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WATER BULLETIN NUMBER 9

Flow of the Rio Grande and Tributary Contributions

From San Marcial, New Mexico
to the Gulf of Mexico

1939

WITH MAXIMUMS, MINIMUMS, AND NORMALS

STORAGE CAPACITIES AND WATER STORED IN LARGE RESERVOIRS
HYDROLOGIC BALANCE SHEET
RUN-OFF TRENDS SINCE 1871 AND FLOWS AND DROUGHTS SINCE 1830
ON THE DEVILS RIVER
SOURCES OF RIVER FLOW
DIVERSIONS
SILT, CHEMICAL CONSTITUENTS, SALT BURDEN
BACTERIA AND DISSOLVED OXYGEN
FLOODS
RAINFALL AND EVAPORATION
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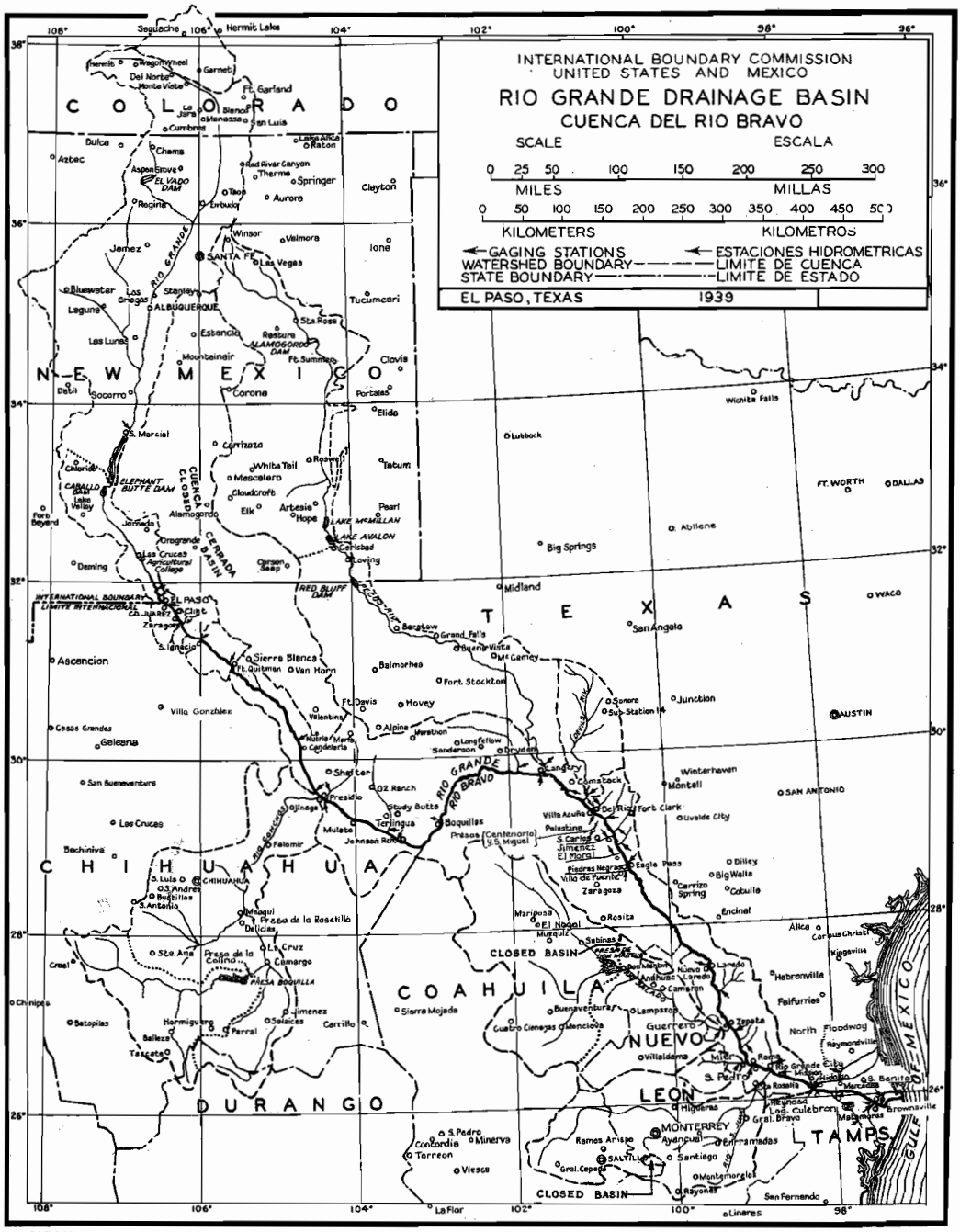


RIO GRANDE DRAINAGE BASIN

CUENCA DEL RIO BRAVO

FOREWORD

This compilation of stream discharges and related data is the ninth unified publication relative to the cooperative determination of the flow of the International portion of the Rio Grande. The first such publication was Water Bulletin No. 1, covering the year 1931. These data are published jointly by the United States and Mexican Sections of the International Boundary Commission and represent the results of stream flow and related measurements made on the Rio Grande and on important 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 1939 as well as adjustments to and authentications of hydrographic records.

International stream gaging was begun in 1889, 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 and 1920. 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. On January 1, 1935, an International Water Commissioner for Mexico was again appointed and since then, though separated, the two Commissions function as one.

This cooperative arrangement for obtaining hydrologic 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 Juarez, Laredo, and Matamoros, were operated in 1939 by the Mexican Section of the Commission, the others by the United States Section. During 1939 the Mexican Section also took over from the United States Section the operation of the Eagle Pass and the Roma gaging stations. Each section operated the gaging stations on tributaries entering the Rio Grande from its own country, or on floodways or diversions within its borders.

Acknowledgments

Some of the data published herein relative to drainage basin and irrigated areas, chemical and bacteriological analyses, silt, stored water, evaporation and rainfall have been furnished by the following agencies within the two countries; United States Department of Agriculture, United States Bureau of Reclamation, United States Army, Agricultural and Mechanical College of Texas, Middle Rio Grande Conservancy District, Pecos Joint Investigation, El Paso City-County Health Unit, the Department of Water and Sewage of the City of El Paso, Federal Board of Public Improvements of Nuevo Laredo, Tamaulipas, National Irrigation Commission of Mexico, Cia. Agricola y de Fuerza Electrica Del Rio Conchos, S. A., the Mexican Department of Agriculture and Development, National Bank of Agricultural Credit of Mexico, The Meteorological Service of Mexico, and private individuals. Specific acknowledgment is made where the data appear.

General Hydrologic Conditions for 1939

Along and Adjacent to The International Portion of the Rio Grande

For 1939 the yearly flow of the Rio Grande and most of its tributaries was below normal. It approached very close to the low year of 1934. In fact, the total tributary inflow from Langtry to Eagle Pass was less than in 1934. After receiving the contributions of all tributaries, the flow at Rio Grande City was only 62.7% of the 1924-1939 normal flow. The lowest flow for the year at this point was 1,250 second feet on June 22. The July flow here was the lowest for the past 16 years as it was at Zapata, also on the Rio Salado, the Escondido, and Goodenough Spring. New 1924-1939 minimum monthly flows were established at Matamoros for April, November and December. For the period since the Lower Brownsville gaging station was established in 1934, new monthly lows were established this year for April, July, November and December.

The measured United States tributaries below Fort Quitman flowed about 659,000 acre feet, or 43% of their annual average, while the Mexican measured tributaries flowed about 1,074,000 acre feet, or 39% of their annual average.

During 1939 three flood peaks occurred at Rio Grande City, the first on May 6 with a peak flow of 42,400 second feet. It came from the San Juan and from along the Rio Grande below Laredo. The second occured on May 14 with a peak flow of 49,500 second feet. It came partly out of the San Juan and was contributed to by the area along the Rio Grande below Del Rio. The third occurred October 12 with a peak flow of 73,100 second feet. It came largely from the Rio San Juan, and was likewise contributed to by the Rio Grande below Del Rio.

The monthly average amount of water in storage in all large reservoirs on the Rio Grande basin was about 3,119,000 acre feet, which was about normal. On the United States side this storage was 1,360,000 acre feet or 94% of normal, while on the Mexican side this storage was 1,759,000 acre feet or 102% of normal. On the United States side the mean monthly amount of water in storage was 42% of the normal storage capacity, and on the Mexican side 54% of the storage capacity was similarly occupied.

FOREWORD —continued

The amount of water consumed in irrigation increased slightly in the El Paso-Juarez Valley. Along the Rio Grande from Fort Quitman to Upper Presidio on the United States side consumption was about 83% of the 1938 figure, while on the Mexican side consumption was about 118%. On the Rio Conchos, consumption was about 112% greater than in 1938 and 162% of 1924 to 1939 normal. In the Presidio Valley the consumption decreased slightly. On the Pecos below Red Bluff Dam consumption was slightly less than in 1938. Near Eagle Pass on the United States side the consumption in 1939 increased 30% over 1938 and 90% over the 1924 to 1939 normal. On the Rio Salado, consumption was about the same as in 1938 and 16% of the 1924 to 1939 normal consumption due to water shortage. In the Lower Rio Grande Valley on the United States side consumption was about 125% of 1938 and 137% of the 1922 to 1939 normal. In 1939 water was diverted for the new Willacy District in the Lower Rio Grande Valley on the United States side and through the new Retamal Canal on the Mexican side. At other places along the Rio Grande and its tributaries below Fort Quitman, there was little change in the amount of water consumed in irrigation.

Precipitation was subnormal for the year in the entire basin below Fort Quitman.

At San Marcial, New Mexico, 2,460 acre feet of suspended silt passed down the Rio Grande. This was 21% of normal. At Eagle Pass the suspended silt passing was 2,820 acre feet which was 32% of average. At Roma the suspended silt was about 6,030 acre feet or 50% of normal.

The tonnage of salts for the year carried by the Rio Grande at various gaging stations and the tributary contributions of salts was in general below the average. There was a general increase in the salt concentration in the water. This increase was greatest on the Rio Grande at Fort Quitman, La Nutria and Upper Presidio stations and on the Pecos River.

At El Paso and at the Ysleta-Zaragoza bridge the Rio Grande water contained less total bacteria than average as was also the case at Nuevo Laredo. There were less than average B. Coli in the water at El Paso and at Nuevo Laredo and more than average at the Ysleta-Zaragoza bridge.

Quantity of Water

There are here shown for the year 1939: Descriptions of gaging stations and their equipment with pertinent notes concerning elevations of gages, station records, high and low flows in previous years, and factors modifying the stream discharge; also the mean daily discharges at points along the Rio Grande and the mean daily inflows from measured tributaries.

Extreme monthly high and low gage heights and peak discharges; also average monthly rates of discharge for each regular station.

The flow of the Rio Conchos was not measured directly, but its monthly flow is shown.

There are also shown: Monthly and annual maximum, minimum and normal discharges in acre feet for the period 1924 to 1939, inclusive, for each gaging station.

The amount of water in storage at the end of each month of 1939 in all large reservoirs of the Rio Grande basin, as well as monthly and annual averages, maximums and minimums.

A hydrologic balance sheet covering a major portion of the Rio Grande Basin.

A graphical presentation of indicated run-off trends on the Devils River as well as magnitude-duration-frequency curves showing flows and droughts on Devils River.

Sources of River Flow

Three maps are presented for the period 1924 to 1939. For sub-divisions of the watershed they show in average annual acre feet per square mile: (a) the unused stream flow, (b) the total watershed yield and (c) the total watershed yield less the estimated deep spring flow.

By graph there is shown progressively from station to station downstream, the normal flow for the two periods 1900 to 1913 and 1924 to 1939, and also the maximum and minimum flows. On this graph there is also shown normal unused run-off per square mile for various sub-divisions of the Rio Grande basin below Fort Quitman.

FOREWORD — continued

Diversions

For the Acequia Madre (Mexican Canal) near Juarez, Chihuahua, the El Paso Valley above Fort Quitman, Texas, the Maverick Canal near Eagle Pass, Texas, for Hidalgo, Cameron and Willacy Counties, Texas, and for the Retamal Canal in Tamaulipas, tabulations covering the year 1939 show the amount of water diverted from the Rio Grande, the average acreage of land irrigated, the average duty of water, and the average annual rainfall. The diversions into the American Canal at El Paso, Texas, are also shown.

Quality of Water

With reference to the probable life of storage reservoirs on the Rio Grande, there is shown the results of silt sampling at 3 points on the Rio Grande and on two tributaries.

Showing the suitability of the water of the Rio Grande and tributaries for irrigation use, there is recorded detailed chemical analyses of water samples from nine important points on the Rio Grande and from four tributaries in 1939, and also a graphical representation of the salt burden in tons, its sources and its concentration in the stream flow for 1939 and five year averages for 1935 to 1939.

With reference to the use of Rio Grande water for domestic, recreational, municipal or industrial purposes, there is shown the results of bacteriological examinations of water samples at Nuevo Laredo, Tamaulipas, and in the vicinity of El Paso, Texas. The results of tests for dissolved oxygen in Rio Grande water, near El Paso, are also shown.

Floods

The average frequency of floods of different peak flows is shown for the Rio Grande at Langtry for the past 75 years, for Lozier Creek near Langtry for the past 40 years, for the Pecos River near Comstock for the past 40 years, and for the Devils River near Del Rio for the past 109 years. Some data are also given on flood peaks at Lower Presidio.

Evaporation and Rainfall

For its pertinent relation to floods, irrigation and losses from reservoirs there is brought together here from numerous sources, evaporation observations at points on both sides of the basin; also rainfall records, not published elsewhere, from the United States side for 1939 and previous years, and many rainfall records from the Mexican side of the basin for 1939 and previous years.

Drainage Basin and Irrigated Areas

From the most reliable sources available there has been determined the drainage basin area above each gaging station as well as the areas irrigated below San Marcial, New Mexico, and below the Red Bluff Dam on the Pecos River. Because of new information some revisions appear in this table for drainage basin areas. On the Pecos River the office of the Pecos River Joint Investigation has supplied new data.

Authenticated Discharges and Related Records

For convenience and completeness there have been brought together and tabulated the publications in which may be found discharge records of the Rio Grande and its tributary inflows below San Marcial, New Mexico which have been authenticated by this Commission.

Also tabulated here are references to all Water Bulletins in which have been published data concerning water in storage in large reservoirs of the Rio Grande Basin, sources of river flow, diversions, chemical analyses, silt sampling, sanitary assays of water samples, floods, evaporation and rainfall.

Index

There is presented an index to all Water Bulletins and the data therein.

RIO GRANDE AT SAN MARCIAL STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car and winch located at railroad bridge about one mile below San Marcial, New Mexico. The recorder is on the upstream end of the first bridge pier from the south abutment of the bridge. The zero of its gage is 4,455.38 feet, United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 162 meter measurements, by wading, and from cable about 1,000 feet above railroad bridge (128 measurements by I.B.C. and 34 by U.S.G.S.). Computations by shifting channel methods. 1939 records good. Records available: January 1895 to December 1939.

REMARKS: For gage history 1895 to 1938 see Water Bulletins Nos. 4, 7 and 8. During 1939 the river continued to flow through the Val Verde area. See Water Bulletin No. 7.

El Vado reservoir on the Rio Chama in New Mexico and many irrigation diversions above this station in Colorado and New Mexico modify the river flow.

COMPARATIVE FLOWS FROM PREVIOUS RECORDS: Momentary peak: Max., Oct. 11, 1904, 50,000 sec. ft. with water surface level of 4,459.5 ft. on U.S.C. & G.S. datum about .25 mile above the present station gage. This is the greatest flood peak flow in at least the past 111 years, or since 1828. Min., sometimes dry. See Water Bulletin No. 6, page 79, for all large peak flows since 1828 and their average frequency. Daily: Max., Oct. 11, 1904, 33,000 sec. ft. average. Min., somstimes dry. Monthly: Max., May, 1905, 15,649 sec. ft. average. Min., sometimes dry. Yearly: Max., 1905, 3,350 sec. ft. average. Min., 1902, 277 sec. ft. average. Two Successive Years: Max., 1905 and 1906, 2,750 sec. ft. average. Min.,1899 and 1900, 487 sec. ft. average. Three Successive Years: Max., 1905 to 1907, 2,830 sec. ft. average. Min., 1900 to 1902, 609 sec. ft. average. Four Successive Years: Max., 1905 to 1908, 2,390 sec. ft. average. Min., 1899 to 1902, 539 sec. ft. average. Five Successive Years: Max., 1905 to 1909, 2,260 sec. ft. average. Min., 1898 to 1902, 697 sec. ft. average. Ten Successive Years: Max., 1903 to 1912, 1,980 sec. ft. average. Min., 1925 to 1934, 1,170 sec. ft. average. Forty-Four Year Average: 1,550 sec. ft.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	737	822	723	3,530	1,280	385	3.9	1,520	148	83.4	117	396
2	770	794	772	3,110	1,990	279	11.1	693	96.3	74.9	111	614
3	812	740	754	2,990	1,450	197	10.0	1,210	59.2	73.5	131	637
4	811	864	724	2,970	1,860	139	14.8	1,070	29.2	73.8	113	558
5	780	1,000	715	2,990	1,840	123	17.0	2,060	29.0	90.1	99.2	516
6	757	879	700	3,930	1,790	151	157	2,180	28.8	123	106	520
7	806	769	642	4,380	1,780	89.8	313	863	26.4	184	112	472
8	981	728	679	4,690	1,660	65.0	192	555	23.4	974	121	466
9	1,090	825	650	4,240	1,780	49.2	106	415	17.4	1,410	119	503
10	1,050	759	534	3,990	1,380	39.1	68.0	406	15.6	948	120	515
11	1,140	780	841	3,300	1,130	37.8	40.5	229	79.3	764	113	529
12	1,060	964	1,320	2,480	921	35.6	31.9	145	112	539	98.6	550
13	884	866	1,350	2,300	806	28.7	23.3	90.0	255	457	106	510
14	833	727	1,380	1,860	924	26.5	20.6	67.4	348	371	106	516
15	808	652	1,230	1,790	1,180	19.2	18.1	49.8	455	314	144	559
16	727	688	1,390	1,710	1,710	17.1	18.8	42.3	2,220*	277	142	564
17	699	647	1,620	1,740	1,290	13.3	18.8	42.5	1,590	253	143	581
18	769	769	1,770	1,730	988	12.0	80.5	28.1	643	250	136	569
19	756	737	1,640	1,260	837	8.3	345	21.9	664	246	128	495
20	750	756	1,930	1,060	674	5.6	167	16.2	475	220	127	481
21	763	666	2,600	841	551	2.8	103	13.2	386	192	133	479
22	721	658	2,920	689	466	3.9	46.3	12.3	246	165	135	471
23	794	668	2,700	615	563	3.4	23.3	234	184	155	156	550
24	877	731	3,200	670	545	4.0	20.0	287	144	158	147	597
25	886	665	3,620	1,410	277	4.0	19:2	106	133	155	159	565*
26	922	637	3,600	1,090	243	2.5	19.2	85.6	119	159	164	593*
27	833	615	3,840	838	225	2.1	19.3	87.6	128	145	172	585*
28	732	664	3,960	863*	230	1.3	29.9	160	165	126	217	573
29	743		4,360	1,150	286	.8	869	226	131	124	255	539*
30	706		4,090	1,170	236	1.3	1,610	219	103	116	297	561
31	761		3,710		350		2,200	174		108		611
Sum	25,758	21,070	59,964	65,386	31,242	1,747.3	6,616.5	13,308.9	9,053.6	9,328.7	4,227.8	16,675

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.83	.66	11	1,200	16	400	831	51,100	42,628	56,000	17,400
Feb.	1.93	.48	12	1,310	17	328	752	41,800	46,983	77,100	29,600
Mar.	4.48	.51	29	4,460	10	335	1,930	119,000	59,632	119,000	23,400
Apr.	4.67	.26	8	4,850	23	574	2,180	130,000	129,889	407,000	16,850
May	2.38	-.66	16	2,300	28	211	1,010	62,000	250,784	608,000	4,450
June	-.08	-1.85	1	443	29	.7	58.2	3,470	138,180	368,000	228
July	3.08	-1.80	31	2,620	1	2.0	213	13,100	52,593	157,140	0
Aug.	3.10	-1.68	5	3,620	22	12.3	429	26,400	49,192	275,000	1,620
Sept.	2.43	-1.77	16	3,180	11	12.5	302	18,000	59,214	308,000	2,920
Oct.	1.54	-1.40	9	1,810	3	62.9	301	18,500	34,313	123,000	0
Nov.	-.42	-1.30	30	341	12	83.0	141	8,390	28,908	76,200	2,550
Dec.	-.41	-.16	30	768	22	420	538	33,100	40,536	58,400	15,100
Yearly	4.67	-1.85		4,850		.7	725	524,860	932,852	1,557,800	244,489

* Partly Estimated

RIO GRANDE AT BELOW ELEPHANT BUTTE DAM STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car with winch. Prior to January 17, 1939 the recorder was located at the south side of the pool immediately below the dam. The cable was .75 mile below this recorder. Zero of this gage was elevation 4,255.10 feet on United States Coast and Geodetic Survey sea level datum. On January 17, 1939 a temporary water-stage recorder was established 1900 feet below the dam with zero of the gage at elevation 4,242.24. On March 29, 1939 the zero of this gage was changed to elevation 4,240.94 on the above mentioned sea level datum.

RECORDS: Based upon 62 meter measurements during the year and a stable rating curve. Records available: 1915 to 1939. 1939 records good. Records furnished by the El Paso Office of the United States Bureau of Reclamation.

REMARKS: The station described here is operated by the Reclamation Bureau. It has been the official station since 1931. Prior to 1931 it was located at other points a little farther downstream. See United States Geological Survey Water Supply Papers. The river flow at this station is completely modified by irrigation diversions in Colorado and New Mexico, and by Elephant Butte and El Vado reservoirs. Elephant Butte Dam is 43.9 river miles downstream from the San Marcial gaging station at the upper end of Elephant Butte Reservoir.

PREVIOUS EXTREME FLOWS: The greatest mean daily flow to pass Elephant Butte Dam (since storage began on January 6, 1915) occurred June 4, 1915 when the flow was 7,500 second feet. The minimum flow sometimes reaches zero.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	14.0	16.4	17.7	1,140	2,390	514	2,030	2,260	2,190	2,410	15.0	15.7
2	13.2	16.0	17.6	2,110	2,390	1,090	2,000	1,860	2,190	2,400	15.0	15.6
3	14.0	15.6	17.6	2,110	2,240	1,570	2,000	648	2,190	2,400	15.0	15.5
4	14.0	16.3	17.5	2,010	1,840	1,570	1,990	2,260	2,190	2,390	14.3	15.7
5	14.0	17.0	17.4	2,040	1,810	1,570	1,990	2,260	2,190	2,390	14.3	15.5
6	14.0	17.7	17.4	2,040	1,810	1,730	1,990	2,260	2,190	2,370	14.3	15.3
7	304	17.7	17.4	2,190	1,810	1,980	1,980	291	2,190	2,360	13.5	15.2
8	1,670	17.7	17.4	2,420	1,810	1,980	2,080	2,050	2,190	2,350	14.0	15.1
9	2,490	17.7	17.4	2,420	1,810	2,000	2,210	2,260	2,180	2,350	14.5	15.1
10	2,890	17.7	17.4	1,660	1,810	2,050	2,210	2,250	2,180	2,350	14.5	15.1
11	2,900	17.7	17.3	1,770	1,810	2,050	2,200	2,250	2,180	1,170	14.5	15.1
12	2,880	17.7	17.3	2,420	1,810	2,050	2,200	2,250	2,170	36.0	14.5	15.1
13	2,880	17.7	17.3	2,420	1,310	2,040	2,190	2,250	2,170	19.0	15.8	15.3
14	2,880	17.7	17.3	2,420	1,620	2,070	2,250	2,240	2,170	17.8	15.8	16.0
15	1,000	17.7	17.3	2,420	1,620	2,190	2,300	2,240	2,170	17.5	15.2	15.5
16	12.3	17.7	17.3	2,420	1,220	2,250	2,290	2,240	2,160	17.2	14.5	15.8
17	16.5	17.7	17.2	2,420	921	2,260	2,290	2,230	2,160	16.9	15.7	16.1
18	16.5	17.7	17.2	2,420	1,630	2,250	2,290	2,230	2,160	16.6	14.7	14.6
19	16.5	17.7	17.2	2,420	1,630	2,250	2,290	2,230	2,160	16.0	14.7	14.8
20	16.5	17.7	17.1	2,420	1,630	2,240	2,280	2,220	2,160	15.5	14.7	15.2
21	16.5	17.7	17.1	2,420	1,630	2,220	2,290	2,220	2,160	16.0	14.6	15.4
22	14.8	17.7	17.0	2,420	1,550	2,210	2,290	2,220	2,160	16.4	14.5	15.7
23	15.4	17.7	17.0	2,410	1,160	2,210	2,290	2,220	2,150	16.9	14.5	14.2
24	15.4	17.7	16.9	2,410	908	2,170	2,290	2,220	2,150	17.3	15.3	11.3
25	16.0	17.7	16.8	2,410	1,440	2,100	2,290	2,220	2,150	17.8	14.4	12.8
26	16.5	17.7	17.1	1,760	1,430	2,080	2,290	2,220	2,140	18.3	14.9	14.5
27	* 16.0	17.7	17.4	2,030	1,240	2,070	2,290	2,210	2,140	18.8	15.6	14.6
28	* 16.4	17.7	17.7	2,390	391	2,070	2,280	2,210	1,640	18.8	16.0	14.8
29	* 16.8		18.0	2,010	391	2,070	2,290	2,210	2,420	18.8	15.8	14.9
30	* 17.2		18.4	2,390	391	2,070	1,920	2,200	2,410	18.8	15.6	13.2
31	* 17.0		247.0		391		1,670	2,200		18.8		13.0
Sum	20,233.5	488.4	767.7	66,340	45,843	58,974	67,250	65,129	65,060	25,309.2	445.7	461.7

Month	Extreme Gage Feet — 1939		@Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total	Period 1924-1939		
	High	Low	Day		Day			1939	Normal	Maximum	Minimum
Jan.			11	2,900	16	12.3	653	40,100	4,929	40,100	184
Feb.			‡ 6	17.7	3	15.6	17.4	969	27,509	57,500	969
Mar.			31	247	25	16.8	24.8	1,520	62,539	88,500	1,520
Apr.			‡ 8	2,420	1	1,140	2,210	132,000	114,206	136,000	84,400
May			‡ 1	2,390	‡28	391	1,480	90,900	106,000	155,000	78,500
June			17	2,260	1	514	1,970	117,000	121,250	146,000	101,000
July			15	2,300	31	1,670	2,170	133,000	124,362	137,000	97,800
Aug.			‡ 1	2,260	7	291	2,100	129,000	123,350	162,000	78,700
Sept.			29	2,420	28	1,640	2,170	129,000	74,612	129,000	24,900
Oct.			1	2,410	20	15.5	816	50,200	18,471	50,200	506
Nov.			28	16.0	7	13.5	14.9	884	13,146	39,300	884
Dec.			17	16.1	24	11.3	14.9	916	13,189	68,700	916
Yearly				2,900		11.3	1,140	825,489	803,563	1,003,484	637,534

* Partly Estimated. ‡ And other days. @ Mean Daily.

RIO GRANDE AT BELOW CABALLO DAM STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car and winch located .75 river mile below Caballo Dam. Elevation of zero of the gage was 4,147.03 feet from February 26 to October 7, 1938 when it was changed to 4,146.03 feet. On October 13, 1938 it was again changed to 4,145.03 feet. All elevations are on United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 192 meter measurements during the year. Records available: February 26, 1938 to December 31, 1939. 1939 records good. Records furnished by the El Paso Office of the United States Bureau of Reclamation.

REMARKS: This gaging station was installed by the Bureau of Reclamation on the Rio Grande on February 26, 1938 to measure the flow from the Caballo reservoir. Caballo Dam is located on the Rio Grande 26.7 river miles below Elephant Butte Dam. The river flow here is completely modified by reservoirs and irrigation diversions above this station. This station is about 1.5 miles upstream from Percha Dam (a low diversion dam) at which point records have been kept in past years. Small accretions to the river take place between this station and Percha Dam. 1,653 acre feet of water, not accounted for in the tables below, were diverted from Caballo reservoir into a small irrigation canal (Bonito Lateral) just below the dam.

PREVIOUS EXTREME FLOWS: The greatest mean daily flow to pass Caballo Dam (since storage began February 8, 1938) occurred August 6 and 7, 1938 when the discharge was 2,430 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	4	755	2,100	1,470	1,740	1,950	1,650	2,450	1,030	37.5	31.2
2	1.9	4	750	2,010	1,460	1,820	1,920	1,740	2,160	1,060	29.7	31.3
3	2.1	3	848	1,990	1,510	1,950	1,790	1,830	2,190	1,070	25.1	31.5
4	2.3	3	1,030	1,930	1,510	1,960	2,040	1,770	2,110	684	25.1	31.6
5	2.5	3	994	1,920	1,470	1,930	1,970	1,770	2,010	316	25.1	31.6
6	2.6	704	966	1,850	1,650	1,900	1,930	1,800	1,940	114	25.1	31.6
7	2.7	1,050	997	1,820	1,710	1,860	1,920	1,620	1,860	93	25.1	31.6
8	3.0	974	894	1,940	1,690	1,830	2,110	1,530	1,840	90	26.0	31.6
9	3.0	715	862	1,980	1,640	1,900	2,240	1,690	1,790	86	26.0	31.6
10	3.0	524	779	1,940	1,640	2,010	2,180	1,790	1,750	106	296	31.6
11	2.5	519	926	1,850	1,630	2,070	2,110	1,800	1,740	106	987	31.6
12	2.9	730	1,010	1,780	1,670	2,070	2,190	1,950	1,730	88	965	57.3
13	2.7	876	1,010	1,790	1,670	2,060	2,280	1,980	1,580	68.2	849	29.0
14	2.2	816	1,040	1,780	1,710	2,120	2,300	1,950	1,140	68	800	668
15	2.5	822	1,160	1,760	1,700	2,220	2,240	1,760	668	68	392	920
16	3.5	785	1,250	1,740	1,700	2,180	2,240	1,770	434	75.9	82.0	837
17	3.6	443	1,460	1,830	1,650	2,250	2,240	1,750	406	907	56.0	707
18	4.2	201	1,630	1,820	1,610	2,250	2,240	1,800	454	855	31.5	559
19	4.1	156	1,560	1,760	1,580	2,250	2,100	2,030	542	831	31.5	188
20	4.6	80	1,500	1,730	1,690	2,230	2,090	2,030	835	739	31.5	9.0
21	4.6	3	1,530	1,640	1,760	2,180	2,200	1,970	760	591	31.4	4.3
22	4.4	3	1,540	1,610	1,760	2,160	2,200	1,990	749	247	31.3	4.3
23	4.3	3	1,390	1,710	1,800	2,070	2,220	2,030	965	84	31.1	4.3
24	3.9	3	1,330	1,680	1,930	2,050	2,200	2,030	941	83	30.9	4.3
25	3.8	3	1,440	1,630	1,930	2,040	2,150	2,000	892	60	30.8	4.3
26	3.7	3	1,490	1,610	1,930	2,040	2,040	2,080	861	43	30.7	3.7
27	4.1	2	1,450	1,610	1,910	2,010	1,970	2,160	951	35.4	30.7	3.7
28	4.5	668	1,450	1,520	1,980	1,990	1,970	2,160	987	35.8	30.8	3.7
29	3.9		1,760	1,480	1,950	1,950	1,940	2,280	987	36.2	30.9	3.7
30	3.9		1,750	1,480	1,840	1,950	1,880	2,490	987	36.6	31.0	3.6
31	4.2		1,790		1,780		1,730	2,340		37.0		3.4
Sum	103.0	10,100	38,341	53,290	52,930	61,040	64,580	59,540	38,709	9,744.1	5,075.8	4,364.4

Month	Extreme Gage Feet — 1939 High	Extreme Gage Feet — 1939 Low	Extreme Second Feet — 1939 High Day	High	Low Day	Low	Average Second Feet 1939	Acre Feet Total 1939	Acre Feet Period 1938-1939 Average	Maximum	Minimum
Jan.			‡20	4.6	1	1.8	3.3	204	1,642	3,080	204
Feb.			7	1,050	27	2.0	361	20,000	21,100	22,200	20,000
Mar.			31	1,790	2	750	1,240	76,000	74,900	76,000	73,800
Apr.			1	2,100	‡29	1,480	1,780	106,000	111,000	116,000	106,000
May			28	1,980	2	1,460	1,710	105,000	109,000	113,000	105,000
June			‡17	2,250	1	1,740	2,030	121,000	121,000	121,000	121,000
July			14	2,300	31	1,730	2,080	128,000	118,500	128,000	109,000
Aug.			30	2,490	8	1,530	1,920	118,000	124,500	131,000	118,000
Sept.			1	2,450	17	406	1,290	76,800	60,300	76,800	43,800
Oct.			3	1,070	27	35.4	314	19,300	22,700	26,100	19,300
Nov.			11	987	‡ 3	25.1	169	10,100	11,100	12,100	10,100
Dec.			15	920	31	3.4	141	8,660	8,990	9,320	8,660
Yearly				2,490		1.8	1,090	789,064	784,732	789,064	780,400

‡ And other days. ⊕ Mean Daily

RIO GRANDE AT EL PASO STATION

DESCRIPTION: Staff gage and cable with sit down cable car and winch located in the pass opposite Courchesne quarry, 4 miles northwest of El Paso, Texas and 5 miles northwest of Cd. Juarez, Chihuahua and .9 river miles above the American Dam. Zero of gage is 3,720.51 feet above U.S.C. and G.S. mean sea level datum. Also water-stage recorder 1 mile farther upstream with zero of its gage 3,722.52 feet on the above mentioned datum. This later gage has been the official gage since August 3, 1938.

RECORDS: At high flows the record was based upon meter measurements made here during the year and computations by shifting channel methods. At flows below about 1,500 second feet, the record is based upon the record of flows into the American Canal at the American Dam and flows passing the American Dam in the Rio Grande. 1939 records good. Records available: 1889 to 1939, inclusive.

REMARKS: El Vado reservoir on the Rio Chama, Elephant Butte, and Caballo reservoirs on the Rio Grande, also many irrigation diversions in Colorado and New Mexico, completely modify the river flow.

