----	-----	-----	-----	* 0	
March.....	-----	-----	50	0	1.6	97	
April.....	-----	-----	† 30	0	† 1.9	† 113	
May.....	-----	-----	865	0	51	2,412	
June.....	157	0	80	0	1.1	69	
July.....	-----	0	0	0	0	0	
August.....	161.68	-----	1,420	0	38.2	2,350	
September.....	165.52	-----	2,880	0	428	25,460	
October (1).....	166.57	-----	3,340	0	140	8,610	
November.....	0	0	0	0	0	0	
December.....	0	0	0	0	0	0	
Yearly.....	166.57	-----	3,340	0	55.2	39,111	73.1

*Estimated †Partly estimated

RIO GRANDE AT RIO GRANDE CITY STATION

Description: Automatic water-stage recorder and cable with stand up cable car located about 4 miles by river below Rio Grande City, Starr County, Texas, and 7.3 miles below the confluence of the Rio San Juan with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 56 current meter measurements from cable car and one slope-area measurement. Computations by shifting channel methods. 1932 records considered good.

Records Available: January to December, 1932.

Remarks: When the water at this station rises above a gage height of about 151 feet, water overflows the left river bank beyond the station cable, but such water is measured.

When floods in the Rio San Juan exceed a gage height of about 38 feet or a flow of about 160,000 second feet at the Santa Rosalia station, water begins to overflow the right bank of that river at several places from El Asucar (20 miles below Santa Rosalia station) downstream. This overflow water cuts across country and reaches the Rio Grande about 9 river miles below Rio Grande City gaging station and is therefore not measured there. The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated, the drainage area above this station is 174,208 square miles; 94,323 being in the United States and 79,885 in Mexico.

Previous Extreme Flows: The highest gage height ever reported was in 1909, when the extreme gage height was 159.2 present gage datum, as reported by residents.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,230	2,760	2,820	2,080	6,250	2,210	9,690	1,330	5,250	114,320	17,770	10,480
2	3,140	2,680	3,180	2,030	4,690	2,230	4,030	1,280	41,450	95,930	18,220	10,440
3	3,190	2,670	3,110	1,970	2,140	2,120	6,200	1,300	71,070	94,730	17,920	10,430
4	3,250	2,650	3,220	1,930	1,650	2,070	5,640	1,290	91,190	81,410	16,550	10,410
5	3,170	2,600	3,250	1,860	1,580	2,470	5,960	1,290	166,650	72,490	16,380	10,390
6	3,250	2,510	3,080	1,740	1,720	3,810	7,040	1,550	137,310	68,590	17,390	10,470
7	3,340	2,620	3,030	1,780	1,580	2,720	6,970	1,640	78,160	67,170	17,530	11,660
8	3,290	2,620	2,820	1,810	1,380	2,380	7,200	1,820	44,830	70,970	17,460	10,640
9	3,080	2,530	2,680	1,730	1,430	2,520	6,940	1,720	38,500	72,530	16,080	10,950
10	3,110	2,490	2,680	1,680	1,370	2,190	5,500	1,640	63,140	65,510	15,620	11,420
11	3,120	2,450	2,640	1,680	3,050	2,310	3,790	1,530	69,960	57,520	15,110	10,260
12	3,120	2,440	2,600	1,700	14,130	2,370	2,940	1,550	66,040	46,050	14,640	10,560
13	3,150	2,380	2,580	1,710	14,340	2,330	3,100	1,540	53,480	37,570	14,380	11,160
14	3,200	2,400	2,490	1,700	8,410	2,250	2,820	2,120	40,770	34,190	13,560	10,720
15	3,170	2,470	2,440	1,690	8,190	2,070	2,400	5,660	24,530	32,610	13,330	9,940
16	2,980	2,410	2,570	1,680	10,050	1,870	2,690	4,900	25,340	31,180	13,040	8,970
17	3,050	2,380	2,640	1,650	8,010	1,690	2,420	7,200	33,620	29,570	12,530	8,800
18	3,160	2,340	2,560	1,680	5,310	1,560	2,330	8,390	42,350	27,160	12,290	8,720
19	3,090	2,350	2,320	1,800	4,000	1,570	2,610	9,450	44,720	27,290	12,060	8,580
20	3,140	2,830	2,240	1,770	4,070	1,610	2,510	9,860	31,860	26,260	11,790	8,410
21	3,100	4,150	2,250	1,740	3,490	1,480	2,230	10,020	24,220	27,260	12,220	8,980
22	3,000	3,460	2,220	1,700	2,850	1,370	2,190	10,010	23,770	38,760	11,990	9,340
23	2,850	2,810	2,190	1,640	2,510	1,340	2,100	8,200	29,860	34,120	11,910	* 9,100
24	2,950	2,590	2,140	1,620	2,270	1,340	1,930	9,480	32,340	28,220	11,660	* 9,000
25	2,930	2,590	2,050	1,670	2,150	2,000	1,710	13,950	43,680	26,220	11,220	* 9,700
26	2,930	2,630	2,050	1,700	1,980	2,180	1,590	6,220	46,840	25,560	10,930	*11,000
27	2,940	2,540	2,120	*7,000	1,850	1,730	1,600	5,260	45,880	24,970	10,870	*12,000
28	2,900	2,570	2,130	*6,200	1,850	1,420	1,510	4,770	51,560	22,860	12,010	*12,250
29	2,810	2,320	2,080	*4,600	1,880	1,290	1,460	4,220	82,970	19,620	11,100	*10,750
30	2,740	-----	2,080	*3,600	1,930	1,420	1,430	3,800	118,840	18,600	10,520	*10,000
31	2,740	-----	2,100	-----	1,870	1,420	1,420	3,550	-----	18,760	-----	* 9,700

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	129.21	128.75	3,370	2,740	3,068	188,670	
February.....	130.00	128.35	4,310	2,340	2,630	151,300	
March.....	129.32	127.95	3,370	2,030	2,528	155,430	
April.....	-----	127.33	* 7,000	1,600	† 2,238	†133,170	
May.....	134.32	127.47	17,630	1,350	4,128	253,810	
June.....	129.59	127.03	4,210	1,260	1,997	118,850	
July.....	132.90	127.08	13,400	1,370	3,611	222,050	
August (2).....	134.20	126.92	16,160	1,260	4,727	283,770	
September (5).....	137.40	129.62	198,750	3,870	55,673	3,312,800	
October.....	133.90	134.90	127,630	18,460	46,387	2,852,270	
November.....	135.10	132.30	18,500	10,240	13,936	829,260	
December.....	-----	131.41	*12,420	8,390	†10,169	†625,260	
Yearly.....	137.40	126.92	198,750	1,260	12,572	9,126,640	52.4

*Estimated †Partly estimated

Special Note: Flood water from the Rio San Juan overflowed the San Juan banks and cut across country reaching the Rio Grande below the Rio Grande City gaging station for the last three days in September. It is estimated that 411,000 acre feet thus reached the Rio Grande.

RIO GRANDE AT HIDALGO STATION

Description: Automatic water-stage recorder at international bridge at Hidalgo, Hidalgo County, Texas. Zero of gage is 79.28 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 10 current meter measurements during the year from bridge. Computations by shifting channel methods. 1932 records considered fair.

Records Available: July, 1928 to December, 1931, also September and October, 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated, the drainage area above this station is 175,110 square miles; 94,663 being in the United States and 80,447 in Mexico. This station was operated only during the flood period in 1932. When the river rises above a stage of about 21 feet on this gage, water begins to overflow into the American floodways above this station. This gage height corresponds to a river discharge of about 43,000 second feet.

Previous Extreme Flows: The highest previous gage height ever recorded at this station was in 1909, when the extreme gage reading was equivalent to 27.89 feet on the present gage, or 107.17 feet above mean sea level, United States Coast and Geodetic Survey datum. In 1910, the extreme gage reading was equivalent to 24.82 feet on the present gage, or 104.1 feet above mean sea level datum. These readings were before the present river bridge and highway embankment were constructed at this point. Lesser extremes from 1928 to 1931 may be seen in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Period Summary, 1932

Day	Sept.	Oct.	Day	Sept.	Oct.	Day	Sept.	Oct.
1	† 4,910	69,650	11	50,220	54,260	21	28,660	25,110
2	†13,610	82,240	12	52,740	51,020	22	21,000	27,850
3	31,850	74,620	13	53,830	46,530	23	22,560	35,960
4	38,830	69,790	14	51,660	41,080	24	28,380	31,230
5	42,790	65,760	15	44,430	36,900	25	31,530	†25,790
6	52,510	60,420	16	33,430	†34,110	26	37,050	†24,530
7	78,050	56,440	17	†30,240	†31,850	27	40,510	†23,810
8	78,090	54,570	18	†33,580	29,030	28	42,030	†22,960
9	64,690	54,610	19	†36,770	26,930	29	43,420	†21,150
10	52,140	55,510	20	†37,370	29,270	30	49,010	†20,110
						31	.....	†18,040

†Partly estimated

	Sept.	Oct.	Period
Peak Gage—Feet.....	*25.85	†25.85	25.85
Peak Second Feet.....	*83,830	†83,870	83,870
Average Second Feet.....	40,873	41,972	41,431
Total Acre Feet.....	2,432,150	2,580,790	5,012,940

*Sept. 7. †Oct. 2

RIO GRANDE AT MERCEDES BRIDGE STATION

Description: One staff-gage reading each day by operator at Mercedes irrigation pumps about 500 feet west of bridge. Zero of this gage is 3.47 feet below mean sea level, United States Coast and Geodetic Survey datum. Also one staff-gage reading each day by United States Weather Bureau observer at bridge. Zero of gage is 50.53 feet above mean sea level, United States Coast and Geodetic Survey datum. Current meter measurements from bridge.

Records: Based upon 2 current meter measurements in September at high flows and upon discharge curve of Morgan Engineering Company for low flows. September and October records considered fair.

Records Available: For September and October, 1932.

Remarks: When the river rises above a stage of about 17.6 feet on the Weather Bureau gage, water begins to overflow the river banks on the Mexican side, and at higher stages overflows at numerous points from Reynosa to Matamoros. This gage height corresponds to a river discharge of about 24,300 second feet.

Previous Extreme Flows: River stage records at Mercedes pumps for every year beginning with 1910, except 1913, show that the stage of 17.6 on the Weather Bureau gage just referred to was exceeded one or more times each year since 1909 except the years 1913 and 1929. The highest previous recorded stages were 21.5 on June 16, 1930; 21.4 on September 12 and October 3, 1925; and 21.2 on June 25, 1922.

Mean Daily Discharge in Second Feet and Period Summary, 1932

Day	Sept.	Oct.	Day	Sept.	Oct.	Day	Sept.	Oct.
1	3,910	37,010	11	37,120	37,010	21	35,350	28,940
2	5,120	37,290	12	37,320	36,910	22	30,140	29,750
3	20,520	37,320	13	37,320	36,670	23	27,040	33,030
4	28,170	37,250	14	37,320	36,540	24	30,860	33,510
5	30,530	36,980	15	37,220	35,690	25	32,940	30,800
6	32,390	36,980	16	36,570	34,440	26	34,440	28,310
7	34,440	36,910	17	34,540	33,380	27	35,960	27,470
8	36,330	36,740	18	33,580	32,040	28	36,300	26,690
9	37,010	37,080	19	34,840	30,770	29	36,610	24,920
10	37,290	37,220	20	36,470	30,050	30	36,670	22,340
						31	.....	20,990

	Sept.	Oct.	Period
Peak Gage—Feet.....	75.80	75.80	75.80
Peak Second Feet.....	37,320	37,320	37,320
Average Second Feet.....	32,144	32,936	32,547
Total Acre Feet.....	1,912,730	2,025,210	3,937,940

RIO GRANDE AT MATAMOROS STATION

Description: Automatic water-stage recorder and cable with sit down cable car, located opposite Matamoros, Tamaulipas, Mexico, 53.3 miles upstream from the Gulf of Mexico. The water-stage recorder is attached to the central pier of the railroad bridge over the Rio Grande between Matamoros and Brownsville, Texas. The cable and car are located 0.3 mile upstream from the bridge. Zero of present gage is 15.26 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based on 146 current meter measurements during the year from cable car. Computations by shifting channel methods. 1932 records considered good.