COMPARATIVE FLOWS FROM PREVIOUS RECORDS: Momentary Peak: Max., June 12, 1905, 24,000 sec. ft., with 6.0 ft. stage (lower gage). This is the greatest peak flow in the past 111 years or since 1828, or possibly longer. Min., sometimes dry. Daily: Max., June 12, 1905, 23,680 sec. ft. average. Min., sometimes dry. Monthly: Max., June 1905, 14,300 sec. ft. average. Min., sometimes dry. Yearly: Max., 1905, 2,780 sec. ft. average. Min., 1902, 70.1 sec. ft. average. Two Successive Years: Max., 1905 and 1906, 2,160 sec. ft. average. Min., 1899 and 1900, 168 sec. ft. average. Three Successive Years: Max., 1905 to 1907, 2,280 sec. ft. average. Min., 1900 to 1902, 269 sec. ft. average. Four Successive Years: Max., 1904 to 1907, 1,880 sec. ft. average. Min., 1899 to 1902, 227 sec. ft. average. Five Successive Years: Max., 1903 to 1907, 1,790 sec. ft. average. Min., 1898 to 1902, 669 sec. ft. average. Ten Successive Years: Max., 1903 to 1912, 1,560 sec. ft. average. Min., 1929 to 1938, 733 sec. ft. average. Fifty Years: Average 1,000 sec. ft. See Water Bulletin No. 6, p. 79, for all large peak flows since 1828 and their average frequency.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	203	* 126	183	801	918	1,020	1,040	1,350	1,190	571	307	265
2	199	* 127	171	853	921	936	1,020	1,320	1,220	552	296	257
3	195	* 132	221	1,100	909	896	1,090	1,180	1,410	523	289	252
4	192	135	372	945	785	960	1,190	1,180	1,350	504	285	249
5	190	132	404	964	900	1,240	1,360	1,990	1,230	531	269	249
6	192	130	474	938	819	1,090	1,190	1,520	1,240	583	295	252
7	192	134	534	1,100	890	1,080	1,090	1,380	1,120	641	289	252
8	202	137	490	899	1,080	1,030	1,010	1,500	1,030	616	264	232
9	186	229	486	799	1,020	1,000	970	1,190	1,010	502	240	222
10	190	583	521	995	1,000	966	996	1,030	1,010	457	258	232
11	193	506	494	996	937	1,020	1,220	1,040	1,030	421	258	230
12	195	333	472	923	926	1,080	1,100	1,280	1,010	435	261	215
13	191	309	458	855	955	1,010	1,050	1,240	1,130	426	257	222
14	181	288	501	790	956	959	1,050	1,340	1,210	426	426	212
15	168	346	503	902	1,000	972	2,000	1,580	1,930	418	469	192
16	154	408	498	989	984	965	1,030	*1,300	2,710	396	452	196
17	152	399	505	1,000	994	1,180	1,210	1,160	1,440	323	462	253
18	150	460	618	942	978	1,140	1,180	1,000	929	298	404	368
19	152	506	960	979	1,000	1,210	1,100	971	702	305	349	370
20	154	388	960	974	923	1,110	1,080	922	666	468	272	442
21	152	360	863	903	885	1,150	1,080	1,160	658	476	291	448
22	156	336	776	938	906	1,120	1,130	1,060	619	498	267	407
23	149	* 307	881	931	980	1,100	1,320	1,050	689	545	250	320
24	148	* 252	830	937	943	1,180	1,320	1,040	635	504	252	294
25	144	* 220	740	987	982	1,210	1,210	955	644	466	272	273
26	142	211	694	973	1,100	1,150	1,110	907	642	353	301	258
27	141	210	727	919	996	1,130	1,250	878	648	354	301	275
28	* 142	199	839	926	997	1,130	1,290	874	601	337	287	248
29	138		781	981	1,080	1,170	1,190	983	563	321	289	219
30	134		700	1,000	1,150	1,100	1,630	974	574	319	272	194
31	* 130		849		1,120		1,540	1,080		317		210
Sum	5,207	7,903	18,505	28,239	30,034	32,304	37,046	36,434	30,840	13,886	9,184	8,308

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	3.04	2.68	8	211	31	115	168	10,300	11,086	17,500	8,180
Feb.	3.98	2.68	10	639	5	120	282	15,700	20,597	48,500	8,800
Mar.	4.86	2.65	19	1,290	3	165	597	36,700	39,324	56,800	18,400
Apr.	4.90	4.19	3	1,170	9	758	941	56,000	63,201	91,000	44,900
May	4.86	4.26	30	1,160	6	647	969	59,600	67,816	122,000	47,600
June	5.02	4.44	4	1,380	2	837	1,080	64,100	70,359	98,200	56,200
July	6.13	4.63	15	3,610	18	850	1,200	73,500	81,481	111,000	69,900
Aug.	6.27	4.89	5	2,920	28	812	1,180	72,300	87,552	107,000	63,100
Sept.	6.69	4.26	16	3,710	29	545	1,030	61,200	63,900	87,400	48,000
Oct.	4.60	3.80	7	668	18	292	448	27,500	26,139	34,860	17,800
Nov.	4.20	3.58	14	479	12	235	306	18,200	18,411	29,500	11,400
Dec.	4.20	3.51	20	495	12	177	268	16,500	16,873	27,700	9,590
Yearly	6.69	2.65		3,710		115	707	511,600	566,739	810,200	459,910

* Partly Estimated.

RIO GRANDE AT BELOW AMERICAN DAM STATION

DESCRIPTION: Water-stage recorder at the lower side of the American Dam 2.1 miles above the Mexican Dam, near El Paso, Texas. Zero of the recorder gage is 3,712.30 feet. Prior to January 1, 1939, zero of gage was 3,722.30 feet. Also a staff gage 1,100 feet below the American Dam the zero of which is 3,716.28 feet. This has been the official gage since May 1, 1939. The above elevations are on U.S.C. & G.S.sea level datum. The American Dam is 1,197.6 river miles above the Gulf of Mexico.

RECORDS: Based upon 99 meter measurements at normal and low stages during the year, 94 by the United States and 5 by the Mexican Section and since May 1, 1939, staff gage read several times daily and more frequently during floods. Computations by shifting channel methods. High flows determined by subtracting the American Canal diversion from the Rio Grande flow at El Paso Station. 1939 records good. Records available: June 1, 1938 to December 31, 1939.

REMARKS: The operation of this station began June 2, 1938, when the American Dam first began operating. At this dam part of the flow passing the El Paso Gaging Station (see preceding page) was diverted into the new American Canal (see records of "Diversions From The Rio Grande" elsewhere herein) and the remainder, including excess flood flows, passed this gaging station. Reservoirs and diversions in the United States completely modify the river flow.

PREVIOUS EXTREME FLOWS: See other Water Bulletins, especially No. 6, pages 79-81 where a record is given of all large floods passing this point and their average frequency since 1828. The largest such flow was 24,000 second feet on June 12, 1905.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	δ202	δ 125	9.6	103	182	167	156	247	163	11.8	1.3	12.6
2	δ 198	δ 126	8.7	109	204	162	158	163	156	9.0	1.4	13.4
3	δ 194	δ 131	7.9	99.0	232	160	162	169	218	5.7	1.6	14.2
4	δ 191	δ 132	6.5	105	224	159	173	169	227	5.2	1.7	15.0
5	δ 189	δ 131	4.8	118	210	155	179	δ 856	158	4.4	1.8	14.7
6	δ 191	δ 129	39.1	119	193	153	179	δ 470	157	4.2	1.9	δ 130
7	δ 191	81.9	51.7	124	207	153	186	δ 240	154	4.3	2.0	¤ 250
8	δ 201	8.7	46.1	118	214	149	154	δ 320	153	4.3	2.1	¤ 230
9	δ 185	4.9	44.0	121	210	152	148	166	172	3.3	2.2	¤ 220
10	δ 189	5.2	45.4	115	214	159	144	168	δ 201	3.0	2.4	¤ 230
11	δ 192	24.4	45.1	113	219	159	148	159	172	2.7	2.5	228
12	δ 194	4.8	44.5	101	214	158	144	162	167	2.7	2.6	213
13	δ 190	4.1	42.4	102	222	160	144	159	165	2.5	2.7	¤ 220
14	δ 180	3.5	42.0	104	220	161	155	162	215	2.5	3.5	¤ 210
15	δ 167	3.3	38.9	110	224	162	δ 965	δ 460	δ 978	2.4	3.4	¤ 190
16	δ 153	3.2	35.8	106	222	167	δ 153	* 257	δ1,670	2.4	3.3	δ 72.0
17	δ 151	2.9	35.8	103	223	166	174	150	δ 627	2.6	3.2	20.6
18	δ 149	2.6	36.5	102	225	162	161	145	196	2.5	δ 184	16.5
19	δ 151	2.5	38.9	105	224	169	157	155	156	2.3	δ 347	12.4
20	δ 153	2.5	36.9	109	222	172	144	163	149	2.6	δ 270	11.7
21	δ 151	2.5	40.6	114	218	172	138	173	146	2.5	δ 289	10.9
22	δ 155	2.3	35.1	116	225	172	139	* 194	137	2.4	δ 265	10.2
23	δ 148	2.3	34.7	106	233	172	139	162	149	2.2	δ 248	9.5
24	δ 147	2.3	35.0	103	228	176	145	153	153	2.1	δ 250	8.7
25	δ 143	2.1	31.5	110	226	178	148	148	158	1.9	δ 276	δ 157
26	δ 141	2.1	33.5	99.4	224	177	146	154	166	1.7	δ 300	256
27	δ 140	6.5	34.9	91.0	222	172	144	157	169	1.3	δ 114	273
28	δ 141	11.6	35.3	92.5	229	170	152	159	166	1.2	10.2	246
29	δ 137		33.6	95.0	230	170	176	161	162	1.2	10.1	217
30	δ 133		33.1	92.8	231	162	δ 746	158	166	1.2	10.0	192
31	δ 129		32.9		225		δ 422	161		1.2		208
Sum	δ 5,176	960.2	1,040.8	3,205.7	6,796	4,926	6,479	6,720	7,826	99.3	2,612.9	3,912.4

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.			8	δ 210	31	δ 114	δ167	δ 10,300			
Feb.			5	δ 152	25	¤ 2.0	34.3	1,900			
Mar.			26	141	27	* 2.0	33.6	2,060			
Apr.			8	184	30	65.9	107	6,360			
May	* 3.25	2.90	3	256	2	163	219	13,500			
June	3.18	2.94	25	194	5	143	164	9,770	17,085	24,400	9,770
July	4.82	2.88	15	δ 2,120	23	127	209	12,900	15,600	18,300	12,900
Aug.	4.80	2.94	5	δ 1,526	18	132	217	13,300	10,640	13,300	7,980
Sept.	5.50	3.03	16	δ 2,670	22	133	261	15,500	16,500	17,500	15,500
Oct.	* 2.40	2.04	1	* 13.1	28	1.2	3.2	197	549	901	197
Nov.	3.44	2.00	26	#δ 300	1	#δ 1.3	87.1	5,180	4,820	5,180	4,460
Dec.	3.25	1.91	27	283	25	8.0	126	7,760	4,835	7,760	1,910
Yearly	5.50	1.91		δ 2,670		1.2	136	98,727			

δ Deduced. * Partly Estimated. ¤ Estimated. # Mean Daily Extreme

RIO GRANDE AT CD. JUAREZ STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights located 2.5 miles downstream from El Paso, Texas and Cd. Juarez, Chihuahua. This station is on the newly rectified channel of the Rio Grande, 7.0 river miles below the American Dam at El Paso, Texas and 4.9 river miles below the Mexican Dam. The zero of the gage is 3,687.26 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 173 meter measurements during the year, 170 by the Mexican and 3 by the United States Section. Computations by shifting channel methods. 1939 records good. Records available April 1, 1938 to December 31, 1939.

REMARKS: The operation of this station began April 1, 1938. Reservoirs in the United States as well as irrigation diversions in the United States and Mexico, completely modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest flow since April 1, 1938 occurred September 2, 1938 with a gage height of 9.74 feet and a flow of 5,010 second feet. The lowest flow since April 1, 1938 occurred December 6, 1938 with a gage height of 4.36 feet and a flow of 34.3 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	213	135	48.7	509	487	583	696	858	660	277	261	71.0
2	196	129	46.3	509	431	530	607	876	724	329	299	63.6
3	198	123	60.0	812	385	515	597	696	840	315	280	56.1
4	184	118	149	632	335	586	682	773	784	327	262	58.3
5	213	112	162	590	403	862	812	1,384	756	346	273	74.2
6	173	107	219	593	381	734	717	1,201	777	388	303	226
7	177	121	240	728	392	671	558	943	674	406	269	236
8	182	63.9	244	593	572	611	547	1,035	576	477	253	209
9	151	35.3	225	434	579	604	551	759	509	392	288	213
10	155	334	260	579	537	537	523	593	537	273	196	216
11	159	284	215	650	459	576	653	579	526	125	92.2	220
12	161	105	190	572	438	579	586	766	530	155	70.3	200
13	180	102	182	512	445	565	547	802	628	243	20.5	180
14	180	81.6	235	434	466	480	544	844	713	335	73.1	177
15	163	95.3	272	494	508	498	1,317	1,056	1,330	364	187	173
16	181	220	267	604	484	484	664	830	2,440	413	185	112
17	149	217	243	675	477	618	632	784	1,017	347	201	58.3
18	116	232	330	593	480	621	618	590	604	283	301	135
19	125	269	632	607	501	696	562	537	403	282	378	145
20	152	189	788	668	410	632	576	501	319	463	266	209
21	173	154	646	558	399	639	572	625	340	505	284	230
22	143	137	558	558	388	621	593	614	262	417	257	161
23	147	81.6	618	632	438	597	788	572	339	367	256	108
24	178	83.3	653	554	431	621	833	590	260	252	256	73.1
25	174	176	530	615	456	675	731	505	233	235	248	165
26	161	149	431	607	586	604	653	456	247	175	259	303
27	149	140	473	562	544	604	742	441	272	105	279	249
28	143	103	586	579	523	604	812	406	219	69.2	151	245
29	136		554	593	576	646	678	505	159	69.9	112	213
30	129		456	629	650	629	982	523	137	121	80.5	209
31	165		590		625		999	569		169		187
Sum	5,106	4,097	11,103	17,675	14,786	18,222	21,372	22,213	17,815	9,025.1	6,640.6	5,175.6

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	5.25	4.79	10	260	28	57.6	165	10,100			
Feb.	5.58	4.43	10	519	9	20.8	146	8,130			
Mar.	6.27	4.49	19	1,030	3	36.0	358	22,000			
Apr.	6.04	5.22	3	936	9	403	589	35,100	34,250	35,100	33,400
May	5.68	4.89	30	735	6	302	477	29,300	28,650	29,300	28,000
June	5.97	5.12	5	1,050	16	452	607	36,100	40,200	44,300	36,100
July	7.22	5.02	15	2,250	9	448	689	42,400	45,900	49,400	42,400
Aug.	7.58	4.59	5	2,710	28	406	717	44,100	42,050	44,100	40,000
Sept.	8.07	3.77	16	3,270	30	122	594	35,300	38,900	42,500	35,300
Oct.	4.59	3.77	20	586	28	48.7	291	17,900	15,500	17,900	13,100
Nov.	4.59	3.51	1	576	13	18.7	221	13,200	12,650	13,200	12,100
Dec.	4.46	3.67	29	381	16	20.1	167	10,300	10,115	10,300	9,930
Yearly	8.07	3.51		3,270		18.7	420	303,930			

RIO GRANDE AT ISLAND STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights, located near Clint, Texas, and San Augustin, Chihuahua. This station is on the rectified channel of the Rio Grande, 27.1 river miles below the new American Dam at El Paso, Texas. The zero of the gage is 3,608.99 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 62 meter measurements during the year. 55 by the United States and 7 by the Mexican Section. Computations by shifting channel methods. 1939 records good. Records available August 17, 1938 to December 31, 1939.

REMARKS: Reservoirs and diversions in the United States and Mexico completely modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest flow since August 17, 1938 occurred September 3, 1938 with a gage height of 15.50 feet and a flow of 4,570 second feet. The lowest flow since August 17, 1938 occurred August 28, 1938 when a flow of 1.0 second foot was recorded.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	146	88.7	8.9	4.1	76.1	91.4	5.7	319	3.7	3.3	5.1	2.4
2	162	100.	9.2	2.4	16.7	25.6	3.0	209	13.4	13.0	4.8	2.3
3	159	103	6.6	83.8	8.6	10.7	1.4	136	95.3	6.8	4.4	2.5
4	166	101	7.7	94.5	5.7	6.0	42.5	84.4	241	4.5	4.4	8.1
5	146	93.2	4.9	5.9	4.5	126	100	336	58.8	2.1	4.2	22.6
6	156	99.7	7.5	75.4	3.7	174	138	1,040	32.3	1.5	3.7	24.0
7	154	101	7.0	302	2.6	18.9	28.1	417	45.1	32.6	3.7	24.6
8	196	87.1	17.4	95.7	14.5	10.0	.9	450	9.3	198	3.9	24.5
9	177	62.3	20.0	6.7	58.8	7.2	.5	233	5.5	202	4.6	21.5
10	155	237	20.0	3.8	13.5	5.3	11.5	55.8	3.9	152	4.8	20.2
11	151	106	13.1	93.7	7.9	4.1	.1	7.0	3.7	13.9	4.1	27.8
12	150	35.8	4.3	11.1	4.9	49.9	# 0	24.9	2.2	10.0	* 3.1	26.1
13	170	32.3	4.5	4.6	3.7	7.2	# 0	196	3.1	9.0	* 2.3	22.0
14	155	30.3	4.5	3.0	5.3	5.7	# 0	214	81.6	8.3	* 1.8	27.2
15	* 158	23.6	5.4	1.4	5.7	3.4	150	344	524	10.3	2.0	26.7
16	* 164	21.6	7.4	1.3	6.0	2.8	451	480	2,410	7.8	2.2	25.3
17	157	19.8	5.1	46.2	5.3	2.6	15.4	211	1,200	8.7	2.6	25.1
18	154	19.3	4.8	17.0	4.9	12.1	94.6	114	500	7.3	4.8	24.8
19	147	19.0	5.7	3.8	4.9	6.4	12.8	81.9	134	6.8	7.0	24.6
20	132	17.9	148	39.6	4.1	22.8	7.2	73.1	64.8	7.5	2.5	24.0
21	131	16.6	11.0	27.0	3.4	3.4	6.0	50.2	63.1	31.8	4.5	24.2
22	126	16.8	11.5	2.8	3.0	2.8	4.9	82.5	87.0	30.5	37.1	24.4
23	135	16.3	46.2	2.1	3.0	3.2	29.7	13.3	118	33.6	5.0	23.0
24	114	13.2	23.4	16.1	2.6	3.0	170	4.7	126	35.3	4.0	23.0
25	115	6.3	7.0	4.3	2.4	9.3	86.2	3.9	75.5	16.2	5.6	72.9
26	114	3.9	5.8	32.1	2.2	21.0	12.8	3.5	35.7	12.8	3.6	244
27	117	2.8	4.9	39.1	14.8	4.1	11.3	3.4	35.6	9.2	3.3	220
28	117	3.8	4.5	6.3	3.7	3.0	152	3.2	32.6	7.5	3.1	177
29	106		6.1	12.3	10.1	2.4	123	3.0	26.9	6.6	3.9	160
30	109		4.9	50.0	115	17.0	171	6.6	8.5	5.0	3.0	136
31	97.5		4.1		112		613	4.2		4.8		154
Sum	4,436.5	1,478.3	441.4	1,088.1	529.6	661.3	2,442.6	5,204.6	6,040.6	898.7	149.1	1,664.8

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	12.14	11.44	9	314	30	45.5	143	8,800			
Feb.	12.74	10.87	10	* 850	27	2.0	52.8	2,930			
Mar.	12.11	10.94	20	292	6	2.6	14.2	876			
Apr.	12.30	10.83	7	491	16	1.1	36.3	2,160			
May	11.92	10.94	30	188	ǂ 7	2.2	17.1	1,050			
June	12.21	10.90	5	380	29	1.4	22.0	1,310			
July	13.27		16	1,330	ǂ12	0	78.8	4,840			
Aug.	13.56		6	1,640	12	# 0	168	10,300			
Sept.	14.62	10.65	16	2,970	30	1.8	201	12,000	20,700	29,400	12,000
Oct.	11.81	10.58	8	262	1	1.1	29.0	1,780	1,700	1,780	1,620
Nov.	11.52	10.60	22	67.3	14	1.4	5.0	296	1,258	2,220	296
Dec.	12.34	10.69	29	537	1	2.1	53.7	3,300	2,890	3,300	2,480
Yearly	14.62			2,970		0	68.6	49,642			

* Partly Estimated. # Estimated. ǂ And other days.

RIO GRANDE AT COUNTY LINE STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights located 0.8 mile downstream from the El Paso-Hudspeth county line. This gaging station is on the rectified channel of the Rio Grande, 47.4 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,547.59 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 61 meter measurements during the year, 55 by the United States and 6 by the Mexican Section. Computations by shifting channel methods. 1939 records good. Records available January 1, 1938 to December 31, 1939.

REMARKS: Reservoirs and diversions in the United States and Mexico, completely modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest flow since January 1, 1938, occurred September 3, 1938 with a gage height of 6.39 feet and a flow of 4,050 second feet. The lowest flow since January 1, 1938, occurred February 8, 1938 with a gage height of 1.15 feet and a flow of 46.1 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	258	158	77.5	108	307	120	97.9	352	78.8	121	209	175
2	246	168	58.5	92.8	190	105	94.9	196	94.9	213	189	131
3	232	189	57.1	92.3	115	88.6	109	197	118	220	199	116
4	225	187	46.8	174	89.5	112	136	147	266	215	164	133
5	222	185	108	114	84.6	122	135	216	187	183	158	131
6	207	182	137	145	91.2	204	181	1,190	196	157	253	142
7	221	173	106	352	94.0	134	186	613	208	222	278	172
8	266	183	185	232	98.7	132	108	393	178	526	243	179
9	270	132	138	173	101	108	122	401	161	452	258	192
10	282	225	159	127	116	120	131	285	159	367	253	238
11	303	305	114	130	105	125	93.3	240	222	322	244	235
12	312	321	143	143	94.9	144	111	240	173	299	130	256
13	314	142	105	108	115	109	89.3	370	170	294	97.3	239
14	307	91.1	67.9	113	114	101	92.0	386	282	300	78.7	235
15	293	80.4	56.9	111	157	87.6	90.9	383	587	312	123	213
16	279	98.2	59.3	184	124	91.4	570	762	2,330	298	250	200
17	268	247	56.9	230	95.1	85.7	200	554	1,700	248	217	177
18	262	176	56.9	198	105	120	173	434	824	226	225	157
19	255	199	64.9	139	106	148	133	297	540	231	242	168
20	245	266	201	133	128	130	118	301	434	209	294	149
21	226	154	181	150	137	108	112	261	432	245	278	159
22	215	100	137	106	133	108	121	286	436	266	272	183
23	200	134	175	146	94.3	80.1	152	227	341	260	271	199
24	187	130	111	182	98.0	97.3	258	164	387	290	265	266
25	191	122	105	131	92.1	161	276	148	351	310	320	280
26	176	148	119	127	95.7	176	210	113	286	285	309	421
27	181	105	97.6	149	95.5	83.7	140	97.2	275	165	304	328
28	168	71.9	67.2	156	106	75.7	205	86.3	252	133	303	270
29	162		74.7	238	143	97.9	327	82.4	223	143	218	297
30	165		76.2	340	179	88.6	297	81.7	152	150	177	213
31	155		68.7		157		658	82.7		150		232
Sum	7,293	4,672.6	3,211.1	4,824.1	3,761.6	3,463.6	5,727.3	9,586.3	12,043.7	7,812	6,822.0	6,486

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	3.42	2.58	14	615	31	92.0	235	14,500	15,500	16,500	14,500
Feb.	3.54	2.33	20	626	28	64.3	167	9,270	13,235	17,200	9,270
Mar.	3.26	2.23	20	511	5	44.3	104	6,370	10,785	15,200	6,370
Apr.	3.20	2.32	7	502	4	80.9	161	9,570	12,685	15,800	9,570
May	3.10	2.21	1	402	5	78.9	121	7,460	10,680	13,900	7,460
June	2.93	2.07	26	274	24	60.5	115	6,870	17,185	27,500	6,870
July	4.25	2.17	16	1,260	1	81.7	185	11,400	26,900	42,400	11,400
Aug.	4.72	2.03	6	1,640	29	76.0	309	19,000	17,400	19,000	15,800
Sept.	6.08	2.05	16	2,980	1	72.4	401	23,900	35,250	46,600	23,900
Oct.	3.35	2.40	8	600	1	96.0	252	15,500	14,400	15,500	13,300
Nov.	3.28	2.19	11	533	15	63.4	227	13,500	13,150	13,500	12,800
Dec.	3.50	2.50	30	681	3	96.1	209	12,900	13,400	13,900	12,900
Yearly	6.08	2.03		2,980		44.3	208	150,240	200,570	250,900	150,240

RIO GRANDE AT FORT QUITMAN STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights located on the rectified Rio Grande channel 1.5 miles below Old Fort Quitman, and 80.9 river miles below the American Dam at El Paso. The zero of the new gage is 3,450.57 feet, U.S.C. and G. S. datum. See Water Bulletin No. 7 for a gage history of this station.

RECORDS: Based upon 96 meter measurements during the year, 91 by the United States and 5 by the Mexican Section. Computations by shifting channel methods. 1939 records good. Records available: January 1923 to December 1939.

REMARKS: Reservoirs in the United States and many irrigation diversions in the United States and Mexico completely modify the river flow.

COMPARATIVE FLOWS FROM PREVIOUS RECORDS: Momentary Peak: Max., about June 20, 1905, 17,000 sec. ft.@. This is the greatest flow in the last 111 years. Max. since Jan. 1923, 3,180 sec. ft., Sept. 8, 1938. Min., frequently dry prior to Jan. 1915**. Since Jan. 1923, dry only once, March 30, 1935. Daily: Max. about 17,000 sec. ft. June 20, 1905@. Since Jan. 1923, 2,600 sec. ft. average on Sept. 11, 1925. Min., frequently dry prior to Jan. 1915. Since Jan. 1923, 0.9 sec. ft. average May 31 to June 4, 1935. Monthly: Max., since Jan. 1923, 1,080 sec. ft. average in August 1928. Min., frequently dry prior to Jan. 1915. Since Jan. 1923, 14.3 sec. ft. average in May 1935. Yearly: Max., since Jan. 1923, 514 sec. ft. average in 1924. Min., since Jan. 1923, 141 sec. ft. average in 1934. Two Successive Years: Max., since Jan. 1923, 487 sec. ft. average 1923 and 1924. Min., 171 sec. ft. average 1934 and 1935. Three Successive Years: Max., since Jan. 1923, 448 sec. ft. average 1923 to 1925. Min., since Jan. 1923, 183 sec. ft. average 1934 to 1936. Four Successive Years: Max., since 1923, 431 sec. ft. average 1923 to 1926. Min. since Jan. 1923, 199 sec. ft. average 1934 to 1937. Five Successive Years: Max., since Jan. 1923, 412 sec. ft. average 1923 to 1927. Min., since 1923, 218 sec. ft. average 1933 to 1937. Sixteen Years: Average 314 sec. ft. See pages 71 and 72 of Water Bulletin No. 8 for the magnitude and average frequency of floods in the past 110 years.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	314	153	120	49.9	359	113	104	457	26.7	144	231	215
2	290	163	114	* 83.4	229	109	86.5	266	25.4	167	227	190
3	263	160	105	*103	160	118	105	143	30.6	203	264	197
4	209	192	* 97.8	73.3	106	106	86.9	130	77.5	239	263	234
5	216	189	* 90.1	82.2	93.0	109	75.4	755	83.5	255	268	275
6	217	199	* 85.2	64.1	98.8	114	60.8	968	42.2	198	* 296	254
7	* 226	207	131	239	101	147	69.3	842	40.5	217	* 326	242
8	* 237	212	122	180	129	91.8	72.7	452	41.2	415	243	224
9	247	185	146	178	102	76.6	73.3	411	31.0	525	225	211
10	* 254	163	* 120	147	74.2	61.1	62.1	279	33.8	384	218	239
11	* 186	228	* 118	97.6	119	83.4	41.7	421	57.6	357	207	225
12	221	265	* 115	60.4	105	80.3	27.5	645	107	364	143	234
13	201	186	* 126	43.5	108	64.0	36.2	330	162	366	142	220
14	187	200	133	40.7	114	41.5	43.0	417	232	373	144	214
15	179	183	104	54.8	188	31.3	53.2	481	423	381	155	234
16	171	181	82.7	45.5	149	25.7	245	884	1,380	379	222	215
17	180	200	70.0	112	133	22.3	230	909	2,050	358	256	204
18	174	295	59.2	136	117	32.1	109	620	1,420	348	238	177
19	175	315	62.3	117	114	46.4	89.7	370	679	350	277	202
20	183	346	85.8	86.1	101	76.4	84.0	355	555	330	285	147
21	167	320	164	90.4	124	107	62.0	346	525	340	270	181
22	170	283	139	86.2	138	93.3	64.2	248	489	360	227	179
23	166	225	149	90.8	121	104	91.3	232	423	350	269	190
24	159	231	* 138	170	67.0	83.1	139	178	407	363	287	261
25	178	207	* 137	126	58.1	101	226	86.9	384	359	325	339
26	184	157	* 121	107	70.9	145	160	78.1	326	395	308	489
27	161	156	* 120	92.1	62.1	119	98.9	67.5	312	284	330	420
28	164	139	111	137	87.2	91.7	67.5	79.9	258	201	339	384
29	147		57.9	207	* 212	77.3	171	42.1	203	218	293	293
30	154		53.0	262	* 213	89.0	705	31.1	153	192	223	256
31	158		56.6		133		601	28.1		177		259
Sum	6,138		3,333.6		3,986.3		4,141.2		10,978		7,501	
	5,940		3,362.0		2,559.3		11,552.7		9,592		7,604	

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
				High		Low		Total	Period 1924-1939		
	High	Low	Day		Day		1939	1939	Normal	Maximum	Minimum
Jan.	2.76	.95	9	449	28	110	198	12,200	11,954	19,200	5,370
Feb.	2.75	1.97	20	504	1	113	212	11,800	12,703	30,400	3,510
Mar.	2.33	1.34	21	217	29	46.6	108	6,610	11,186	28,500	1,090
Apr.	3.01	1.27	7	330	1	38.1	112	6,670	13,394	34,700	1,200
May	5.62	1.84	29	1,930	25	44.4	129	7,910	16,318	50,700	880
June	2.85	1.70	7	221	17	19.5	85.3	5,080	15,569	31,000	3,630
July	6.88	1.81	30	3,390	12	24.5	134	8,210	20,526	61,500	4,300
Aug.	6.41	2.00	16	2,820	31	26.6	373	22,900	29,398	66,400	4,430
Sept.	6.06	1.97	17	2,320	9	23.6	366	21,800	32,769	59,500	9,050
Oct.	3.90	2.89	9	596	1	108	309	19,000	21,749	45,720	4,520
Nov.	4.00	3.02	27	493	12	98.9	250	14,900	15,258	20,900	4,990
Dec.	4.24	3.01	26	548	18	103	245	15,100	15,601	20,970	5,640
Yearly	6.88	.95		3,390		19.5	210	152,180	216,425	373,500	102,420

* Partly Estimated. ** Elephant Butte reservoir closed January, 1915.

@ Estimated from peak flow at El Paso and Upper Presidio Station.

RIO GRANDE AT LA NUTRIA STATION

DESCRIPTION: Water-stage recorder about 9.5 miles above Candelaria, Texas, 9.5 miles above San Antonio, Chihuahua, 64 miles above Presidio, Texas and 62 miles above Ojinaga, Chihuahua, and 201 river miles below the new American Dam at El Paso, Texas. Zero of gage is 2,871.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 24 meter measurements by wading during the year for stages below 650 second feet. Station rating curve extended above 650 second feet by means of areas and water surface slopes shown by maximum stage pipe gages. Computations by shifting channel methods. 1939 records good. Records available: January 1935 to December 31, 1939. Records estimated from January 1 to June 15, 1935.

REMARKS: Reservoirs in the United States as well as many irrigation diversions in the United States and Mexico completely modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on August 31, 1935, when the peak discharge was 7,480 second feet. The river is sometimes dry. A careful survey of flood marks shows that about 30,000 second feet has passed this station in the past.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	240	190	163	83.8	234	173	* 82.4	640	32.3	150	166	284
2	234	196	161	68.2	213	* 111	* 59.0	407	29.7	137	159	218
3	228	185	150	66.1	246	* 81.3	* 47.3	385	25.5	121	173	211
4	220	173	144	64.0	218	* 65.1	78.3	428	22.0	118	188	211
5	222	174	136	63.0	169	* 58.0	77.6	* 160	20.4	129	202	188
6	226	169	128	64.0	123	58.6	48.6	* 124	18.3	135	219	200
7	213	174	116	61.9	102	61.7	47.3	* 158	17.4	137	211	211
8	214	174	104	61.0	96.6	68.8	31.3	* 428	17.0	189	244	205
9	210	169	104	62.5	94.4	63.4	17.3	347	18.3	202	276	222
10	216	166	128	127	92.3	64.2	15.8	255	17.8	387	248	222
11	229	165	122	100	93.3	52.3	15.8	382	17.0	390	240	238
12	234	143	119	94.5	92.8	41.3	11.0	526	17.0	346	208	315
13	223	203	107	82.8	90.7	34.4	6.2	549	16.5	328	215	260
14	220	* 218	120	73.0	91.7	27.7	5.6	345	67.0	332	178	243
15	212	* 196	134	57.8	91.2	25.4	664	374	96.8	321	164	229
16	208	* 187	132	47.9	95.8	23.7	195	969	190	349	159	231
17	207	* 165	122	43.6	95.2	21.1	98.1	927	522	350	168	243
18	207	* 144	107	42.8	96.4	* 13.7	129	* 872	1,150	326	196	235
19	206	* 130	96.0	42.8	92.9	* 13.8	212	* 564	1,430	291	260	219
20	202	151	89.8	44.5	89.5	10.7	120	* 433	722	262	252	203
21	199	177	174	72.1	87.9	299	91.5	* 354	515	247	315	209
22	211	224	212	67.6	86.4	96.7	115	* 294	423	260	350	187
23	220	202	171	58.2	84.9	39.9	73.0	286	380	664	282	216
24	204	177	155	53.5	84.9	21.3	44.8	221	360	481	241	256
25	195	154	150	55.4	83.3	99.8	33.7	154	306	* 328	251	286
26	200	155	141	56.3	81.8	62.9	54.5	124	316	* 289	261	287
27	199	172	126	86.4	81.7	158	128	98.3	287	* 289	264	289
28	201	151	113	112	80.1	1,180	237	69.7	225	318	267	439
29	202		104	146	80.1	559	303	56.9	200	267	272	417
30	199		114	245	80.0	127	298	47.0	182	198	311	395
31	195		108		127		297	36.6		178		372
Sum	6,596	4,884	4,050.8	2,303.7	3,475.9	3,712.8	3,637.1	11,014.5	7,641.0	8,519	6,940	7,943

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1935-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	4.18	3.82	1	260	30	181	213	13,100	* 10,234	15,000	¤ 3,000
Feb.	4.32	3.52	14	282	20	117	174	9,690	* 8,156	14,400	¤ 2,500
Mar.	4.48	3.19	21	332	21	82.4	131	8,030	* 6,144	13,600	¤ 500
Apr.	5.66	2.82	30	836	18	41.9	76.8	4,570	* 4,822	13,000	¤ 0
May	5.70	3.13	1	944	30	78.5	112	6,890	* 6,592	10,900	¤ 0
June	7.08	2.34	28	2,160	25	5.9	124	7,360	* 9,212	14,000	¤ 5,290
July	6.95	2.55	15	2,040	15	4.6	117	7,210	16,176	57,900	2,780
Aug.	7.22	2.78	16	2,300	31	34.2	355	21,800	19,620	40,300	10,500
Sept.	6.57	2.45	19	1,660	14	16.1	255	15,200	48,100	71,800	15,200
Oct.	8.88	3.31	23	4,140	4	110	275	16,900	23,580	42,700	13,500
Nov.	4.49	3.59	22	373	16	154	231	13,800	13,080	15,400	11,100
Dec.	4.72	3.65	28	451	5	164	256	15,800	14,760	17,600	13,100
Yearly	8.88	2.34		4,140		4.6	194	140,350	180,476	260,000	140,350

* Partly Estimated. ¤ Estimated.

RIO GRANDE AT UPPER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights located 7.7 river miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 272.6 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,579.82 feet above mean sea level, United States Coast and Geodetic Survey datum. This elevation was erroneously reported as 2,575.82 in Water Bulletins Nos. 6 and 7.

RECORDS: Based on 57 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: April 1900 to March 1914; September 1919 to March 1920; August 1923 to December 1939.

REMARKS: Reservoirs in the United States, as well as many irrigation diversions in the United States and Mexico, completely modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on June 12, 1912, when peak discharge was 15,200 second feet. The river is sometimes dry. See pages 71 and 72 of Water Bulletin No. 8 for the magnitude and average frequency of floods during the past periods of record.

CORRECTION: Because of arithmetical errors the following corrections should be made in the 1927 and 1932 discharge records for this station (see Water Bulletin No. 4, page 52 and Water Bulletin No. 2, page 8): June, 1927 total should be 11,700 acre feet and the yearly total should be 214,580 acre feet. July 1932 average should be 109 second feet, July total should be 6,700 acre feet and the yearly total should be 226,970 acre feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	179	183	144	58.1	64.7	4.6	*108	13.0	23.3	*123	158	244
2	188	169	*143	54.9	250	4.4	* 58.6	267	19.0	* 95.4	145	241
3	209	*176	*138	53.7	128	29.0	* 34.8	260	15.6	* 77.9	141	198
4	195	172	131	49.8	158	25.0	* 21.2	192	* 12.5	* 68.5	140	174
5	178	*170	129	* 45.9	176	15.0	* 11.6	286	* 9.5	* 61.2	149	166
6	178	*169	122	* 38.2	140	11.6	* 4.2	215	* 7.2	51.6	160	180
7	178	*172	114	* 30.9	* 91.5	8.3	3.2	113	5.1	49.3	161	170
8	186	*175	107	30.6	* 64.6	5.8	3.5	722	3.3	60.7	177	171
9	186	*178	100	25.2	* 47.5	4.6	1.8	702	2.4	96.7	173	184
10	190	*172	92.6	21.3	* 29.9	4.2	1.1	391	1.4	113	190	185
11	199	*169	91.2	19.0	* 18.4	3.6	.9	474	1.0	*173	205	184
12	209	164	95.1	17.0	* 11.9	3.3	.6	569	10.3	*347	214	188
13	*216	164	96.4	29.6	7.4	2.6	.4	1,280	22.4	261	208	195
14	213	148	87.2	25.3	5.5	2.0	180	735	48.6	243	194	203
15	198	216	76.2	19.9	5.7	1.4	18.9	728	81.5	228	184	196
16	197	258	72.6	18.3	4.5	1.5	167	957	39.4	214	152	198
17	190	209	83.0	17.9	4.4	1.0	123	1,040	34.2	211	141	191
18	184	181	91.3	16.4	4.2	.7	49.7	*1,110	391	*223	132	196
19	*176	172	94.6	12.9	4.0	.6	36.4	*1,070	1,180	*259	145	205
20	*172	163	94.2	11.2	3.8	.4	29.4	* 601	1,380	235	177	194
21	177	*148	88.8	9.6	3.9	.5	41.1	447	*651	205	205	177
22	173	*152	85.0	8.5	4.0	23.3	39.2	* 298	459	186	215	166
23	172	176	133	7.9	4.5	66.3	17.5	* 283	*421	167	258	173
24	173	216	144	7.4	7.0	21.3	12.9	* 303	*375	614	250	177
25	174	190	122	6.3	7.1	13.7	11.7	* 313	*342	*421	218	201
26	174	170	110	5.3	6.2	7.7	7.6	* 163	*304	*286	203	219
27	181	150	105	4.4	4.8	108	3.5	* 142	*275	273	214	230
28	186	148	95.2	4.0	4.4	86.6	3.5	116	*246	262	222	210
29	187		80.9	41.6	4.9	530	3.3	84.5	207	286	230	281
30	*182		72.1	63.6	5.2	267	31.0	53.8	174	250	244	300
31	*181		62.6		5.0		19.3	38.4		188		318
Sum	5,781	*4,930	3,201	754.7	1,277.0	1,254.0	1,044.9	*13,966.7	*6,741.7	*6,329.3	5,605	6,315

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	2.21	1.95	14	221	1	170	186	11,500	12,818	27,300	644
Feb.	2.45	1.76	15	272	21	136	176	* 9,780	11,662	29,400	1,420
Mar.	1.99	1.19	23	182	31	56.5	103	6,350	10,784	41,500	285
Apr.	1.34	.32	30	88.7	28	3.5	25.2	1,500	10,044	39,900	0
May	2.56	.32	2	386	20	3.3	41.2	2,530	14,391	55,300	0
June	3.46	.07	29	793	22	.3	41.8	2,490	14,465	62,100	830
July	3.60	.24	14	836	13	.3	33.7	2,070	18,791	68,800	13.3
Aug.	5.14	.68	16	1,640	2	11.5	451	* 27,700	35,151	81,700	2,170
Sept.	4.77	.51	20	1,560	12	¤ 0	*225	* 13,400	38,756	82,500	3,140
Oct.	4.43	1.11	24	1,350	7	44.9	*204	* 12,600	30,776	78,000	0
Nov.	2.22	1.64	24	260	18	125	187	11,100	15,957	26,800	0
Dec.	2.20	1.76	29	321	5	164	204	12,500	14,276	21,700	374
Yearly	5.14	.07		1,640		¤ 0	157	113,520	227,871	531,300	54,315

* Partly Estimated. ¤ Estimated.

RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car equipped for winch and heavy weights located about 2.25 miles above the international highway bridge between Presidio, Texas, and Ojinaga, Chihuahua, 1.6 miles below the confluence of the Rio Conchos with the Rio Grande, and 282.0 miles below the American Dam at El Paso, Texas. Zero of gage is 2,556.42 feet, United States Coast and Geodetic Survey sea level datum.

RECORDS: Based on 56 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: May 1900 to July 1915; September 1919 to March 1920; August 1923 to December 1939.

REMARKS: Station moved to its present location on June 14, 1932. Previously it was located 11.1 miles farther downstream and .4 mile above the Alamito Creek confluence. See Water Bulletin No. 1 for description of the old station. Reservoirs in the United States, also Boquilla, Colina and Rosetilla reservoirs on the Rio Conchos, as well as many irrigation diversions in the United States and Mexico, greatly modify the river flow.

PREVIOUS EXTREME FLOWS: The greatest recorded flow occurred in September, 1904, with a peak flow estimated at 162,000† second feet at the present station. The lowest recorded flow was 3.5 second feet in May, 1904. See pages 71 and 72 of Water Bulletin No. 8 for the magnitude and average frequency of floods in the past 109 years.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,230	1,420	945	422	334	126	464	1,370	1,070	696	1,410	1,070
2	1,110	1,190	949	404	422	161	396	1,210	869	757	1,430	866
3	1,010	1,110	917	386	453	225	547	1,250	776	713	1,320	855
4	1,000	1,260	880	374	632	236	777	1,160	743	656	1,380	836
5	916	1,440	903	387	569	* 246	785	2,100	637	538	1,440	1,080
6	935	1,430	884	369	521	* 290	700	* 3,610	606	591	1,280	985
7	926	1,400	855	363	386	269	752	1,800	* 504	637	1,220	774
8	822	1,360	836	352	329	240	1,180	* 5,780	491	561	1,160	712
9	908	1,310	800	336	295	208	1,030	3,000	550	601	1,010	779
10	1,090	1,120	790	330	243	278	978	2,250	442	640	889	963
11	1,090	1,060	633	353	278	418	987	1,620	375	813	928	1,070
12	985	1,230	602	534	255	313	* 979	1,500	348	1,160	985	978
13	1,040	1,220	742	434	221	298	* 772	2,390	396	1,180	1,110	989
14	1,040	1,330	671	354	196	510	902	3,080	1,270	1,350	1,360	809
15	1,230	1,600	1,040	292	176	515	629	2,040	1,180	1,430	1,090	704
16	1,110	1,580	1,010	267	157	365	787	2,460	935	1,400	980	680
17	1,270	1,310	903	266	135	279	886	* 5,950	1,150	1,390	1,100	773
18	1,080	1,380	1,030	254	121	225	596	* 6,330	1,540	1,350	1,030	862
19	1,100	1,410	1,120	230	132	190	429	* 8,230	2,160	1,500	1,260	827
20	1,080	1,450	1,150	280	140	164	410	* 9,270	2,310	1,290	1,670	902
21	1,090	1,420	1,160	246	135	1,090	749	8,110	1,460	1,310	1,690	710
22	1,020	1,230	1,030	217	129	382	533	6,640	1,010	1,450	1,140	656
23	964	1,060	1,750	202	192	332	473	5,140	912	1,510	1,120	827
24	1,160	998	1,600	190	249	239	543	4,180	901	1,780	1,130	857
25	1,310	1,090	1,020	170	265	204	915	3,390	1,210	1,600	1,060	905
26	1,410	993	781	146	212	222	795	2,860	1,290	1,490	1,030	1,260
27	1,200	931	654	151	180	435	626	2,610	995	1,440	1,150	1,130
28	1,220	970	582	217	163	329	710	2,280	893	1,570	1,050	1,040
29	1,480		558	230	155	408	656	1,970	856	1,690	994	1,140
30	1,600		491	533	142	580	881	1,780	755	1,510	1,090	1,130
31	1,470		436		132		1,100	1,580		1,270		928
Sum	34,896	35,302	27,722	9,289	7,949	9,777	22,967	*106,940	28,634	35,873	35,506	28,097

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total	Period 1924-1939		
	High	Low	Day		Day		1939	1939	Normal	Maximum	Minimum
Jan.	3.46	2.50	30	1,800	8	773	1,130	69,200	78,700	174,800	24,500
Feb.	3.45	2.62	15	1,800	27	861	1,260	70,000	67,606	77,900	26,300
Mar.	4.11	2.00	23	2,750	31	422	894	55,000	60,762	76,300	21,200
Apr.	2.34	1.41	30	692	26	129	310	18,400	48,035	66,500	4,460
May	2.25	1.30	4	674	19	103	256	15,800	51,860	150,400	3,660
June	4.52	1.31	21	3,620	1	120	315	19,400	65,997	106,000	9,250
July	3.32	1.76	31	1,770	20	338	741	45,600	116,381	564,000	23,900
Aug.	7.92	2.52	8	14,500	2	920	*3,450	* 212,000	170,919	509,000	38,000
Sept.	4.41	1.45	14	3,880	12	318	954	56,800	239,288	1,200,000	16,000
Oct.	3.68	1.79	24	2,550	5	472	1,160	71,200	184,831	859,000	41,000
Nov.	3.28	2.23	21	1,990	12	827	1,180	70,400	81,788	105,300	30,500
Dec.	2.88	1.98	26	1,500	22	635	906	55,700	77,000	94,600	28,900
Yearly	7.92	1.30		14,500		103	1,050	759,500	1,243,167	2,651,800	599,000

† Revised on account of better data after the 1938 flood. * Partly Estimated.

ALAMITO CREEK STATION NEAR PRESIDIO, TEXAS

DESCRIPTION: Water-stage recorder, about 1,800 feet above confluence with the Rio Grande, and six miles below Presidio, Texas and Ojinaga, Chihuahua. This creek enters the Rio Grande .4 river miles below the lower end of the Presidio Valley and 293.5 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,541.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 1 meter measurement during the year by wading and a rating curve, the high points of which are determined by slope-area calculations; also upon numerous estimates by the hydrographer at low flow. Computations by shifting channel methods. 1939 records good. Records available: January 1, 1932, to December 31, 1939.

REMARKS: The flow of this spring-fed creek is modified by a small irrigation reservoir (San Estaban) 10.5 miles south of Marfa and by irrigation diversions for about 1,065 acres of land below the reservoir. 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, 461 square miles of which are above San Estaban Dam and 1,043 square miles below it.

PREVIOUS EXTREME FLOWS: The greatest recorded flow occurred July 20, 1937 with a gage height of 5.33 feet and a flow of 9,670 second feet. The lowest recorded flow was .87 second feet on several days in 1932. On July 30, 1936, a gage height of 5.93 feet was recorded with a flow of 3,900 second feet. On October 2, 1932, backwater from the Rio Grande caused a gage height of 8.33 feet. This is the highest recorded gage height.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	4.0	4.5	4.0	5.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0
2	4.0	4.0	4.5	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3	4.0	4.0	4.5	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
4	4.0	4.0	4.5	4.0	7.7	4.0	4.0	33.1	4.0	4.0	4.0	4.0
5	4.0	4.0	4.5	4.0	4.0	4.0	4.0	‡ 10.0	4.0	4.0	4.0	4.0
6	4.0	4.0	4.5	4.0	4.0	4.0	4.0	33.0	4.0	4.0	4.0	4.0
7	4.0	4.0	4.5	4.0	4.0	4.0	4.0	7.7	4.0	4.0	4.0	4.0
8	4.0	4.0	4.5	4.0	4.0	4.0	4.0	52.9	4.0	4.0	4.0	4.0
9	4.0	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
10	4.0	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
11	4.0	4.0	4.5	4.0	4.0	4.0	4.0	8.5	4.0	4.0	4.0	4.0
12	4.0	4.0	4.5	4.0	4.0	4.0	4.0	‡ 5.0	5.0	4.0	4.0	4.0
13	4.0	4.0	4.5	4.0	4.0	4.0	4.0	13.0	4.0	4.0	4.0	4.0
14	4.0	4.0	4.5	4.0	4.0	4.0	34.9	11.4	18.0	4.0	4.0	4.0
15	4.0	4.0	4.5	4.0	4.0	4.0	‡ 6.0	60.7	289	4.0	4.0	4.0
16	4.0	4.0	4.5	4.0	4.0	4.0	4.0	348	4.0	4.0	4.0	4.0
17	4.0	4.5	4.5	4.0	4.0	4.0	4.0	329	4.0	4.0	4.0	4.0
18	4.0	4.5	4.5	4.0	4.0	4.0	4.0	93.0	4.0	4.0	4.0	4.0
19	4.0	4.5	4.5	4.0	4.0	4.0	255	12.2	4.0	4.0	4.0	4.0
20	4.0	4.5	4.5	4.0	4.0	4.0	475	4.0	4.0	4.0	4.0	4.0
21	4.0	4.5	4.5	4.0	4.0	570	‡ 10.0	4.0	4.0	4.0	4.0	4.0
22	4.0	4.5	4.5	4.0	4.0	*19.4	4.0	4.0	4.0	4.0	4.0	4.0
23	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
24	4.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
25	4.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
26	4.0	4.5	4.0	4.0	4.0	35.0	4.0	4.0	4.0	4.0	4.0	4.0
27	4.0	4.5	4.0	88.5	4.0	*559	4.0	4.0	4.0	4.0	4.0	4.0
28	4.0	4.5	4.0	22.6	4.0	* 12.0	20.5	4.0	4.0	4.0	4.0	4.0
29	4.0		4.0	36.0	46.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0
30	4.0		4.0	10.7	11.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0
31	4.0		4.0		5.2		4.0	4.0		4.0		4.0
Sum	124	118	136	261.8	183.8	*1,295.9	901.4	1,085.5	420	124	120	124

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1932-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.				4.0		4.0	4.0	246	194	265	123
Feb.			‡17	4.5	‡ 1	4.0	4.2	234	183	234	111
Mar.			‡ 1	4.5	‡25	4.0	4.4	270	193	270	123
Apr.	4.56		27	2,400	‡ 1	4.0	8.7	519	216	519	119
May	4.03		29	270	‡ 5	4.0	5.9	365	1,365	8,520	189
June	5.10		21	4,600	‡ 2	4.0	43.2	* 2,570	2,140	* 6,360	206
July	5.00		19	4,300	‡ 1	4.0	29.1	1,790	3,435	6,650	249
Aug.	3.50		16	860	‡ 1	4.0	35.0	2,150	4,910	* 16,330	378
Sept.	3.98		14	1,630	‡ 1	4.0	14.0	833	5,709	19,600	179
Oct.				4.0		4.0	4.0	246	835	* 2,900	157
Nov.				4.0		4.0	4.0	238	251	524	119
Dec.				4.0		4.0	4.0	246	212	246	131
Yearly	5.10			4,600		4.0	13.4	9,707	19,643	* 39,964	6,497

* Partly Estimated. ‡ And other days.

TERLINGUA CREEK STATION NEAR TERLINGUA, TEXAS

DESCRIPTION: Water-stage recorder, and cable with sit down cable car, located about 12 miles south of Terlingua, Texas, 2.5 miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. This creek enters the Rio Grande 356.4 miles below the American Dam at El Paso, Texas. Zero of gage is 2,191.044.5 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 25 meter measurements and rating curve, the higher points of which are determined by slope-area calculations. Computations by shifting channel methods. 1939 records fair. Records available: January 1, 1932 to December 31, 1939.

REMARKS: The flow of this spring-fed creek is modified by irrigation diversions above the station. The low flow is steady, being from springs. The high flows are erratic, being from storms.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on May 24, 1935, when the extreme gage height was 17.59 feet, with a discharge of 34,900 second feet. The lowest flow recorded was on January 27 and February 3, 1935, when the discharge was .20 of a second foot.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.9	2.4	2.3	1.7	85.1	16.7	# 3.0	# 1.2	# 4.0	# 3.0	# 3.5	# 3.9
2	2.9	2.2	2.3	1.7	34.3	6.3	# 3.0	1.2	# 4.0	# 3.0	# 3.5	# 3.9
3	2.8	2.3	2.3	1.7	149	3.2	# 3.0	# 1.2	# 4.0	# 3.0	# 3.5	# 3.2
4	2.8	2.3	2.4	1.7	54.3	3.0	# 3.0	#706	# 4.0	# 3.0	# 3.5	# 3.2
5	3.0	2.2	2.4	1.6	163	3.1	188	#777	# 4.0	# 3.0	# 3.5	# 2.5
6	2.8	2.0	2.4	1.7	209	2.5	397	#424	# 4.0	# 3.0	# 3.5	# 2.5
7	2.6	2.2	2.5	2.0	62.9	2.3	97.3	#360	# 4.0	# 3.0	# 3.5	* 1.5
8	2.4	2.2	2.5	1.8	24.6	17.1	4.0	#639	# 4.0	# 3.0	# 3.5	* 1.5
9	2.4	1.8	2.5	1.8	* 11.4	19.1	3.5	#441	# 4.0	# 3.0	# 3.5	* 1.5
10	2.4	1.9	2.6	1.7	* 7.5	5.0	3.2	#1,080	# 4.0	# 3.0	# 74.2	* 1.5
11	2.7	1.9	2.4	1.7	* 4.7	* 2.8	3.2	# 283	# 4.0	# 3.0	#338	* 1.5
12	3.1	2.0	2.3	1.8	* 2.8	* 1.8	3.0	# 50.0	# 4.0	# 3.0	#143	* 1.5
13	2.6	2.2	2.4	1.8	2.8	* 1.4	324	# 20.0	# 4.0	# 3.0	# 8.8	* 1.5
14	2.5	2.0	2.4	1.8	2.8	* 1.6	3,570	# 4.0	# 4.0	# 3.0	# 5.7	* 1.5
15	2.4	2.2	2.4	1.7	2.8	* 1.9	1,430	# 4.0	# 4.0	# 3.0	# 3.5	* 1.5
16	2.5	2.2	2.3	1.7	2.2	1.9	# 351	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
17	2.6	2.0	2.3	1.8	2.2	2.2	79.1	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
18	2.6	2.2	2.4	1.8	2.2	2.2	# 5.0	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
19	2.6	2.2	2.4	1.8	12.6	2.2	# 4.3	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
20	2.7	2.2	2.3	1.8	4.0	71.8	# 4.0	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
21	2.8	2.0	2.2	1.8	2.8	2,510	# 4.0	# 4.0	# 3.5	# 3.0	# 3.5	* 1.5
22	2.8	2.0	2.2	1.8	2.2	310	# 3.5	# 4.0	# 3.5	# 3.0	# 3.5	* 3.0
23	2.8	2.0	2.2	1.8	2.8	139	# 3.5	# 4.0	# 3.5	# 3.0	# 3.5	* 2.0
24	2.8	2.0	2.1	1.8	35.1	74.6	# 3.0	# 4.0	# 3.5	# 3.0	# 4.6	1.8
25	2.6	1.9	2.1	1.8	4.7	353	584	# 4.0	# 3.5	# 3.0	# 5.7	1.8
26	2.8	2.0	2.1	1.8	2.8	1,350	1,330	# 4.0	# 3.5	# 3.0	#132	1.4
27	2.7	1.9	2.1	2.0	2.8	2,000	# 69.0	# 4.0	# 3.5	# 3.0	#622	1.4
28	2.6	2.2	2.1	2.0	* 47.2	954	# 6.0	# 4.0	# 3.5	# 3.0	# 68.2	* 1.5
29	2.3		2.0	103	*6,310	# 50.0	# 4.0	# 4.0	# 3.5	# 3.0	# 31.1	* 1.5
30	2.4		1.8	469	*3,200	3.0	# 3.5	# 4.0	# 3.5	# 3.0	# 7.1	* 1.5
31	2.5		1.7		* 313		# 3.5	# 4.0		# 3.0		* 1.5
Sum	82.4	58.6	70.4	621.9	*10,763.6	7,911.7	*8,492.8	# 4,855.6	# 112.5	# 93.0	#1,503.4	* 59.1

Month	Extreme Gage Feet — 1939 High	Extreme Gage Feet — 1939 Low	Extreme Second Feet — 1939 High Day	High	Low Day	Low	Average Second Feet 1939	Acre Feet Total 1939	Acre Feet Period 1932-1939 Average	Maximum	Minimum
Jan.	.59	.49	12	3.6	29	1.9	2.7	163	225	743	82.7
Feb.	.55	.47	1	2.6	2	1.5	2.1	116	139	223	90.6
Mar.	.56	.50	4	2.7	31	1.7	2.3	140	213	489	74.4
Apr.	4.06	.48	29	1,960	5	1.5	20.7	1,230	353	1,230	55.1
May	10.10	1.04	29	11,400	ǂ12	2.2	347	*21,300	9,123	* 26,000	117
June	13.40	.09	21	20,400	17	.2	264	15,700	11,589	39,100	431
July	7.34	* .22	14	5,990	12	3.0	274	* 16,800	8,433	26,800	621
Aug.	# 6.00		4	# 4,050	ǂ 2	1.2	157	9,630	6,609	* 26,680	254
Sept.			ǂ 1	# 4.0	ǂ16	# 3.5	# 3.8	# 223	11,608	24,600	# 223
Oct.				# 3.0		# 3.0	# 3.0	# 184	3,016	8,100	50.8
Nov.	# 5.00	# 1.95	27	# 2,400	ǂ 1	# 3.5	# 50.1	# 2,980	641	# 2,980	64.9
Dec.				# 3.9	ǂ26	# 1.4	* 1.9	* 117	516	3,080	90.0
Yearly	13.40	.09		20,400		.2	94.7	68,583	52,465	90,407	6,470.2

Estimated. * Partly Estimated. ǂ And other days.

RIO GRANDE AT JOHNSON RANCH STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car, with winch, located about 2 miles above Johnson Ranch, about 14 miles below Castolon, Brewster County, Texas and Santa Helena ranch, Chihuahua, Mexico, and 378.2 river miles below the American Dam at El Paso, Texas. Zero of the gage is 2,046.00 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 18 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: April 1936 to December 1939.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico.

PREVIOUS EXTREME FLOWS: From high water marks it was determined that a stage of 24.6 feet was reached October 3, 1932; the estimated discharge for this stage was 97,000 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,150	1,510	979	502	517	* 616	* 480	1,210	1,580	* 777	*1,310	*1,110
2	1,190	1,460	997	447	459	* 412	424	1,330	1,240	* 685	*1,370	*1,170
3	1,200	1,310	981	423	383	* 302	342	1,120	1,060	* 682	*1,350	* 961
4	1,100	1,160	966	405	1,450	276	288	2,190	868	* 671	*1,270	* 918
5	1,060	1,130	926	376	679	270	591	1,860	811	* 678	*1,320	* 929
6	993	1,390	911	354	687	266	914	2,450	* 680	*3,460	‼ 965	
7	969	1,440	928	367	554	261	658	3,680	* 640	* 922	*1,340	1,100
8	961	1,440	905	354	463	255	814	2,300	* 596	* 713	*1,230	913
9	921	1,400	890	348	357	260	1,310	7,500	* 573	* 710	*2,040	776
10	851	1,370	843	340	291	254	822	4,030	* 700	* 717	*2,830	753
11	1,000	1,280	844	333	249	241	796	3,750	* 550	* 777	*1,450	806
12	1,220	1,140	740	326	217	241	883	1,920	496	* 883	*1,110	1,050
13	1,060	1,140	639	318	189	320	875	1,820	476	*1,050	*1,030	1,000
14	1,110	1,260	655	397	205	303	*2,840	2,620	457	*1,230	*1,130	985
15	1,040	1,280	678	363	185	236	*2,490	4,460	1,170	*1,310	*1,230	906
16	1,140	1,490	720	311	192	349	1,020	3,090	1,380	*1,360	*1,110	785
17	1,230	1,610	1,030	295	172	442	637	3,210	1,060	*1,360	*1,030	705
18	1,160	1,340	1,000	275	156	340	724	7,300	1,030	*1,310	*1,110	726
19	1,230	1,330	902	262	144	277	1,560	5,260	1,420	*1,310	*1,090	801
20	1,020	1,390	1,090	243	174	326	1,560	7,880	1,930	*1,420	*1,230	824
21	1,140	1,420	1,130	223	144	4,100	1,630	9,040	2,180	*1,240	*1,510	873
22	1,090	1,410	1,160	214	134	2,160	780	7,310	1,440	*1,310	*1,620	849
23	1,090	1,300	1,170	233	129	1,050	751	6,000	1,040	*1,590	*1,200	742
24	1,040	1,220	1,460	218	125	835	672	4,810	911	*1,590	*1,130	714
25	1,010	1,040	1,680	205	133	733	626	4,000	880	*1,560	*1,130	1,000
26	1,260	1,100	1,270	199	139	878	637	3,280	‼1,100	*1,480	*1,130	927
27	1,380	1,120	963	219	218	2,250	1,180	2,790	*1,230	*1,420	*1,450	989
28	1,300	978	774	405	218	1,900	780	2,530	* 932	*1,380	*1,220	1,170
29	1,190		650	657	807	* 703	706	2,230	* 865	*1,480	*1,180	1,020
30	1,340		587	546	2,370	* 321	710	2,000	* 840	*1,600	*1,070	981
31	1,570		555		1,040		808	1,780		*1,440		1,150
Sum	35,015	36,458	29,023	10,158	13,180	21,177	29,308	114,750	30,135	*38,115	*39,580	28,598

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				ϕ Normal	⊕ Maximum	⊕ Minimum
Jan.	4.10	3.16	31	1,690	10	822	1,130	69,500	75,430	74,900	35,900
Feb.	4.12	3.34	16	1,720	28	954	1,300	72,300	60,044	72,300	39,400
Mar.	4.26	2.73	24	1,930	31	523	936	57,600	55,341	57,600	31,100
Apr.	3.50	2.04	29	1,100	27	173	339	20,100	40,778	20,100	8,990
May	6.20	1.88	30	5,470	24	120	425	26,100	59,241	61,300	19,900
June	8.15	2.20	21	11,800	21	224	706	42,000	72,150	127,000	17,700
July	*6.36	2.28	14	* 5,910	4	276	945	58,100	116,199	620,000	43,900
Aug.	7.96	2.91	9	11,200	1	704	3,700	228,000	179,823	288,000	52,100
Sept.	4.36	2.41	10	* 2,170	14	447	*1,000	* 59,800	323,963	1,144,000	*59,800
Oct.	‼6.20	‼2.88	6	‼ 5,500	5	‼ 600	*1,230	* 75,600	188,402	208,000	*75,600
Nov.	‼5.50	‼3.25	10	‼ 4,000	17	‼ 900	*1,320	* 78,500	77,144	101,000	53,900
Dec.	3.52	2.81	28	1,250	17	684	923	56,700	70,473	75,800	56,700
Yearly	8.15	1.88		11,800		120	1,170	844,300	1,318,988ϕ	2,755,000ϕ	610,000ϕ

* Partly Estimated. ‼ Estimated.

⊕ The monthly maximums and minimums are for the period 1936 to 1939 only.

ϕ The monthly normals and the yearly normal, maximum, and minimum from January 1924 to March 1936 included in above table were estimated from Boquillas and Lower Presidio.

RIO GRANDE AT LANGTRY STATION, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located at Langtry, Texas, 78.4 miles above Villa Acuña, Coahuila and 597.2 river miles below the American Dam at El Paso, Texas. Zero of gage is 1,091.69 feet above mean sea level, United States Coast and Geodstic Survey datum.

RECORDS: Based upon 26 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: May 1900 to October 1914; December 1919 to March 1920; and January 1924 to December 1939.

REMARKS: Large reservoirs and many irrigation diversions in the United States and Mexico, greatly modify the river flow.

PREVIOUS EXTREME FLOWS: The highest recorded gage height was on June 18, 1922, when the extreme gage height was 56.9 feet; the estimated discharge for this stage from extension of the rating curve was 204,000 second feet. This is a corrected figure over that given in previous Water Bulletins as a result of additional data. The lowest flow ever recorded was in May 1904, with an extreme of 270 second feet. Elsewhere in this Water Bulletin will be found a record of flood occurrences since 1864 at this station.

CORRECTION: Because of fuller information the following corrections should be made to the discharge records for this station in 1904 and 1906 as given in U.S.G.S. Water Supply Papers Nos. 37, 210 and 358. The mean daily discharge for September 12, 13 and 14, 1904 should be 84,000, 110,000 and 82,000 second feet respectively. The September and the annual totals should be 1,520,000 and 3,167,700 acre feet respectively. The mean daily discharge for August 11, 1906 should be 51,700 second feet and the August and annual totals should be 1,358,000 and 4,038,600 acre feet respectively.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*1,220	1,490	1,310	* 958	713	1,390	1,790	909	2,530	1,230	1,680	1,520
2	*1,560	1,720	1,800	* 902	791	1,890	1,150	1,070	2,290	1,080	1,770	1,580
3	1,510	1,920	1,220	* 859	898	1,380	888	952	2,120	1,040	1,690	1,510
4	1,470	1,820	1,220	817	850	942	734	2,440	1,950	976	1,530	1,380
5	1,550	1,760	1,220	775	1,190	759	791	5,270	1,640	897	1,580	1,470
6	1,530	1,560	1,190	730	1,700	671	732	4,000	1,440	845	1,620	1,310
7	1,440	1,430	1,170	729	1,410	618	694	3,500	1,280	838	1,560	1,230
8	1,460	1,460	1,140	717	984	548	792	7,520	1,240	856	1,600	1,210
9	1,330	1,710	1,150	706	923	509	1,220	9,700	1,160	7,810	1,640	1,250
10	1,300	1,730	1,160	707	881	486	980	4,200	1,080	1,130	1,630	1,360
11	1,320	1,700	1,140	685	815	492	950	6,620	1,030	959	1,810	1,230
12	1,340	1,670	1,110	669	861	497	1,330	4,600	994	1,000	2,980	1,130
13	1,290	1,640	1,060	664	6,640	498	1,230	*3,660	1,020	943	3,470	1,100
14	1,420	1,500	1,060	664	2,220	508	4,300	*2,240	1,060	940	1,840	1,120
15	1,490	1,400	1,040	665	939	514	1,720	*2,090	922	942	1,450	1,300
16	1,340	1,450	966	660	1,040	505	2,250	*3,510	856	1,120	1,350	1,280
17	1,380	1,500	929	655	750	501	2,960	5,000	848	1,370	1,430	1,270
18	1,300	1,560	990	672	744	585	1,820	3,670	1,260	1,440	1,550	1,230
19	1,440	1,840	967	650	688	808	1,290	4,330	1,540	1,610	1,520	1,140
20	1,470	1,890	1,190	625	634	695	1,040	7,380	1,250	1,620	1,340	1,070
21	1,480	1,620	1,190	593	582	687	1,930	6,010	1,210	1,590	1,340	1,050
22	1,480	1,600	1,120	573	556	624	1,930	9,150	1,510	1,570	1,360	1,120
23	1,330	1,670	1,260	554	512	1,890	2,040	9,310	2,080	1,670	1,400	1,160
24	1,400	1,730	1,320	544	497	2,440	1,510	7,690	2,120	1,660	1,780	1,200
25	1,370	1,710	1,340	539	512	1,950	1,070	6,310	1,650	1,670	1,860	1,230
26	1,360	1,570	1,310	524	605	1,210	970	5,300	1,300	2,340	1,550	1,150
27	1,390	1,450	1,700	529	585	948	891	4,420	1,230	1,960	1,390	1,120
28	1,380	1,280	1,800	702	493	894	843	3,800	3,600	1,890	1,420	1,320
29	1,580		1,400	545	488	1,260	774	3,350	1,250	1,770	1,460	1,250
30	1,690		1,180	516	478	2,300	1,140	3,090	1,350	1,630	1,350	1,300
31	1,560		*1,050		493		1,010	2,820		1,600		1,420
Sum	44,180	45,380	37,702	20,128	31,472	28,999	42,769	143,911	44,810	47,996	49,950	39,010

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.55	.99	30	1,740	1	1,170	1,430	87,600	102,524	* 245,000	52,300
Feb.	1.79	1.00	3	1,970	28	1,260	1,620	90,000	84,035	* 117,000	48,900
Mar.	1.75	.48	28	1,950	17	917	1,220	74,800	81,032	118,000	48,100
Apr.	1.05	- .26	28	1,280	30	506	671	39,900	66,731	105,000	30,100
May	8.42	- .34	13	14,000	30	464	1,020	62,400	95,122	233,000	32,300
June	3.40	- .30	23	4,140	10	486	967	57,500	101,623	160,000	37,310
July	6.21	- .02	14	9,810	7	652	1,380	84,800	151,439	719,000	56,100
Aug.	9.32	.43	9	15,700	2	879	4,640	285,000	221,556	730,000	78,100
Sept.	5.50	.20	28	8,110	17	820	1,490	88,900	389,623	1,100,130	35,700
Oct.	11.63	.57	9	20,600	8	793	1,550	95,200	230,564	856,120	55,200
Nov.	3.98	1.04	12	5,160	21	1,320	1,660	99,100	103,874	147,000	56,600
Dec.	1.37	.62	2	1,660	21	1,030	1,260	77,400	95,616	134,000	49,800
Yearly	11.63	- .34		20,600		464	1,580	1,142,600	1,723,739	3,095,000	879,000

* Partly Estimated.