Records Available: 1901 to 1912; 1923 to 1927; 1929 to 1932.

Remarks: The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods only a very small amount of water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries. The gage datum was lowered five feet on October 3, 1930. With all closed basins eliminated the drainage area above this station is 175,138 square miles; 94,677 being in the United States and 80,461 in Mexico.

Previous Extreme Flows: The greatest previous flow recorded here was on July 20, 1906, when a mean daily flow of 38,300 second feet occurred. The highest gage reading was on September 12, 1925, when a reading of 21.63 present gage datum was reached. In 1930 the river at this station was dry for a few days in March and April. Numerous records of extreme flow may be seen in Water Bulletin No. 1.

Mean Daily Discharge in Second Feet and Annual Summary, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,880	2,200	1,860	1,350	4,300	400	1,500	475	3,450	22,200	17,700	10,500
2	1,750	2,150	1,625	1,700	3,400	280	1,430	400	3,300	21,400	17,600	9,850
3	1,980	2,050	1,450	1,825	3,700	200	3,200	180	13,200	21,500	17,300	9,600
4	2,480	1,910	1,330	1,850	4,100	135	4,000	145	24,000	21,400	17,450	9,700
5	2,680	1,800	1,630	1,600	3,550	100	3,800	79.8	26,000	21,310	17,155	9,700
6	2,690	1,820	1,970	1,400	2,700	230	3,750	67.8	27,510	21,500	16,400	9,650
7	2,600	1,780	2,450	2,000	2,050	360	3,900	55.1	24,700	21,500	16,200	9,650
8	2,640	1,820	2,590	1,180	1,750	225	4,550	60.0	22,500	21,300	16,500	9,800
9	2,690	1,600	2,560	970	1,560	430	5,300	90.1	22,800	21,400	16,750	10,500
10	2,730	1,180	2,480	1,125	1,530	890	5,750	50.1	23,010	21,310	16,400	10,260
11	2,750	715	2,280	1,280	1,300	800	5,900	42.0	22,500	21,300	15,500	10,400
12	2,700	780	2,220	900	1,230	831	5,200	55.1	22,000	21,200	14,800	10,500
13	2,400	710	2,290	740	2,300	1,050	3,900	55.1	22,000	21,200	15,600	9,850
14	2,360	760	2,250	580	11,000	880	2,850	44.8	22,200	22,000	13,900	9,850
15	2,350	1,200	2,080	400	10,500	600	2,350	155	22,310	22,010	13,210	10,300
16	2,340	1,230	1,960	420	6,700	430	2,200	175	22,200	21,200	12,700	10,250
17	2,350	960	1,850	575	6,600	290	2,200	74.9	22,000	21,200	12,600	9,600
18	2,500	820	1,750	870	9,300	200	2,150	1,650	21,900	20,800	12,500	8,900
19	2,390	780	1,780	860	7,000	300	2,000	2,850	21,900	20,500	12,310	8,400
20	2,290	870	1,910	660	4,900	450	1,800	4,700	21,900	20,510	12,100	8,210
21	2,350	1,320	2,120	610	3,950	420	1,550	6,800	21,800	20,300	11,800	8,000
22	2,390	1,980	1,860	490	3,500	180	1,500	8,000	21,800	20,300	11,300	7,750
23	2,380	1,980	1,220	400	3,500	200	1,430	11,700	21,700	20,500	11,600	8,150
24	2,390	2,460	880	590	3,200	310	1,450	8,400	21,600	21,110	11,650	8,800
25	2,350	2,530	840	1,000	2,300	975	1,500	6,100	22,010	21,100	11,750	8,900
26	2,450	2,330	860	675	1,950	1,125	1,125	12,210	22,300	20,900	11,150	8,900
27	2,390	2,020	920	745	1,650	1,250	810	11,500	22,400	20,710	10,900	9,500
28	2,320	1,930	1,220	825	1,200	1,225	710	6,100	22,300	20,400	10,750	10,300
29	2,290	2,080	1,130	3,400	930	1,300	470	4,550	22,300	20,000	10,500	11,600
30	2,250	.....	900	7,200	1,000	1,375	390	3,900	22,410	19,000	11,110	11,810
31	2,150	.....	940	.....	790	.....	450	3,750	.....	18,000	.....	10,400

Month	Gage Height		Second Feet			Acre Feet	
	Extreme—Feet		Extreme		Average	Total	Per Sq. Mile
	High	Low	High	Low			
January.....	7.91	6.20	2,750	1,750	2,400	147,290	
February.....	7.58	4.59	2,530	710	1,580	90,770	
March.....	7.64	4.82	2,590	840	1,720	105,530	
April.....	11.78	3.77	8,400	400	1,270	75,810	
May.....	13.71	5.48	12,200	790	3,660	225,010	
June.....	6.14	3.67	1,380	99.9	581	34,590	
July.....	11.19	4.26	5,900	390	2,550	156,920	
August (11).....	13.94	2.62	12,500	42	3,050	187,270	
September.....	20.47	8.69	27,500	3,300	21,070	1,253,590	
October (14).....	20.96	19.46	22,200	18,000	20,840	1,287,410	
November.....	19.23	14.67	17,700	10,500	13,910	827,490	
December.....	15.68	12.57	12,040	7,750	9,660	594,220	
Yearly.....	20.96	2.62	27,500	42	6,860	4,985,900	28.5

DIVERSIONS FROM RIO GRANDE BETWEEN UPPER AND LOWER PRESIDIO STATIONS, 1932

There are 11 irrigation pumps which divert water from the Rio Grande between the Upper and Lower Presidio gaging stations. From June 1 to December 31, a record was kept of the operation of these pumps, their discharges being measured with weir or current meter.

The difference between the discharge of the Rio Grande at Upper and Lower Presidio stations plus the diversions by these pumps gives the flow of the Rio Conchos which enters the Rio Grande between Upper and Lower Presidio stations.

Mean Daily Diversions in Second Feet between Upper and Lower Presidio Stations, 1932

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	↑	↑	↑	↑	↑	6.5	13.8	.9	10.	0	0	0
2						5.3	11.8	.9	5	0	0	0
3						5.2	11.9	.9	5.0	0	0	0
4						6.6	11.8	.9	1	0	0	0
5						5.1	14.0	.9	5.6	0	0	0
6						3.8	11.9	.9	.....	0	0	0
7						2.7	11.8	1.1	5.4	0	0	0
8						1.7	11.9	10.0	0	0	0	0
9						1.7	13.8	10.0	0	0	0	0
10						6.2	11.8	10.2	0	0	0	0
11						6.7	11.9	10.0	0	0	0	0
12						6.7	13.9	10.5	0	0	0	0
13						6.7	11.8	10.4	0	0	0	0
14						6.7	12.6	10.5	0	0	0	0
15						6.7	11.9	10.6	0	0	0	0
16	*0	*0	*0	*2.0	*7.0	6.7	13.8	10.9	0	0	0	0
17						6.7	11.8	11.5	0	0	0	0
18						6.7	11.9	10.0	0	0	0	0
19						6.7	14.3	10.0	0	0	0	0
20						6.7	11.8	.2	0	0	0	0
21						6.7	10.0	10.0	0	0	0	0
22						11.6	10.0	0	0	0	0	0
23						11.5	11.9	10.0	0	0	0	0
24						11.6	11.9	1.2	0	0	0	0
25						11.5	12.0	10.0	0	0	0	0
26						11.6	13.0	0	0	0	0	0
27						11.5	10.9	.5	0	0	0	0
28						14.1	.9	0	0	0	0	0
29						12.4	.9	0	0	0	0	0
30						11.7	.9	0	0	0	0	0
31						.....	2.1	0	.....	0	.....	0

Annual Summary

Month	Second Feet		Average	Acres Feet
	Extreme			Total
	High	Low		
January.....	.....	.....	*0	*0
February.....	.....	.....	*0	*0
March.....	.....	.....	*0	*0
April.....	.....	.....	*2.0	*119
May.....	.....	.....	*7.0	*430
June.....	14.1	1.7	7.53	448
July.....	14.0	.9	10.8	664
August.....	11.5	0	5.26	323
September.....	10.0	0	.89	52.8
October.....	0	0	0	0
November.....	0	0	0	0
December.....	0	0	0	0
Yearly.....	14.1	0	2.8	2,036.8

*Estimated

NORTH FLOODWAY STATION SOUTH OF McALLEN, TEXAS

Description: Automatic water-stage recorder attached to a pile on the downstream side of the floodway bridge on the main highway ½ mile east and 2½ miles south of McAllen. Zero of gage is 79.45 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 2 current meter measurements made in September, 1932 records considered fair.

Records Available: For September and October, 1932.

Remarks: This floodway diverts only excess flood water from the Rio Grande at an inlet about 7½ miles northwesterly from the Hidalgo gaging station. The flow reported here is the first flood water from the Rio Grande to be carried through the floodways since their completion in 1926.

Mean Daily Discharge in Second Feet and Period Summary, 1932

Day	Sept.	Oct.	Day	Sept.	Oct.	Day	Sept.	Oct.
1	No	11,860	11	2,240	4,410	21	No	No
2	Flood	33,310	12	3,300	3,490	22	Flood	Flood
3	Flow	25,180	13	4,150	2,070	23	Flow	Flow
4	"	15,970	14	3,800	724	24	"	"
5	"	10,160	15	2,090	341	25	"	"
6	2,010	6,070	16	492	No	26	"	"
7	31,350	4,610	17	37	Flood	27	"	"
8	28,020	4,070	18	No	Flood	28	"	"
9	9,210	4,110	19	Flood	"	29	"	"
10	3,260	4,550	20	Flow	"	30	*500	"
						31		"

Month	Gage Height		Second Feet			Acre Feet
	Extreme—Feet		Extreme		Average	Total
	High	Low	High	Low		
September.....	21.37	0	38,710	0	3,015	179,420
October.....	21.10	0	35,710	0	4,223	259,690
Period.....	21.37	0	38,710	0	3,629	439,110

SOUTH FLOODWAY STATION SOUTH OF McALLEN, TEXAS

Description: Automatic water-stage recorder attached to a pile on the downstream side of the floodway bridge on the main highway ½ mile east and 4½ miles south of McAllen. Zero of gage is 79.65 feet above mean sea level, United States Coast and Geodetic Survey datum.

Records: Based upon 2 current meter measurements made in September, 1932 records considered fair.

Records Available: For September and October, 1932.

Remarks: This floodway diverts only excess flood water from the Rio Grande at an inlet about 3 miles northwesterly from the Hidalgo gaging station. The flow reported here is the first flood water to be carried through the floodways since their completion in 1926.

Mean Daily Discharge in Second Feet and Period Summary, 1932

Day	Sept.	Oct.	Day	Sept.	Oct.	Day	Sept.	Oct.
1	No	7,390	11	572	1,450	21	75	No
2	Flood	23,920	12	720	1,030	22	68	Flood
3	Flow	16,430	13	1,010	563	23	No	Flow
4	"	8,580	14	830	243	24	Flood	"
5	"	5,300	15	393	135	25	Flow	"
6	61	2,650	16	172	104	26	"	"
7	16,240	1,580	17	122	90	27	"	"
8	22,510	1,250	18	100	79	28	"	"
9	5,300	1,290	19	88	72	29	"	"
10	966	1,550	20	81	66	30	*80	"
						31		"

Month	Gage Height		Second Feet			Acre Feet
	Extreme—Feet		Extreme		Average	Total
	High	Low	High	Low		
September.....	22.16	0	29,120	0	1,646	97,960
October.....	21.91	0	25,890	0	2,380	146,330
Period.....	22.16	0	29,120	0	2,019	244,290

*Estimated

UNUSUAL FLOODS

The greatest recorded flood in North America* for a water shed of from 1,000 to 10,000 square miles occurred on the Devils River September 1, 1932. This was the greatest flood on this stream in the past 100 years, at least. This is shown by the age of pecan groves swept away when the river valley was washed clean to bed rock, and by hydrographic records since 1900. Above the point of flood measurement are two small power reservoirs of about 10 miles total length which lessened somewhat the peak flow, but a very carefully made slope-area measurement checked by the computed discharge over the Lake Walk power dam, 1½ miles upstream, showed a maximum flow of 138.23 second feet per square mile of water shed above the measuring point, that is, 557,500 second feet from 4,033 square miles.

When this flood crest entered the Rio Grande 12 miles west of Del Rio, Texas, it entered a river already swollen and only ¾ hours ahead of the peak of the greatest recorded flood (101,800 second feet) ever to come from the Pecos River, which joins the Rio Grande 41.3 miles above Devils River. From the confluence of these two floods to Rio Grande City, a distance of 328 miles by river, all previously recorded flood marks were inundated. At Roma this is known to have been the highest flood for at least 72 years.

On August 31, 1932, Pinto Creek debouched into the Rio Grande 34 miles below the mouth of Devils River, the seventh largest flood recorded in North America for drainage areas of from 200 to 300 square miles*. This was 54,650 second feet from 229 square miles or 238.6 second feet per square mile.

On September 29, 1933, the Rio San Juan poured forth its second greatest recorded flood of 187,200 second feet into the Rio Grande, the torrent being so great that a considerable portion of the water overflowed the San Juan banks above Camargo, cut across country, and reached the Rio Grande about 9 miles below Rio Grande City gaging station.

The two largest floods to come from the Rio Conchos since the building of the great Boquilla reservoir on that stream in 1915 came into the Rio Grande at Presidio, 930 miles above the Gulf of Mexico, on September 12, 1932, and October 2, 1932, 21 days apart. The last of these floods was the greatest, its crest being 103,200 second feet. The Boquilla reservoir greatly reduced the first peak and slightly reduced the second one, as revealed by the rapidly increasing reservoir gage heights during the floods.

The Rio Salado was in flood from September 4th to 10th, but the large new Don Martin reservoir on that stream prevented this torrent from approaching record heights. By September 24th, the reservoir was filled and a large steady overflow kept the Rio Salado at its confluence with the Rio Grande, at moderate flood stage until the end of October.

Floods emptied into the Rio Grande from practically every tributary water course below El Paso, which is 1,275 river miles from the Gulf of Mexico, and held the river at flood stage in the lower reaches for two months, a longer period than ever before known.

At least one million dollars of flood damage was done on the American side and over one million dollars on the Mexican side. Railroads and highways were rendered impassable for days. In all, nine lives were lost.

In the body of this bulletin will be found the mean daily discharges and the extremes of flow and gage height at all points of measurement.

Map on page 2 shows entire water shed of the Rio Grande with its principal tributaries.

Daily rainfall records for August, September, and October at 21 stations on the American side of the water shed below El Paso, Texas, and Carlsbad, New Mexico, and at 18 stations on the Mexican side, reveal that the precipitation for August was 213 percent of normal; for September, 296 percent of normal; and for October, 49.8 percent of normal.

The corresponding total river discharge passing into the Lower Rio Grande Valley was for August, 81 percent of normal; for September, 341 percent of normal; and for October, 368 percent of normal. These rainfall and runoff normals cover the 9-year period 1924 to 1932. Hydrographic records at Rio Grande City since 1900 show that the monthly total discharge for September and October, 1932 were greater than any at that point in the preceding 32 years and strong local evidence shows that they were the greatest in the preceding 60 years.

On page 44 is shown generalized gage height hydrographs for seven stations from Langtry to Brownsville.

The table on page 43 shows rates of travel of flood peaks between gaging stations and river mileages from the Gulf of Mexico, also rates of travel of the toe of the first flood, and a comparison of these rates showing that the flood toe travelled nearly twice as fast as the flood peak. The full line on the graph on page 45 shows how the length of time between passing of flood toe and peak increased as the flood passed down the river below Eagle Pass. Flood toe rates are not given above Eagle Pass because floods from tributaries reached the main river above Eagle Pass before the main flood toe had passed.

The graphs on page 43 show in detail the gage height records for seven stations from Del Rio to Rio Grande City during the first rush of the flood. The dashed line on the graph at the top of page 45 shows the decreasing second footage of the first flood peak as it progressed mile by mile from Eagle Pass to Rio Grande City. The second footage figures used in this graph below Eagle Pass have been decreased to account for tributary inflow and those above Eagle Pass correspondingly increased.

The data and comparison shown in these graphs and tabulations illustrate important characteristics of floods not usually revealed, including (a) the extent to which the flood toe outran the flood peak and (b) the flattening effect, i.e., the extent to which the second footage of peak flow decreased as the flood passed down the stream.

The second largest recorded flood in North America for drainage basins of 500 to 1,000 square miles in area, occurred in 1909 in the Rio Santa Catarina at Monterrey in the Rio Grande basin in Mexico*. This with the records shown herein for the Devils River and for Pinto Creek near Del Rio, Texas, show that three of the greatest rates of flood runoff in North American records have occurred in the lower portion of the Rio Grande since 1909. It is also pointed out that three of the remaining greatest North American flood flow rates* occurred on the Balcones escarpment between Austin and Waco, Texas, in 1921. From Waco to the Rio Grande near the mouth of Devils River this escarpment runs just westward or above the railway connecting Austin, San Antonio, Uvalde, and Del Rio, and marks a sudden rise in earth surface from the coastal plain and hills to the high plateau. A line of similar sudden demarcation extends southward from the Rio Grande several miles west of Del Rio and passes near Muzquiz, Monterrey and Rayonnes. This sudden rise in earth level is favorable for the precipitation of heavy rainfall from Gulf storms*. The shallow soil and steep slopes are favorable for large percentages of runoff from such storms. Past records and the conditions just delineated indicate the strong likelihood of future severe floods on the Rio Grande below the "Big Bend".

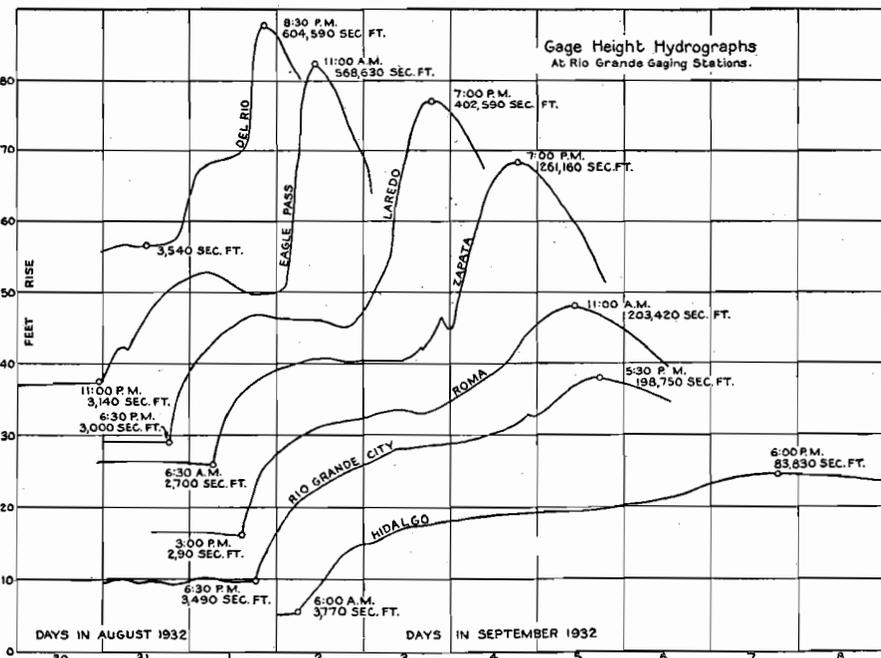
*According to data by C. S. Jarvis in Trans. Am. Soc. C. E. Vol. 89-1926

†A Study of Rainfall in Texas, by Texas Reclamation Dept., 1929

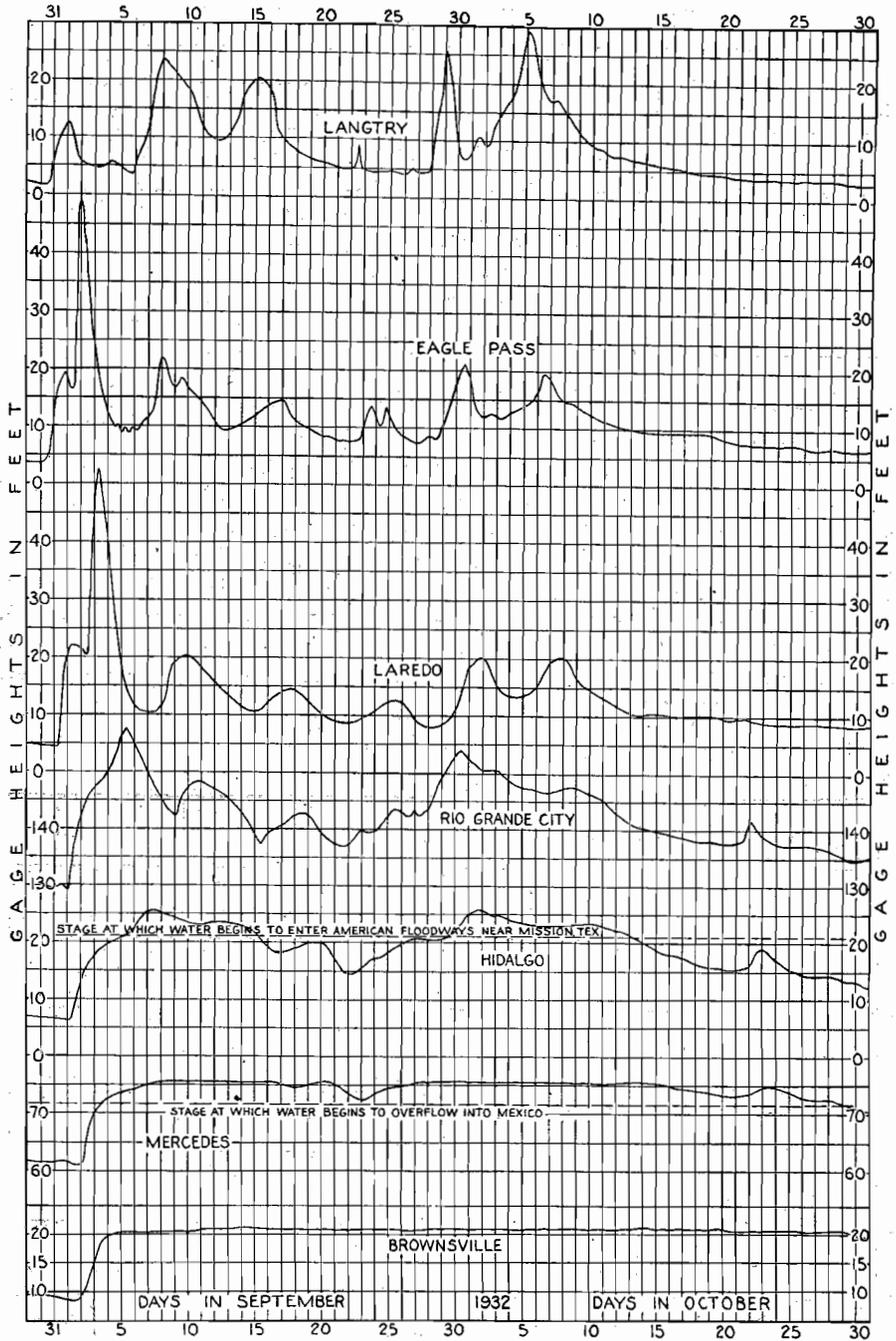
RATES OF FLOOD TRAVEL, 1932

Name of Station	FLOOD PEAKS						FLOOD TOE		Ratio of Rate of Toe To Rate of Peak
	AT THE STATION						Between Stations	Between Stations	
	Elevation of Peak*	Gage (Feet)	Second Feet	Day	Hour	Miles From Gulf	Miles Per Hr.	Miles Per Hr.	
Fort Quitman.....	3,458.04	3.98	786	Sept. 3	4:00 AM	1,138.5			
Upper Presidio..	2,589.10†	9.70	3,190	Sept. 5	2:00 PM	936.7	3.48	Indeterminable.	
Lower Presidio..	2,578.21‡	78.21	106,450	Oct. 2	3:15 PM	928.2	2.00	Indeterminable.	
Alamito Creek....	2,553.33‡	8.33	Backwater	Oct. 2	9:00 PM	916.7	3.54	"	
Boquillas.....	1,827.23†	24.50	95,030	Oct. 4	12:00N	778.8	5.92	"	
Langtry.....	1,120.96	29.27	77,610	Oct. 5	4:00 PM	613.0	5.40	"	
Del Rio.....	882.03	17.23	86,520	Oct. 6	6:30 AM	534.74			
Devils River.....	984.03	48.40	557,500	Sept. 1	5:30 PM	550.9	5.40	Indeterminable.	
Del Rio.....	899.30	34.50	604,590	Sept. 1	8:30 PM	534.74	3.99	"	
Eagle Pass.....	731.91	49.00	568,630	Sept. 2	11:00 AM	476.8	4.08	6.69	1.64
Laredo.....	52.20	403.65	402,590	Sept. 3	7:00 PM	346.3	2.65	5.30	2.00
Zapata.....	262.07	262.07	261,160	Sept. 4	7:00 PM	282.7	2.78	5.22	1.88
Roma.....	181.33	35.40	203,420	Sept. 5	11:00 AM	238.3	3.48	6.46	1.86
Rio Grande City..	157.40	157.40	198,750	Sept. 5	5:30 PM	215.7	1.36	5.73	4.21
Hidalgo.....	105.13	25.85	§83,830	Sept. 7	6:00 PM	149.8			
Average—Eagle Pass to Hidalgo							2.57	5.95	2.32