PECOS RIVER STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Staff-gage and cable with sit down cable car and winch, located at the Pecos high bridge on the railroad 12 miles northwest of Comstock, Texas, 5.5 miles above the confluence with the Rio Grande. This river enters the Rio Grande 621.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is 1,058.01 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 13 meter measurements during the year. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1939 records good. Records available: March 17, 1898 to December 3, 1898, and May 1900 to December 1939.

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, and the Red Bluff reservoir in Texas.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 1, 1932, when the extreme gage height was 38.25 feet and the extreme flow was 116,000 second feet. An extreme gage height of 35.75 feet was reported on April 6, 1900; discharge based upon 1935 rating curve was 107,000 second feet. The lowest flow ever recorded was on August 31, 1930, when the extreme gage height was -0.15 foot and the extreme flow was 97 second feet. Elsewhere in this Water Bulletin will be found a record of flood occurrences since 1899 at this station.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	291	292	239	261	212	303	220	193	218	219	245	323
2	291	285	243	257	205	282	207	193	214	235	263	292
3	291	278	261	255	262	279	206	193	223	203	262	281
4	291	274	270	252	1,050	268	206	1,020	222	235	244	285
5	291	278	270	230	4,120	272	205	761	219	219	227	279
6	290	271	285	228	1,420	255	196	623	215	218	244	271
7	290	267	281	245	792	242	199	240	211	218	317	264
8	306	267	285	242	529	236	192	269	215	218	261	264
9	321	273	278	250	417	229	181	896	208	424	243	287
10	345	259	274	246	362	224	166	991	208	217	357	287
11	354	259	269	250	318	217	157	418	190	268	491	276
12	461	259	255	241	306	211	* 177	1,310	154	268	316	306
13	519	259	245	233	311	212	* 381	407	142	250	278	265
14	471	259	234	255	303	206	* 377	330	142	267	260	263
15	403	259	234	247	502	201	250	306	139	285	260	266
16	353	255	238	230	526	196	201	304	142	232	296	273
17	354	259	224	227	493	190	201	298	142	232	259	273
18	337	258	224	217	438	195	216	290	142	266	245	282
19	314	258	222	220	443	203	185	302	145	284	266	282
20	307	258	225	220	* 349	196	199	292	158	266	266	282
21	300	258	233	230	* 310	357	199	286	142	266	265	285
22	296	251	240	211	* 299	257	184	273	142	265	258	290
23	292	251	237	214	* 300	245	231	266	142	247	258	290
24	293	258	248	208	* 285	242	184	260	153	265	262	290
25	297	257	241	204	* 296	241	199	252	153	265	258	301
26	309	257	367	220	* 265	238	199	245	153	387	264	309
27	305	253	346	220	* 279	244	193	244	191	468	261	298
28	305	243	300	513	* 266	265	196	237	152	264	264	298
29	297		271	245	* 284	251	193	237	152	264	282	294
30	296		267	205	* 302	236	193	232	191	281	292	298
31	292		272		* 318		199	228		235		294
Sum	10,162	7,355	8,078	7,276	16,562	7,193	6,492	12,396	5,220	8,231	8,264	8,848

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.02	.49	13	519	6	290	328	20,200	23,478	55,880	12,900
Feb.	.50	.36	1	296	28	243	263	14,600	18,488	39,060	10,900
Mar.	.70	.30	26	375	17	221	261	16,000	18,238	32,870	11,100
Apr.	2.46	.21	28	1,460	25	201	243	14,400	16,226	25,400	9,520
May	6.15	.21	5	5,800	2	202	534	32,900	40,598	156,000	10,800
June	.70	.12	21	394	17	190	240	14,300	32,690	135,000	13,300
July	1.04	.02	14	542	12	152	209	12,900	22,977	84,200	7,620
Aug.	5.80	.17	12	5,280	3	190	400	24,600	19,421	50,400	7,620
Sept.	.30	-.03	27	235	ǂ15	139	174	10,400	51,358	324,420	6,190
Oct.	¤1.80	.20	9	¤ 984	10	201	266	16,300	37,304	192,240	9,520
Nov.	1.00	.30	11	514	9	226	275	16,400	22,399	73,260	10,300
Dec.	.65	.40	1	352	13	258	285	17,600	22,202	54,260	12,200
Yearly	6.15	-.03		5,800		139	291	210,600	325,379	831,510	176,780

* Partly Estimated. ¤ Estimated. ǂ And other days.

GOODENOUGH SPRING STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder and light cable (winch operated, for carrying current meter and light weights only), located 4,000 feet above confluence with Rio Grande and 11.75 miles southwest of Comstock, Val Verde County, Texas. The stream from this spring enters the Rio Grande 647.2 river miles below the American Dam at El Paso. Zero of gage is 971.9 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 14 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: February 23, 1929 to December 1939. Annual discharges for the years 1924 to 1928, inclusive were estimated as were the monthly discharges for January and February 1929. See page 52, Water Bulletin No. 6.

REMARKS: The flow of this spring channel is very uniform and is not modified by diversions or storage. When the Rio Grande reaches a flow of about 35,000 second feet near this station, then backwater from the Rio Grande reaches this gaging station.

PREVIOUS EXTREME FLOWS: The highest recorded gage height was on November 5, 1932, when the extreme gage height was 3.85 feet, discharge 742 second feet. The lowest flow ever recorded was on April 4, 1930 when the extreme gage height was 0.27 foot and the extreme flow was 93 second feet. Backwater from the Rio Grande reached a gage height of 13.86 on September 4, 1935, and 17.30 on September 1, 1932.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	116	113	112	111	103	133	115	118	119	115	121	119
2	118	112	112	109	102	131	114	118	120	117	120	118
3	119	110	115	108	104	133	114	119	120	116	117	118
4	117	110	115	109	104	133	114	134	119	116	117	118
5	116	110	114	108	105	133	114	115	120	115	117	118
6	117	109	113	105	106	132	114	114	120	115	117	118
7	117	108	113	106	106	131	114	118	120	115	115	117
8	117	108	114	108	106	128	114	118	120	115	114	117
9	116	110	115	108	108	128	114	120	120	117	114	118
10	116	108	115	108	108	126	114	120	120	116	112	118
11	116	107	114	106	108	124	114	120	121	118	115	118
12	117	108	112	104	107	124	114	123	122	118	118	117
13	117	110	113	105	159	123	114	126	121	119	120	115
14	117	111	113	105	199	122	114	124	120	118	119	116
15	115	108	111	105	201	122	114	123	118	118	118	117
16	116	106	111	104	192	122	116	121	118	118	118	117
17	116	103	111	102	165	121	117	122	119	118	118	118
18	115	107	111	102	158	120	117	121	119	118	118	122
19	115	108	111	103	153	120	118	120	118	118	118	120
20	115	108	111	103	149	119	119	119	118	118	118	120
21	115	107	111	102	146	118	119	118	119	116	119	121
22	114	108	111	102	143	117	119	118	118	116	119	121
23	114	110	111	103	140	117	120	118	118	116	120	120
24	110	112	112	104	135	117	120	116	118	117	119	118
25	111	110	115	104	134	117	120	116	118	118	118	121
26	111	112	117	103	134	116	120	117	118	121	118	120
27	114	112	118	103	133	115	120	118	118	122	118	119
28	115	112	117	102	133	115	120	118	121	122	118	119
29	113		115	102	132	114	120	118	119	123	120	118
30	112		112	103	132	115	121	118	116	120	120	118
31	113		111		132		120	119		121		119
Sum	3,570	3,057	3,506	3,147	4,137	3,686	3,617	3,707	3,575	3,650	3,533	3,673

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	ϕ Maximum	ϕ Minimum
Jan.	.62	.52	13	119	24	109	115	7,080	9,183	19,620	6,580
Feb.	.62	.40	15	116	17	102	109	6,060	8,203	17,030	5,890
Mar.	.51	.39	27	119	19	109	113	6,950	8,636	17,770	6,210
Apr.	.41	.28	1	112	21	100	105	6,240	8,019	16,580	5,850
May	1.33	.28	14	204	2	101	133	8,210	8,682	16,840	6,950
June	.66	.36	3	134	30	113	123	7,310	8,907	16,040	7,020
July	.48	.35	30	122	14	112	117	7,170	9,192	16,460	7,170
Aug.	2.93	.40	4	582	5	114	120	7,350	8,958	15,840	6,960
Sept.	.88	.58	12	134	30	116	119	7,090	11,967	# 41,490	6,550
Oct.	.81	.52	25	135	8	113	118	7,240	10,473	* 25,870	6,950
Nov.	.65	.51	1	122	10	111	118	7,010	9,620	21,850	6,600
Dec.	.59	.44	18	124	13	114	118	7,290	9,441	20,470	6,730
Yearly	2.93	.28		582		100	117	85,000	111,281	192,840	85,000

ϕ Maximum and minimum figures are for period 1929 to 1939 only. # Estimated. * Partly Estimated.

DEVILS RIVER STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder on main highway bridge, 12 miles northwest of Del Rio, Texas, and 4.5 miles above confluence with the Rio Grande. Devils River enters the Rio Grande 662.8 river miles below the American Dam at El Paso, Texas. High stage measurements from highway bridge, low stage measurements by wading. Zero of gage is 951.80 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 14 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: May 1900 to March 1914, at a point .8 mile below Southern Pacific Railroad bridge; December 1923 to September 1, 1932, at a point .2 mile above Southern Pacific Railroad bridge; September 2, 1932 to December 31, 1939, at highway bridge 2 miles upstream from railroad bridge.

REMARKS: The monthly flow of this spring-fed river is not modified, but the daily flow is modified by 2 power dams, the operation of which began in 1929. There are no irrigation diversions from this river.

PREVIOUS EXTREME FLOWS: The highest recorded gage height was on September 1, 1932, when the extreme gage height was 41.0 feet at present station and the extreme flow was 597,000 second feet. (See Special Flood Report 1932 by United States Section of this Commission.) This corresponds to a flow of 147 second feet per square mile of water shed. The lowest flow ever recorded was on November 18, 1935 and December 20, 1938, when the extreme gage height was .84 foot for a fraction of a day and the extreme flow 0 second feet. Elsewhere in this Water Bulletin will be found a record of flood occurrences since 1832 at this station.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	365	381	342	314	278	300	307	257	286	270	290	312
2	371	368	347	321	283	319	274	250	256	250	287	324
3	374	289	329	318	282	1,180	279	266	255	251	265	309
4	375	338	335	313	1,390	786	287	499	265	271	276	297
5	365	336	330	314	1,580	564	255	359	277	263	295	306
6	363	327	329	306	591	530	305	318	268	280	290	315
7	366	330	326	305	543	300	293	394	265	274	298	318
8	362	318	330	298	542	289	280	284	265	258	300	296
9	362	332	329	296	383	289	274	352	267	257	297	300
10	368	353	331	293	335	273	230	262	262	264	321	308
11	354	356	337	307	306	289	281	274	259	259	384	307
12	346	347	329	307	268	* 322	283	286	269	283	292	317
13	311	341	322	310	861	327	309	306	281	263	335	297
14	334	352	306	314	778	334	308	303	285	270	314	305
15	372	340	297	329	570	317	295	286	287	255	320	298
16	347	341	303	313	466	289	891	271	295	277	324	303
17	363	342	296	313	344	308	518	259	280	264	326	283
18	376	337	306	327	317	316	592	224	269	301	307	295
19	356	334	315	326	335	309	352	362	281	276	305	312
20	358	352	311	324	321	326	325	300	283	272	303	302
21	361	430	311	318	328	244	314	271	281	281	290	288
22	359	335	304	321	323	216	310	276	268	297	264	298
23	365	333	298	320	332	328	315	280	273	281	275	305
24	354	339	298	313	303	317	287	277	269	300	296	304
25	358	338	307	300	296	295	286	278	266	354	307	360
26	353	331	320	282	297	298	302	265	272	983	287	367
27	352	280	336	281	317	299	285	262	284	559	296	* 350
28	372	341	347	301	310	300	239	194	328	296	293	* 340
29	379		343	316	290	325	239	302	365	285	290	323
30	362		332	300	320	285	246	263	306	274	287	314
31	367		325		310		241	266		280		293
Sum	11,170	9,541	9,971	9,300	14,199	10,874	10,002	9,046	8,367	9,548	9,014	9,646

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
				High		Low		Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.59	.88	4	561	13	36.2	360	22,200	25,559	* 45,250	14,500
Feb.	1.57	.66	1	533	27	¤ 0	341	18,900	22,812	* 36,880	13,300
Mar.	1.51	1.14	29	460	13	170	322	19,800	23,571	39,420	14,000
Apr.	1.44	1.12	15	415	12	183	310	18,400	26,406	67,800	11,100
May	3.46	.84	4	5,000	29	43.0	458	28,200	49,165	301,000	10,500
June	¤ 3.00	1.00	3	¤ 3,460	30	112	362	21,600	46,862	285,000	16,100
July	1.98	.79	16	1,170	11	17.5	323	19,800	53,425	377,000	19,800
Aug.	2.48	.83	4	1,850	28	54.0	292	17,900	25,765	* 51,000	15,500
Sept.	1.77	1.18	27	570	1	150	279	16,600	112,689	895,990	13,900
Oct.	2.59	1.00	26	2,110	7	73	308	18,900	54,041	349,000	18,600
Nov.	1.76	1.18	11	563	10	139	300	17,900	26,772	56,350	15,900
Dec.	1.77	1.20	10	576	15	150	311	19,100	26,429	49,520	15,900
Yearly	3.46	.66		5,000		¤ 0	331	239,300	493,496	1,284,080	237,400

* Partly Estimated. ¤ Estimated.

RIO GRANDE AT DEL RIO STATION

DESCRIPTION: Water-stage recorder, located 900 feet upstream from international highway bridge between Del Rio, Texas and Villa Acuña, Coahuila, and 675.5 river miles below the American Dam at El Paso, Texas. High stage measurements from highway bridge, low stage measurements from boat on cable at gage well. Zero of gage is 864.80 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 25 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: December 1923 to December 1939. Records are also available for station 11 miles upstream from May 1900 to April 1915; and for station 7.5 miles upstream at McKee's Switch from December 1919 to March 1920. Several small springs but no important tributaries enter the river between the various sites.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico.

PREVIOUS EXTREME FLOWS: The highest recorded gage height was on September 1, 1932, when the extreme gage height was 34.5 feet, discharge 605,000 second feet. This is the greatest rate of discharge ever recorded at any point on the Rio Grande. (See Special Flood Report 1932 by American Section of this Commission). 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 extreme flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,410	2,550	2,200	1,870	1,350	1,510	2,830	1,690	*3,470	*2,120	2,430	2,260
2	2,350	2,550	2,220	1,790	1,550	2,450	2,360	1,590	*3,170	*2,040	2,480	2,400
3	2,560	2,660	2,230	1,750	1,570	5,610	1,810	1,740	*2,920	*1,890	2,590	2,520
4	2,480	2,810	2,160	1,690	2,060	3,010	1,590	3,580	*2,720	*1,850	2,510	2,440
5	2,450	2,740	2,170	1,600	5,200	2,110	1,480	6,490	*2,530	*1,800	2,380	2,300
6	2,500	2,700	2,130	1,630	5,100	1,890	1,430	6,760	*2,300	*1,740	2,460	2,340
7	2,490	2,600	2,120	1,650	3,750	1,590	1,400	5,630	*2,130	*1,680	2,510	2,210
8	2,430	2,500	2,120	1,610	3,060	1,490	1,390	4,380	*1,980	*1,690	2,440	2,230
9	2,420	2,490	2,090	1,600	2,280	1,380	1,420	11,300	*1,920	*5,310	2,430	2,220
10	2,370	2,650	2,090	1,570	2,060	1,310	1,860	7,410	*1,910	4,800	2,410	2,300
11	2,350	2,700	2,070	1,590	1,960	1,290	1,600	6,510	*1,840	*1,980	2,720	2,330
12	2,460	2,620	2,040	1,560	1,860	1,250	1,830	7,690	*1,780	*1,760	2,940	2,190
13	2,530	2,580	1,980	1,520	5,750	1,230	2,140	6,540	*1,800	*1,830	4,310	2,030
14	2,480	2,520	1,960	1,520	5,830	1,230	2,680	4,370	*1,710	*1,820	3,760	2,000
15	2,520	2,460	1,910	1,530	3,370	1,230	4,580	3,580	*1,790	*1,790	*2,630	2,010
16	2,540	2,380	1,880	1,530	2,400	1,180	2,920	3,530	*1,710	*1,760	*2,350	2,220
17	2,430	2,360	1,830	1,430	2,340	1,170	3,380	5,140	*1,650	*1,850	*2,240	2,120
18	2,480	2,400	1,770	1,390	1,930	1,160	3,770	5,480	*1,600	*2,150	*2,300	2,120
19	2,380	2,460	1,820	1,460	1,700	1,210	2,700	4,700	*1,940	*2,210	*2,380	2,090
20	2,460	2,640	1,810	1,460	1,590	1,400	2,060	6,410	*2,360	2,360	*2,340	2,010
21	2,520	2,740	1,990	1,430	1,540	1,430	1,810	6,760	*2,030	2,370	*2,240	1,940
22	2,510	2,440	1,990	1,360	1,500	1,460	2,680	7,470	*1,950	2,370	*2,160	1,920
23	2,490	2,420	1,930	1,330	1,470	1,370	2,640	9,100	*2,240	2,350	*2,120	1,960
24	2,380	2,500	2,340	1,310	1,390	2,470	2,760	8,400	2,720	2,420	*2,160	2,150
25	2,460	2,510	2,160	1,300	1,340	2,960	2,250	7,420	2,760	2,660	*2,550	2,210
26	2,420	2,490	2,100	1,300	1,310	2,550	1,900	6,320	*2,360	*5,160	*2,580	2,220
27	2,450	2,380	2,210	1,310	1,340	1,900	1,730	5,520	*2,110	*3,380	*2,390	2,130
28	2,460	2,240	2,430	1,410	1,450	1,680	1,610	4,890	2,980	*2,850	*2,220	2,080
29	2,400		2,440	1,750	1,350	1,580	1,570	4,450	3,660	*2,660	*2,240	2,240
30	2,530		2,210	1,470	1,330	1,890	1,530	3,970	*2,140	*2,540	*2,260	2,220
31	2,630		1,990		1,280		1,850	3,690		*2,440		2,260
Sum	76,340	71,090	64,390	45,720	72,010	53,990	67,560	172,510	*68,180	*75,630	*75,530	67,670

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	*1.11	.65	31	* 2,840	2	2,200	2,460	151,000	175,486	344,000	111,000
Feb.	1.20	.64	4	3,000	28	2,120	2,540	141,000	146,530	229,970	96,200
Mar.	2.06	.28	24	4,130	18	1,660	2,080	128,000	146,722	224,670	94,700
Apr.	.72	-.07	28	2,230	27	1,190	1,520	90,700	130,915	196,000	83,300
May	5.06	-.14	13	11,900	31	1,130	2,320	143,000	209,441	* 700,000	68,200
June	3.36	-.19	3	7,310	18	1,030	1,800	107,000	213,752	704,000	107,000
July	3.28	-.10	15	7,200	9	1,230	2,180	134,000	251,276	*1,228,000	97,800
Aug.	5.92	.06	9	14,900	2	1,480	5,560	342,000	288,773	865,000	124,000
Sept.	2.90	.03	28	6,380	18	1,480	2,270	*135,000	603,879	2,754,590	72,600
Oct.	*5.84	*.15	9	*14,600	7	*1,580	*2,440	*150,000	366,498	1,409,020	110,000
Nov.	2.46	*.47	13	5,470	23	*2,020	*2,520	*150,000	180,357	376,150	108,000
Dec.	.86	.25	2	2,620	21	1,800	2,180	134,000	170,196	295,180	108,000
Yearly	5.92	-.19		14,900		1,030	2,490	1,805,700	2,883,825	6,041,720	1,639,000

* Partly Estimated.

ARROYO LAS VACAS NEAR VILLA ACUNA, COAHUILA

DESCRIPTION: Beginning September 7, 1939, water-stage recorder and cable with sit down cable car located 1.5 miles upstream from Villa Acuña, Coahuila, and 1.8 miles upstream from the confluence with the Rio Grande just above Del Rio-Villa Acuña international bridge and 675.6 river miles below the American Dam at El Paso, Texas. Low stage measurements by wading, high stage flows from cable or estimated by extending the rating curve. Zero of the gage is 884.15 feet, United States Coast and Geodetic Survey sea level datum. Prior to September 7, 1939 a staff gage at the same location and on the same datum was used.

RECORDS: Based upon 38 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: Occasional estimates from June, 1935, to March 20, 1939, after which the present record extends to December 31, 1939.

REMARKS: This gaging station began operating March 20, 1938. The flow of this spring-fed stream was greatly modified by irrigation diversions.

PREVIOUS EXTREME FLOWS: The highest previous recorded flow was on July 23, 1938, when a flow of 16,100 second feet was recorded with a gage height of 6.56 feet. The lowest flow was 0.7 second foot during several days in November 1938.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	2.4	3.5	1.4	3.2	1.8	1.8	1.1	2.8	2.1	3.9	3.9
2	2.5	2.5	3.2	1.8	3.5	1.8	1.8	1.1	2.8	2.5	3.9	3.2
3	2.5	2.4	2.8	2.1	3.2	1.8	1.8	1.1	2.5	2.8	3.9	3.2
4	2.5	2.5	2.5	2.1	3.2	2.1	1.8	1.1	2.5	2.8	3.9	2.1
5	2.5	2.4	2.1	2.1	3.2	2.1	1.8	1,200	2.5	2.8	3.9	1.8
6	2.5	2.5	1.8	2.1	3.2	2.1	1.8	5.6	2.1	3.2	3.9	1.8
7	2.5	2.4	1.8	2.1	2.8	2.1	1.8	7.4	2.1	3.2	3.9	1.8
8	2.5	2.5	1.8	2.1	2.8	2.1	1.8	2.8	2.1	3.2	2.8	2.1
9	2.5	2.4	2.1	2.1	2.8	2.1	1.8	1.8	1.8	2.5	2.8	2.1
10	2.5	2.5	2.1	2.5	2.8	2.1	1.8	1.4	1.8	2.8	2.8	2.1
11	2.5	2.5	2.1	2.5	2.8	2.1	1.8	38.5	1.8	2.5	4.6	1.8
12	2.5	2.4	2.1	2.5	2.8	2.1	1.8	90.8	57.2	3.9	3.5	2.1
13	2.5	2.5	2.1	2.1	163	2.1	183	7.8	16.2	6.0	3.5	1.8
14	2.5	2.4	2.1	2.1	3.3	2.1	37.4	7.4	2.8	4.6	2.5	1.8
15	2.5	2.5	2.1	2.1	3.2	2.1	2.1	6.7	1.8	4.6	3.5	1.8
16	2.5	2.5	2.1	2.1	3.2	2.1	2.5	6.4	9.2	6.0	3.5	1.8
17	2.5	2.5	2.1	2.1	3.2	2.1	2.8	6.4	2.8	5.3	4.6	1.8
18	2.5	2.5	2.1	2.1	3.2	2.1	2.8	6.4	2.1	5.3	3.5	2.1
19	2.5	2.5	2.1	2.5	3.2	2.1	2.8	5.3	2.1	4.9	3.5	1.8
20	2.5	2.5	3.2	2.5	2.8	2.1	2.5	4.9	2.1	4.9	3.5	1.8
21	2.5	2.5	3.9	2.5	2.8	2.1	2.5	4.9	2.1	4.9	3.5	1.8
22	2.7	2.5	2.8	2.8	2.8	2.1	2.1	4.9	2.1	4.6	4.2	2.1
23	2.8	2.5	2.5	2.8	2.8	1.8	2.1	4.6	1.8	4.6	4.2	2.1
24	2.8	2.5	7.4	2.8	2.8	1.8	2.1	4.6	1.8	4.6	3.2	2.1
25	2.8	2.5	685.	3.2	2.5	1.8	1.8	3.5	1.8	4.6	3.2	3.2
26	2.8	2.5	2.8	3.2	2.1	1.8	1.8	3.5	1.4	4.2	3.2	2.1
27	2.8	2.5	2.5	3.2	2.1	1.8	1.8	3.2	59.0	4.2	3.2	2.1
28	2.8	2.5	2.1	14.5	2.1	1.8	1.4	3.2	206	3.5	3.2	2.1
29	2.8		2.5	3.5	1.8	1.8	1.4	3.2	2.8	3.2	3.9	2.1
30	2.8		2.8	3.2	1.8	1.8	1.4	2.8	3.2	3.2	4.0	2.1
31	2.8		3.2		1.8		1.1	2.8		3.9		2.1
Sum	80.4	69.3	763.3	84.7	246.8	59.7	277.0	1,445.2	403.1	121.4	107.7	66.6

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	1.02	1.02	‡23	2.8	‡ 1	2.5	2.6	159			
Feb.	1.05	1.05	‡ 1	2.5	‡ 1	2.5	2.5	137			
Mar.	4.99	1.05	25	5,120	‡ 6	1.8	24.6	1,510			
Apr.	2.03	.92	28	103	1	1.4	2.8	168	604	1,040	168
May	3.28	.85	13	848	‡29	1.8	8.0	490	323	490	156
June	.85	.85	‡ 4	2.1	‡ 1	1.8	2.0	118	133	148	118
July	3.94	.79	13	1,870	31	1.1	8.9	549	4,224	7,900	549
Aug.	6.59	.79	5	16,500	‡ 1	1.1	46.6	2,870	2,190	2,870	1,510
Sept.	4.27	1.08	28	2,630	‡ 9	1.4	13.4	800	460	800	119
Oct.	1.12	.92	13	6.7	11	2.1	3.9	241	188	241	134
Nov.	1.08	.95	11	5.3	25	2.1	3.6	214	160	214	106
Dec.	1.08	.92	1	4.9	‡ 5	1.8	2.1	132	135	138	132
Yearly	6.59	.79		16,500		1.1	10.2	7,388			

‡ And other days.

SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder at Silos farm road bridge 1.75 miles 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. This stream enters the Rio Grande 679.0 river miles below the American Dam at El Paso, Texas. Low and medium flow measurements by wading or from bridge. High flows by slope-area measurements. Zero of gage is 875.05 feet above mean sea level, United States Coast and Geodstic Survey datum.

RECORDS: Based upon 14 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: September 1, 1931 to December 31, 1939.

REMARKS: The flow of this spring-fed creek was greatly modified in 1939 by municipal diversions at Del Rio of 1,020 acre feet and by irrigation diversions above this station.

PREVIOUS EXTREME FLOWS: The highest previous recorded flow was on June 14, 1935, when a flow of 45,000 second feet was reached with a gage of 23.20 feet. With spring flow eliminated this storm flow corresponds to 726 second feet per square mile of water shed. The lowest flow was 2.2 second feet on December 19, 1934. Backwater from the Rio Grande reaches this station whenever the Rio Grande stage at Del Rio station gets above 14 feet or a flow of about 60,000 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*56.9	85.5	41.1	41.5	31.8	37.5	40.8	34.3	41.7	41.1	43.0	50.6
2	*56.9	86.6	42.6	40.6	31.8	78.1	38.5	33.5	41.7	38.1	43.0	50.6
3	*56.9	86.6	44.0	40.5	31.7	99.5	38.6	27.9	40.9	36.5	43.9	50.5
4	*93.2	85.5	40.1	41.3	41.0	51.3	38.6	1,160	41.7	35.7	43.9	*50.5
5	91.7	73.7	40.0	41.2	33.9	51.3	37.1	86.5	40.9	35.0	43.0	*51.3
6	91.3	60.8	39.2	45.3	33.1	45.9	33.3	61.0	41.0	35.0	43.9	*51.3
7	90.9	51.6	41.4	49.5	34.7	44.2	29.7	55.4	41.0	34.2	44.0	*52.2
8	90.1	46.6	42.1	53.1	*34.6	43.4	27.7	60.9	40.3	35.7	44.0	*52.2
9	89.3	46.6	42.0	48.4	*34.6	42.6	27.7	*71.0	39.5	40.4	44.0	*52.1
10	89.7	47.4	42.6	48.4	*34.5	40.0	27.0	*59.2	38.7	41.9	44.9	*53.0
11	92.5	47.4	41.8	48.3	*34.5	41.8	24.4	*50.9	38.7	*41.9	58.7	*51.0
12	*98.0	47.5	42.4	48.2	*34.4	41.0	26.4	*49.2	40.3	*41.9	50.7	50.1
13	*86.2	48.3	42.3	49.0	*1,840	37.8	26.5	51.1	42.6	41.2	49.7	51.0
14	*85.5	44.9	42.2	48.9	55.8	37.9	25.2	48.4	41.8	40.5	50.6	49.2
15	*84.8	43.3	42.1	47.1	44.0	36.3	22.7	40.1	37.2	38.9	48.8	48.3
16	*84.0	44.2	39.0	42.9	38.9	37.1	23.4	68.2	38.6	38.9	48.8	48.3
17	83.3	45.0	39.0	41.0	37.3	36.4	21.5	40.8	38.0	38.9	48.7	50.1
18	83.7	45.0	40.4	39.3	37.3	36.4	20.9	38.5	36.4	39.7	*48.7	50.1
19	81.9	45.0	42.6	36.9	46.0	37.2	21.6	39.3	*36.4	38.9	*48.6	49.2
20	*82.3	44.2	42.5	33.8	62.8	41.3	21.0	39.3	*37.2	39.7	*48.6	49.2
21	*83.8	44.3	45.8	33.0	39.7	42.2	22.3	40.2	*37.2	*39.7	*48.5	45.8
22	84.2	44.3	49.1	33.0	38.9	42.3	21.7	39.4	*38.0	*39.8	*49.3	43.3
23	84.6	43.5	49.1	34.4	37.4	42.3	21.7	40.2	*38.0	*39.8	*50.1	43.3
24	83.9	43.5	150	34.4	36.6	42.3	24.9	*40.2	*38.7	40.6	*51.0	42.4
25	84.3	40.6	54.3	33.6	35.8	42.4	29.7	*40.2	*38.7	94.4	*51.8	66.8
26	85.4	40.6	52.3	32.0	37.4	42.4	33.2	*40.2	*39.6	122	*52.8	59.3
27	89.9	40.6	50.4	32.0	37.5	41.6	34.8	*40.2	*45.7	47.2	*52.7	66.2
28	95.7	40.5	46.9	33.0	36.7	41.6	31.2	*40.2	*103	45.5	*51.7	66.2
29	90.0		47.8	31.2	36.7	40.7	27.1	40.2	40.4	45.6	50.7	67.3
30	85.5		47.7	30.4	36.7	43.4	31.3	41.7	40.4	43.9	52.6	66.2
31	85.5		45.0		37.5		34.9	40.9		43.9		67.3
Sum	*2,621.9	1,463.6	1,467.8	1,212.2	*2,983.6	1,338.2	885.4	2,559.1	*1,254.3	1,376.5	*1,450.7	*1,644.9

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1932-1939 ⊕		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	1.79	1.16	12	125	1	56.9	84.6	*5,200	4,520	7,070	934
Feb.	1.45	.92	2	87.7	27	38.2	52.3	2,900	3,156	5,490	487
Mar.	6.35	.92	24	1,530	16	37.4	47.3	2,910	2,954	4,190	1,560
Apr.	1.38	.87	28	75.7	30	29.7	40.4	2,400	2,890	*6,120	566
May	13.23	.88	13	8,030	3	30.3	96.2	*5,920	4,091	6,700	2,310
June	3.50	.94	2	458	2	34.5	44.6	2,650	8,518	*47,900	1,510
July	1.04	.71	1	43.4	19	20.3	28.6	1,760	3,318	*5,350	1,550
Aug.	13.94	.74	4	9,440	4	22.8	82.6	5,080	3,558	5,590	1,280
Sept.	4.66	.92	27	794	15	35.6	41.8	*2,490	5,594	19,100	2,070
Oct.	4.27	.87	25	672	7	32.1	44.4	2,730	3,612	6,320	1,710
Nov.	1.42	.99	11	82.7	4	41.4	48.4	*2,880	3,306	5,560	526
Dec.	1.57	1.00	25	98.1	21	40.7	53.1	*3,260	3,507	5,820	496
Yearly	13.94	.71		9,440		20.3	55.5	40,180	49,024	98,137	22,202

* Partly Estimated.

⊕ The average, maximum, and minimum discharges for September, October, November, and December are for the period 1931 to 1939.

PINTO CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder, cable with sit down cable car equipped for winch and heavy weights, and concrete control dam, 500 feet above Del Rio-Eagle Pass highway and 5.5 miles above confluence with the Rio Grande. This creek enters the Rio Grande 697.1 river miles below the American Dam at El Paso, Texas. Zero of gage is 854.61 feet above mean sea level, United States Coast and Geodetic Survey datum. Also a series of pipe gages (high stage indicating gages) 750 feet upstream from the gage well.

RECORDS: Based upon 17 meter measurements during the year and stable rating curve. 1939 records good. Records available: November 1928 to December 1939.

REMARKS: The flow of this spring-fed creek is modified by small irrigation diversions above the gaging station.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on August 31, 1932, when the extreme gage height was 21.08 feet and the extreme flow 54,650 second feet. This corresponds to a flood flow of 239 second feet per square mile of water shed. This spring-fed creek is often dry.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.1	5.5	5.2	4.5	3.0	* 1.5	0	0	0	* 1.0	1.3	4.0
2	7.9	5.6	5.1	4.1	2.4	202	0	0	0	.5	1.4	3.8
3	7.7	5.6	5.0	3.8	1.9	70.4	0	0	0	0	1.3	3.8
4	7.5	5.6	5.0	3.6	1.6	11.9	0	324	0	0	1.4	3.8
5	7.1	5.7	4.8	3.3	1.4	6.0	0	19.3	0	0	1.4	3.7
6	6.8	6.0	4.5	3.1	1.4	4.0	0	195	0	0	1.5	3.7
7	7.0	6.0	4.5	3.6	1.4	3.5	0	7.6	0	0	1.7	3.6
8	7.6	6.0	4.6	4.0	1.4	3.1	0	2.8	0	0	1.9	3.7
9	7.4	6.2	4.7	3.6	* .5	2.5	0	99.6	0	38.7	1.9	3.6
10	7.0	5.8	4.7	3.4	* .5	1.7	0	6.1	0	14.6	2.0	3.8
11	7.4	5.8	4.4	3.6	* .5	1.0	0	9.7	0	6.1	4.4	3.8
12	11.5	5.8	4.4	3.3	* .5	.5	0	6.0	0	3.4	4.4	3.7
13	8.4	5.9	4.0	3.3	648	* .5	16.9	3.7	0	2.7	3.4	3.7
14	7.7	5.9	3.8	3.6	90.7	* .5	3.6	2.7	0	2.5	3.2	3.6
15	7.5	5.6	3.8	3.6	26.4	* .5	1.4	2.1	0	2.4	3.2	3.6
16	7.1	5.9	3.5	3.2	10.7	* .3	.5	1.6	0	2.3	3.4	3.6
17	6.8	6.1	3.5	2.8	7.8	0	* .3	1.2	0	2.1	3.5	3.8
18	6.5	5.6	3.7	2.5	6.6	0	0	1.0	0	2.0	3.6	3.8
19	6.1	5.8	3.9	2.4	5.5	0	0	1.3	0	2.0	3.4	3.6
20	6.1	5.8	3.8	2.3	4.5	0	0	4.9	0	1.9	3.4	3.5
21	5.8	5.3	4.0	2.1	4.0	0	0	2.0	0	1.9	3.5	3.6
22	5.8	5.5	3.9	1.8	3.4	0	0	1.0	0	1.8	3.5	3.9
23	5.8	5.6	3.4	1.0	2.7	0	0	.7	0	1.8	3.8	4.3
24	5.6	6.0	219	.3	2.0	0	0	.5	0	1.7	3.7	3.9
25	5.4	6.0	36.1	.1	1.8	0	0	* .6	0	2.1	3.9	7.9
26	5.6	5.8	11.0	.1	* .5	0	0	* .5	0	3.5	3.9	6.5
27	6.1	5.7	7.1	.1	* .5	0	0	* .4	0	* 2.3	3.8	5.5
28	5.9	5.2	5.7	21.0	* .5	0	0	* .3	50.6	* 2.1	3.8	5.5
29	5.6		4.9	4.7	* .5	0	0	* .2	3.9	1.7	4.3	5.6
30	5.3		4.7	2.8	* .5	0	0	* .1	2.9	1.6	4.5	5.6
31	5.3		4.8		2.9		0	0		1.4		5.4
Sum	211.4	161.3	391.5	101.6	836.0	309.9	22.7	694.9	57.4	104.1	90.4	131.9

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	⊕ Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	3.52	3.25	12	12.3	25	5.2	6.8	419	610	2,110	0
Feb.	3.33	3.19	9	6.7	28	5.1	5.8	320	520	1,860	8.3
Mar.	6.18	3.09	24	3,170	‡16	3.4	12.6	777	743	2,500	4.3
Apr.	4.54	2.30	28	282	‡25	# .1	3.4	202	946	3,600	43.0
May	6.36		13	1,540	‡ 9	.5	27.0	1,660	2,934	20,500	28.0
June	7.86		2	2,820	‡17	0	10.3	615	3,257	30,000	0
July	4.26		13	121	‡ 1	0	.7	45.0	3,837	30,000	0
Aug.	7.21		4	2,180	‡ 1	0	22.4	1,380	4,822	48,700	0
Sept.	4.75		28	502	‡ 1	0	1.9	114	2,859	17,300	0
Oct.	4.69		9	431	‡ 3	0	3.4	206	1,195	4,900	0
Nov.	3.33	2.17	11	6.6	‡ 1	1.3	3.0	179	573	2,150	0
Dec.	3.50	3.19	25	9.1	21	3.3	4.3	262	685	2,180	0
Yearly	7.86			3,170		0	8.5	6,179	22,305	76,259.3	2,651.4

Estimated. * Partly Estimated. ‡ And other days.

⊕ The annual figures only (partly estimated) are for the period 1924-1939. The monthly figures are for the period 1929-1939, except December which is for the period 1928 to 1939.

RIO SAN DIEGO STATION AT JIMENEZ, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit down cable car. Masonry Cipoletti weir control for measuring discharges up to 700 second feet. The station is located 4.4 miles west of Jimenez, Coahila, and five miles above the confluence with the Rio Grande. This stream enters the Rio Grande 702.2 river miles below the American Dam at El Paso, Texas. Zero of the gage is 828.90 feet above United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon 5 meter measurements and the weir discharge table. Records for 1939 good. Records available: 1924 to 1939.

REMARKS: This station was constructed by the Mexican Section of the Commission and completed in November, 1932. In December, 1938 the former double weir was changed to a single weir and the weir crest was raised The capacity of the new weir is 700 second feet. From 1924 to 1932 there was a staff-gage at Paso del Salto, 3.1 miles upstream from the present station on which readings were made by agents of the Department of Agriculture, Monterrey, N. L. The flow of this spring-fed stream is modified by two small storage reservoirs, San Miguel and Centenario on the National Irrigation System No. 6 at San Carlos, Coahuila and by irrigation of Dolores Hacienda just above this station. One-fourth mile downstream from this gaging station water was diverted for the Jimenez Community.

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 lowest flow recorded was 4.9 second feet on November 26, 1937.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	52.3	42.0	24.0	32.8	16.2	52.3	16.2	16.2	24.0	42.0	32.8	32.8
2	42.0	42.0	32.8	16.2	16.2	92.2	16.2	16.2	24.0	32.8	32.8	32.8
3	42.0	42.0	32.8	16.2	4.2	371	16.2	16.2	24.0	32.8	32.8	32.8
4	42.0	52.3	32.8	24.0	0	129	16.2	1,340	24.0	32.8	32.8	32.8
5	63.2	42.0	42.0	32.8	0	63.2	16.2	245	24.0	24.0	16.2	32.8
6	100	42.0	42.0	24.7	0	52.3	16.2	159	24.0	32.8	16.2	32.8
7	74.9	32.8	32.8	24.0	0	42.0	16.2	143	24.0	32.8	24.0	32.8
8	74.9	32.8	24.0	24.0	0	32.8	16.2	63.2	16.2	24.0	32.8	32.8
9	63.2	32.8	16.2	32.8	0	24.0	16.2	159	16.2	42.0	32.8	32.8
10	52.3	42.0	32.8	32.8	0	32.8	9.9	42.0	16.2	32.8	32.8	32.8
11	32.8	42.0	24.0	32.8	0	32.8	9.9	32.4	16.2	24.0	32.8	32.8
12	32.8	42.0	32.8	32.8	0	9.9	16.2	32.8	87.2	24.0	32.8	32.8
13	52.3	42.0	32.8	32.8	0	0	42.0	16.2	87.2	32.8	32.8	32.8
14	42.0	32.8	32.8	32.8	4.2	16.2	24.0	24.0	52.3	42.0	32.8	32.8
15	42.0	42.0	42.0	42.0	9.9	16.2	24.0	24.0	42.0	42.0	32.8	32.8
16	42.0	42.0	32.8	42.0	16.2	16.2	24.0	24.0	42.0	42.0	33.9	32.8
17	42.0	42.0	24.0	32.8	32.8	16.2	24.0	24.0	42.0	42.0	32.8	32.8
18	42.0	32.8	24.0	24.0	32.8	16.2	24.0	16.2	42.0	42.0	32.8	32.8
19	42.0	32.8	32.8	16.2	32.8	9.9	24.0	24.0	42.0	42.0	32.8	32.8
20	52.3	42.7	42.9	4.2	42.0	87.1	24.0	24.0	42.0	42.0	32.8	32.8
21	42.0	52.3	52.3	4.2	42.7	32.8	33.8	24.0	42.0	42.9	42.0	32.8
22	42.0	32.8	42.0	4.2	32.8	24.0	32.8	16.2	42.0	42.0	42.0	32.8
23	42.0	32.8	42.0	0	42,0	24.0	24.0	32.8	42.0	42.0	42.0	32.8
24	42.0	32.8	42.0	0	42.0	16.2	16.2	52.3	42.0	42.0	42.0	32.8
25	32.8	52.3	32.8	0	32.8	9.9	16.2	52.3	42.0	16.2	42.0	32.8
26	32.8	42.0	32.8	0	32.8	9.9	16.2	52.3	42.7	16.2	42.0	34.1
27	32.8	42.0	32.8	0	32.8	9.9	16.2	52.3	42.0	32.8	32.8	32.8
28	32.8	42.0	42.0	0	32.8	16.2	16.2	42.0	32.8	42.0	32.8	32.8
29	53.0		42.0	0	32.8	16.2	16.2	24.0	32.8	42.0	32.8	32.8
30	42.0		42.0	0	32.8	16.2	16.2	16.2	42.0	42.0	24.0	42.0
31	42.0		42.0		87.2		16.2	16.2		42.0		42.0
Sum	1,465.2	1,124.8	1,077.8	561.1	650.8	1,287.6	612.0	2,822.0	1,113.8	1,105.7	989.5	1,036.5

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1933-1939 ⊕		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	2.99	2.79	6	100	‡11	32.8	47.3	2,910	10,281	36,430	2,910
Feb.	2.85	2.79	21	52.3	‡ 7	32.8	40.2	2,230	6,910	25,760	2,230
Mar.	2.85	2.72	21	52.3	9	16.2	34.8	2,140	6,376	21,500	2,140
Apr.	2.85	2.56	15	52.3	‡23	0	18.7	1,110	6,564	16,800	1,110
May	3.15	2.56	31	175	‡ 4	0	21.0	1,290	21,720	120,000	1,290
June	4.46	2.56	3	1,340	13	0	42.9	2,550	14,070	62,200	1,420
July	2.92	2.69	13	74.9	‡10	9.9	19.7	1,210	9,493	21,500	1,210
Aug.	6.50	2.72	4	* 8,620	‡ 1	16.2	91.0	5,600	8,973	20,000	2,020
Sept.	3.67	2.72	12	509	‡ 8	16.2	37.1	2,210	15,121	64,500	2,210
Oct.	2.89	2.72	9	63.2	‡25	16.2	35.7	2,190	25,742	146,640	1,950
Nov.	2.82	2.72	‡21	42.0	‡ 5	16.2	33.0	1,960	14,596	68,290	1,960
Dec.	2.82	2.79	‡30	42.0	‡ 1	32.8	33.4	2,060	10,669	45,160	2,060
Yearly	6.50	2.56		* 8,620		0	37.9	27,460	150,515	381,320	27,460

⊕ The Average, Maximum, and Minimum Discharges for October, November, and December are for the period 1932 to 1939.

* Partly Estimated. ‡ And other days.

RIO SAN RODRIGO STATION NEAR EL MORAL, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit down cable car, and masonry control weir located 10.6 miles west of the town of El Moral, Coahuila, 19.3 miles northwest from Piedras Negras and 11.2 miles above the confluence with the Rio Grande. This stream enters the Rio Grande 714.3 river miles below the American Dam at El Paso, Texas. In December, 1938 the gage was moved 3,300 feet downstream and its zero was set at 873.85 feet above sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 1 meter measurement and weir discharge tables. 1939 records good. Records available: 1922 to 1939.

REMARKS: From 1922 to 1932 there were made daily 3 staff-gage readings at this station, on the same gage that was used at this station prior to December, 1938. This station was constructed by the Mexican Section of the Commission and completed in October 1932, at a point 1,640 feet upstream from Paso de las Mulas. Meter measurements began August 4, 1932. The automatic water-stage record began November 8, the same year. The flow of this spring-fed river was modified by irrigation diversions above and below this station.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 7, 1932, when the extreme gage height was 16.08 feet and the extreme flow 81,200 second feet. The lowest recorded flow since January, 1932, occurred in August 1937, and in May, June and July 1938, when the river was dry for several days.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20.5	16.2	8.1	4.9	8.1	8.1	0	0	8.1	0	8.1	8.1
2	16.2	16.2	8.1	4.9	12.0	4.9	0	0	8.1	0	8.1	8.1
3	16.2	16.2	8.1	4.9	12.0	2.1	0	0	12.0	0	8.1	8.1
4	16.2	16.2	8.1	4.9	16.2	0	0	0	12.0	0	8.1	4.9
5	16.2	16.2	8.1	8.1	16.2	0	0	0	16.2	0	8.1	4.9
6	16.2	16.2	8.1	8.1	16.2	0	0	0	16.2	0	8.1	2.1
7	20.5	12.0	8.1	8.1	16.2	0	0	0	16.2	0	8.1	2.1
8	16.2	8.1	12.0	8.1	16.2	0	0	0	21.2	0	8.1	0
9	16.2	8.1	8.1	8.1	16.2	0	0	13.4	21.2	0	8.1	0
10	16.2	8.1	8.1	8.1	16.2	0	0	8.1	16.2	16.2	8.1	0
11	20.5	8.1	8.1	8.1	16.2	0	0	4.9	0	50.1	4.9	0
12	20.5	8.1	8.1	8.1	16.2	0	0	4.9	2.1	57.2	4.9	0
13	16.2	8.1	8.1	8.1	311	0	0	4.9	96.1	50.1	4.9	0
14	16.2	8.1	8.1	4.9	50.1	0	0	2.1	64.3	57.2	4.9	0
15	16.2	8.1	8.1	2.1	12.0	0	0	2.1	64.3	57.2	8.1	0
16	16.2	8.1	8.1	2.1	4.9	0	0	2.1	64.3	31.4	12.0	0
17	16.2	8.1	8.1	2.1	2.1	0	0	9.5	79.5	8.1	12.0	0
18	16.2	8.1	12.0	2.1	2.1	0	0	8.1	71.7	8.1	12.0	0
19	16.2	8.1	12.0	2.1	2.1	0	0	4.9	64.3	8.1	12.0	0
20	16.2	8.1	12.0	2.1	2.1	0	0	2.1	50.1	8.1	12.0	0
21	16.2	8.1	12.0	4.9	4.9	0	0	2.1	43.8	8.1	12.0	0
22	20.5	8.1	8.1	8.1	8.1	0	0	2.1	37.4	4.9	8.1	0
23	16.2	8.1	12.0	8.1	8.1	0	0	2.1	31.4	4.9	12.0	0
24	16.2	8.1	12.0	8.1	8.1	0	0	0	26.1	4.9	8.1	0
25	16.2	8.1	8.1	12.0	8.1	0	0	0	21.2	4.9	8.1	0
26	16.2	8.1	8.1	8.1	12.0	0	0	0	16.2	8.1	8.1	2.1
27	20.5	8.1	8.1	8.1	12.0	0	0	0	12.0	8.1	8.1	8.1
28	16.2	8.1	8.1	8.1	12.0	0	0	4.9	8.1	12.0	12.0	4.9
29	16.2		12.0	8.1	12.0	0	0	4.9	4.9	8.1	12.0	4.9
30	16.2		12.0	8.1	12.0	0	0	8.1	2.1	8.1	12.0	4.9
31	16.2		12.0		4.9		0	8.1		8.1		2.1
Sum	528	279.3	290.1	191.7	666.5	15.1	0	99.4	907.3	432.0	269.2	65.3

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1932-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	.20	.16	‡ 1	20.5	‡ 2	16.2	17.0	1,050	4,321	14,850	1,050
Feb.	.16	.10	‡ 1	16.2	‡ 8	8.1	10.0	554	3,006	11,580	554
Mar.	.13	.07	‡ 8	12.0	4	4.9	9.4	575	2,937	9,900	575
Apr.	.13	0	25	12.0	25	0	6.4	380	2,472	6,870	380
May	2.20	0	13	* 1,110	17	0	21.5	1,320	7,656	42,300	57.5
June	.10	0	1	8.1	‡ 4	0	.5	30	6,486	37,600	30
July	0	0	‡ 1	0	‡ 1	0	0	0	4,477	12,200	0
Aug.	.52	0	9	87.6	‡ 1	0	3.2	197	2,735	6,770	39.3
Sept.	.85	0	12	184	11	0	30.2	1,800	35,871	* 253,960	471
Oct.	.46	0	16	71.7	‡ 1	0	13.9	857	13,343	81,360	815
Nov.	.13	.07	‡16	12.0	‡11	4.9	9.0	534	5,590	24,450	534
Dec.	.13	0	1	12.0	‡ 8	0	2.1	130	4,548	19,060	130
Yearly	2.20	0		* 1,110		0	10.3	7,427	93,442	414,310	7,427

* Partly Estimated. ‡ And other days.

RIO GRANDE AT EAGLE PASS STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch located .5 mile above the international highway bridge between Eagle Pass, Texas and Piedras Negras, Coahuila, and 733.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 96 meter measurements, 83 by the Mexican and 13 by the United States Section during the year. Computations by shifting channel methods. 1939 records good. Records available: May 1900 to April 1916; November 1923 to December 1939.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. On April 10, 1939 the operation and maintenance of this station was turned over from the United States Section to the Mexican Section of the Commission.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 2, 1932, when the extreme gage height was 49.00 feet, discharge 569,000 second feet. (See Special Flood Report 1932 by United States Section of this Commission.) The lowest flow ever recorded was on August 19, 1937 when the extreme gage height was 2.22 feet and the extreme flow 632 second feet. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,580	2,720	2,360	2,090	1,510	1,770	1,970	1,590	3,780	2,060	2,640	2,430
2	2,430	2,510	2,280	1,950	1,230	1,770	2,840	1,900	3,500	2,060	2,610	2,280
3	2,390	2,530	2,280	1,860	1,280	3,220	2,300	1,670	3,300	1,960	2,700	2,480
4	2,650	2,650	2,370	1,730	1,470	6,710	1,770	2,150	3,040	1,860	2,670	2,560
5	2,550	2,830	2,330	1,700	2,660	3,080	1,590	14,900	2,850	1,860	2,600	2,480
6	2,550	2,830	2,310	1,660	5,620	2,380	1,480	9,010	2,670	1,770	2,460	2,330
7	2,590	2,720	2,290	1,620	4,560	2,130	1,440	7,520	2,390	1,670	2,560	2,360
8	2,640	2,540	2,200	1,670	3,710	1,800	1,440	5,860	2,170	1,630	2,550	2,300
9	2,580	2,420	2,160	1,630	3,050	1,570	1,400	7,980	2,010	1,880	2,460	2,250
10	2,560	2,390	2,110	1,640	2,270	1,500	1,400	12,300	1,940	10,500	2,430	2,250
11	2,510	2,590	2,110	1,630	1,900	1,380	1,900	6,960	1,880	4,100	2,630	2,240
12	2,690	2,670	2,090	1,580	1,740	1,350	1,880	8,790	1,820	2,360	2,990	2,370
13	2,740	2,650	2,060	1,580	2,500	1,320	2,860	8,090	2,100	2,110	3,020	2,210
14	2,720	2,640	2,010	1,530	11,800	1,250	2,560	6,460	1,890	2,040	4,980	2,050
15	2,630	2,550	1,910	1,530	5,620	1,260	3,710	4,590	1,780	2,030	3,600	2,060
16	2,690	2,480	1,870	1,540	3,300	1,280	3,460	3,920	1,820	2,030	2,860	2,020
17	2,640	2,410	1,840	1,490	2,490	1,250	2,970	3,810	1,850	1,940	2,680	2,260
18	2,480	2,400	1,810	1,460	2,390	1,230	3,670	5,830	1,590	1,960	2,540	2,210
19	2,520	2,510	1,770	1,480	1,930	1,270	3,180	5,050	1,490	2,210	2,520	2,200
20	2,420	2,570	1,820	1,440	1,710	1,490	2,650	4,340	1,820	2,270	2,550	2,070
21	2,530	2,770	1,860	1,410	1,680	1,600	2,220	7,800	2,160	2,500	2,580	2,010
22	2,530	2,900	2,080	1,360	1,580	1,610	2,080	6,040	1,940	2,560	2,380	1,940
23	2,640	2,590	2,080	1,320	1,480	1,610	2,820	5,260	1,850	2,620	2,290	1,930
24	2,360	2,600	2,010	1,270	1,430	1,530	2,580	9,530	2,110	2,510	2,260	1,970
25	2,380	2,710	2,910	1,290	1,460	2,550	2,610	8,230	2,570	2,530	2,300	2,240
26	2,360	2,690	2,360	1,270	1,320	3,000	2,160	7,200	2,590	4,630	2,570	2,320
27	2,440	2,710	2,380	1,260	1,280	2,750	1,940	6,220	2,140	3,880	2,610	2,240
28	2,420	2,540	2,300	1,230	1,240	2,140	1,910	5,690	2,180	3,490	2,440	2,150
29	2,470		2,500	1,560	1,320	1,770	1,730	4,870	3,530	2,840	2,450	2,060
30	2,410		2,500	1,650	1,210	1,640	1,640	4,270	2,890	2,730	2,520	2,280
31	2,410		2,270		1,400		1,600	4,060		2,620		2,230
Sum	78,510	73,120	67,230	46,430	78,140	59,210	69,760	191,890	69,650	83,210	80,450	68,780

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day	High	Day	Low			Normal	Maximum	Minimum
Jan.	3.51	3.12	13	3,010	25	2,160	2,530	156,000	195,545	365,000	116,000
Feb.	3.58	3.08	5	3,080	17	2,220	2,610	145,000	159,256	254,250	99,200
Mar.	4.20	2.76	25	4,410	19	1,690	2,170	133,000	158,126	247,440	95,900
Apr.	3.08	2.20	1	2,230	27	950	1,550	92,100	143,451	219,000	92,100
May	7.81	2.20	14	18,800	30	1,020	2,520	155,000	252,684	869,000	77,500
June	4.46	2.17	4	¤ 7,800	13	1,140	1,970	117,000	260,769	1,005,000	113,340
July	4.89	2.26	15	6,920	8	1,320	2,250	138,000	274,606	1,255,000	125,000
Aug.	7.55	2.59	10	15,700	4	1,440	6,190	381,000	309,569	969,000	136,000
Sept.	4.59	2.49	29	5,650	19	1,410	2,320	138,000	637,559	2,857,410	80,900
Oct.	7.64	2.53	10	17,500	7	1,450	2,680	165,000	417,294	1,603,480	121,000
Nov.	4.59	3.05	14	5,580	23	2,180	2,680	160,000	210,377	486,390	109,000
Dec.	3.35	2.82	11	2,710	22	1,790	2,220	136,000	191,646	369,760	112,000
Yearly	7.81	2.17		18,800		950	2,650	1,916,100	3,210,882	6,668,460	1,798,000

¤ Estimated.

RIO ESCONDIDO STATION AT VILLA FUENTE, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located 3.1 miles southwest of the City of Piedras Negras, Coahuila 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. This stream enters the Rio Grande 737.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 717.78 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 54 meter measurements. Computations by shifting channel methods. 1939 records fair. Records available: 1922 to 1939.

REMARKS: From 1922 to 1932 there were made daily 3 staff-gage readings 2,300 feet downstream from the present station. The elevation of the zero of this old gage was 0.79 foot above the zero of the gage at the present station, but the water surface is practically level between the two gages. During November and December 1938 a bridge under construction .6 mile downstream from this station modified the recorded discharge. The flow of this spring-fed stream is modified by irrigation diversions in the drainage basins of the San Antonio and the Escondido.

PREVIOUS EXTREME FLOWS: The greatest recorded flow since January 1932 was May 14, 1935, when the extreme gage height was 17.06 feet and the extreme discharge was 17,700 second feet. The lowest recorded flow occurred November 4, 1934, when the extreme gage height was .75 foot and extreme flow was .35 second foot.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	3.2	2.5	6.4	9.9	6.0	2.8	2.8	2.1	2.5	4.6	4.2
2	3.9	3.2	2.5	4.2	7.8	4.2	2.8	2.8	1.7	2.5	4.6	4.2
3	4.6	3.9	2.5	3.9	4.9	3.9	2.8	3.5	1.7	2.5	4.2	4.6
4	5.7	3.9	2.8	3.9	212	3.5	2.5	5.3	1.8	2.5	4.2	4.6
5	12.4	3.9	3.9	3.9	57.6	3.5	2.5	6.0	2.1	2.8	4.2	4.2
6	18.0	3.2	3.9	3.9	56.2	3.5	2.5	4.9	2.1	2.8	4.2	4.2
7	15.2	2.8	3.5	4.2	16.2	3.2	2.5	14.1	1.8	3.2	3.9	3.9
8	10.2	3.5	4.6	3.9	8.5	3.2	2.5	6.0	1.8	3.5	3.9	3.9
9	8.8	2.8	4.2	3.9	8.8	3.2	2.5	35.0	6.7	24.4	3.9	3.9
10	8.8	2.8	4.2	3.9	10.6	2.8	2.5	135	20.1	607	3.9	3.5
11	10.2	3.5	3.9	3.5	11.7	2.8	2.5	22.2	4.6	171	6.7	3.9
12	15.2	3.5	5.3	3.5	15.2	2.5	3.5	10.2	3.9	28.3	6.0	3.9
13	15.2	3.5	4.9	3.2	289	2.5	6.4	7.4	3.5	11.7	4.2	3.9
14	12.0	2.8	6.7	3.2	272	2.5	4.2	6.7	2.8	9.5	4.2	4.2
15	12.0	2.8	6.7	2.8	56.2	2.5	4.2	7.1	2.5	8.8	4.2	4.2
16	12.0	3.5	7.1	2.5	17.3	2.5	3.9	6.4	2.1	8.1	4.2	4.6
17	9.9	3.5	8.8	2.5	10.9	2.5	3.5	6.7	2.5	7.4	4.2	4.6
18	5.3	3.2	10.9	2.5	8.5	2.5	3.5	4.9	2.5	7.4	3.9	4.3
19	4.2	3.2	9.2	2.5	7.4	593	3.5	6.0	2.5	5.7	3.9	3.9
20	3.5	3.2	9.5	2.1	6.0	166	3.5	4.6	2.5	6.0	3.9	6.7
21	4.2	3.2	7.8	2.1	4.2	33.2	3.5	4.9	2.5	6.7	3.9	7.1
22	3.5	3.2	7.4	2.5	4.9	17.3	3.5	4.6	2.5	6.7	3.9	7.8
23	3.5	3.2	4.6	2.1	4.9	12.0	3.2	3.9	2.5	6.7	3.9	7.4
24	2.8	3.2	6.0	2.1	4.6	6.7	2.8	2.8	2.5	6.7	3.9	7.1
25	3.5	3.2	5.7	2.1	3.9	4.9	2.8	2.8	2.1	5.7	3.9	8.8
26	3.9	3.2	5.7	76.3	3.9	3.5	2.8	2.8	2.1	5.7	3.2	8.5
27	3.9	2.5	5.3	184	3.9	3.2	2.8	2.5	2.1	5.7	3.2	8.1
28	3.9	2.4	6.0	54.4	3.2	3.2	2.5	2.1	2.1	5.7	3.5	6.7
29	3.2		6.4	22.2	3.2	3.2	2.5	2.5	2.1	5.7	3.5	6.4
30	3.2		6.7	12.0	3.2	3.2	39.2	2.5	2.1	4.9	4.2	6.0
31	3.2		7.0		16.6		6.4	2.5		4.9		9.9
Sum	229.8	90.0	176.2	430.2	1,143.2	906.7	136.6	331.5	93.9	982.7	124.1	169.2

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1932-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	1.90	1.57	6	21.9	24	2.8	7.4	456	4,054	15,990	456
Feb.	1.64	1.54	4	4.6	19	2.1	3.2	179	2,394	9,990	179
Mar.	1.80	1.57	18	10.9	‡ 1	2.5	5.7	349	1,826	6,910	219
Apr.	5.68	1.48	26	780	‡20	2.1	14.3	853	2,490	5,360	739
May	7.55	1.54	4	1,880	‡28	3.2	36.9	2,270	5,469	23,800	494
June	8.37	1.48	19	2,310	‡12	2.5	30.2	1,800	5,142	19,700	618
July	4.33	1.44	30	364	9	2.1	4.4	271	3,170	9,290	271
Aug.	3.71	1.51	10	246	28	1.8	10.7	658	1,330	4,440	174
Sept.	2.82	1.44	10	112	‡ 2	1.7	3.1	186	3,764	14,340	186
Oct.	6.96	1.48	10	1,410	1	2.1	31.7	1,950	6,705	39,790	117
Nov.	1.94	1.61	11	11.3	‡26	3.2	4.1	246	4,131	25,590	101
Dec.	2.03	1.61	31	11.7	10	3.5	5.5	336	4,075	20,720	336
Yearly	8.37	1.44		2,310		1.7	13.2	9,554	⊕ 45,168	⊕ 126,090	⊕8,350

‡ And other days. ⊕ For period 1924 - 1939.

RIO GRANDE AT LAREDO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car. Cable and car located about 2.5 miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo, 863.9 river miles below the American Dam at El Paso, Texas. Zero of gage at recorder is at elevation 351.50 feet. Zero of gage at the cable is elevation 353.15 feet. All gage elevations are on United States Coast and Geodetic Survey sea level datum. For history of this gage see previous Water Bulletins.

RECORDS: Based on 159 meter measurements. Computations by shifting channel methods. 1939 records fair. Records available: May 1900 to March 1914; from October 1922 to December 1939.

REMARKS: The river flow at this station is modified by many irrigation diversions and by large reservoirs in the United States and Mexico.

PREVIOUS EXTREME FLOWS: The greatest previous recorded flow was on September 3, 1932, when the peak gage reading was 52.20 feet, the flow being 402,000 second feet. On June 20, 1938, a minimum flow of 777 second feet was reached. Numerous records of extreme flows may be found in previous Water Bulletins.

CORRECTION: In the light of additional information it is found that the 1934 record of this station needs correction as follows: The mean daily discharge for September 4 and 5 should be 12,000 and 11,200 second feet respectively. The September and annual totals should be 172,000, and 1,864,000 acre feet respectively.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,110	2,670	2,650	2,510	1,490	1,480	1,740	1,510	4,340	3,300	2,760	2,460
2	2,720	2,790	2,550	2,330	1,580	1,410	1,620	1,940	3,780	2,400	2,660	2,460
3	2,680	2,800	2,470	2,140	1,540	7,700	1,660	1,710	3,490	2,150	2,590	2,340
4	2,580	2,460	2,350	1,940	2,260	8,230	2,240	1,720	3,210	2,180	2,610	2,280
5	2,540	2,420	2,340	1,780	21,900	7,730	2,150	1,720	3,040	2,070	2,650	2,350
6	2,740	2,900	2,400	1,810	9,290	3,850	1,760	14,500	2,830	1,960	2,650	2,470
7	2,680	3,180	2,350	1,730	5,300	3,330	1,580	8,160	2,540	1,880	2,610	2,410
8	2,650	2,860	2,310	1,670	7,170	2,640	1,450	7,910	2,370	1,850	2,590	2,410
9	2,720	2,870	2,270	1,610	5,050	2,020	1,320	5,440	2,290	1,820	2,610	2,360
10	2,730	2,690	2,220	1,550	3,530	1,940	1,380	5,970	2,500	3,710	2,550	2,240
11	2,660	2,470	2,140	1,590	2,930	1,910	1,360	12,500	2,310	10,900	2,530	2,190
12	2,630	2,570	2,140	1,580	2,100	1,540	1,340	7,060	2,200	5,470	2,710	2,150
13	2,620	2,750	1,970	1,560	9,320	1,340	1,620	6,960	2,360	3,190	3,020	2,160
14	2,750	2,730	2,040	1,540	17,100	1,350	1,870	7,560	2,060	2,390	3,210	2,270
15	2,750	2,610	1,990	1,540	9,530	1,350	2,770	6,850	2,100	2,080	4,490	2,210
16	2,720	2,620	1,970	1,500	6,040	1,310	2,310	4,870	1,960	1,980	3,780	2,120
17	2,720	2,650	1,930	1,470	4,660	1,270	3,600	3,780	1,920	1,890	3,100	2,090
18	2,780	2,450	1,960	1,500	3,420	1,200	3,250	3,920	1,830	1,800	2,770	2,100
19	2,780	2,340	1,920	1,560	2,610	1,230	2,810	5,930	1,780	1,820	2,570	2,220
20	2,570	2,240	1,770	1,460	2,320	1,210	3,490	8,690	1,720	1,890	2,480	2,190
21	2,570	2,390	1,770	1,440	2,080	1,290	3,170	9,680	1,660	2,100	2,510	2,180
22	2,570	2,430	1,860	1,450	1,780	1,610	2,540	8,480	1,800	2,350	2,600	2,100
23	2,680	2,790	1,990	1,430	1,740	1,650	2,160	6,600	2,000	2,320	2,430	2,080
24	2,610	2,760	2,100	1,370	1,610	1,600	2,010	7,730	1,900	2,350	2,290	2,060
25	2,650	2,580	2,160	1,330	6,600	1,580	2,420	9,180	1,810	2,390	2,250	2,130
26	2,580	2,620	2,120	1,290	4,520	1,530	2,320	8,190	2,080	2,390	2,280	2,270
27	2,720	2,670	2,950	3,670	2,230	2,230	2,450	7,420	2,570	2,570	2,520	2,430
28	2,680	2,670	2,500	2,420	1,740	2,900	2,190	7,840	2,540	4,800	2,570	2,460
29	2,750		2,320	1,530	1,370	2,650	1,890	6,360	2,190	4,590	2,560	2,270
30	2,610		2,360	1,430	1,620	2,090	1,710	6,250	2,130	3,080	2,480	2,180
31	2,640		2,540		2,060		1,620	4,520		2,680		2,090
Sum	83,190	73,980	68,410	51,730	146,490	73,170	65,800	200,950	71,310	88,350	81,430	69,730

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	5.51	5.02	1	3,490	26	932	2,680	165,000	188,706	352,000	114,000
Feb.	5.35	5.02	6	3,250	5	2,220	2,640	147,000	153,814	237,380	99,400
Mar.	5.51	4.72	27	3,510	21	1,720	2,210	136,000	153,241	223,020	95,680
Apr.	7.05	4.40	27	8,400	27	1,280	1,720	103,000	152,152	401,000	95,640
May	11.48	4.40	14	55,100	4	1,130	4,730	291,000	275,997	906,000	113,000
June	9.38	4.07	3	25,100	21	1,150	2,440	145,000	299,607	1,357,000	89,190
July	5.81	4.23	17	4,630	9	1,250	2,120	131,000	281,323	1,250,000	128,770
Aug.	9.58	4.40	6	21,400	1	1,430	6,480	399,000	300,579	888,000	127,000
Sept.	5.87	4.59	1	4,660	22	1,660	2,380	141,000	679,616	3,116,670	87,260
Oct.	8.30	4.59	11	13,200	10	1,680	2,850	175,000	464,111	2,071,590	126,000
Nov.	6.07	4.99	15	2,130	24	2,120	2,710	162,000	215,235	570,800	122,000
Dec.	5.15	4.82	28	2,510	24	2,010	2,250	138,000	190,507	352,680	107,000
Yearly	11.48	4.07		55,100		932	2,950	2,133,000	3,354,888	7,310,310	1,873,000

RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit down cable car and two masonry Cipoletti weirs located at the place called "El Cable" about 6.2 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southwest of Ciudad Guerrero, Tamaulipas. This stream enters the Rio Grande 926.2 river miles below the American Dam at El Paso, Texas. Zero of gage is 265.74 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based on 150 meter measurements during the year and the weir discharge records. Computations by shifting channel methods. 1939 records good. Records available: 1901 to 1912; 1923 to 1939.