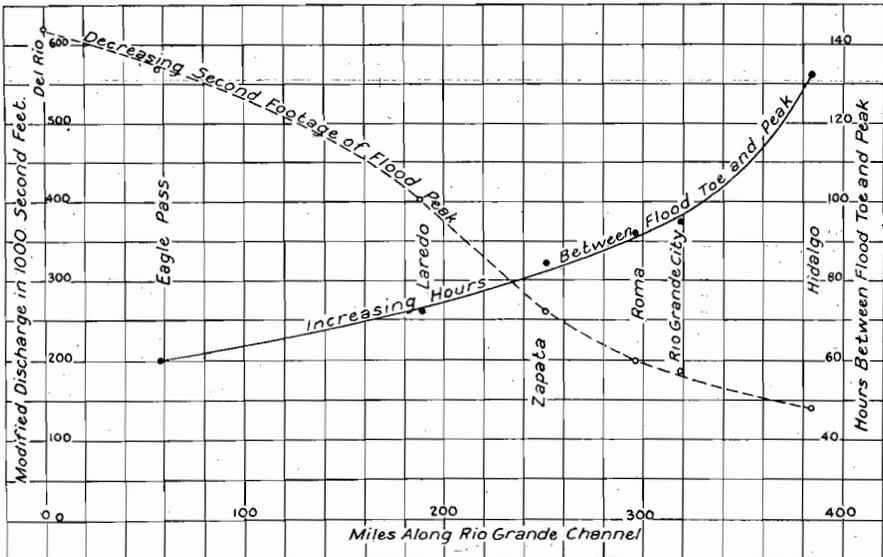
*U. S. C. & G. S. mean Sea Level Datum except as noted.
 ‡International Boundary Commission mean Sea Level Datum.
 †U. S. G. S. mean Sea Level Datum.
 §Floodways divert above Hidalgo.



Detail Gage Height Hydrograph Showing Toe and Peak of Flood



*Generalized Gage Height Hydrographs
At Seven Rio Grande Gaging Stations
During 1932 Flood.*



*First Flood Toe and Principal Flood Peak
at Various Gaging Stations — 1932 Flood*

SALT DETERMINATIONS AND CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES

By United States Agencies — 1932

The salt determinations reported here were made by the United States Bureau of Reclamation at their El Paso Office, from water samples taken by them. Samples were weighed, then filtered to remove silt. The filtrate was then evaporated in an oven and the residue weighed. The tables report the residue as total salts in parts per million by weight (p.p.m.)

The chemical analyses reported here were made by the United States Department of Agriculture at Riverside, California, from water samples taken by the United States Geological Survey, the American Section of the International Water Commission and the United States Bureau of Reclamation.

Conductance, reported in the tables as $(K \times 10^5 \text{ at } 25^\circ \text{ C})$, is a relative measure of the total salt concentration in the water samples.*

Total salts were determined in the same manner as stated above.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: HCO_3 , 61; Cl, 35.5; SO_4 , 48; Ca, 20; Mg, 12.15; Na, 23. In the tables AB indicates alkali bases. This is substantially equivalent to the sodium (Na) but it also includes any potassium and other metals.

*See Circular No. 232 U. S. Dept. Agr. July, 1932.

*Salt and Chemical Constituents of Water Samples from Rio Grande at
San Marcial, New Mexico, 1932*

Date of Sample	Total Salts p.p.m.								
Jan. 6	500	Feb. 7	600	Mar. 8	400	Apr. 11	500	May 7	300
Jan. 14	600	Feb. 12	100	Mar. 14	700	Apr. 15	600	May 12	400
Jan. 21	600	Feb. 18	400	Mar. 21	600	Apr. 16	500	May 18	300
Jan. 27	600	Feb. 25	600	Mar. 27	700	Apr. 23	200	May 24	400
Feb. 2	600	Mar. 2	600	Apr. 4	600	Apr. 30	400	May 31	400
								June 6	300
								June 12	300

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
June 20.....	39	248	2.0	.8	1.30	1.90	.50	1.70
June 28.....	42	312	2.8	1.2	1.50	2.10	.50	2.90
July 5.....	71	472	3.2	.8	3.70	3.30	1.50	2.90
July 11.....	43	296	2.4	.8	1.70	2.10	1.10	1.70
July 18.....	58	370	3.2	1.2	1.90	3.00	1.30	2.00
July 24.....	61	424	2.8	.8	3.00	3.30	1.30	2.00
July 30.....	111	848	3.2	2.0	7.30	5.40	1.50	5.60
Aug. 13.....	99	696	3.6	2.4	4.90	5.60	1.70	3.60
Aug. 25.....	112	832	2.8	2.4	7.95	4.05	1.53	7.57
Sept. 1.....	127	952	2.4	2.4	9.79	4.95	1.79	7.85
Sept. 5.....	87	616	2.8	2.0	4.95	3.15	1.02	5.58
Sept. 10.....	79	568	2.8	1.6	4.44	3.15	1.02	4.67
Sept. 16.....	101	748	3.2	3.2	5.03	3.75	1.41	6.27
Sept. 27.....	136	952	2.8	3.2	8.44	6.00	2.18	6.26
Sept. 30.....	123	780	2.4	2.4	7.41	5.70	1.79	4.72
Oct. 3.....	92	656	3.2	2.8	5.00	4.05	1.41	5.54
Oct. 13.....	90	602	2.6	2.0	5.00	3.45	1.02	5.13
Oct. 24.....	85	568	4.0	1.8	3.92	3.45	1.15	5.12
Oct. 28.....	83	560	2.8	1.8	4.33	3.45	1.02	4.46
Oct. 31.....	82	528	2.4	2.0	4.27	3.30	1.28	4.09
Nov. 12.....	79	552	3.4	1.6	4.25	3.90	1.41	3.94
Nov. 13.....	79	560	3.4	1.4	4.59	3.90	1.41	4.08
Nov. 22.....	89	508	3.7	1.8	3.83	3.90	1.40	4.03
Nov. 23.....	85	460	3.0	2.0	3.85	3.45	1.40	4.00
Nov. 28.....	87	564	3.4	2.2	3.90	3.75	1.40	4.35

Salt and Chemical Constituents of Water Samples from Rio Grande at El Paso, Texas, 1932

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Jan. 2.....	212	1,428	5.6	9.6	7.80	6.60	2.80	13.60
Jan. 6.....	214	1,396	5.2	9.6	8.10	6.30	2.20	14.40
Jan. 13.....	214	1,448	5.2	10.0	7.90	5.40	2.40	15.30
Jan. 20.....	219	1,488	4.8	10.4	8.10	6.00	1.90	15.40
Jan. 27.....	243	1,604	6.0	11.2	8.20	6.50	2.40	16.50
Feb. 3.....	225	1,568	5.6	9.6	9.20	6.30	2.80	15.30
Feb. 10.....	139	925	4.0	4.0	7.10	5.30	1.90	7.90
Feb. 19.....	174	1,188	4.4	8.0	7.00	5.40	2.40	11.60
Feb. 26.....	145	985	4.4	4.8	6.50	4.90	2.20	8.60
Mar. 4.....	141	1,032	4.8	5.2	6.60	5.30	1.70	9.60
Mar. 11.....	135	928	3.6	5.6	6.30	5.30	1.70	8.50
Mar. 18.....	136	908	4.0	4.8	6.20	4.50	2.60	7.90
Mar. 25.....	137	932	3.6	4.8	6.70	4.40	2.70	8.00
Apr. 1.....	126	852	3.6	4.4	6.30	4.40	2.70	7.20
Apr. 8.....	125	848	3.6	4.0	6.20	4.50	2.70	6.60
Apr. 15.....	125	848	4.0	4.0	6.10	4.70	1.90	7.50
Apr. 22.....	124	848	4.4	4.0	5.80	4.80	1.90	7.50
Apr. 29.....	132	856	4.0	4.4	5.50	4.80	2.00	7.10
May 6.....	134	915	3.2	4.4	7.20	5.10	1.80	7.90
May 13.....	127	756	3.2	4.0	5.50	4.50	1.70	6.50
May 20.....	129	848	3.2	4.4	5.90	4.80	1.70	7.00
May 27.....	130	856	3.2	4.0	5.80	4.80	1.80	6.40
June 3.....	130	844	3.2	4.4	5.80	4.80	1.80	6.80
June 10.....	129	856	4.0	4.0	5.80	4.70	2.30	6.80
June 17.....	130	866	4.4	3.6	5.90	4.70	2.30	6.90
June 24.....	112	744	2.4	3.2	5.60	3.90	1.70	5.60
July 6.....	145	880	3.6	4.4	6.60	5.40	2.40	6.80
July 13.....	115	760	3.2	3.2	5.60	5.10	2.30	4.60
July 22.....	121	800	3.6	3.6	6.00	5.40	1.30	6.50
July 29.....	121	780	3.2	3.6	5.70	4.50	1.70	6.30
Aug. 5.....	121	792	3.6	3.6	5.30	4.50	1.50	6.50
Aug. 19.....	112	736	3.6	4.0	5.01	3.15	1.28	8.18
Aug. 26.....	114	776	3.2	4.0	5.46	3.75	1.66	7.25
Sept. 2.....	112	800	3.2	4.0	5.66	4.05	1.92	6.89
Sept. 9.....	123	860	3.6	4.0	5.80	4.65	2.30	6.45
Sept. 16.....	112	768	3.2	4.0	5.53	4.65	2.05	6.03
Sept. 21.....	116	812	3.6	3.6	5.60	4.65	2.05	6.10
Sept. 30.....	119	784	3.6	4.0	5.70	4.65	2.05	6.60
Oct. 7.....	141	930	4.8	4.8	5.94	5.10	2.18	8.26
Oct. 14.....	177	1,232	5.2	6.8	7.41	5.25	2.68	11.48
Oct. 21.....	140	944	4.2	5.0	6.25	4.65	1.92	8.88
Oct. 28.....	166	1,136	4.2	6.8	7.13	4.95	1.79	11.39
Nov. 4.....	198	1,328	4.6	8.2	8.34	6.45	2.18	12.51

Salt and Chemical Constituents of Water Samples from Rio Grande at El Paso, Texas, 1932
—Cont'd.