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

PREVIOUS EXTREME FLOWS: The greatest recorded flow at this station was on September 7, 1933, when an extreme gage height of 18.86 feet was reached with a corresponding discharge of 43,800 second feet. The stream is sometimes dry. Numerous extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	38.1	18.4	5.3	2.8	463	706	14.5	0	12.7	22.2	9.9	2.8
2	31.1	16.6	5.3	2.8	381	473	11.3	1,390	9.9	18.4	9.9	2.8
3	26.5	16.6	5.3	1.8	227	540	8.5	420	8.5	14.5	8.5	1.8
4	26.5	16.6	5.3	1.8	2,270	1,450	6.7	124	6.7	12.7	8.5	1.8
5	26.5	16.6	5.3	1.8	5,580	1,050	3.9	79.8	5.3	9.9	6.7	1.8
6	24.4	14.5	5.3	.7	7,490	441	3.9	57.2	3.9	8.5	6.7	1.8
7	22.2	12.7	3.9	0	5,050	295	2.8	33.2	2.8	6.7	5.3	1.8
8	20.5	12.7	3.9	0	1,000	212	2.8	20.5	6.7	6.7	3.9	1.8
9	20.5	12.7	3.9	0	576	119	1.8	66.0	11.3	5.3	3.9	1.8
10	18.4	14.5	2.8	0	341	84.0	1.8	227	505	855	3.9	1.8
11	16.6	14.5	2.8	0	204	57.2	.7	1,710	2,850	11,000	9.9	1.8
12	14.5	14.5	2.8	0	136	40.6	.7	611	350	2,390	12.7	.7
13	14.5	11.3	1.8	2.8	915	31.1	22.2	304	1,540	1,770	12.7	.7
14	14.5	12.7	1.8	1.8	441	24.4	16.6	156	175	982	11.3	0
15	14.5	12.7	2.8	.7	124	20.5	8.5	119	66.0	360	9.9	0
16	12.7	11.3	2.8	.7	66.0	16.6	3.9	108	54.4	197	8.5	0
17	12.7	9.9	2.8	0	45.9	14.5	1.8	72.4	183	119	6.7	0
18	11.3	9.9	2.8	0	35.7	11.3	1.8	51.6	73.5	84.0	6.7	0
19	11.3	9.9	2.8	0	31.1	9.9	.7	43.4	146	66.0	8.5	0
20	11.3	8.5	2.8	0	26.5	8.5	0	43.4	770	51.6	5.3	0
21	12.7	8.5	2.8	0	22.2	6.7	0	322	1,190	40.6	3.9	0
22	14.5	6.7	2.8	0	18.4	5.3	0	431	1,110	35.7	3.9	0
23	16.6	6.7	2.8	0	14.5	5.3	0	304	304	28.6	3.9	0
24	16.6	6.7	2.8	0	12.7	3.9	0	149	277	24.4	2.8	0
25	14.5	6.7	2.8	0	18.4	3.9	0	88.3	175	20.5	2.8	0
26	14.5	5.3	2.8	0	2,250	11.3	0	63.2	103	18.4	2.8	0
27	20.5	6.7	1.8	0	893	43.4	0	26.5	69.2	18.4	1.8	0
28	22.2	6.7	1.8	0	431	38.1	0	31.1	51.6	18.4	1.8	0
29	18.4		2.8	2,600	402	28.6	0	24.4	38.1	16.6	2.8	0
30	16.6		2.8	989	498	22.2	0	22.2	31.1	14.5	2.8	0
31	18.4		2.8		2,630		0	16.6		11.3		0
Sum	574.1	321.1	101.1	3,606.7	32,593.4	5,773.3	114.9	7,114.8	10,129.7	18,226.9	188.7	23.2

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	2.10	1.61	1	43.4	‡18	11.3	18.5	1,140	21,929	144,110	335
Feb.	1.74	1.48	1	18.4	26	5.3	11.5	637	15,469	98,520	637
Mar.	1.48	1.38	‡ 1	5.3	‡13	1.8	3.3	201	9,959	31,400	52.0
Apr.	7.64	1.08	29	4,240	‡27	0	120	7,150	15,289	54,500	56.4
May	10.07	1.57	6	8,020	24	9.9	1,050	64,600	49,188	* 253,000	5,120
June	6.53	1.41	4	2,220	26	2.8	192	11,500	40,026	192,000	2,710
July	1.94	.92	13	31.1	31	0	3.7	228	23,148	100,000	228
Aug.	7.05	.95	11	2,960	1	0	230	14,100	18,858	67,200	81.0
Sept.	8.53	1.31	11	5,090	8	0	338	20,100	107,089	600,000	3,310
Oct.	14.86	1.44	11	23,400	‡ 9	3.9	588	36,200	89,444	673,070	1,710
Nov.	1.67	1.38	12	14.5	‡27	1.8	6.3	374	33,410	248,590	246
Dec.	1.41	1.25	1	2.8	‡31	0	.7	46.0	24,178	198,160	46.0
Yearly	14.86	.92		23,400		0	216	156,276	447,987	1,350,260	101,796

‡ And other days. *Partly Estimated.

RIO GRANDE AT ZAPATA STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch located about 3 miles below the town of Zapata, Texas, 7.5 miles northeast of Guerrero, Tamaulipas, 1.3 miles below the confluence of the Rio Salado with the Rio Grande, and 927.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 55 meter measurements during the year, 52 by the United States and 3 by the Mexican section. Computations by shifting channel methods. 1939 records good. Records available: January 1932 to December 1939.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 4, 1932, when the extreme gage height was 262.07 feet and the extreme flow was 261,160 second feet. (See Special Flood Report 1932, by United States Section of this Commission.) The lowest flow recorded was on June 21, 1938, when the extreme gage height was 219.62 feet and the extreme flow 888 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,710	2,700	2,710	2,590	2,040	2,880	1,940	1,530	4,300	2,190	2,930	2,530
2	2,760	2,720	2,690	2,550	1,930	3,370	1,690	5,480	3,940	3,500	2,890	2,470
3	2,790	2,820	2,570	2,320	1,900	5,010	1,560	3,120	3,730	2,520	2,730	2,550
4	2,740	2,880	2,460	2,010	7,940	15,400	1,560	1,890	3,520	1,990	2,620	2,490
5	2,620	2,730	2,390	1,820	18,300	11,900	1,750	1,920	3,270	1,930	2,560	2,440
6	2,600	2,720	2,370	1,700	24,900	8,060	2,120	5,700	3,040	1,870	2,620	2,570
7	2,780	2,850	2,380	1,610	13,100	4,630	1,810	10,700	2,820	1,720	2,640	2,600
8	2,730	2,960	2,340	1,550	6,380	3,550	1,570	8,640	2,680	1,670	2,580	2,540
9	2,690	2,910	2,380	1,540	5,490	2,670	1,400	7,320	2,450	1,690	2,450	2,480
10	2,770	2,840	2,330	1,530	4,050	2,230	1,340	5,880	2,920	3,570	2,510	2,540
11	2,770	2,620	2,280	1,530	3,470	1,890	2,590	12,000	7,090	20,200	2,590	2,430
12	2,700	2,480	2,250	1,550	2,780	1,660	2,230	11,200	2,980	13,400	2,580	2,330
13	2,680	2,480	2,200	1,520	5,550	1,490	1,780	6,810	3,900	7,180	2,740	2,270
14	2,680	2,610	2,130	1,500	21,100	1,380	1,670	7,910	2,470	4,350	2,960	2,330
15	2,770	2,640	2,110	1,480	9,220	1,290	1,870	7,730	1,920	2,900	3,180	2,380
16	2,770	2,680	2,080	1,450	9,710	1,260	2,380	6,430	2,150	2,290	4,050	2,240
17	2,780	2,670	2,080	1,420	5,880	1,220	2,260	4,620	2,370	2,170	4,070	2,140
18	2,740	2,630	2,070	1,370	4,100	1,140	3,890	3,970	2,200	2,060	3,260	2,080
19	2,770	2,550	1,990	1,330	3,140	1,190	3,140	6,240	2,400	1,970	2,740	2,030
20	2,680	2,460	1,980	1,360	2,590	1,120	2,910	6,560	3,220	1,910	2,540	2,160
21	2,530	2,460	1,940	1,310	2,380	1,080	3,640	7,080	3,360	1,850	2,400	2,160
22	2,590	2,470	1,970	1,280	2,050	1,080	3,070	8,400	2,920	2,130	2,400	2,130
23	2,540	2,490	1,980	1,280	1,740	1,510	2,470	7,700	1,950	2,520	2,510	2,100
24	2,650	2,650	2,010	1,280	2,260	1,420	1,970	6,480	2,300	2,410	2,440	2,030
25	2,640	2,690	2,120	1,270	3,010	1,480	1,710	8,250	2,100	2,390	2,280	2,000
26	2,720	2,560	2,180	1,300	9,780	1,440	2,310	9,280	1,820	2,360	2,200	2,040
27	2,730	2,640	2,160	1,320	5,100	1,440	2,330	8,000	1,970	2,320	2,230	2,230
28	2,710	2,660	3,020	5,720	2,700	2,030	2,440	6,980	2,470	3,100	2,360	2,430
29	2,700		2,560	4,610	2,680	2,720	2,040	7,460	2,440	5,390	2,680	2,550
30	2,700		2,420	2,950	3,040	2,330	1,750	5,430	2,120	4,880	2,700	2,480
31	2,690		2,390		4,190		1,610	4,810		3,500		2,340
Sum	83,730	74,570	70,540	56,050	192,500	89,870	66,800	205,520	86,820	113,930	81,440	72,090

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1932-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	220.89	220.72	3	2,840	23	2,470	2,700	166,000	218,659	* 484,450	119,000
Feb.	220.89	220.67	9	3,020	21	2,380	2,660	148,000	176,022	* 361,350	111,000
Mar.	220.95	220.43	28	3,230	21	1,920	2,280	140,000	172,009	252,080	138,000
Apr.	222.50	220.00	28	8,210	25	1,260	1,870	111,000	156,396	226,000	110,000
May	228.15	220.23	6	33,200	31	1,460	6,210	382,000	282,619	584,000	134,000
June	225.40	219.76	4	21,800	22	1,040	3,000	178,000	370,432	1,517,000	115,000
July	221.36	219.94	18	4,420	11	1,310	2,150	132,000	373,088	1,238,000	132,000
Aug.	224.58	220.08	6	17,800	2	1,480	6,630	408,000	292,172	665,000	163,000
Sept.	222.94	220.33	11	10,100	26	1,720	2,890	172,000	1,028,771	2,895,330	172,000
Oct.	226.56	220.25	11	27,200	9	1,630	3,680	226,000	648,592	2,396,440	165,000
Nov.	221.56	220.52	16	5,000	26	2,140	2,710	162,000	257,442	748,020	133,000
Dec.	220.74	220.42	1	2,650	19	1,970	2,330	143,000	229,395	591,380	119,000
Yearly	228.15	219.76		33,200		1,040	3,270	2,368,000	4,205,597	8,038,070	2,231,000

* Partly Estimated.

RIO ALAMO STATION AT CD. MIER, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit down cable car and weir for measurement of flows up to 177 second feet, located about 3 miles from the confluence of the Rio Alamo with the Rio Grande and .7 of a mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Cantaro". This stream enters the Rio Grande 964.4 river miles below the American Dam near El Paso, Texas. Zero of gage is 187.04 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 43 meter measurements during the year. Computations by shifting channel methods, except at low flows. 1939 records good. Records available: July 1923 to December 31, 1939.

REMARKS: This station was constructed in December 1932. The flood of September 7, 1933 wrecked the tower on the left bank. In December, 1933, the cable was moved 980 feet upstream. The zero of its staff gage remained the same as before. The recorder and its gage were not moved. In September, 1934, a channel with a small weir of 12 second feet capacity was constructed for measuring low flows. In December, 1938, a new weir of 177 second feet capacity was built to replace the smaller weir. The flow of this spring-fed stream is modified by small storage and irrigation diversions above this station.

PREVIOUS RECORDED FLOWS: The greatest recorded flow occurred on September 7, 1933, with an extreme gage height of 26.9 feet and a corresponding flow of 76,600 second feet. The river is often dry. Numerous records of extreme flow may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.1	6.0	2.5	1.1	30.7	33.9	1.1	67.1	1.1	4.2	13.1	10.6
2	8.1	4.2	2.5	1.1	18.7	40.6	1.1	104	0	4.2	10.6	10.6
3	8.1	2.5	2.4	1.1	13.1	1,230	0	148	0	2.5	10.6	10.6
4	8.1	2.5	2.4	0	4,270	152	0	24.7	0	2.5	10.6	10.6
5	10.6	4.2	2.4	0	4,180	36.1	0	8.1	0	2.5	8.1	8.2
6	8.1	2.5	2.4	0	1,860	18.7	0	4.2	0	2.5	6.0	8.2
7	8.1	2.5	1.1	0	148	15.9	0	1.1	0	2.5	6.0	8.1
8	8.1	2.5	1.1	0	340	33.9	0	1.1	160	2.5	6.0	8.1
9	8.1	2.5	1.1	0	178	24.7	0	0	4.2	2.5	4.2	8.1
10	8.1	4.2	1.1	0	40.6	10.6	0	0	10.9	636	4.2	6.0
11	8.1	4.2	1.1	0	24.7	6.0	234	0	788	8,480	4.2	6.0
12	10.6	2.5	1.1	42.0	18.7	6.0	104	0	148	9,750	4.2	6.0
13	8.1	2.5	1.1	1,300	576	4.2	21.5	0	399	1,900	6.0	6.0
14	8.1	2.5	1.1	71.3	2,590	2.5	8.1	0	178	153	6.0	6.0
15	8.1	2.5	1.1	13.1	99.6	2.5	4.2	0	33.9	71.3	6.0	6.0
16	8.1	2.5	1.1	4.2	33.9	1.1	2.5	0	10.6	47.3	6.0	6.0
17	6.0	2.5	1.1	2.5	21.5	1.1	1.1	0	81.9	33.9	6.0	6.0
18	4.2	2.5	1.1	2.5	15.9	1.1	1.1	0	112	27.9	6.0	6.0
19	4.2	2.5	1.1	1.1	13.1	1.1	1.1	107	918	24.7	6.0	6.0
20	2.5	1.1	2.4	1.1	10.6	1.1	0	547	1,560	21.5	6.0	6.0
21	2.5	2.5	4.1	1.1	8.1	1.1	0	766	1,250	18.7	6.0	6.0
22	2.5	2.5	6.0	0	6.0	0	0	43.8	236	15.9	6.0	6.0
23	2.5	4.2	6.0	0	4.2	0	0	10.6	84.8	15.9	6.0	6.0
24	4.2	4.2	4.2	0	4.2	0	0	4.2	37.1	15.9	6.0	6.0
25	2.5	4.2	4.2	0	18.7	152	0	2.5	21.5	15.9	6.0	6.0
26	4.2	4.2	2.4	0	43.8	83.6	0	2.5	13.1	13.1	6.0	6.0
27	37.1	4.2	2.4	0	15.9	15.9	0	2.5	8.1	13.1	6.0	6.0
28	67.2	2.5	2.5	6,500	8.1	8.1	0	1.1	8.1	13.1	6.0	6.0
29	18.7		2.5	1,890	183	4.2	0	1.1	6.0	13.1	10.6	6.0
30	10.6		1.1	67.1	1,110	2.5	0	1.1	6.0	13.1	10.6	6.0
31	6.0		1.1		104		131	1.1		13.1		6.0
Sum	309.5	87.4	67.8	9,899.3	15,989.1	1,890.5	510.8	1,848.8	6,076.3	21,332.4	205.0	215.1

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day	High	Day	Low			Normal	Maximum	Minimum
Jan.	2.43	1.38	28	120	31	2.5	10.0	614	6,500	34,900	0
Feb.	1.44	1.35	1	6.0	20	1.1	3.1	173	4,844	25,500	67.2
Mar.	1.44	1.35	22	6.0	‡14	1.1	2.2	134	3,822	19,800	63.0
Apr.	13.16	1.18	28	12,100	‡ 4	0	330	19,600	8,078	26,700	443
May	9.48	1.38	4	7,380	25	2.5	516	31,700	19,566	* 137,000	209
June	5.09	1.31	3	1,970	‡22	0	63.0	3,750	14,984	83,230	0
July	4.33	.92	31	1,100	‡ 3	0	16.5	1,010	9,795	37,590	256
Aug.	6.89	1.15	20	4,630	‡ 9	0	59.6	3,670	8,819	56,900	0
Sept.	5.02	.89	20	1,920	‡ 2	0	203	12,100	29,005	190,520	* 135
Oct.	13.02	1.35	12	11,900	10	1.1	688	42,300	15,403	51,620	0
Nov.	1.57	1.41	1	15.9	‡ 9	4.2	6.8	407	5,148	21,940	0
Dec.	1.51	1.44	‡ 1	10.6	‡10	6.0	6.9	427	5,124	15,000	124
Yearly	13.16	.89		12,100		0	160	115,885	131,088	316,803	11,898.7

* Partly Estimated. ‡ And other days.

RIO GRANDE AT ROMA STATION

DESCRIPTION: Water-stage recorder at international bridge between Roma, Texas and San Pedro, Tamaulipas, and 972.0 river miles below the American Dam at El Paso, Texas. Zero of gage is 145.90 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 93 mster measurements, 67 by the Mexican and 26 by the United States Section, during the year from bridge. Computations by shifting channel methods. 1939 records good. Records available: August 1900 to March 1914; November 1922 to December 1939.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. This station was operated by the Mexican section until March 1929 when operation and maintenance was taken over by the United States section. On August 1, 1939, the operation and maintenance of this station was turned over again to the Mexican section of the Commission. Datum of present gage is 1.1 foot lower than that used prior to 1922. Backwater from the Rio San Juan sometimes reaches this station. See Water Bulletin No. 3, page 50.

PREVIOUS EXTREME FLOWS: The greatest previous recorded flow was on September 5, 1932, when the extreme gage height was 35.4 feet and the extreme flow 203,000 second feet. (See Special Flood Report 1932 by United States Section of this Commission.) The lowest flow ever recorded was on August 25, 1937, when the extreme flow was 914 second feet, at a stage of -.32 feet. Records of other extreme flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 2,690	2,700	2,580	2,260	2,500	5,120	2,210	1,840	4,480	1,990	2,890	2,620
2	* 2,720	2,700	2,580	2,440	2,030	3,740	1,910	2,040	4,130	2,450	2,540	2,400
3	* 2,820	2,720	2,540	2,380	1,980	6,000	1,680	5,830	3,780	3,240	2,550	2,340
4	* 2,870	2,790	2,400	2,210	8,400	10,900	1,550	2,730	3,600	2,510	2,400	2,370
5	* 2,810	2,790	2,330	2,100	14,600	13,000	1,720	1,690	3,350	1,910	2,340	2,360
6	* 2,740	2,680	2,290	1,890	27,900	10,300	2,300	1,660	3,090	1,720	2,330	2,440
7	* 2,760	2,690	2,300	1,790	16,800	6,140	2,030	8,790	2,960	1,670	2,470	2,530
8	* 2,770	2,820	2,280	1,740	8,760	4,410	1,740	7,770	3,100	1,630	2,450	2,520
9	* 2,770	2,850	2,230	1,740	7,450	3,470	1,540	7,980	3,150	1,700	2,430	2,430
10	* 2,780	2,790	2,240	1,630	5,720	2,750	1,410	6,180	2,630	1,700	2,370	2,380
11	2,790	2,700	* 2,250	1,600	4,480	2,360	1,430	7,060	6,110	38,100	2,430	2,430
12	* 2,790	2,570	* 2,180	1,590	3,740	2,040	2,010	12,360	5,370	24,500	2,500	2,340
13	* 2,710	2,500	* 2,130	2,690	4,980	1,790	2,250	7,910	3,450	11,300	2,420	2,250
14	* 2,700	2,550	2,110	1,750	25,300	1,580	1,770	6,960	2,970	5,690	2,680	2,120
15	* 2,740	2,630	2,090	1,550	14,200	1,400	1,800	8,090	2,190	3,670	2,790	2,200
16	* 2,800	2,650	2,090	1,460	10,800	1,240	2,100	7,770	1,620	2,690	2,900	2,260
17	2,780	2,610	2,030	1,430	7,800	1,230	2,840	5,900	2,920	2,360	4,310	2,060
18	2,760	2,610	1,990	1,380	* 5,510	1,220	2,700	4,560	2,330	2,250	3,500	2,010
19	2,730	2,600	1,920	1,350	4,100	1,190	3,710	4,030	3,710	2,140	2,840	2,000
20	2,760	2,530	1,900	1,310	3,370	1,210	3,010	8,370	6,780	2,120	2,510	1,990
21	2,690	2,480	1,900	1,340	2,970	1,120	3,100	7,590	6,670	1,810	2,420	2,020
22	2,640	2,480	1,860	1,280	2,790	1,060	3,450	9,250	3,880	1,980	2,370	2,110
23	2,660	2,530	1,830	1,290	2,490	1,120	2,890	7,350	2,670	2,320	2,330	2,150
24	2,660	2,610	1,840	1,310	2,310	1,680	2,430	7,240	2,010	2,630	2,350	2,130
25	2,750	2,790	1,850	1,260	4,560	1,820	2,120	7,060	2,360	2,290	2,320	2,110
26	2,760	2,720	1,950	1,250	6,530	1,680	1,930	9,360	2,070	2,270	2,190	2,070
27	2,940	2,570	1,980	1,270	8,400	1,520	2,430	8,480	1,890	2,250	2,210	2,070
28	2,900	2,580	2,000	5,860	4,170	1,520	2,330	7,700	1,970	2,100	2,260	2,200
29	2,770		2,170	7,520	2,870	2,170	2,370	7,700	2,490	3,740	2,500	2,370
30	2,730		* 2,340	4,590	7,770	2,530	2,040	6,430	2,540	4,910	2,710	2,480
31	2,740		2,400		3,490		1,840	5,230		3,920		2,390
Sum	*85,530	74,240	66,580	63,260	228,770	97,310	68,640	202,910	100,270	145,560	77,310	70,150

Month	Extreme Gage Feet — 1939 High	Extreme Gage Feet — 1939 Low	Extreme Second Feet — 1939 High Day	High	Low Day	Low	Average Second Feet 1939	Acre Feet Total 1939	Acre Feet Period 1924-1939 Normal	Maximum	Minimum
Jan.	1.31	.95	27	2,970	23	2,590	2,760	*170,000	229,268	467,370	119,000
Feb.	1.25	.79	9	2,890	22	2,430	2,650	147,000	186,333	349,000	108,000
Mar.	1.57	.33	1	2,600	22	1,810	2,150	132,000	178,980	260,610	99,000
Apr.	7.02	-.23	29	14,900	27	1,130	2,110	125,500	186,846	400,000	104,000
May	11.68	.49	6	32,600	3	1,950	7,380	454,000	353,062	683,000	133,000
June	7.87	-.16	4	18,300	23	1,030	3,240	193,000	388,909	1,586,000	92,600
July	2.17	.03	19	4,030	10	1,390	2,210	136,000	338,771	1,217,000	131,000
Aug.	6.92	.16	12	13,600	2	1,560	6,550	402,000	316,238	743,000	157,000
Sept.	5.02	.49	11	9,750	27	1,850	3,340	199,000	835,291	3,047,630	117,000
Oct.	14.83	.33	11	53,700	8	1,630	4,700	289,000	577,352	2,371,870	163,000
Nov.	2.82	.89	17	4,730	27	2,160	2,580	153,000	257,104	735,960	127,000
Dec.	1.28	.59	1	2,670	19	1,940	2,260	139,000	227,707	565,140	114,000
Yearly	14.83	-.23		53,700		1,030	3,510	2,539,500	4,075,861	8,098,030	2,227,000

* Partly Estimated.

RIO SAN JUAN STATION AT SANTA ROSALIA, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located about 27.5 miles above the confluence with the Rio Grande and 15 miles south of Ciudad Camargo, Tamaulipas, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station. This stream joins the Rio Grande 987.2 river miles below the American Dam at El Paso, Texas. Zero of gage is 205.15 feet, U.S.C. & G.S. sea level datum.

RECORDS: Based upon 186 meter measurements during the year. Computations by shifting channel methods. 1939 records good. Records available: May 1, 1900 to 1913; 1923 to 1939.

REMARKS: This station has not always been at its present site. For detailed history of gage changes see previous Water Bulletins. When the river at this station rises above a gage height of 36.1 feet, water overflows the west river bank above the station and returns to the river below. It is estimated that a peak flow of 21,000 second feet thus by-passed this station in 1938. In the light of the 1938 flood, the peak flow of the 1932 flood is now estimated at 212,000 second feet including 18,000 second feet of by-pass to the west; also the mean daily discharge on Sept. 29 and 30, 1932 is now estimated at 182,000 and 117,000 second feet, respectively, which includes 11,300 and 3,530 second feet, respectively, of water which by-passed the station. These new amounts are included in the tabulated normals below. 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 was modified at this station by irrigation diversions and other uses along the San Juan river basin.

PREVIOUS EXTREME FLOWS: For the flood of September 29, 1932, see preceeding paragraph. On August 30, 1909, there occurred a flood which reached a height of 49.21 feet, present scale, according to records of residents of the region. Slope-area computations and measurements during the 1932 and 1933 floods, show the 1909 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.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	558	364	173	103	1,670	2,230	151	22.2	34.3	420	417	339
2	558	345	174	101	848	1,670	118	21.5	30.7	347	381	360
3	562	312	166	92.5	530	1,910	89.3	23.3	25.1	313	371	357
4	540	305	165	77.7	3,990	1,660	72.7	24.7	23.0	281	345	336
5	530	297	164	68.9	17,200	604	64.3	32.8	16.6	273	337	317
6	516	290	164	63.6	4,660	367	55.1	98.9	10.6	256	325	307
7	505	280	149	54.4	1,240	360	50.5	108	7.1	245	322	310
8	491	279	144	52.3	752	1,840	47.3	72.4	8.1	229	310	314
9	477	278	138	54.7	537	886	44.5	52.3	9.5	188	307	322
10	473	278	141	57.2	667	403	45.2	98.2	10.6	179	308	321
11	452	267	127	53.3	745	325	961	742	11.7	26,100	289	310
12	445	247	130	53.7	484	270	1,110	572	40.6	37,100	272	301
13	434	236	126	176	1,240	245	2,210	289	26.1	8,860	234	289
14	420	222	125	1,070	15,500	166	1,240	161	17.0	3,090	224	274
15	420	207	116	576	2,990	134	547	120	24.7	1,660	223	269
16	438	206	117	381	1,090	109	611	82.6	238	1,180	240	257
17	410	193	110	262	745	85.8	424	74.2	186	985	266	262
18	385	186	108	192	586	69.9	255	111	176	890	257	259
19	381	181	100	156	473	56.2	161	127	1,200	918	248	248
20	364	176	98.5	121	392	59.0	111	224	7,880	826	247	228
21	353	174	104	96.8	344	505	84.8	1,340	8,020	731	236	206
22	352	173	109	235	296	562	66.7	1,720	5,720	657	234	195
23	339	166	108	696	254	629	51.6	1,010	2,000	604	234	205
24	339	176	107	1,340	216	427	45.9	551	1,080	555	235	204
25	339	188	106	780	171	544	39.2	283	1,210	597	236	193
26	338	200	105	509	427	544	33.5	250	982	611	238	190
27	349	189	105	392	252	971	30.0	165	816	484	248	190
28	357	185	106	523	232	452	27.2	116	650	470	262	171
29	360		107	1,750	232	277	25.4	80.5	562	431	276	162
30	385		106	3,340	908	231	24.0	56.9	498	406	302	172
31	378		106		805		25.1	45.6		445		172
Sum	13,248	6,600	3,904.5	13,428.1	60,476	18,591.9	8,821.3	8,675.1	31,513.7	90,331	8,424	8,040

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total	Period 1924-1939		
	High	Low	Day		Day			1939	Normal	Maximum	Minimum
Jan.	3.97	3.25	1	576	26	329	427	26,300	35,089	93,500	9,230
Feb.	3.44	2.76	1	374	23	166	236	13,100	22,456	92,810	3,740
Mar.	2.79	2.49	2	174	20	98.5	126	7,740	16,498	56,570	1,810
Apr.	10.66	2.20	30	4,520	8	52.3	448	26,600	18,829	98,500	1,670
May	17.95	2.76	14	23,800	25	162	1,950	120,000	55,391	136,360	3,500
June	8.99	2.17	8	3,310	20	59.0	620	36,900	105,243	586,000	5,160
July	8.14	1.87	13	2,980	31	22.6	285	17,500	83,442	280,000	2,840
Aug.	7.84	1.87	21	2,890	2	21.5	280	17,200	⊕ 112,764	⊕ 802,000	2,120
Sept.	14.57	1.80	20	9,850	7	7.1	1,050	62,500	⊕ 249,891	1,411,080	22,790
Oct.	25.10	2.72	11	65,000	10	168	2,910	179,000	162,022	772,040	18,970
Nov.	3.64	3.02	1	417	15	223	281	16,700	57,361	221,640	12,900
Dec.	3.35	2.72	3	360	31	161	259	15,900	41,552	135,490	12,000
Yearly	25.10	1.80		65,000		7.1	745	539,440	960,538	3,387,480	328,180

⊕ Includes the water which by-passed to the west of the station.

RIO GRANDE AT RIO GRANDE CITY STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located about 4 miles by river below Rio Grande City, Texas, 3.7 miles northeast of Camargo, Tamaulipas, 7.3 miles below the confluence of the Rio San Juan with the Rio Grande and 994.5 river miles below the American Dam at El Paso, Texas. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 66 meter measurements during the year, 58 by the United States and 8 by the Mexican section. Computations by shifting channel methods. 1939 records good. Records available: January 1, 1932 to December 31, 1939.

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 172,000 second feet at the Santa Rosalia station, water begins to overflow the right bank of that river at several places from El Azucar (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. In the 1932 flood 411,000 acre feet and in 1938, 12,000 acre feet of water are estimated to have thus by-passed the Rio Grande City station and reached the Rio Grande, but these estimated amounts of by-pass water are included in the tabulation below. The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico.

PREVIOUS EXTREME FLOWS: The highest reported gage height was in 1909, when the extreme gage height was 159.2 feet, present gage datum, as reported by residents and confirmed by extreme gage height at Rio Grande City Weather Bureau gage and other points in the vicinity, as found in Joint Report of International Boundary Commission 1910-11. The lowest recorded flow was on June 11, 1938 when the extreme gage height was 124.95 feet and the extreme flow 984 second feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,340	3,140	2,760	2,330	7,710	6,040	2,650	1,920	4,920	2,850	4,080	3,090
2	3,340	3,110	2,750	2,450	4,740	6,760	2,140	1,850	4,500	2,470	3,340	3,000
3	3,390	3,090	2,730	2,560	3,700	6,120	1,780	4,170	4,250	3,710	3,140	2,830
4	3,420	3,160	2,850	2,380	6,330	11,000	1,570	3,910	4,130	3,090	2,980	2,820
5	3,350	3,140	2,800	2,180	25,000	15,000	1,470	2,290	4,060	2,380	2,840	2,840
6	3,280	3,040	2,600	2,010	38,500	11,800	2,030	1,850	* 3,630	2,150	2,730	2,790
7	3,300	3,030	2,550	1,860	22,700	8,020	2,270	4,680	* 3,240	2,120	2,750	2,810
8	3,250	* 3,160	2,550	1,760	12,400	5,260	1,900	8,900	* 2,870	2,010	2,860	2,900
9	3,280	* 3,200	2,450	1,690	9,960	5,360	1,600	8,160	3,100	1,930	2,830	2,930
10	3,320	3,040	2,450	1,640	8,440	3,700	1,470	7,950	2,580	2,010	2,790	2,780
11	3,340	2,950	2,400	1,620	7,550	2,790	1,410	6,130	3,280	*32,100	2,730	2,770
12	3,280	2,820	2,400	1,610	7,370	2,330	2,770	12,400	7,420	*68,200	2,750	2,710
13	3,230	2,790	2,350	2,130	8,040	1,970	3,290	10,300	4,000	*32,300	2,830	2,570
14	3,210	2,800	2,300	3,340	41,900	1,770	4,160	7,190	4,220	*12,700	2,720	2,480
15	3,390	2,830	2,300	2,390	27,900	1,640	3,000	7,880	3,160	* 7,740	2,580	2,450
16	3,280	2,860	2,250	* 1,890	12,700	1,530	2,490	8,110	2,260	* 5,360	2,860	2,510
17	3,270	2,830	2,250	* 1,750	10,900	1,460	3,210	6,930	2,430	3,900	4,040	2,580
18	3,250	* 2,830	2,200	* 1,670	7,540	1,400	3,040	5,250	3,920	3,420	4,810	2,390
19	3,130	* 2,830	2,200	* 1,640	5,530	1,330	3,500	4,480	4,080	3,160	3,810	2,340
20	3,160	2,860	2,150	* 1,590	4,060	1,290	3,480	6,440	13,900	3,040	3,080	2,310
21	3,120	2,620	2,100	* 1,740	3,180	1,300	2,870	8,250	16,800	2,860	2,820	2,330
22	3,070	* 2,860	2,150	1,990	2,690	1,470	3,340	9,380	10,600	2,630	2,690	2,410
23	3,070	* 2,770	2,050	1,540	2,220	1,630	3,020	9,150	7,060	2,650	2,670	2,380
24	3,050	* 2,840	2,000	2,020	1,800	1,830	2,540	8,640	4,240	2,850	2,730	2,370
25	2,980	3,010	2,020	2,360	2,800	2,620	2,240	7,150	3,530	3,050	2,770	2,400
26	3,090	2,970	2,090	* 1,940	5,070	2,510	2,050	8,990	3,320	3,070	2,660	2,380
27	3,280	2,800	2,190	* 1,720	9,470	2,190	2,520	9,920	3,000	3,020	2,560	2,320
28	3,310	2,760	2,140	3,490	5,680	2,320	2,420	8,250	2,740	2,910	2,530	2,380
29	3,150		2,550	12,900	2,790	1,950	2,400	7,260	2,920	3,260	2,590	2,470
30	3,050		2,510	8,980	5,540	2,820	2,260	7,320	3,000	5,350	2,830	2,610
31	3,040		2,320		7,230		1,960	5,640		5,340		2,700
Sum	100,020	82,140	73,410	79,170	321,440	117,210	76,850	210,740	143,160	*233,630	89,400	80,650

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	126.86	126.25	4	3,430	25	2,960	3,230	198,000	269,879	521,000	140,000
Feb.	126.52	125.92	9	3,220	21	*2,600	2,930	163,000	214,499	* 368,690	125,000
Mar.	126.10	125.23	29	2,800	24	1,980	2,370	146,000	200,986	284,000	108,000
Apr.	132.00	124.68	29	16,300	21	1,490	2,640	157,000	208,483	395,000	118,000
May	139.49	126.20	14	49,500	4	3,450	10,400	638,000	419,692	638,000	153,000
June	133.10	124.91	5	17,500	22	1,250	3,910	232,000	496,488	1,737,000	94,300
July	127.86	125.01	14	4,580	11	1,380	2,480	152,000	431,343	1,240,000	152,000
Aug.	131.89	125.25	12	14,100	2	1,740	6,800	418,000	407,567	1,280,000	163,000
Sept.	132.95	125.73	21	18,300	17	2,030	4,770	284,000	1,073,205	3,723,800	147,000
Oct.	146.43	125.63	12	73,100	9	1,890	7,540	*463,000	762,261	2,852,270	204,000
Nov.	127.97	125.95	1	4,670	28	2,520	2,980	177,000	322,720	829,260	156,000
Dec.	126.35	125.61	2	2,960	20	2,280	2,600	160,000	274,753	625,260	143,000
Yearly	146.43	124.68		73,100		1,250	4,400	3,188,000	5,081,876	9,537,640	2,642,000

* Partly Estimated.

RIO GRANDE AT HIDALGO STATION

DESCRIPTION: Water-stage recorder on the United States end of the Hidalgo-Reynosa international bridge near Hidalgo, Texas, and Reynosa, Tamaulipas, and 1,053.0 river miles below the American Dam at El Paso, Texas, and 144.6 river miles from the Gulf of Mexico. Zero of the gage is 79.28 feet above mean sea level, United States Coast and Geodetic Survey datum. Meter measurements are from the bridge.