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Nov. 11.....	171	1,112	4.0	6.6	7.32	6.00	1.92	10.00
Nov. 19.....	188	1,232	4.2	8.0	7.95	6.30	2.18	11.67
Nov. 25.....	154	1,040	3.2	6.0	6.54	5.70	1.54	8.50
Dec. 2.....	201	1,340	4.0	8.4	8.39	6.45	2.56	11.78
Dec. 9.....	142	936	2.8	5.2	6.26	5.10	1.54	7.62
Dec. 16.....	179	1,220	3.2	6.6	7.15	6.45	1.92	8.58
Dec. 23.....	154	1,004	3.8	5.6	6.32	5.70	1.79	8.23
Dec. 30.....	198	1,256	5.0	8.2	7.85	6.45	1.92	12.68

Salt and Chemical Constituents of Water Samples from Rio Grande at Febens, Texas, 1932

Date of Sample	Total Salts p.p.m.								
Feb. 8	1,200	June 10	1,500	July 28	1,000	Sept. 7	1,400	Oct. 31	1,600
May 15	1,100	June 16	1,600	Aug. 3	1,100	Sept. 19	1,300	Nov. 6	1,400
May 22	1,400	June 25	1,100	Aug. 12	1,300	Sept. 27	1,900	Nov. 15	1,600
May 28	1,600	July 2	1,500	Aug. 23	1,300	Oct. 11	1,400	Nov. 21	1,600
June 3	1,500	July 21	1,400	Aug. 26	1,100	Oct. 27	1,500	Nov. 27	1,300

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Jan. 1.....	306	2,036	6.0	16.8	9.80	6.90	4.20	21.50
Jan. 6.....	289	1,896	5.2	16.0	9.30	7.10	4.20	19.20
Jan. 15.....	277	1,840	5.6	14.4	9.00	7.10	3.50	18.40
Jan. 22.....	275	1,792	5.6	14.4	8.80	6.90	2.80	19.10
Jan. 29.....	290	1,912	5.6	15.6	9.80	7.20	3.70	20.10
Feb. 5.....	272	1,832	5.2	14.8	9.20	7.70	3.70	17.80
Feb. 10.....	191	1,228	4.0	8.4	7.10	4.90	2.90	11.70
Feb. 17.....	253	1,720	5.2	13.6	8.90	7.50	3.20	17.00
Feb. 24.....	189	1,228	4.0	8.0	7.10	6.30	2.60	10.20
Feb. 29.....	214	1,448	4.4	10.4	7.90	6.90	2.80	13.00
Mar. 2.....	222	1,448	4.4	11.2	7.20	6.60	2.80	13.40
Mar. 8.....	191	1,288	4.4	8.8	7.00	6.00	2.60	11.60
Mar. 17.....	199	1,308	4.4	8.8	7.80	6.30	2.60	12.10
Mar. 24.....	234	1,528	4.4	11.6	8.50	7.50	3.60	13.40
Mar. 28.....	247	1,855	4.8	13.6	8.30	6.90	2.70	17.10
Apr. 3.....	184	1,208	4.4	8.0	7.70	6.30	2.30	11.50
Apr. 10.....	208	1,336	4.4	8.8	8.50	6.60	2.60	12.50
Apr. 19.....	259	1,749	4.8	12.8	9.50	7.20	2.70	17.20
Apr. 25.....	200	1,328	4.0	8.4	8.00	6.80	3.20	10.40
May 1.....	201	1,328	4.0	8.4	8.10	6.80	2.80	10.90
May 6.....	322	2,064	5.6	18.0	10.50	8.50	3.60	22.00
May 12.....	175	1,144	4.0	7.2	7.20	6.00	2.20	10.20
May 18.....	202	1,304	4.0	10.0	8.30	7.20	1.80	13.30
May 25.....	302	2,008	5.6	16.8	10.50	9.45	3.97	19.48
May 31.....	185	1,280	4.8	8.0	7.42	6.30	2.82	11.10
June 6.....	171	1,240	3.6	7.2	8.36	5.55	2.05	11.56
June 13.....	203	1,416	4.4	10.0	8.13	7.35	3.07	12.11
June 22.....	191	1,320	4.0	8.4	8.54	5.85	2.43	12.66
June 29.....	159	1,127	4.0	6.8	7.38	6.30	2.43	9.45
July 6.....	246	1,855	5.2	14.0	9.15	8.40	3.07	16.88
July 10.....	165	1,276	4.4	8.4	7.61	6.90	3.07	10.44
July 18.....	169	1,392	4.0	10.8	7.82	6.90	2.69	13.03
July 24.....	205	1,268	4.0	10.0	7.51	5.55	3.20	12.76
July 31.....	157	1,044	4.0	6.4	6.29	4.65	2.56	9.48
Aug. 8.....	168	1,048	4.0	6.4	6.66	5.45	2.56	9.05
Aug. 16.....	160	1,024	3.6	6.8	6.29	4.95	2.56	9.18
Aug. 20.....	166	1,093	3.6	6.8	6.77	5.40	2.56	9.21
Aug. 30.....	154	1,056	4.0	6.4	6.66	5.25	2.18	9.63
Sept. 3.....	154	1,076	4.0	6.8	6.35	5.40	2.82	8.93
Sept. 11.....	210	1,428	4.8	10.4	7.92	6.60	2.82	13.70
Sept. 15.....	231	1,584	4.8	12.8	8.09	7.05	3.07	15.57
Sept. 23.....	185	1,260	4.0	8.8	7.20	6.15	2.68	11.17
Oct. 7.....	206	1,292	4.2	9.2	7.37	6.90	2.30	11.57
Oct. 15.....	246	1,536	3.6	10.6	8.81	6.75	2.56	13.70
Oct. 25.....	207	1,320	5.0	10.0	7.48	6.75	2.56	13.17
Oct. 29.....	242	1,632	4.8	12.0	9.00	8.10	2.56	15.14
Nov. 3.....	267	1,788	5.2	12.4	9.73	8.55	2.82	15.96
Nov. 9.....	186	1,232	4.0	8.0	7.68	6.75	1.92	11.01
Nov. 12.....	232	1,568	4.4	11.2	8.57	7.50	2.68	13.99
Nov. 18.....	274	1,840	4.0	15.2	10.51	8.25	3.20	18.26
Nov. 24.....	187	1,236	4.0	8.4	7.68	6.45	1.92	11.71
Nov. 30.....	252	1,692	4.8	12.8	9.42	8.40	3.07	15.55
Dec. 6.....	236	1,572	4.8	10.8	8.88	7.95	2.94	13.59
Dec. 13.....	222	1,464	4.4	10.4	8.22	7.95	2.05	13.02
Dec. 23.....	181	1,176	4.0	8.0	7.03	6.15	1.79	11.09
Dec. 27.....	232	1,580	4.8	11.2	8.81	7.80	2.30	14.71
Dec. 30.....	270	1,808	4.8	14.0	9.68	8.10	2.94	17.44

*Salt and Chemical Constituents of Water Samples from Rio Grande at
Fort Quitman, Texas, 1932*

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Jan. 1	370	2,376	5.2	22.4	10.60	7.20	5.20	25.80
Jan. 8	361	2,188	3.2	22.4	10.50	7.20	4.10	24.80
Jan. 15	364	2,284	4.8	23.6	9.00	7.10	5.10	25.20
Jan. 22	370	2,396	3.6	24.0	12.50	8.10	4.70	27.30
Jan. 29	370	2,368	4.0	24.4	11.20	8.10	4.70	26.80
Feb. 5	348	2,384	5.6	22.0	11.10	7.80	3.30	27.60
Feb. 12	254	1,724	4.8	14.8	8.80	8.70	2.60	17.10
Feb. 15	261	1,764	4.8	14.8	8.90	7.80	2.90	17.80
Feb. 23	296	2,008	4.8	19.2	9.20	9.00	3.60	20.60
Feb. 29	274	1,824	4.4	16.0	8.90	9.00	3.30	17.00
Mar. 7	317	2,112	3.6	21.2	10.50	9.30	3.70	22.30
Mar. 14	273	1,816	4.0	17.6	9.00	8.90	3.60	18.10
Mar. 21	312	2,120	4.0	20.0	9.40	8.40	4.10	20.90
Mar. 28	346	2,304	4.0	22.4	10.50	9.50	4.10	23.30
Apr. 4	368	2,446	4.0	24.8	10.20	9.90	4.20	24.90
Apr. 11	354	2,240	4.0	23.6	9.70	9.30	4.10	23.90
Apr. 18	349	2,364	4.0	24.0	10.50	9.90	4.10	24.50
Apr. 25	427	2,932	4.0	32.0	11.80	11.10	4.90	31.80
May 2	503	3,174	3.6	36.0	12.70	8.40	4.10	39.80
May 9	541	3,520	3.8	38.0	12.60	10.20	5.10	38.90
May 16	299	1,830	4.0	16.8	7.60	6.80	3.10	18.50
May 23	389	2,456	3.6	25.2	9.90	8.10	2.80	27.80
May 31	493	3,100	3.6	34.8	12.50	11.30	5.80	33.80
June 6	413	2,472	4.0	25.2	11.00	11.70	4.40	24.10
June 13	385	2,336	4.0	24.0	11.30	10.50	5.40	23.40
June 20	487	2,904	3.6	33.6	13.20	11.90	4.90	33.60
June 28	315	1,832	3.6	18.0	9.40	8.60	3.20	19.20
July 11	415	2,608	4.0	28.8	10.40	12.00	5.10	26.10
July 18	290	1,696	3.6	16.8	8.90	8.30	3.70	17.30
July 25	425	2,528	3.2	26.8	11.80	12.00	5.50	24.30
Aug. 1	283	1,672	3.2	16.0	8.40	8.10	3.30	16.20
Aug. 8	293	1,760	3.6	18.0	8.90	8.30	3.30	18.90
Aug. 15	247	1,608	5.6*	13.2	6.60	8.00	3.30	14.10
Aug. 22	250	1,640	3.6	15.6	7.99	5.40	2.56	19.23
Aug. 29	322	2,240	3.2	23.2	9.90	8.55	3.58	24.17
Sept. 2	225	1,508	3.2	12.8	7.65	8.55	3.33	11.77
Sept. 9	288	1,992	5.2	18.0	9.25	8.55	3.58	20.32
Sept. 16	370	2,472	4.0	25.2	10.34	8.70	3.46	27.38
Sept. 30	166	1,085	4.0	8.0	5.63	4.65	1.92	11.06
Oct. 7	250	1,632	8.8*	12.8	3.58*	7.50	3.20	.....
Oct. 14	269	1,748	4.6	15.6	8.43	7.05	3.07	18.51
Oct. 21	339	2,208	4.4	20.4	10.51	8.10	2.17	25.04
Oct. 28	255	1,640	4.8	14.8	8.53	6.75	1.92	19.46
Nov. 4	327	2,160	4.0	20.0	10.44	9.90	3.46	21.08
Nov. 11	272	1,808	3.2	15.4	8.88	9.00	3.46	15.02
Nov. 18	332	2,180	2.0	19.6	10.41	10.35	3.46	18.20
Nov. 25	212	1,900	4.6	17.0	9.51	8.40	3.33	19.38
Dec. 2	308	1,956	4.6	17.8	9.87	9.60	3.33	19.34
Dec. 9	308	1,944	4.2	18.0	9.90	8.75	3.20	20.15
Dec. 16	308	1,928	4.6	18.0	9.17	9.15	3.20	19.42
Dec. 23	278	1,724	4.6	15.0	8.64	8.40	2.94	16.90
Dec. 30	327	2,036	4.6	19.0	9.71	9.45	3.58	20.28

*Salt and Chemical Constituents of Water Samples from Pecos River at
Shumla Bend, Texas, 1932*

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Feb. 24	485		2.70	23.50	20.80	14.10	8.61	20.29

*Salt and Chemical Constituents of Water Samples from Springs on Rio Grande Opposite
Shumla Bend, Texas, 1932*

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Feb. 24	58.7		3.95	1.20	0.64	3.66	0.43	1.70
Feb. 24	58.7		3.90	1.20	0.91	3.68	0.43	1.90

*Decomposed, odor of H₂S.