RECORDS: Based upon 55 meter measurements during the year. Computations by shifting channel methods. Records available: July 1928 to December 1931; September and October 1932, and September 1933: peak flows in 1934; January to July, also September 1935; peak flows May and October, also full record July and September 1936; April 26 to December 31, 1938; January to November 1939. 1939 record good.

REMARKS: From 1931 to 1937 this station was operated only during flood periods. The river flow is greatly modified by irrigation diversions and large reservoirs in the United States and Mexico. Water begins to flow into Hackney Lake and Mission floodway inlets on the United States side when the river at this station reaches a stage of about 21.5 feet or a flow of about 60,000 second feet, but the river may begin to overflow at Granjeno and Jardin de Flores at stages about 3.5 feet lower. The bottom of the river at this station is subject to considerable erosion during floods. See Water Bulletin No. 3, page 38. On November 15, 1939 the bridge (suspension) over the river at this point collapsed and the gaging station was not operated for the remainder of the year.

PREVIOUS EXTREME FLOWS: The highest recorded stage was in 1909 when 27.89 feet on the present gage was reached. In 1910, 24.82 was reached. These were before the present river bridge and highway embankments were constructed at this point. In 1932 the peak stage was 25.85 and the peak flow was 83,870 second feet. See previous Water Bulletins and Special Flood Report 1932 by the United States Section.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,630	3,290	2,340	2,130	6,770	6,760	1,720	2,040	5,310	3,480	4,920	
2	3,540	3,200	2,310	2,200	5,650	6,300	2,230	2,150	4,640	2,800	4,180	
3	3,430	3,060	2,420	2,160	3,930	6,770	1,980	2,220	4,310	2,900	3,320	
4	3,410	3,070	2,450	2,140	2,880	7,230	1,400	3,030	3,900	2,800	2,890	
5	3,440	3,130	2,560	2,040	7,740	12,400	1,600	4,190	3,480	3,000	2,990	
6	3,310	3,220	2,410	1,840	30,400	12,000	1,000	3,400	3,050	2,800	2,700	
7	3,240	3,090	2,100	1,680	33,200	10,100	1,140	2,530	2,940	2,300	2,280	
8	3,320	2,870	2,050	1,670	19,000	7,780	1,640	4,200	2,860	2,110	2,480	
9	3,350	3,020	2,080	1,750	11,100	6,220	1,650	7,300	2,880	2,000		
10	3,300	3,120	2,090	1,520	8,000	5,830	1,460	7,540	3,110	1,890		
11	3,340	3,150	2,070	1,290	6,640	4,590	1,100	6,800	3,060	4,240		
12	3,310	3,160	2,170	1,210	5,740	3,550	1,350	6,820	3,600	38,000		
13	3,330	2,910	2,090	1,370	5,210	3,060	1,680	10,500	5,930	49,000		
14	3,220	2,610	1,860	1,660	15,900	2,590	2,900	8,690	4,810	28,100		
15	3,120	2,540	* 1,800	2,660	37,800	2,270	3,690	6,770	4,160	11,300		
16	2,980	2,570	* 2,020	2,700	20,600	2,040	2,900	6,990	3,770	6,670		
17	2,960	2,590	2,050	2,140	13,600	1,890	2,350	7,030	2,890	5,060		
18	3,000	2,870	2,070	1,710	10,000	1,800	2,650	6,240	2,470	3,500		
19	2,960	2,940	2,140	1,540	6,460	1,580	2,980	5,000	3,010	3,190		
20	3,020	2,880	2,050	1,520	5,310	1,350	3,000	4,520	3,600	2,880		
21	3,030	2,620	1,860	1,420	4,380	1,280	3,000	5,910	12,000	2,690		
22	3,160	2,660	1,780	1,500	3,640	1,200	2,800	7,100	14,000	2,500		
23	3,140	2,630	1,820	1,920	3,140	1,080	3,360	8,310	10,500	2,400		
24	2,860	2,610	1,730	1,570	2,840	1,200	3,420	7,850	8,000	2,200		
25	2,860	2,630	1,750	1,520	2,460	1,390	2,700	7,280	5,000	2,400		
26	2,930	2,740	1,920	2,060	2,690	1,680	2,410	6,680	4,000	2,510		
27	3,240	2,710	1,860	1,940	5,140	1,860	1,980	7,870	3,500	2,600		
28	3,410	2,490	1,780	1,770	7,780	1,490	1,880	8,170	2,900	2,500		
29	3,490		1,800	3,710	5,900	1,590	2,250	7,240	2,500	2,500		
30	3,430		1,870	8,150	3,860	1,450	2,300	6,680	2,700	2,970		
31	3,340		2,170		5,770		2,200	6,400		4,290		
Sum	100,100	80,380	63,470	62,490	303,530	120,330	68,720	187,450	138,880	207,580		

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	3.85	2.81	1	3,640	24	2,800	3,230	199,000			
Feb.	3.48	2.23	1	3,300	28	2,410	2,870	159,000			
Mar.	2.84	1.15	5	2,590	28	1,700	2,050	126,000			
Apr.	8.06	.40	30	9,280	12	1,140	2,080	124,000			
May	16.37	2.70	15	40,000	26	2,280	9,790	602,000	391,500	602,000	181,000
June	10.72	1.16	5	14,200	23	1,040	4,010	239,000	154,750	239,000	*70,500
July	4.35	.47	15	3,850	6	904	2,220	136,000	562,500	989,000	136,000
Aug.	8.90	1.70	13	10,900	1	1,940	6,050	372,000	675,000	978,000	372,000
Sept.	10.05	2.82	22	14,800	18	2,320	4,630	275,000	978,000	1,681,000	275,000
Oct.	19.88	2.22	13	51,600	10	1,840	6,700	412,000	532,500	653,000	412,000
Nov.											
Dec.											
Yearly											

* Partly Estimated.

RIO GRANDE AT MERCEDES BRIDGE STATION

DESCRIPTION: Prior to January 8, 1938, a staff-gage located at Mercedes pumping plant, about 500 feet upstream from the international bridge between Mercedes, Texas and Rio Rico, Tamaulipas. Zero of this gage is 50.53 feet above mean sea level, United States Coast and Geodetic Survey datum. After January 8, 1938, a water-stage recorder located 380 feet downstream from the above mentioned bridge and 1,090.9 river miles below the American Dam at El Paso, Texas. Zero of this new gage is United States Coast and Geodetic Survey mean sea level datum. Meter measurements made from the bridge.

RECORDS: Based upon 12 current meter measurements during the year and the previous rating curve. Computations by shifting channel methods. 1939 gage height record good and discharge records fair. Records of discharge are available for September and October 1932; April 28 to October 3, 1935; July 1 to 31, September 1 to October 3, 1936; October 24 to December 31, 1937; June 7 to June 17, July 26 to August 7, August 29 to September 6, and September 12 to October 7, 1938; May 5 to 8, June 5 to 12, July 6 to 8, September 22 and 23, and October 12 to 15, 1939. Unpublished records of daily river stage are available for each year from 1910 to 1937, except 1913. Mean daily gage height records for 1938 and 1939 are available in Water Bulletins Nos. 8 and 9.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande, as part finds outlet to the Gulf of Mexico through flood channels in both countries.

PREVIOUS EXTREME FLOWS: The highest previous recorded stage was on September 11, 1935, when a stage of 76.60 feet was reached, with a flow of 40,000 second feet.

Mean Daily Gage Height in Feet — 1939

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	56.92	56.30	54.71	53.95	58.84	59.97	53.70	54.48	*58.64	*55.62	57.37	55.64
2	56.75	56.08	54.44	54.02	58.18	59.82	54.14	54.39	*58.04	*55.52	57.55	55.40
3	56.47	55.74	54.62	54.04	*57.00	59.99	54.69	54.57	*57.50	*55.27	57.07	55.83
4	56.27	55.87	54.76	53.72	*55.81	60.05	54.91	54.21	*56.85	*54.80	56.62	55.49
5	56.13	56.13	54.90	53.78	*56.19	*62.09	54.33	54.44	*56.40	*55.28	56.65	54.99
6	56.36	56.09	55.11	53.51	*64.49	*63.89	53.18	56.40	*55.68	*55.09	56.27	54.93
7	56.20	55.95	54.59	53.34	*69.38	62.96	51.97	55.46	*55.42	*54.84	55.54	54.60
8	56.35	55.52	54.04	53.13	*66.52	61.92	52.26	54.27	*55.29	*54.81	55.29	54.60
9	56.30	55.54	53.92	53.95	62.52	*60.46	53.50	57.85	*55.04	*54.48	55.38	54.89
10	56.18	55.54	53.95	53.73	60.60	*59.52	53.79	*59.38	*55.57	*54.41	55.49	55.21
11	56.23	55.87	53.99	52.91	59.83	59.05	53.84	*59.39	*55.90	*54.20	55.75	55.16
12	56.04	56.02	54.13	52.50	58.91	57.99	54.08	*59.15	*55.98	*63.76	56.09	54.73
13	56.10	55.73	54.32	53.33	58.34	57.12	54.33	*60.84	*57.59	*71.09	56.06	55.19
14	56.19	55.07	53.88	54.00	59.50	56.44	54.89	*61.52	*58.50	*71.06	55.68	55.21
15	56.31	54.64	53.42	54.19	*68.52	55.93	56.35	*59.71	57.20	*64.79	55.34	54.75
16	56.23	54.72	53.86	55.19	67.51	*55.45	56.90	*58.96	*57.09	61.25	55.38	54.79
17	55.91	54.70	54.58	55.37	62.81	*55.06	56.07	*58.91	*56.40	*59.65	55.73	55.01
18	55.70	55.40	54.72	54.78	61.84	54.78	55.34	*58.84	*55.66	*58.78	56.05	55.17
19	55.52	55.82	54.87	53.94	60.62	54.59	54.90	*58.15	*55.48	*57.89	57.01	55.40
20	55.56	55.62	54.63	53.58	59.75	54.04	55.00	*57.40	*55.88	*57.25	57.27	55.50
21	55.57	55.32	54.14	53.80	59.02	53.36	55.21	*57.50	*59.37	57.06	56.76	55.52
22	55.72	55.26	54.15	53.80	58.47	*53.09	55.73	*59.09	*63.04	*56.92	55.90	55.71
23	56.02	55.15	53.89	53.85	57.97	*53.20	56.00	*59.93	*62.19	*56.55	55.36	55.38
24	55.76	55.27	53.80	54.23	57.28	*53.00	55.77	*60.78	*59.93	*56.08	55.25	55.11
25	55.53	55.02	54.01	53.42	56.81	53.28	55.55	*60.25	*58.46	*55.36	55.29	54.75
26	55.55	55.27	54.13	53.68	56.28	54.05	54.91	*59.91	*57.41	*55.45	55.61	54.83
27	56.05	55.31	54.11	54.72	57.11	*54.56	54.20	*59.83	*56.94	*55.90	55.70	54.78
28	56.41	55.03	53.82	54.58	59.91	*54.62	53.61	*60.55	*56.46	*56.07	55.61	54.76
29	56.55		53.50	53.96	60.23	*53.98	53.59	*60.33	*56.05	*56.43	55.57	54.79
30	56.58		53.37	58.77	58.53	54.02	54.49	*59.65	*55.77	*56.21	55.78	54.83
31	56.52		53.48		57.65		54.77	*59.21		*56.21		54.97

Mean Daily and Extreme Discharges in Second Feet — 1939

Date	Flow	Date	Flow	Date	Flow	Date	Flow	Date	Flow
May 5	* 2,050	May 10	6,860	June 5	*10,200	July 7	199	Oct. 13	*34,300
May 6	*13,100	May 15	*26,400	June 6	*13,700	July 8	348	Oct. 14	*32,900
May 7	*31,000	May 16	22,800	June 7	12,400	Sept. 22	*10,400	Oct. 15	*11,000
May 8	*20,000	May 17	11,000	June 8	9,810	Sept. 23	* 9,210		
May 9	10,800	May 18	9,070	July 6	805	Oct. 12	*10,900		

Extreme	⊕ May	⊕ June	# July	⊕ September	⊕ October
Gage Height in Feet	70.06	* 64.25	51.70	* 63.50	* 71.77
Second Feet	32,800	*14,200	100	* 11,000	* 36,500

* Partly Estimated. ⊕ Extreme High. # Extreme Low.

RIO GRANDE AT MATAMOROS STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car and winch. The water-stage recorder is attached to the central pier of the railroad bridge over the Rio Grande between Matamoros, Tamaulipas and Brownsville, Texas, 53.1 miles upstream from the Gulf of Mexico and 1,144.5 river miles below the American Dam at El Paso, 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 upon 156 meter measurements during the year. The river bottom shifts greatly at this station. Computations by shifting channel methods. 1939 records good. Records available: 1901 to 1913; 1923 to December 1939.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande as part finds outlet to the Gulf of Mexico through flood channels in both countries. In May 1924 a recorder was established ½ mile upstream from the bridge. In September 1925 the recorder was moved to its present location. On October 3, 1930 the zero of the gage was lowered 5 feet.

PREVIOUS EXTREME FLOWS: The greatest previous flow recorded here was on June 22, 1903, when a mean daily flow of 36,200 second feet occurred with a gage height of 13.2 feet. The highest gage reading was on June 18, 1935, when a reading of 22.28 feet, present gage, was reached. In 1930 the river at this station was dry for a few days in March and April. On June 17, 1938 the minimum flow was 9.5 second feet with a stage of 1.44 feet.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,640	3,030	1,590	512	5,300	3,670	682	1,180	5,650	1,710	1,570	1,590
2	3,490	2,940	1,330	805	5,540	5,540	713	1,390	4,980	1,820	1,920	1,650
3	3,250	2,840	1,120	1,080	4,730	6,110	770	1,480	4,310	1,590	2,190	1,680
4	3,140	2,560	1,150	749	3,440	6,320	964	1,450	3,710	1,230	2,150	1,840
5	2,810	2,620	1,440	622	2,600	6,750	1,220	1,340	3,060	975	2,010	1,560
6	2,480	2,810	1,630	554	7,200	12,600	1,010	1,630	2,650	1,260	1,960	1,160
7	2,620	2,650	1,540	438	24,800	13,100	706	2,510	2,020	1,350	1,670	950
8	2,780	2,550	1,290	388	27,500	10,300	420	2,140	1,780	1,290	1,270	883
9	3,010	2,300	862	448	15,900	7,800	273	1,380	1,730	1,320	1,010	848
10	2,930	2,220	646	699	8,510	6,500	72.4	3,160	1,840	1,080	1,020	1,000
11	2,790	2,190	636	745	6,460	5,720	424	5,400	2,120	837	1,140	1,210
12	2,800	2,450	752	466	5,300	4,910	498	6,070	2,370	2,580	1,510	1,110
13	2,680	2,620	826	291	4,410	3,990	600	6,710	2,520	22,900	1,860	925
14	2,700	2,390	893	360	4,130	3,220	812	9,500	3,570	26,500	1,630	992
15	2,820	1,820	717	901	18,600	2,650	957	8,230	4,480	21,800	1,390	1,170
16	2,950	1,480	523	1,250	25,800	2,160	1,930	6,180	3,780	10,100	1,240	1,080
17	2,840	1,550	530	1,730	15,700	1,770	2,640	5,370	3,470	5,930	1,280	1,140
18	2,540	1,700	1,060	1,790	10,700	1,620	2,140	5,370	3,080	4,450	1,420	1,230
19	2,280	2,370	1,650	1,540	8,120	1,560	1,600	5,230	#2,570	3,400	1,730	982
20	2,100	2,860	1,800	1,020	6,500	1,300	1,250	4,660	#2,260	2,560	2,270	837
21	2,170	2,520	1,560	957	5,400	1,080	1,230	3,880	#2,520	2,110	2,520	738
22	2,330	2,130	1,010	1,040	4,520	788	1,350	3,810	#8,300	2,130	2,260	657
23	2,550	1,730	872	1,310	3,670	583	1,840	5,300	#13,000	2,010	1,730	763
24	2,640	1,600	862	1,220	3,140	519	2,180	6,670	9,110	1,820	1,290	922
25	2,490	1,790	791	1,290	2,640	459	1,830	7,200	6,070	1,400	1,260	1,240
26	2,330	1,890	992	1,070	2,250	501	1,640	6,960	4,520	1,020	1,350	1,510
27	2,390	2,080	1,140	893	2,190	660	1,390	6,570	3,290	876	1,390	1,290
28	2,740	1,930	939	1,350	3,030	946	1,020	6,780	2,660	1,090	1,380	1,000
29	3,100		756	1,550	5,790	957	653	7,660	2,200	1,340	1,390	1,010
30	3,200		547	1,630	5,830	788	629	7,310	1,860	1,670	1,440	1,010
31	3,100		487		4,130		911	6,250		1,700		1,150
Sum	85,690	63,620	31,941	28,698	253,830	114,871	34,354.4	148,770	115,480	131,848	48,250	35,127

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	8.53	6.33	1	3,740	20	2,050	2,760	170,000	236,746	491,000	106,000
Feb.	7.58	5.12	1	3,060	16	1,370	2,270	126,000	165,809	328,330	71,350
Mar.	5.84	3.31	1	1,760	16	466	1,030	63,400	125,681	240,770	27,860
Apr.	6.89	2.56	30	2,690	14	238	957	56,900	123,642	318,000	56,900
May	20.93	6.40	15	29,300	27	2,140	8,190	503,000	298,724	503,000	99,400
June	15.09	3.74	6	13,500	25	438	3,830	228,000	377,189	1,180,380	31,700
July	7.15	2.49	17	2,740	10	36.7	1,110	68,100	323,454	629,000	54,400
Aug.	12.37	4.76	14	9,780	1	1,100	4,800	295,000	314,293	834,000	73,200
Sept.	11.68	5.41	23	# 13,000	9	1,730	3,850	229,000	624,006	1,259,620	124,060
Oct.	20.05	3.77	13	27,400	12	738	4,250	262,000	573,236	1,287,410	124,280
Nov.	7.15	4.86	21	2,550	9	957	1,610	95,700	292,085	827,490	95,700
Dec.	5.91	3.87	4	1,860	22	646	1,130	69,700	233,469	594,220	69,700
Yearly	20.93	2.49		29,300		36.7	2,990	2,166,800	3,688,334	5,745,160	1,969,900

Estimated.

RIO GRANDE AT LOWER BROWNSVILLE STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located about 1,000 feet below the El Jardin pumping plant, about 8.5 river miles below Brownsville, Texas, and Matamoros, Tamaulipas, 46.6 miles upstream from the Gulf of Mexico and 1,151.0 river miles below the American Dam at El Paso, Texas. Zero of gage is on United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon 53 current meter measurements, 50 by the United States and 3 by the Mexican Section, made during the year. Computations by shifting channel methods. 1939 records good. Records available: January 1934 to December 1939.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande as part finds outlet to the Gulf of Mexico through flood channels in both countries.

PREVIOUS EXTREME FLOWS: On June 10, 1935, a peak discharge of 31,000 second feet was reached with an estimated gage height of 32.10 feet. Additional data concerning peaks may be found in previous Water Bulletins. The river was dry at this station a few days in 1930 and March 25-28, 1935, also June 16-19, 1938.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,600	3,020	1,540	455	3,960	3,490	696	1,040	5,910	1,630	1,520	1,490
2	3,450	2,890	1,290	634	5,070	4,810	724	1,220	5,260	1,710	1,760	1,540
3	3,240	2,720	1,030	934	4,600	5,650	756	1,330	4,590	1,550	2,200	1,550
4	3,010	2,420	1,030	674	3,650	5,940	847	1,330	*3,940	1,280	2,310	1,610
5	2,750	2,550	1,350	572	2,780	6,280	1,000	1,240	*3,140	903	2,260	1,590
6	2,540	2,700	1,590	476	6,500	11,200	948	1,340	2,650	1,160	*2,120	1,330
7	2,600	2,600	1,500	392	23,000	11,900	711	2,430	2,050	1,330	1,740	963
8	2,670	2,500	1,160	* 321	23,800	9,500	472	2,210	1,780	1,270	1,330	816
9	2,810	2,300	731	376	16,500	7,190	344	1,560	1,780	1,340	1,030	800
10	2,780	2,200	531	514	9,050	6,080	259	2,760	1,860	1,080	942	820
11	2,700	2,200	550	626	6,740	5,500	375	5,460	2,200	902	1,030	991
12	2,690	2,420	660	426	5,820	4,920	* 600	6,220	2,460	1,720	1,400	1,130
13	2,630	2,610	700	291	5,070	3,970	* 658	6,660	2,650	*18,900	1,650	988
14	2,620	2,360	780	308	4,850	3,080	* 801	9,190	3,370	*24,200	1,560	817
15	2,710	1,850	623	753	18,000	2,520	894	7,760	4,450	*21,700	1,300	*1,010
16	2,850	1,400	444	1,130	*24,400	*2,110	1,500	6,120	4,020	*11,400	1,200	1,010
17	2,760	1,550	460	1,480	18,100	1,780	2,210	5,210	3,580	6,550	1,250	1,010
18	2,410	1,650	990	1,650	10,200	1,570	1,980	5,160	3,220	5,030	1,350	1,110
19	2,140	2,300	1,550	1,560	7,810	1,470	1,630	5,090	2,560	3,940	1,650	700
20	2,000	2,700	1,750	1,020	6,310	1,280	1,360	4,620	2,240	3,040	2,100	600
21	2,020	2,500	1,540	842	5,280	*1,090	1,300	3,860	2,520	*2,360	2,400	650
22	2,190	2,050	1,040	913	4,440	800	*1,390	3,370	8,140	*2,120	*2,140	850
23	2,390	1,710	822	1,190	3,700	590	*1,730	4,380	12,700	*2,010	*1,600	570
24	2,590	1,690	773	1,120	3,150	530	2,070	6,050	8,900	*1,610	*1,250	* 754
25	2,520	1,830	690	1,170	2,670	470	1,740	7,180	6,340	*1,200	1,200	*1,190
26	2,350	1,850	854	1,040	2,380	510	1,570	7,060	4,840	* 904	1,440	*1,390
27	2,350	1,930	1,040	757	2,000	* 676	1,340	6,690	3,520	803	1,500	*1,260
28	2,570	1,850	881	1,050	3,300	* 821	1,060	6,660	2,780	1,030	1,450	*1,010
29	2,950		682	1,400	4,610	908	768	7,430	2,260	1,310	1,410	* 907
30	3,110		515	1,380	5,420	813	704	7,360	1,870	1,600	*1,400	1,060
31	3,080		454		4,290		812	6,470		1,680		1,130
Sum	83,080	62,350	29,550	25,454	247,450	107,448	33,249	144,460	117,580	*127,262	47,492	32,646

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1934-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	19.42	17.04	1	3,670	20	1,950	2,680	165,000	212,500	299,000	106,000
Feb.	18.47	15.73	1	3,050	16	1,280	2,230	124,000	149,667	237,000	78,000
Mar.	16.51	13.73	20	1,770	17	373	953	58,600	115,717	183,000	29,700
Apr.	16.50	12.92	30	1,740	14	247	848	50,500	106,067	242,000	50,500
May	31.95	17.28	16	25,500	27	2,160	7,980	491,000	322,333	491,000	110,000
June	26.34	*14.87	6	12,400	26	* 400	3,580	213,000	338,833	*1,161,000	32,000
July	18.23	13.53	17	2,260	11	232	1,070	65,900	325,317	587,000	65,900
Aug.	23.65	15.89	14	9,700	1	* 968	4,660	287,000	273,817	679,000	77,900
Sept.	25.52	16.59	23	13,300	9	1,720	3,920	233,000	579,333	1,045,000	150,000
Oct.	31.30	14.65	14	24,500	12	649	4,110	*252,000	431,167	‼ 629,000	200,000
Nov.	18.12	15.39	21	2,450	10	928	1,580	94,200	177,200	‼ 349,000	94,200
Dec.	16.74	14.31	4	1,670	23	517	1,050	64,800	171,767	‼ 302,000	64,800
Yearly	31.95	12.92		25,500		232	2,900	2,099,000	3,203,718	*4,877,700	1,911,600

* Partly Estimated. ‼ Estimated.

RIO CONCHOS NEAR OJINAGA, CHIHUAHUA

DESCRIPTION: The Rio Conchos enters the Rio Grande about 4 miles above the international highway bridge between Presidio, Texas, and Ojinaga, Chihuahua, 1.6 miles above the Lower Presidio gaging station on the Rio Grande 7.8 miles below the Upper Presidio gaging station on the Rio Grande and 280.4 river miles below the American Dam at El Paso, Texas.

RECORDS: Based on discharge records of the Rio Grande at Upper Presidio and Lower Presidio stations, and estimated irrigation diversions and arroyo inflow between these two stations. The normals shown here correspond with the revisions in Rio Conchos discharge shown in Water Bulletin No. 7, page 44. 1939 records fair. Records available: 1900 to 1913 and 1924 to 1939.

REMARKS: The Boquilla storage reservoir, as well as irrigation diversions for land in the Rio Conchos basin greatly modify the river flow. The Colina reservoir with 21,900 acre feet capacity, located about 10.5 miles downstream from Boquilla Dam and the Rosetilla reservoir located about 52.7 miles farther downstream, with a capacity of 15,400 acre feet are used for power development only. The daily river flow may be modified by these reservoirs but, except for evaporation, the monthly flow is not.

PREVIOUS EXTREME FLOWS: The greatest previous recorded flow occurred September 11, 1904, when the estimated peak was 162,000 second feet. See pages 71 and 72 of Water Bulletin No. 8 for the magnitude and average frequency of floods from the Rio Conchos since 1828.

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1924-1939		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.			30	1,620	8	587	939	57,700	54,816	147,500	14,410
Feb.			15	1,580	27	711	1,085	60,200	42,625	66,180	16,130
Mar.			23	2,620	31	359	791	48,600	39,988	70,240	20,870
Apr.			30	628	26	124	297	17,700	29,050	62,780	5,000
May			4	516	19	99	222	13,700	33,601	122,740	3,950
June			21	3,620	1	115	290	17,300	43,482	91,900	8,720
July			31	1,750	20	309	724	44,500	85,437	502,000	22,140
Aug.			8	13,800	2	653	3,010	185,000	123,843	435,400	18,900
Sept.			14	3,830	12	308	730	43,500	254,806	1,141,000	9,370
Oct.			24	1,940	5	411	953	58,600	141,989	798,000	41,000
Nov.			21	1,780	12	613	997	59,300	53,348	87,100	17,190
Dec.			26	1,280	22	469	703	43,200	50,174	76,000	15,280
Yearly				13,800		99	897	649,300	953,159	2,431,850	400,930

EL PASO SEWAGE OUTFALL

Into the Rio Grande at El Paso, Texas

The water supply for the City of El Paso, Texas, comes from wells located eastward and northeastward from the city. The present sewage treatment plant began operating in March 1936. This sewage outfall enters the Rio Grande 6.6 river miles below the American Dam at El Paso, Texas. The flow of sewage is measured by Venturi Meter. The record was furnished by the Department of Water and Sewage of the City of El Paso.

Month	1939		Period 1936 to 1939
	Mean Second Feet	Acre Feet	Average Acre Feet
January	8.3	513	478
February	9.3	517	484
March	10.0	613	472
April	10.7	636	528
May	9.5	583	538
June	10.1	601	568
July	10.0	614	569
August	9.1	562	553
September	* 8.1	* 483	524
October	* 8.1	* 495	519
November	8.5	504	507
December	8.2	506	512
Yearly	9.2	6,627	6,252

* Partly Estimated

RIO GRANDE FLOODWAY DISCHARGES IN THE LOWER RIO GRANDE VALLEY

On The United States Side

There are three floodways on the United States side of the Rio Grande delta which carry excess Rio Grande flood waters to the Gulf of Mexico. Such floodway discharges are measured at the floodway gaging stations, descriptions of which will be found in previous Water Bulletins.

On the United States side in 1939 flood water passed through the Rancho Viejo floodway only.

When the Rio Grande at the Matamoros gaging station on the Brownsville-Matamoros railroad bridge reaches a stage of 16.4 feet (5 meters), or a flow of about 14,500 second feet, then water begins to flow into the Rancho Viejo floodway 18.4 river miles upstream, if the control gates are open. The Rancho Viejo gaging station is on the floodway-highway bridge 1.2 floodway miles below the floodway control gates on the river bank.

Mean Daily Discharge in Second Feet and Period Summary, 1939

Rancho Viejo Floodway Near Brownsville, Texas

Date	Second Feet	Date	Second Feet
May 7	23	October 13	65
May 8	163	October 14	213
May 15	1	October 15	43.6
May 16	148		
The Period	335		321.6

Period Summary			
Period	Gage	Second Feet	Acre Feet
	Extreme Feet High	Extreme High	Total
May	42.50	300	664
October	42.16	230	638
The Period	42.50	300	1,302

On The Mexican Side

There are three floodways on the Mexican side of the Rio Grande Delta through which excess flood waters flow. These are the Retamal Canal, Control No. 2 and Control No. 3. Only the Retamal Canal flows are measured. See Diversions from the Rio Grande into the Retamal Canal on page 60 of this Water Bulletin.

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

The following data for El Vado reservoir on the Rio Chama are from the Middle Rio Grande Conservancy District, Albuquerque, New Mexico. The data for Elephant Butte and Caballo reservoirs on the Rio Grande and for McMillan, Avalon and Alamogordo reservoirs on the Pecos in New Mexico, are from the United States Reclamation Bureau. The office of the Pecos Joint Investigation furnished the data for Red Bluff reservoir on the Pecos river in Texas. The data for Boquilla reservoir on the Rio Conchos in Chihuahua, are from the Compañia Agricola y de Fuerza Electrica del Rio Conchos, S. A. The data for Don Martin reservoir on the Rio Salado are from the National Bank of Agricultural Credit of Mexico.

The monthly figures on the following page represent the acre feet of water in storage on the last day of each month, and the capacities represent the normal capacities on the last day of the year.

The data shown on the following page for Elephant Butte Reservoir were modified to conform to a revised capacity curve of the United States Section of the International Boundary Commission.

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN —continued

In The United States

In Thousands of Acre Feet

Month	El Vado (Capacity 198.8)				Elephant Butte (Capacity 2,228.1)				Caballo (Capacity 346.0)			
	Year 1939		Average 1935-39		Year 1939		Normal 1924-39		Year 1939		Average 1938-39	
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change
January	61.6	+ 2.9	56.3	+ 3.1	1,177.0	+ 10.3	1,111.7	+ 26.7	112.4	+ 32.0	56.2	+ 16.0
February	62.7	+ 1.2	57.2	+ .8	1,207.1	+ 30.1	1,123.5	+ 11.8	92.8	- 19.6	48.6	- 7.6
March	45.5	-17.3	60.5	+ 3.3	1,299.3	+ 92.2	1,108.0	- 15.5	25.4	- 67.4	17.2	- 31.4
April	82.6	+37.2	119.6	+59.1	1,291.3	- 8.0	1,105.6	- 2.4	43.1	+ 17.7	28.9	+ 11.7
May	148.0	+65.4	167.0	+47.4	1,247.9	- 43.4	1,215.3	+109.7	27.8	- 15.3	20.4	- 8.5
June	108.0	-40.0	153.4	-13.6	1,132.2	-115.7	1,214.2	- 1.1	18.3	- 9.5	18.1	- 2.3
July	57.7	-50.3	119.1	-34.4	1,007.8	-124.4	1,131.2	- 83.0	20.8	+ 2.5	17.9	- .2
August	27.5	-30.2	80.1	-38.9	911.2	- 96.6	1,046.1	- 85.1	30.4	+ 9.6	21.3	+ 3.4
September	17.3	-10.2	62.1	-18.1	810.5	-100.7	1,018.1	- 28.0	73.1	+ 42.7	37.5	+ 16.2
October	14.6	- 2.7	57.0	- 5.1	778.7	- 31.8	1,026.6	+ 8.5	96.4	+ 23.3	53.8	+ 16.3
November	17.4	+ 2.8	54.2	- 2.8	784.4	+ 5.7	1,038.1	+ 11.5	86.0	- 10.4	58.4	+ 4.6
December	19.6	+ 2.2	57.1	+ 2.9	814.1	+ 29.7	1,049.2	+ 11.1	79.3	- 6.7	79.8	+ 21.4
Annual	⊕ 55.2	-39.0	87.0	+ 3.9	⊕ 1,038.5	-352.6	1,099.0	- 35.8	⊕ 58.8	- 1.1	38.2	+ 39.6
Maximum	‡ 149.9	136.4	195.7		‡ 1,330.2	560.3	‡ 1,986.4		‡ 114.2	97.3	‡ 114.2	
Minimum	‡ 13.5		0		‡ 769.9		421.5		‡ 16.9		0	

Month	Alamogordo (Capacity 157.0)				McMillan and Avalon (Capacity 45.5)				Red Bluff (Capacity 284.0)			
	Year 1939		Average 1937-39		Year 1939		Normal 1924-39		Year 1939		Average 1936-39	
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change
January	103.9	+ 4.6	68.0	+ 5.0	23.0	- .1	35.9	+ .8	154.0	+ 17.8	135.2	+ 1.1
February	107.1	+ 3.2	72.0	+ 4.1	20.3	- 2.7	35.0	- .9	158.0	+ 4.0	139.9	+ 4.7
March	90.9	-16.2	55.4	-16.7	22.4	+ 2.1	31.5	- 3.5	154.0	- 4.0	138.4	- 1.5
April	99.1	+ 8.2	59.6	+ 4.2	20.0	- 2.4	20.1	-11.4	124.5	- 29.5	114.0	- 24.4
May	84.6	-14.5	53.2	- 6.4	26.6	+ 6.6	28.8	+ 8.7	115.0	- 9.5	107.1	- 6.9
June	61.9	-22.7	38.0	-15.1	19.0	- 7.6	23.2	- 5.7	101.0	- 14.0	186.8	+ 79.7
July	93.4	+31.5	71.9	+33.8	20.2	+ 1.2	21.0	- 2.2	76.0	- 25.0	166.4	- 20.4
August	108.3	+14.9	69.0	- 2.8	20.2	0	19.2	- 1.8	66.0	- 10.0	144.1	- 22.3
September	89.7	-18.6	87.1	+18.0	17.5	- 2.7	26.9	+ 7.7	47.0	- 19.0	140.5	- 3.6
October	88.4	- 1.3	94.7	+ 7.6	15.1	- 2.4	31.7	+ 4.8	46.5	- .5	108.7	- 31.8
November	91.5	+ 3.1	71.4	-23.3	13.0	- 2.1	31.8	+ .2	50.0	+ 3.5	110.4	+ 1.7
December	94.2	+ 2.7	73.4	+ 2.0	12.7	- .3	33.0	+ 1.2	58.0	+ 8.0	115.1	+ 4.7
Annual	⊕ 92.8	- 5.1	67.8	+10.4	⊕ 19.2	-10.4	28.2	- 2.1	⊕ 95.8	- 78.2	133.9	- 78.2
Maximum	108.3	46.4	108.3		26.6	13.9	85.5		158.0	111.5	275.5	
Minimum	61.9		0		12.7		0		46.5		0	

Month	Total In United States Reservoirs (Capacity 3,259.4)		
	Year 1939		Estimated Average
	Storage	Change	
January	1,631.9	+ 67.5	1,463.3
February	1,648.0	+ 16.1	1,476.2
March	1,637.5	- 10.5	1,411.0
April	1,660.6	+ 23.1	1,447.8
May	1,649.9	- 10.7	1,591.8
June	1,440.4	- 209.5	1,633.7
July	1,275.9	- 164.5	1,527.5
August	1,163.6	- 112.3	1,379.8
September	1,055.1	- 108.5	1,372.2
October	1,039.7	- 15.4	1,372.5
November	1,042.3	+ 2.6	1,364.3
December	1,077.9	+ 35.6	1,407.6
Annual	⊕ 1,360.2	- 486.5	1,454.0
Maximum	1,660.6	620.9	
Minimum	1,039.7		

In Mexico

Month	Boquilla (Capacity 2,116.0)				Don Martin (Capacity 1,123.0)				Total In Mexican Reservoirs (Capacity 3,239.0)		
	Year 1939		Normal 1924-39		Year 1939		Normal 1930-39		Year 1939		Estimated Average
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	
January	1,875.5	- 57.2	1,346.6	- 37.4	36.4	- .3	486.8	- 3.0	1,911.9	- 57.5	1,833.4
February	1,804.2	- 71.3	1,313.4	- 33.2	33.9	- 2.5	469.4	-17.4	1,838.1	- 73.8	1,782.8
March	1,736.9	- 67.3	1,256.7	- 56.7	30.1	- 3.8	447.6	-21.8	1,767.0	- 71.1	1,704.3
April	1,664.5	- 72.4	1,191.1	- 65.6	26.7	- 3.4	432.5	-15.1	1,691.2	- 75.8	1,623.6
May	1,567.6	- 96.9	1,115.5	- 75.6	29.2	+ 2.5	414.0	-18.5	1,596.8	- 94.4	1,529.5
June	1,485.5	- 82.1	1,056.5	- 59.0	39.6	+10.4	415.4	+ 1.4	1,525.1	- 71.7	1,471.9
July	1,491.3	+ 5.8	1,112.6	+ 56.1	34.0	- 5.6	410.7	- 4.7	1,525.3	+ .2	1,523.3
August	1,886.1	+394.8	1,263.8	+151.2	39.3	+ 5.3	399.9	-10.8	1,925.4	+400.1	1,663.7
September	1,820.7	- 65.4	1,442.7	+178.9	37.0	- 2.3	464.4	+64.5	1,857.7	- 67.7	1,907.1
October	1,782.6	- 38.1	1,434.3	- 8.4	43.7	+ 6.7	475.8	+11.4	1,826.3	- 31.4	1,910.1
November	1,745.8	- 36.8	1,383.9	- 50.4	42.4	- 1.3	490.9	+15.1	1,788.2	- 38.1	1,874.8
December	1,815.6	+ 69.8	1,364.0	- 19.9	38.5	- 3.9	493.6	+ 2.7	1,854.1	+ 65.9	1,857.6
Annual	⊕1,723.0	-117.1	1,273.4	- 20.2	⊕ 35.9	+ 1.8	450.1	+ 3.8	⊕ 1,758.9	-115.3	1,723.5
Maximum	1,932.7	447.2	2,152.0		43.7	17.0	1,163.4		ϕ 1,969.4	444.3	
Minimum	1,485.5		54.0		26.7		0		1,525.1		

⊕ Average. ‡ Daily Maximum or Minimum. ϕ January 1, 1939.