Salt and Chemical Constituents of Water Samples from Rio Grande at Roma, Texas, 1932

Date of Sample	K x 10 ⁵ at 25° C	Total Salts p.p.m.	Milligram Equivalents					
			HCO ₃	Cl	SO ₄	Ca	Mg	AB
Jan. 5.....	118	728	2.80	4.80	5.10	4.50	1.90	6.30
Feb. 11.....	170	1,096	2.80	8.00	6.60	5.70	2.40	9.30
Mar. 1.....	148	984	2.80	6.40	6.80	4.90	2.30	8.80
Apr. 16.....	169	1,093	2.40	8.00	6.50	5.40	2.00	9.50
May 5.....	51	356	2.80	1.60	1.90	2.10	.90	3.30
June 7.....	96	628	3.20	3.20	3.80	4.00	1.80	4.40
July 12.....	66	401	2.40	1.20	3.10	3.50	1.50	1.70
Aug. 8.....	109	644	2.00	4.00	4.10	4.50	1.90	3.70
Nov. 9.....	146	912	3.60	6.80	5.46	5.10	2.56	8.20

CHEMICAL AND BACTERIOLOGICAL ANALYSES OF WATER SAMPLES FROM THE RIO GRANDE AT NUEVO LAREDO, TAMAULIPAS

By Mexican Agencies—1932

The chemical and bacteriological analyses of water shown here were made by the Federal Board of Public Improvements at Nuevo Laredo, Tamaulipas, Mexico, from samples of water taken from the Rio Grande by means of the pumps of the city water service, under the supervision of such Board.

Month	Parts per Million					Bacteriological Analysis	
	Turbidity	Total Alkalinity	Phenolphthalein Alkalinity	Hardness	Magnesia	Total Bacteria in Agar-Agar at 37.5° c.	Bacillus Coli per 100 c.c.
AVERAGE							
January.....	120	151	4.2	340	24.6	525	122
February.....	203	135	5.2	400	29.3	1,200	236
March.....	340	134	5.0	400	28.2	850	122
April.....	208	117	4.3	363	31.9	1,780	424
May.....	1,071	112.2	3.9	269	17.8	6,162	3,287
June.....	402	110.9	4.86	408	29.9	1,830	740.3
July.....	2,591	124.4	5.7	249	16.4	16,347	228.06
August.....	5,649	118.3	4.2	272.9	10.97	22,956	3,210
September.....	4,108	113	3.0	204	4.4	33,270	10,433
October.....	2,282	145	4.25	331	11.3	8,507	9,242
November.....	190	159	3.66	430	33.98	846	176
December.....	40	159	4.0	413	33.9	261	63
Total.....	17,204	1,578.8	52.27	4,079.9	272.65	94,534	28,283.36
Average.....	1,434	131.6	4.36	339.9	22.72	7,878	2,356.94
Minimum.....	40	110.9	3.0	204	4.4	261	63
Maximum.....	5,649	159	5.7	430	33.98	33,270	10,433

MINIMUM

January.....	96	146	2.0	275	16.5	320	10
February.....	95	92	2.5	240	11.6	315	10
March.....	113	117	3.0	324	18.4	340	10
April.....	87	109	2.5	255	13.6	325	10
May.....	87	81.5	1.0	135	1.9	300	50
June.....	49	72	2.0	315	10.7	815	10
July.....	550	71	1.0	127	1.9	625	50
August.....	107	98	2.0	154	1.9	390	50
September.....	431	63	0.0	107	0.0	5,900	1,000
October.....	343	116	2.0	147	0.9	990	100
November.....	66	126	1.0	324	21.3	198	10
December.....	29	142	2.0	363	25.4	119	10

MAXIMUM

January.....	161	157	5.5	402	34.0	715	1,000
February.....	1,440	150	7.5	452	35.9	6,150	1,000
March.....	1,328	160	7.0	462	36.9	4,450	500
April.....	2,190	123	6.5	453	46.6	24,900	10,000
May.....	5,364	148	8.0	398	33.0	29,000	10,000
June.....	1,168	149	8.0	699	85.5	7,300	10,000
July.....	12,313	147	9.0	338	39.1	95,000	10,000
August.....	19,589	146	7.0	473	21.3	100,500	10,000
September.....	11,300	145	5.0	331	14.5	88,000	100,000
October.....	9,188	179	7.0	481	29.1	56,500	100,000
November.....	893	169	8.0	467	58.3	6,445	1,000
December.....	65	170	7.0	606	42.7	820	100

Note: Turbidity reached 26,000 parts per million on August 17th

SILT SAMPLING OF RIO GRANDE WATER
By United States Agencies, 1924-1932

The gravimetric percentages of dry silt reported here were determined by the United States Bureau of Reclamation at El Paso, Texas, from water samples taken by the International Boundary Commission in small necked bottles by lowering the open bottle into the water at one or more verticals in the stream cross section, being careful to approach but not to strike bottom. The discharges, where shown, are those determined by current meter measurement at the time the samples were taken.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualizing and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

The summaries shown on pages 50, 51 and 52 are only roughly approximate because of the infrequency of the silt samples.

*Gravimetric Percentages of Dried Silt in the Rio Grande at San Marcial, New Mexico as Determined from Water Samples During 1926-1932**

Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet
1926		1927		1929		1931			1932		
Jan. 4	.50	July 15	11.52	Apr. 14	.52	Jan. 15	.48	624	Feb. 2	.94	701
Jan. 7	.74	July 26	6.22	Apr. 16	.16	Jan. 31	.48	779	Feb. 7	1.09	1,020
Jan. 10	.53	July 30	.22	Apr. 20	.30	Feb. 15	.66	967	Feb. 12	3.86	2,180
Jan. 22	.56	July 31	3.90	Apr. 22	.73	Mar. 1	.34	765	Feb. 18	1.28	1,320
Jan. 25	.34	Aug. 25	3.63	Apr. 22	.88	Mar. 15	.86	700	Feb. 25	1.38	1,220
Feb. 16	.45	Aug. 31	2.09	Apr. 24	.42	Mar. 31	.85	922	Mar. 2	1.13	1,680
Feb. 26	.24	Sept. 9	10.21	Apr. 26	.55	Apr. 6	.31	939	Mar. 8	1.25	1,620
Feb. 28	.43	Sept. 15	3.64	Apr. 28	.36	Apr. 12	.44	529	Mar. 14	.83	1,560
Mar. 15	.43	Sept. 24	1.03	Apr. 30	.79	Apr. 18	1.31	1,460	Mar. 21	1.05	1,350
Apr. 1	.47	Sept. 30	1.01	May 2	.38	Apr. 20	1.07	1,470	Mar. 27	.72	1,520
Apr. 11	.95	Oct. 14	1.20	May 4	.21	Apr. 26	1.02	1,520	Apr. 4	1.31	1,520
Apr. 14	.81	Oct. 31	.37	May 6	.54	May 9	.91	1,710	Apr. 11	.95	3,560
Apr. 30	.71	Nov. 16	.14	May 8	.85	May 15	.43	1,370	Apr. 15	1.54	3,330
May 8	1.08	Nov. 30	.30	May 10	.83	May 21	.84	2,000	Apr. 16	4.10	4,440
May 16	.56	Dec. 16	.14	May 13	.91	May 27	.49	669	Apr. 23	1.35	6,260
May 21	.29	1928		May 15	.63	June 2	.09	421	Apr. 30	1.06	3,130
May 27	.55	Jan. 16	.18	May 19	.34	June 8	.07	156	May 7	.68	4,770
May 31	.19	Jan. 31	.22	May 19	1.08	July 3	6.76	323	May 12	1.37	6,480
June 6	.36	Feb. 15	.25	May 21	1.38	July 8	7.21	82.9	May 18	.92	7,630
June 15	.34	Mar. 1	.12	May 23	1.48	Aug. 4	4.40	720	May 24	.63	11,460
July 13	6.30	Mar. 16	.20	May 25	1.56	Aug. 10	12.22	1,210	May 31	1.95	7,270
July 31	4.79	Mar. 31	.28	May 28	.82	Aug. 16	6.83	19	June 6	.69	4,430
Aug. 14	7.45	Apr. 15	.25	June 1	.51	Aug. 26	11.80	36	June 12	.36	2,450
Aug. 16	6.48	Apr. 30	.23	June 3	.48	Sept. 3	10.31	76	June 20	.94	3,990
Sept. 15	12.35	May 3	.83	June 5	.41	Sept. 17	9.67	709	June 28	.85	3,960
Sept. 20	8.12	May 14	.96	June 8	.31	Sept. 19	10.40	3,840	July 5	1.67	4,570
Oct. 1	.59	May 25	.69	June 15	.34	Sept. 25	7.22	6,740	July 11	.71	2,290
Oct. 17	.72	May 31	.50	July 12	4.91	Sept. 29	6.37	3,510	July 18	.52	1,870
Oct. 31	.28	July 31	.44	July 22	3.78	Oct. 2	2.406	752	July 24	.60	2,000
Nov. 30	.79	Aug. 18	.66	July 26	10.53	Oct. 5	5.40	1,270	July 30	2.72	800
Dec. 17	.56	Aug. 26	4.67	July 30	.04	Oct. 11	9.39	610	Aug. 13	.87	865
Dec. 31	.14	Sept. 1	3.38	Aug. 1	3.91	Oct. 17	.85	423	Aug. 25	4.95	1,510
		Dec. 31	.32	Aug. 8	10.72	Oct. 29	.69	401	Sept. 1	3.87	1,270
				Aug. 16	.89	Nov. 4	.58	362	Sept. 5	1.00	513
Jan. 14	.74	1929		Aug. 25	.48	Nov. 10	.47	307	Sept. 10	.36	238
Jan. 31	.50	Jan. 31	.62	Aug. 31	6.72	Nov. 16	.88	593	Sept. 16	.10	20.8
Feb. 14	.56	Feb. 6	.47	Sept. 5	6.05	Nov. 23	.56	450	Sept. 27	1.92	82
Feb. 27	.57	Feb. 8	.38			Dec. 5	.73	617	Sept. 30	.96	103
Mar. 15	.48	Feb. 12	.18	1930		Dec. 11	.59	631	Oct. 3	.66	295
Apr. 1	1.11	Feb. 19	.68	Mar. 25	.29	Dec. 18	.51	541	Oct. 13	.46	254
Apr. 16	.76	Feb. 25	.56	May 8	.18	Dec. 24	.76	1,000	Oct. 24	.48	271
Apr. 30	.72	Mar. 2	.69	June 8	.26				Oct. 28	1.02	752
May 16	.38	Mar. 14	.85	June 12	3.44	1932			Oct. 31	.54	447
June	2.71	Mar. 20	.18	Aug. 22	.54	Jan. 6	1.30	1,010	Nov. 12	.39	377
June	.55	Mar. 25	.18	Sept. 23	4.60	Jan. 14	.54	753	Nov. 13	.42	612
June	.37	Mar. 31	.67	Dec. 15	.45	Jan. 21	1.26	707			
July 2	1.25	Apr. 10	.11	Dec. 31	.61	Jan. 27	.53	673			

*Elephant Butte reservoir silt survey completed December, 1925.

Summary

Years	Tons of Water	Suspended Silt		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons per Ac. Ft.
1926	1,425,661,000	9,553,354	.6701	6,579.4
1927	1,835,989,000	30,653,672	1.6696	21,113.4
1928	803,841,000	4,841,534	.6023	3,334.4
1929	1,933,048,000	59,990,745	3.0100	41,315.9
1930	994,891,000	6,184,242	.6216	4,259.1
1931	666,605,000	14,961,949	2.2445	10,304.4
1932	1,904,665,000	23,324,528	1.2246	16,063.7
Total	9,624,700,000	149,510,024		102,970.3
Average	1,374,957,000	21,358,575	1.5534	14,710

Gravimetric Percentages of Dried Silt in the Rio Grande at El Paso, Texas as Determined from Water Samples During 1924-1932

Date	% Silt	Date	% Silt	Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet	
1924													
Jan. 30	.01	Feb. 24	.06	Jan. 16	.04		Mar. 16	.005	969	Jan. 27	0	114	
Feb. 12	.05	Mar. 17	.00	Jan. 23	.01		Mar. 20	.035	800	Feb. 3	0	118	
Feb. 16	.06	Mar. 24	.02	Feb. 3	.01	123	Mar. 27	.071	1,430	Feb. 10	0	529	
Feb. 23	.05	July 21	1.10	Feb. 6	.04	325	Apr. 6	.044	1,260	Feb. 19	0	254	
Feb. 29	.03	Aug. 4	.00	Feb. 15	.03	220	Apr. 13	.027	1,130	Feb. 26	0	328	
Mar. 7	.03	Sept. 27	.64	Feb. 19	.04	250	Apr. 17	.112	1,880	Mar. 4	0	430	
Mar. 14	.03	Oct. 5	.02	Mar. 1	.06	630	Apr. 24	.020	1,050	Mar. 11	0	601	
Mar. 21	.03	Oct. 24	.01	Mar. 11	.04	369	May 1	.099	964	Apr. 15	0	1,030	
Mar. 28	.02	Dec. 5	.05	Mar. 25	.09	1,100	May 11	.033	638	Apr. 22	0	973	
Apr. 4	.06			Apr. 1	.08	910	May 18	.032	518	Apr. 29	0	980	
Apr. 12	.09	1928			Apr. 5	.04	768	May 25	.025	959	June 10	0	1,040
Apr. 18	.09	Jan. 20	.02	Apr. 12	.07	962	June 1	.013	1,410	June 17	.028	1,270	
Apr. 26	.07	Feb. 1	.02	May 3	.03	623	June 8	.024	1,360	June 24	.084	1,480	
May 9	.06	Mar. 1	.02	May 14	.02	691	June 15	.026	1,050	July 6	.061	964	
May 23	.06	Apr. 2	.04	July 2	.04	1,090	June 22	.026	1,420	July 13	.036	1,540	
July 1	.07	May 2	.04	July 8	.04	1,330	June 29	.016	968	July 22	.025	1,150	
July 7	.04	June 1	.03	July 16	.02	1,250	July 3	.308	2,220	July 29	.048	1,380	
July 7	.02	Aug. 16	.09	July 23	.22	1,200	July 10	.032	1,100	Aug. 5	.042	1,180	
Aug. 7	.06	Sept. 18	.06	July 26	.04	2,340	July 17	.047	857	Aug. 19	.024	1,410	
Sept. 26	.01	Oct. 15	.04	Aug. 6	.04	981	July 27	.056	1,330	Aug. 26	.029	1,300	
Oct. 31	.03	Oct. 30	.05	Aug. 15	.02	1,520	July 31	.024	1,480	Sept. 2	.086	1,420	
Nov. 3	.00			Sept. 4	.04	1,140	Aug. 3	.496	4,430	Sept. 9	.021	927	
Nov. 11	.03	1929			Sept. 28	.11	1,070	Aug. 8	.137	1,320	Sept. 16	0	1,140
Nov. 12	.01	Jan. 2	.01	Oct. 1	.00	657	Aug. 17	.086	1,040	Sept. 21	.004	1,040	
Dec. 29	.06	Jan. 16	.00	Oct. 11	.07	465	Aug. 24	.092	1,440	Sept. 30	.124	1,420	
		Feb. 2	.00	Oct. 20	.01	418	Aug. 31	.048	1,060	Oct. 7	.020	663	
		Feb. 16	.01	Oct. 27	.01	294	Sept. 8	.032	967	Oct. 14	.008	394	
1925													
Jan. 20	.00	Mar. 1	.01	Nov. 10	.00	237	Sept. 14	.038	963	Oct. 21	.008	625	
Apr. 15	.02	May 4	.03	Nov. 17	.00	212	Sept. 21	.003	1,030	Oct. 28	.008	331	
May 7	.03	June 6	.03	Nov. 19	.01	190	Sept. 28	.880	544	Nov. 4	.008	243	
June 8	.03	June 28	.06	Nov. 25	.00	280	Oct. 5	.026	533	Nov. 11	.016	346	
July 3	.03	July 11	.27	Dec. 3	.00	210	Oct. 14	0	302	Nov. 19	.014	543	
July 27	.06	Aug. 1	.65	Dec. 13	.00	240	Oct. 19	0	251	Nov. 25	.017	362	
Aug. 8	.61	Aug. 11	.59	Dec. 19	.00	166	Oct. 26	.070	1,040	Dec. 2	.009	208	
Aug. 8	.61	Aug. 24	1.50	Dec. 26	.00	200	Nov. 4	0	275	Dec. 9	.015	480	
Sept. 16	.09	Sept. 23	.21				Nov. 11	0	374	Dec. 16	.016	263	
Sept. 30	.04	Sept. 30	.24	1931			Nov. 18	0	218	Dec. 23	.011	345	
Oct. 5	.03	Oct. 15	.11	Jan. 2	.004	154	Nov. 25	0	281	Dec. 30	.000	344	
Oct. 9	.02	Oct. 28	.05	Jan. 9	.009	154	Dec. 4	0	230				
		Nov. 7	.05	Jan. 16	.006	154	Dec. 9	0	192				
1926													
Jan. 13	.00	Dec. 4	.01	Jan. 24	.003	136	Dec. 16	0	192				
Feb. 23	.00	Dec. 12	.02	Jan. 30	.003	143	Dec. 23	0	256				
Apr. 24	.05	Dec. 19	.05	Feb. 6	.008	133							
May 1	.03	Dec. 25	.05	Feb. 13	.009	276	1932						
July 10	.05			Feb. 20	.010	269	Jan. 2	0	170				
Aug. 25	.11	1930			Mar. 1	.017	426	Jan. 6	0	173			
Oct. 11	.03	Jan. 9	.02	Mar. 9	.021	414	Jan. 13	0	157				
							Jan. 20	0	143				

Summary

Years	Tons of Water	Suspended Silt		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons per Ac. Ft.
1924	1,102,682,000	1,142,379	.1036	786.8
1925	862,602,000	1,111,894	.1289	765.8
1926	757,805,000	339,497	.0448	233.8
1927	843,276,000	2,163,846	.2566	1,490.3
1928	848,992,000	406,667	.0479	280.1
1929	751,408,000	1,671,883	.2225	1,151.4
1930	724,569,000	332,577	.0459	229.0
1931	704,698,000	593,356	.0842	408.6
1932	772,014,000	209,370	.02712	144.2
Total	7,868,046,000	7,971,406		5,490.0
Average	818,672,000	885,712	.1082	610

*Gravimetric Percentages of Dried Silt in the Rio Grande at Fort Quitman, Texas
as Determined from Water Samples During 1928-1932*

Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet	Date	% Silt	Sec. Feet
1928			1929			1930			1931		
Jan. 3	.000	180	Aug. 27	1.020	888	Oct. 24	.018	306	Nov. 20	.000	209
Jan. 10	.010	164	Sept. 4	.000	328	Oct. 30	.017	310	Nov. 27	.000	280
Jan. 17	.000	191	Sept. 9	.000	209	Nov. 6	.004	199	Dec. 4	.000	266
Jan. 24	.020	211	Sept. 16	.120	241	Nov. 13	.009	196	Dec. 11	.000	224
Jan. 31	.010	183	Sept. 17	.100	.....	Dec. 8	.004	218	Dec. 18	.000	211
Feb. 7	.050	175	Sept. 26	.160	450	Dec. 15	.014	273	Dec. 24	.000	280
Feb. 14	.010	224	Oct. 2	.000	186	Dec. 22	.004	181			
Feb. 21	.030	277	Oct. 7	.240	168	Dec. 29	.004	184	1932		
Feb. 28	.010	212	Oct. 30	.060	392				Jan. 1	.000	141
Mar. 5	.020	139	Nov. 12	.270	339	1931			Jan. 8	.000	125
Mar. 15	.040	44	Nov. 19	.040	.....	Jan. 2	.000	177	Jan. 15	.000	136
Mar. 20	.010	219	Dec. 4	.020	180	Jan. 12	.000	161	Jan. 22	.000	127
Mar. 27	.010	90	Dec. 11	.060	228	Jan. 19	.000	158	Jan. 29	.000	123
Apr. 3	.000	74	Dec. 18	.000	197	Jan. 26	.000	127	Feb. 5	.000	148
Apr. 10	.080	518	Dec. 25	.040	243	Feb. 1	.000	182	Feb. 12	.000	223
Apr. 24	.030	424	1930			Feb. 9	.000	148	Feb. 15	.000	227
Apr. 30	.020	295	Jan. 2	.030	190	Feb. 16	.000	208	Feb. 23	.000	390
May 15	.060	672	Jan. 9	.020	199	Feb. 23	.004	215	Feb. 29	.000	258
May 18	.040	425	Jan. 16	.010	191	Mar. 1	.006	161	Mar. 7	.000	161
May 22	.020	233	Jan. 23	.000	174	Mar. 9	.005	93	Mar. 14	.000	246
June 5	.010	284	Feb. 6	.020	172	Mar. 16	.021	131	Mar. 21	.000	112
June 26	.000	179	Feb. 13	.156	223	Mar. 23	.014	247	Mar. 28	.000	107
June 29	.010	187	Mar. 6	.480	249	Mar. 30	.015	245	Apr. 4	.000	102
July 3	.000	106	Mar. 13	.254	162	Apr. 6	.015	157	Apr. 11	.000	134
July 10	.000	68	Mar. 20	.192	130	Apr. 13	.002	144	Apr. 18	.000	146
Aug. 7	.060	.....	Mar. 23	.073	215	May 2	.063	1,360	Apr. 25	.000	78
Dec. 5	.000	208	Mar. 27	.088	207	May 9	.021	281	June 6	.016	135
Dec. 11	.010	250	Mar. 31	.073	301	May 18	.011	186	June 13	.012	126
			Apr. 3	.064	248	May 25	.007	104	June 20	.000	72
1929			Apr. 9	.037	166	June 1	.007	95	June 28	.011	262
Jan. 4	.000	151	Apr. 17	.048	216	June 8	.004	190	July 11	.006	163
Jan. 11	.000	154	Apr. 23	.084	315	June 15	.024	167	July 18	.008	238
Jan. 24	.000	242	May 7	.036	185	June 23	.011	65	July 25	.028	145
Jan. 30	.000	220	May 14	.042	288	July 1	.042	172	Aug. 1	.044	325
Feb. 6	.000	158	May 19	.012	109	July 6	.069	580	Aug. 8	.188	302
Feb. 6	.000	158	May 26	.007	125	July 10	.078	320	Aug. 22	.037	384
Feb. 13	.010	141	June 2	.027	265	July 17	.008	143	Aug. 29	.024	173
Mar. 5	.010	180	June 11	.191	706	July 24	.063	353	Sept. 2	.053	687
Mar. 13	.000	141	June 18	.016	922	July 31	.004	528	Sept. 9	.029	285
Mar. 22	.000	127	July 2	.008	121	Aug. 4	.004	678	Sept. 16	.000	172
Apr. 13	.020	44.4	July 9	.028	209	Aug. 14	.061	1,160	Sept. 30	.390	1,520
Apr. 22	.020	212	July 23	.071	412	Aug. 21	.004	129	Oct. 14	.041	640
Apr. 29	.010	150	July 27	.125	828	Aug. 28	.012	195	Oct. 21	.022	367
May 6	.000	226	Aug. 6	.012	86	Sept. 3	.070	140	Oct. 28	.034	453
May 13	.000	87.4	Aug. 15	.128	1,220	Sept. 11	.003	106	Nov. 4	.014	325
June 10	.020	120	Aug. 27	.005	71	Sept. 18	.009	100	Nov. 11	.028	423
June 19	.030	115	Sept. 3	.071	338	Sept. 25	.058	580	Nov. 18	.018	300
July 16	.080	646	Sept. 12	.032	224	Oct. 2	.123	366	Nov. 25	.020	381
July 23	.090	336	Sept. 22	.005	173	Oct. 8	.032	286	Dec. 2	.006	307
Aug. 1	.160	795	Oct. 1	.003	209	Oct. 16	.000	155	Dec. 9	.010	350
Aug. 7	.080	462	Oct. 6	.068	466	Oct. 23	.000	168	Dec. 16	.009	285
Aug. 19	.030	2,100	Oct. 16	.000	420	Oct. 30	.000	306	Dec. 23	.021	468
Aug. 20	.040	2,460				Nov. 6	.000	200	Dec. 30	.199	276
Aug. 21	.120	1,110				Nov. 13	.000	346			

Summary

Years	Tons of Water	Suspended Silt		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Ac. Ft.
1928	359,005,000	179,502	.0500	123.6
1929	288,232,000	31,706	.0110	21.8
1930	255,909,000	128,978	.0504	88.8
1931	288,056,000	49,258	.0171	33.9
1932	287,334,000	113,497	.0395	78.2
Total	1,478,536,000	502,941		346.3
Average	295,707,000	100,588	.0340	69.3

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas
as Determined from Water Samples During 1932*

The gravimetric percentages of dry silt reported here were determined by the United States Department of Agriculture at Austin, Texas, from samples of Rio Grande water taken daily by the American Section of the International Boundary Commission. The samples were taken in small necked bottles at three points at the surface of the stream, viz: at the mid-point, and at each side, one sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy.

The daily figures were computed in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualizing and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.0143	.0206	.0308	.0256	.3432	.0212	.2232	.0308	1.2881	.5192	.0547	.0217
2	.0146	.0200	.0253	.0245	1.268	.0195	.4408	.0204	.4969	.5929	.0594	.0239
3	.0132	.0212	.0278	.0245	.0539	.0088	.4403	.0190	.3218	.2904	.0468	.0173
4	.0223	.0195	.0396	.0129	.0437	.0151	.2247	.0190	.7213	.3726	.0382	.0154
5	.0294	.0165	.0316	.0099	.0696	.6088	.1980	.0289	.4881	.3798	.0841	.0206
6	.0143	.0165	.0195	.0245	.0440	.0371	.1631	.0187	.7106	.4716	.0465	.0355
7	.0135	.0157	.0385	.0209	.0297	.0154	.1504	.0173	*.6176	.5459	.0553	.0272
8	.0143	.0165	.0261	.0190	.0187	.0311	.1837	.0143	.5247	1.1850	.0671	.0311
9	.0110	.0173	.0209	.0198	.0110	.0140	.2126	.0173	.3049	.5789	.0558	.0261
10	.0058	.0187	.0261	.0204	.0190	.0146	.2629	.0132	.4235	.4436	.0569	.0250
11	.0124	.0124	.0836	.0182	.3372	.0275	.3429	.0138	.3680	.4312	.0470	.0223
12	.0118	.0069	.0748	.0124	.6487	.0300	.3682	.0143	.4612	.3996	.0346	.0341
13	.0104	.0088	.0773	.0179	.5679	.0407	1.0931	.0129	.7571	.4194	.0404	.0212
14	.0088	.0107	.0657	.0173	.3118	.0550	.2527	.2046	1.0942	.3451	.0421	.0195
15	.0143	.0096	.0503	.0132	.3030	.0415	.1257	.4796	1.0046	.2585	.0451	.0190
16	.0091	.0080	.0429	.0063	.4868	*.0326	.0864	1.0406	.6790	.2112	.0396	.0143
17	.0228	.0066	.0382	.0169	.2808	.0236	.0927	1.1330	.8825	.1691	.0363	.0187
18	.0267	.0096	.0352	.0275	.1969	.0198	.0891	1.3714	.6641	.1719	.0253	.0154
19	.0242	.0195	.0294	.0165	.1881	.0168	.0770	1.7237	.5860	.1438	.0256	.0129
20	.0121	.0462	.0245	.0058	.1713	.0201	.1064	1.8447	.5478	.1375	.0451	.0113
21	.0143	.0396	.0192	.0107	.1103	.0256	.1295	1.4905	.3952	.1427	.0275	.0289
22	.0180	.0385	.0176	.0165	.0580	.0173	.1108	1.1547	.5673	.1235	.0220	.0234
23	.0217	.0382	.0165	.0102	.0602	.0132	.0957	.7708	.8044	.1174	.0399	.0270
24	.0242	.0682	.0102	.0082	.0448	.0198	.1367	1.0021	.6443	.1141	.0333	.0231
25	.0162	.0594	.0135	.0143	.0327	*.0170	.0965	.5783	.3121	.1114	.0256	.0396
26	.0214	.0275	.0154	.0113	.0278	.0143	.0646	.5569	*.4088	.0811	.0487	.0330
27	.0179	.0212	.0187	.6358	.0220	.0088	.0718	.3883	*.5056	.0756	.0443	.0630
28	.0088	.0099	.0107	.8151	.0140	.0096	.0484	.3663	.6022	.0679	.0446	.0509
29	.0151	.0033	.0094	.3421	.0074	.0082	.0385	.2904	.5123	.0795	.0297	.0231
30	.0099	.....	.0091	.1969	.0082	.0055	.0407	.2640	.5574	.0616	.0245	.0275
31	.0091	.....	.0170	.....	.0195	.....	*.0400	.2423	.....	.0773	.....	.0275

Tons of Suspended Silt Passing Roma in the Rio Grande During 1932

Months 1932	Tons of Water	Suspended Silt		
		Tons	Average Percent by Weight	Acre Feet at 1,452 Tons per Ac. Ft.
January.....	227,164,510	35,300	.0155	24.3
February.....	207,321,130	46,900	.0226	32.3
March.....	211,050,270	68,100	.0323	46.9
April.....	181,652,670	343,600	.1892	236.6
May.....	317,739,060	926,400	.2916	638
June.....	153,384,700	84,700	.0552	58.3
July.....	265,953,010	600,500	.2258	413.6
August.....	310,416,880	2,488,000	.8015	1,713
September.....	4,497,955,290	26,133,000	.5810	17,998
October.....	3,310,278,640	13,418,000	.4053	9,241
November.....	1,001,641,560	425,900	.0425	293
December.....	769,155,540	209,400	.0272	144
Yearly.....	11,453,713,260	44,779,800	.2241	30,840.0

*Estimated

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

From the records of the United States Reclamation Bureau, the following data are taken for Elephant Butte reservoir on the Rio Grande, and for the McMillan and Avalon reservoirs on the Pecos river, all in New Mexico. The data for Boquilla reservoir on the Rio Conchos in Chihuahua is taken from the records of the "Compania Agricola y de Fuerza Electrica del Rio Conchos, S. A." and that for Don Martin reservoir on the Rio Salado is from the records of the National Irrigation Commission of Mexico.

The monthly figures represent the number of acre feet of water in storage on the last day of each month, and the normals represent the averages for the period covered by the table.

Stored Water in Elephant Butte Reservoir in Thousands of Acre Feet

Month	1924	1925	1926	1927	1928	1929	1930	1931	1932	Total	Normal
Jan. 1	1,373										
Jan.	1,402										
Feb.	1,400	1,464	1,020	1,126	1,410	996	1,566	1,304	962	11,250	1,250
Mar.	1,381	1,392	1,031	1,083	1,379	962	1,556	1,294	1,038	11,116	1,235
Apr.	1,617	1,339	1,031	1,085	1,281	901	1,599	1,293	1,168	11,259	1,251
May	1,978	1,257	1,320	1,257	1,418	1,070	1,599	1,219	1,502	12,620	1,402
June	1,930	1,140	1,418	1,273	1,387	1,074	1,523	1,100	1,593	12,438	1,382
July	1,820	1,020	1,328	1,270	1,223	998	1,472	969	1,584	11,684	1,298
Aug.	1,641	945	1,198	1,198	1,106	1,155	1,389	877	1,485	10,994	1,221
Sept.	1,559	914	1,115	1,281	1,009	1,355	1,289	858	1,392	10,772	1,197
Oct.	1,520	952	1,098	1,347	979	1,461	1,259	888	1,379	10,863	1,207
Nov.	1,485	956	1,081	1,368	971	1,505	1,254	888	1,379	10,887	1,210
Dec.	1,472	983	1,098	1,384	979	1,541	1,273	924	1,395	11,049	1,228
Yearly Change	+99	-489	+115	+286	-405	+562	-268	-349	+471		

Stored Water in McMillan and Avalon Reservoirs in Acre Feet

Month	1924	1925	1926	1927	1928	1929	1930	1931	1932	Total	Normal
Jan. 1	46,000										
Jan.	45,000	21,150	49,000	50,600	27,200	49,000	43,100	51,500	45,300	382,150	42,460
Feb.	45,200	19,350	43,500	48,500	26,600	49,000	42,700	51,500	44,000	370,350	41,150
Mar.	42,300	16,600	43,700	39,500	20,700	41,400	33,900	40,400	40,700	319,500	35,500
Apr.	34,600	100	36,400	16,600	3,100	21,600	18,900	51,600	32,000	214,900	23,880
May	40,200	100	50,600	8,900	28,400	36,300	15,700	51,600	47,000	278,500	30,900
June	26,600	550	48,300	3,600	18,100	32,000	24,800	35,800	36,800	228,550	25,170
July	19,400	16,800	51,300	4,100	16,200	22,200	18,800	21,700	31,800	202,300	22,480
Aug.	2,050	49,600	33,100	21,700	27,900	19,300	10,900	41,300	13,800	219,650	24,410
Sept.	150	52,000	51,000	28,600	26,800	30,600	4,900	36,300	47,000	277,350	30,820
Oct.	4,650	51,000	50,000	25,000	48,500	41,000	52,000	44,200	47,000	363,350	40,370
Nov.	8,750	49,500	47,300	22,300	47,800	44,000	51,500	43,500	45,000	359,650	39,960
Dec.	15,100	48,000	50,400	24,300	47,300	46,500	51,500	49,300	45,000	377,400	41,930
Yearly Change	-30,900	+32,900	+2,400	-26,100	+23,000	-800	+5,000	-2,200	-300		

Stored Water in Boquilla Reservoir in Thousands of Acre Feet

Month	1924	1925	1926	1927	1928	1929	1930	1931	1932	Total	Normal
Jan. 1	2,136										
Jan.	2,092	1,816	1,994	1,947	1,445	835	131	389	212	10,861	1,207
Feb.	2,059	1,759	1,938	1,869	1,374	756	111	551	199	10,616	1,180
Mar.	2,007	1,698	1,878	1,780	1,285	675	103	524	169	10,119	1,124
Apr.	1,970	1,624	1,804	1,682	1,192	594	79	467	122	9,534	1,059
May	1,909	1,550	1,711	1,577	1,096	505	57	396	83	8,884	987
June	1,832	1,589	1,620	1,474	999	419	54	316	59	8,362	929
July	1,863	1,950	1,587	1,403	983	361	145	286	139	8,672	964
Aug.	1,859	2,152	2,035	1,429	1,078	351	319	413	538	10,174	1,130
Sept.	1,970	2,124	2,101	1,467	1,156	327	298	383	1,281	11,107	1,234
Oct.	1,962	2,112	2,100	1,416	1,086	263	313	348	1,564	11,194	1,244
Nov.	1,984	2,062	2,042	1,332	997	216	331	289	1,527	10,730	1,192
Dec.	1,881	2,007	2,019	1,451	914	169	346	253	1,573	10,613	1,179
Yearly Change	-255	+126	+12	-568	-537	-745	+177	-93	+1,320		

Stored Water in Don Martin Reservoir in Acre Feet — Storage of water in this reservoir began in 1930

Month	1930	1931	1932	Total	Normal
Jan.		672,900		1,528,200	764,100
Feb.		745,900		1,578,500	789,250
Mar.	0	778,300		1,585,000	792,500
April	14,600	786,400		1,585,800	528,600
May	36,500	798,500		1,589,000	529,670
June	208,400	865,800		1,775,500	591,830
July	283,700	934,700		1,862,900	620,970
Aug.	287,800	956,600		1,864,600	621,530
Sept.	280,500	832,300		1,163,400	792,070
Oct.	393,200	901,500		1,161,700	818,800
Nov.	555,300	873,900		1,155,300	861,500
Dec.	624,200	873,100		1,102,600	866,630
Yearly Change		+624,200	+248,900	+229,500	