HYDROLOGIC BALANCE SHEET
FOR LARGE WATER-SHEDS OF THE RIO GRANDE BASIN

Sufficient precipitation records now being available for some large subdivisions of the Rio Grande basin, a hydrologic balance sheet is set out below covering 59,771 square miles, or 35% of the Rio Grande watershed.

The watershed covered in this table comprises all of the watershed below Fort Quitman, excluding the Rio Conchos, the Pecos above Red Bluff reservoir, the Rio Salado above the Rio Salado Station and the Rio San Juan above Santa Rosalia. The Period covered is the 16 years 1924 to 1939. One side of the balance sheet shows all amounts and sources of water received on the surface of the watershed. The other side shows all amounts of water leaving the same watershed surface and the manner in which it left. Any water leaving the watershed beneath the surface is neglected as negligible when compared with the figures representing evaporation and transpiration. Evaporation from reservoirs is included under the heading "Irrigation Consumption".

Average Annual Amounts

	RECEIVED ON THE WATERSHED FROM			DISBURSED FROM THE WATERSHED BY		
	Rainfall	Deep Springs	Streams	Evaporation and Transpiration	Irrigation Consumption	Streams
Inches deep on the restricted watershed	15.18			14.65		
Thousands of acre feet of water	48,379	1,035	2,777	46,701	408	5,082
Percent	92.7	2.0	5.3	89.5	0.8	9.7

INDICATED TRENDS IN RUN-OFF OF DEVILS RIVER

The two strip graphs presented on the following page show cumulative plottings for the 69-year period from 1871 to 1939, inclusive. The lower strip represents the trends of average monthly rainfall on the Devils River watershed. The upper strip represents corresponding monthly run-off trends of the Devils River. All of the monthly values cumulated in the rainfall graph are from actual records, as are some of the monthly run-off values, but some of the monthly run-off values are synthetic. These synthetic values are indicated on the strips. All of the monthly values, whether actual or synthetic, represent departures from monthly normals. These monthly departures and the monthly normals were computed by a smoothing process which consisted of using one-half of the total of the two-month progressive interval. (Example:

(a) The figure for February is one-half the sum of the January and February figures.

(b) The figure for March is one-half the sum of the February and March figures, etc.)

For the rainfall graph the 69-year normals were used as the basis for computing departures. The departures for that portion of the run-off graph labeled "actual" were based upon the normals for the period of record only, which covered the 360 months, May 1900 to March 1914, and December 1923 to December 1939.

The departures for the run-off graph, labeled "synthetic", were derived from three relationship curves, (a) one representing the summer months June to October, (b) one representing the winter months December to April, and (c) one, halfway between the two above mentioned curves, representing the overlapping winter and summer months of the two-month progressive intervals, i.e., the two-month progressive intervals March-April, April-May, also October-November and November-December.

These relationship curves were first plotted from actual rainfall and run-off data for the 360-month period of record mentioned above; then the relationship curves were adjusted until the 69-year synthetic run-off graph, shown here, practically closed upon the zero line from which it began.

These graphs indicate that the 69-year normal run-off of Devils River was about 1,100 acre feet per year less than was the normal of the 360-month (30 year) period during which the flow was measured. This measured period normal was 464,300 acre feet per year.

Also indicated clearly is the fact that, during the 29-year period from 1901 to 1930 there was a definite trend downward in the Devils River run-off. For during this period the average annual was 57,100 acre feet below the measured normal or only 407,200 acre feet per year.

The smallest 6-year average run-off of the 69-year period was from 1907 to 1913 when the annual average was 129,000 acre feet below normal or only 335,300 acre feet.

On the other hand the greatest 6-year average run-off (from 1930 to 1936) was 236,900 acre feet per year above normal or 701,200 acre feet per year.

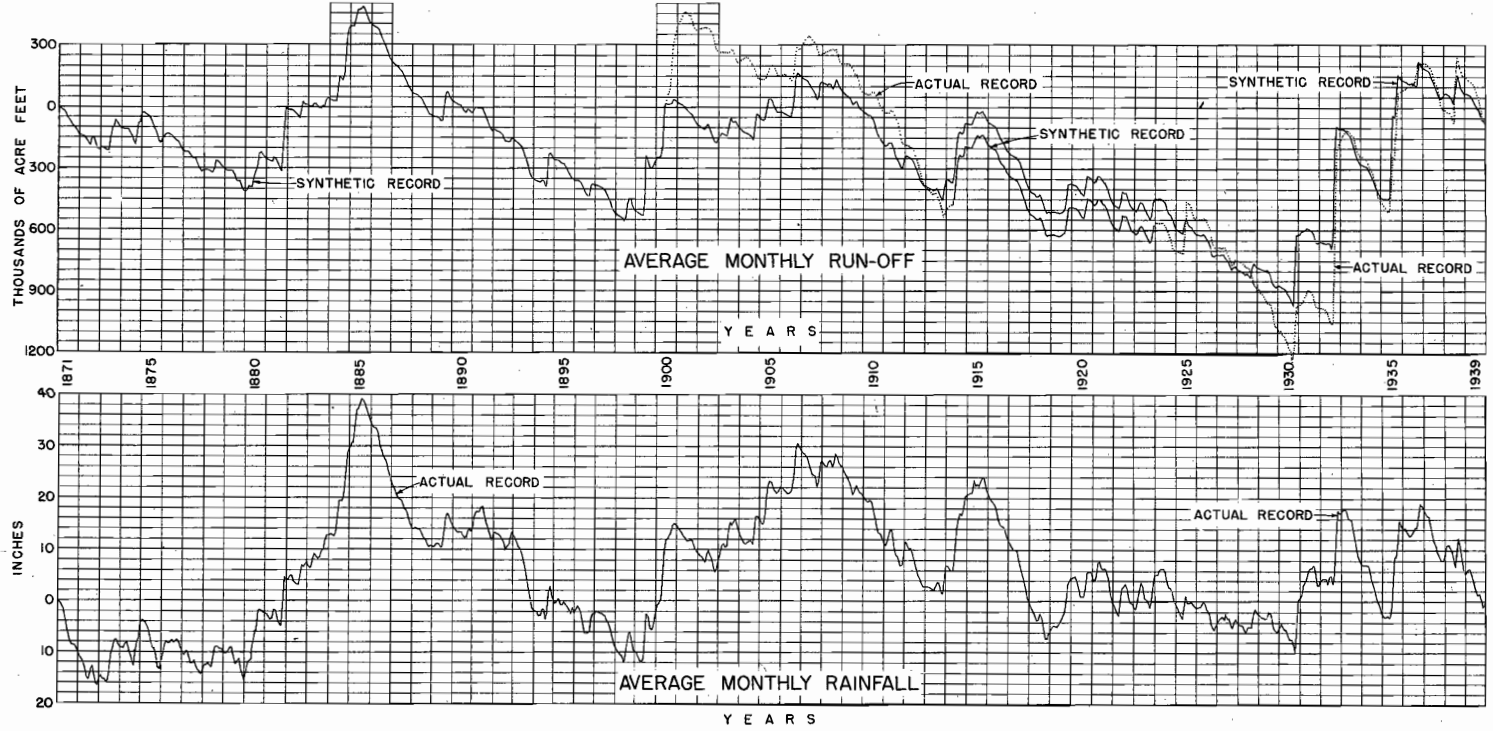
In other words, it is seen that during the six leanest years the run-off was less than half of that during the six fattest years.

In general the graphs show that the rising trends are steeper and shorter than the falling trends. This is another way of saying that in general the years of drought are much more numerous but depart from normal somewhat less than the years of plenty.

INDICATED RUN-OFF TRENDS OF DEVILS RIVER

SINCE 1871

AT DEVILS RIVER STATION



FLOWS AND DROUGHTS ON DEVILS RIVER AT DEVILS RIVER STATION Since 1830

There are 30 years of records of measured flow of Devils River and 109 years of records of flood flows. From these records, the following graphs were prepared. The first graph represents flows and the second graph represents non-flows or droughts. Each represents its phenomena in three dimensions, viz: magnitude, duration and frequency.

The scale across the bottom of each graph (logarithmic) represents duration of continuous flow or non-flow expressed as days.

The scale up along the side of each graph (logarithmic) represents magnitude of flow in second feet.

The curved lines on the graphs represent average frequencies in years.

The flow of the Devils River fluctuates from a minimum mean daily of 125 second feet to a maximum mean daily of 222,000 second feet. For convenience this large range of flow was divided into 33 horizons, each horizon comprising a range of about 23% of the mean discharge of the horizon. For example, one horizon extended from 125 to 150 second feet; another from 80,000 to 100,000 second feet, etc.

A flow event is defined as a continuous duration of days during which the river flow was within or above a given horizon of flow. A drought event is defined as a continuous duration of days during which the river flow was below or less than a given horizon of flow.

From the entire Devils River record, all flow events and all drought events on each horizon were arranged in their decending order of length of duration. This arrangement established the frequency. The event of longest duration on a given horizon occurred only once in 100 years, hence its average frequency rate was once in 100 years. The event of second longest duration on that horizon was assigned an average frequency of once every 50 years, because on that horizon an event of that duration or of longer duration occurred at the average frequency rate of twice in 100 years.

The following examples illustrate the manner of reading the graphs:

The point marked "A" on the flow graph shows that on an average of once every twenty years in the past, a flow equalling or exceeding 6,000 second feet ran continuously for 6 days or longer and point "B" on the flow graph shows that with equal average frequency (once every 20 years) a flow equalling or exceeding 300 second feet ran continuously for 2,600 days or longer. Similarly the point marked "C" on the drought graph shows that on an average of once every 3 years the flow was less than 15,000 second feet continuously for 100 days or longer and point "D" shows that on an average of once every 50 years the flow was less than 100,000 second feet continuously for 10,000 days or longer.

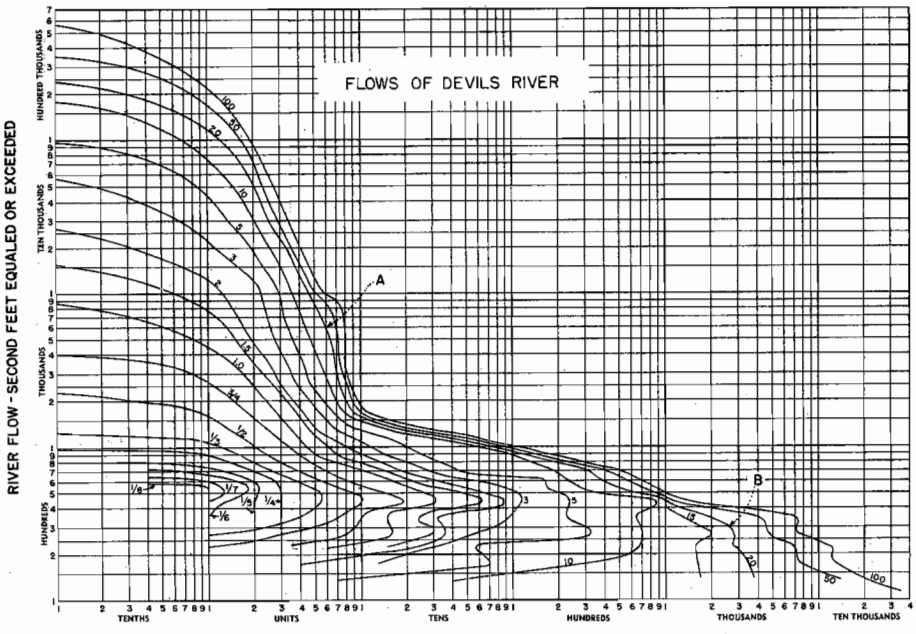
Up and down along the 40-day line of each graph will be found the magnitude equaled or exceeded and average frequency of all events which range in duration from 40 days upward, but it should be remembered that each such event of longer duration than 40 days is also of a lesser frequency than the 40-day event.

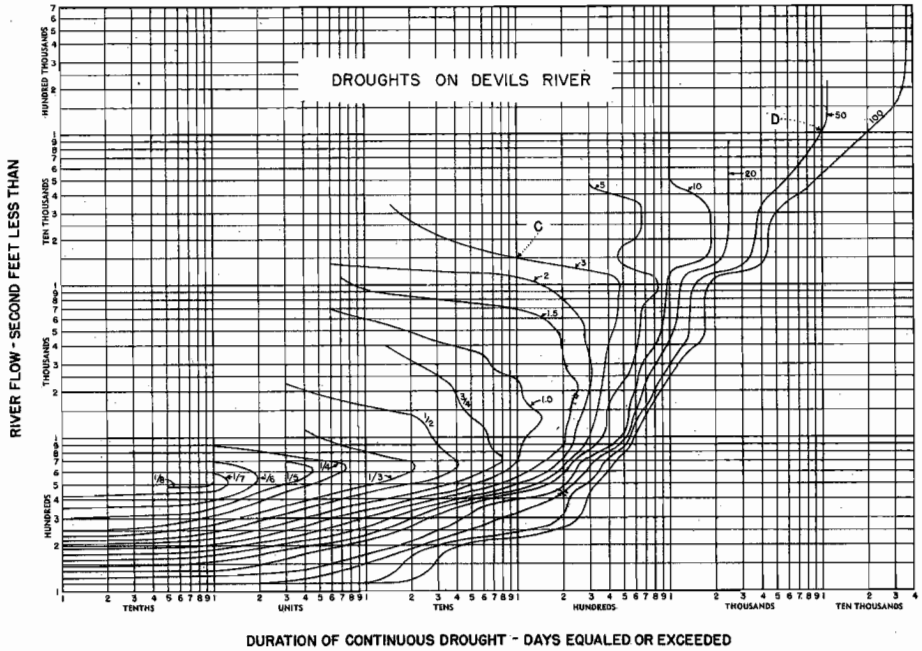
The average frequency and the continuous duration, equaled or exceeded, of all flow events of 10,000 second feet or more and of all drought events during which the flow was less than 10,000 second feet will be found along the 10,000 second foot line on each graph.

The magnitude equaled or exceeded and the continuous duration in days equaled or exceeded of all separate events of flow and of drought which occurred with an average frequency designated as once every 5 years will be found along the 5-year frequency line of each graph.

These graphs are aids to the analysis and synthesis of the statistical data of 109 years of records of flow (30 years of continuous records and 109 years of flood records) at the Devils River gaging station. They are especially valid because in the past 109 years, and more, there has been comparatively little change on the Devils River watershed in those features, such as diversion or storage of water, which make for great changes in the character of the river flow.

FLOWS AND DROUGHTS ON DEVILS RIVER





SOURCES OF RIVER FLOW

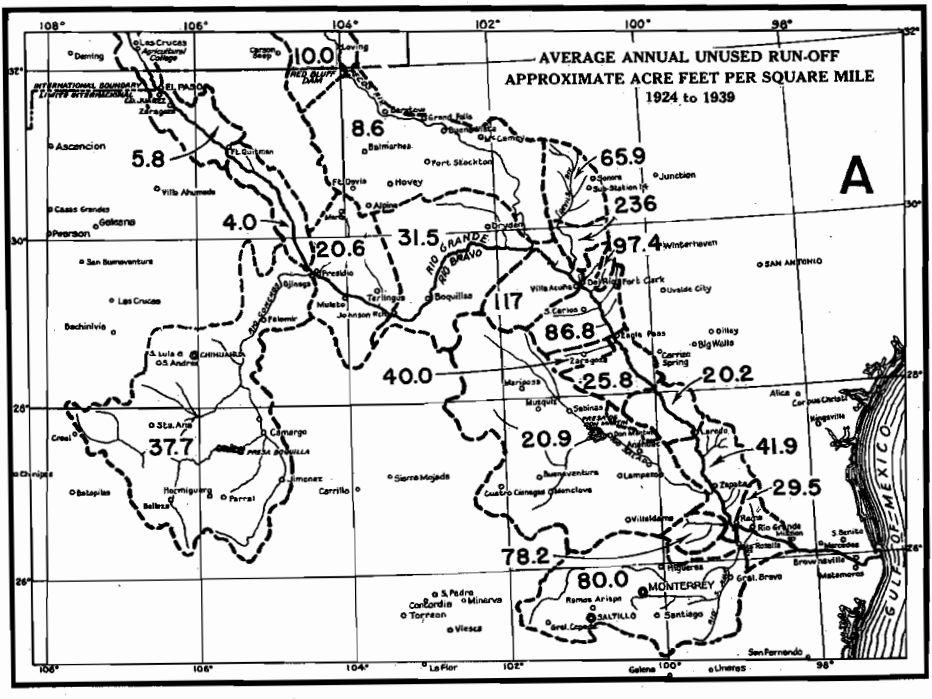
1924 to 1939

Subdivisions of the Rio Grande basin, especially below Fort Quitman on the main river, and below Red Bluff Dam on the Pecos River, are shown on the following three maps.

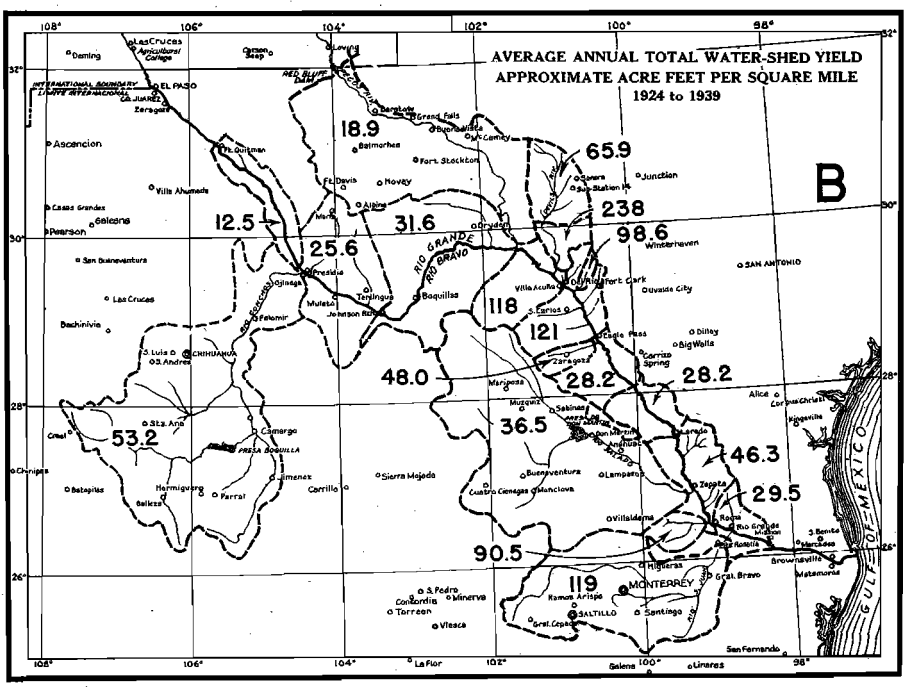
The large figures on the first map, "A" show in terms of acre feet per square mile, the approximate average annual unused run-off which originated on each water-shed subdivision during the 16-year period, 1924 to 1939, and which either flowed from or was reservoired within the subdivision.

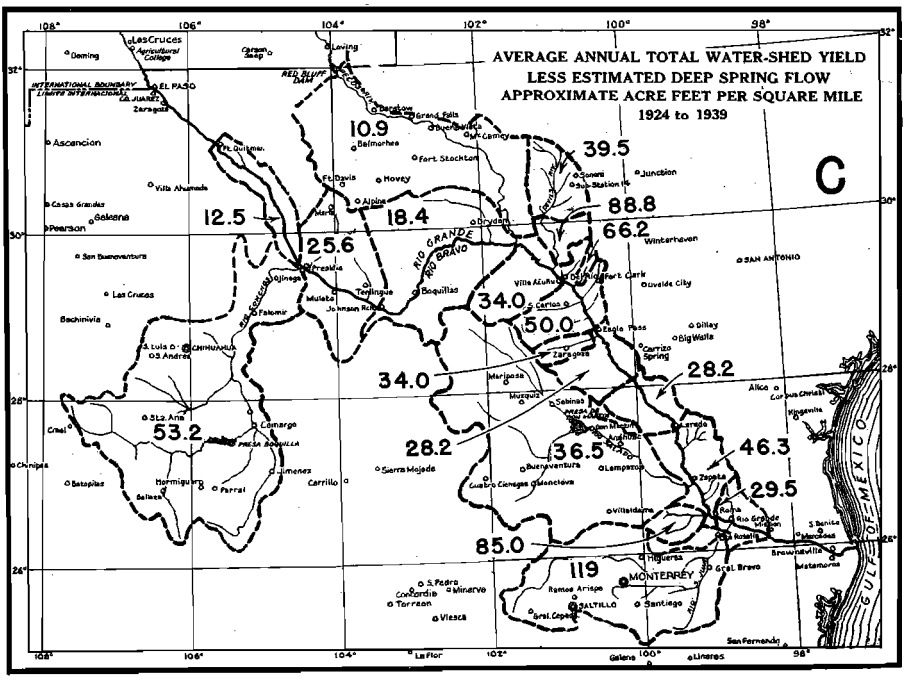
On the second map, "B" there is shown, for each subdivision, the average annual total water-shed yield, sometimes called the virgin yield, that is, the sum of the unused water as shown on the first map and the water estimated to have been consumed by irrigation and reservoir evaporation within each subdivision.

From the total water-shed yield figures, shown on the second map, there was deducted the estimated average annual flow from deep springs within each subdivision and the resulting figures appear on the third map, "C"



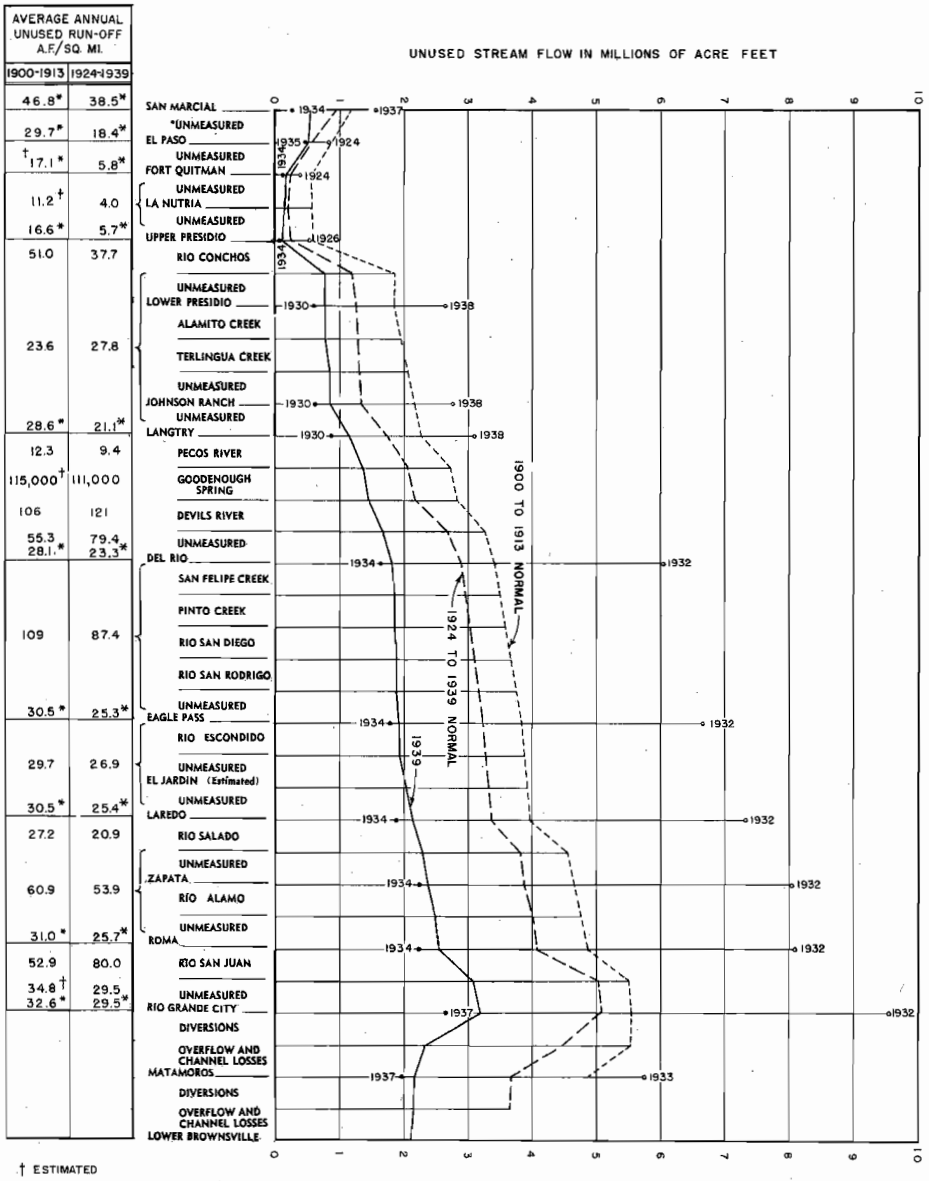
SOURCES OF RIVER FLOW —continued





SOURCES OF RIVER FLOW

A distinction must be made clear between the figures in the table at the lower or left side of this page showing average annual unused run-off and the graphical part of the page showing unused stream flow. As an illustration of this distinction, consider the unused stream flow at Upper Presidio. The amounts shown graphically above or to the right of the page are the millions of acre feet of water which actually flowed past this station, while the amounts shown by figures below or to the left of the page are acre feet per square mile of unused run-off which includes: (a) the water which actually flowed past the station and from which has been subtracted, (b) the water which ran off the water-shed into Elephant Butte reservoir in years prior to 1924 and was drawn from the reservoir during the period 1924 to 1939 and to which has been added, (c) the water which has been impounded since 1924 and remained in El Vado reservoir and Caballo reservoir at the close of the year 1939. This subtractive carry-over storage in Elephant Butte reservoir averaged 35,800 acre feet per year. The additive carry-over storage in El Vado reservoir and Caballo reservoir averaged 6,200 acre feet per year. Other carry-over storage figures are: Boquilla reservoir on the Rio Conchos, 20,000 acre feet per year, subtractive. Alamogordo, McMillan, Avalon, and Red Bluff reservoirs on the Pecos River, 7,400 acre feet per year additive. Centenario and San Miguel reservoirs on the Rio San Diego, 600 acre feet per year, additive. Don Martin reservoir on the Rio Salado, 2,400 acre feet per year, additive.



DIVERSIONS FROM THE RIO GRANDE INTO THE AMERICAN CANAL AT EL PASO, TEXAS

This concrete-lined canal diverts water from the Rio Grande at the American Dam near El Paso, Texas, 2.1 river miles above the Mexican Dam near Ciudad Juarez, Chihuahua. The gaging station is an open channel rating station with water-stage recorder located 396 feet below the canal head-gates. The zero of the gage is 3,712.30 feet above U.S.C. & G.S. sea level datum or 3,670.00 feet above U.S.R.S. and Santa Fe Ry. datum. 1939 record good.

This canal was constructed by the United States Section in connection with the American Dam. Operation began June 2, 1938. Water from this canal discharges into the Franklin Canal from which some is frequently returned to the Rio Grande at spillways 2.2, 2.7 and 3.6 river miles below the American Dam.

RECORDS: Based upon 30 current meter measurements during the year and a stable rating curve. Records available June 2, 1938 (when the operation of this canal began) until Dec. 31, 1939.

PREVIOUS EXTREME FLOWS: The greatest mean daily flow in the canal occurred Sept. 5, 1938 with a flow of 1,260 second feet. The lowest flow in the canal was 2 second feet on many occasions.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.0	* 1.0	173	698	736	856	883	1,100	1,030	559	306	252
2	1.0	* 1.0	162	744	δ 717	774	865	1,160	1,060	543	295	244
3	1.0	* 1.0	213	1,000	δ 677	736	927	1,010	1,190	517	287	238
4	1.0	* 1.0	366	840	561	801	1,020	1,010	1,120	499	283	234
5	1.0	* 1.0	399	846	δ 690	1,080	1,180	1,130	1,070	527	267	234
6	1.0	* 1.0	435	819	δ 626	939	1,010	1,050	1,080	579	293	103
7	1.0	*52.4	482	971	δ 683	927	905	1,140	971	637	287	* 2.0
8	1.0	128	444	781	865	883	852	1,180	880	612	262	* 2.0
9	1.0	224	442	678	813	849	822	1,020	837	499	238	* 2.0
10	1.0	578	476	880	786	807	852	862	812	454	256	* 2.0
11	1.0	482	449	883	718	856	1,070	877	856	418	256	* 2.0
12	1.0	328	428	822	712	918	952	1,120	846	432	258	* 2.0
13	1.0	305	416	753	733	852	902	1,080	968	423	254	* 1.5
14	1.0	285	459	686	736	798	899	1,180	991	423	423	* 1.5
15	1.0	343	464	792	780	810	1,040	1,120	952	416	466	* 1.5
16	1.0	405	462	883	762	798	877	1,040	1,040	394	449	135
17	1.0	396	469	902	771	1,010	1,040	1,010	813	320	459	232
18	1.0	457	582	840	753	981	1,020	856	733	295	220	351
19	1.0	503	921	874	777	1,040	939	816	546	303	* 2.0	358
20	1.0	385	923	865	701	939	936	759	517	465	* 2.0	430
21	1.0	357	822	789	667	975	943	982	512	474	* 2.0	437
22	1.0	334	741	822	681	943	987	869	482	496	* 2.0	397
23	1.0	305	846	825	747	933	1,190	886	540	543	* 1.5	310
24	1.0	250	795	834	715	1,000	1,180	890	482	502	* 1.5	285
25	1.0	218	709	877	756	1,030	1,060	807	486	464	* 1.5	134
26	1.0	209	661	874	877	971	962	753	476	351	* 1.5	* 2.0
27	1.0	204	692	828	774	962	1,110	721	479	353	187	* 2.0
28	1.0	187	804	834	768	959	1,140	715	435	336	277	* 2.0
29	1.0		747	886	852	1,000	1,010	822	401	320	279	* 2.0
30	1.0		667	908	914	933	880	816	408	318	262	* 1.5
31	1.0		816		896		1,130	914		316		* 1.5
Sum	31.0		17,465		23,244		30,583		23,013		6,578	
		6,941.4		25,034		27,360		29,695		13,788		4,401.5

Month	Extreme Gage Feet — 1939		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
			High		Low			Total 1939	Period 1938-1939		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	* 3.40	* 3.40	ǂ 1	1.0	ǂ 1	1.0	1.0	61.5			
Feb.	7.51	* 3.40	10	634	ǂ 1	1.0	248	13,800			
Mar.	9.34	5.26	19	1,250	3	157	563	34,600			
Apr.	8.82	5.53	3	1,070	8	201	834	49,700			
May	8.62	6.70	30	1,000	6	¤ 454	750	46,100			
June	9.29	7.54	5	1,230	2	675	912	54,300	54,200	54,300	54,100
July	10.01	6.84	15	1,490	16	489	987	60,700	60,200	60,700	59,700
Aug.	9.98	7.23	15	1,480	22	590	958	58,900	59,950	61,000	58,900
Sept.	9.54	3.55	3	1,320	10	* 1.0	767	45,600	44,550	45,600	43,500
Oct.	7.50	5.97	7	664	18	289	445	27,300	26,850	27,300	26,400
Nov.	6.85	3.52	15	492	ǂ23	* 1.5	219	13,000	12,600	13,000	12,200
Dec.	6.70	3.57	20	454	ǂ13	* 1.5	142	8,730	11,165	13,600	8,730
Yearly	10.01	* 3.40		1,490		1.0	570	412,791.5			

* Partly Estimated. δ Deduced. ǂ And other days. ¤ Estimated.

DIVERSIONS FROM THE RIO GRANDE IN THE EL PASO VALLEY OF TEXAS

Together With Corresponding

ACREAGE CULTIVATED, WATER DUTY AND RAINFALL

1939

The diversions of water listed below were made for use on lands in the El Paso Valley of Texas, lying between the American Dam and the Fort Quitman gaging station.

The diversions were measured for the 64,456 acres or 98.9% of the total area which lies above the lower end of the Hudspeth County Conservation and Reclamation District Number One. These water measurement and acreage records were furnished by the El Paso office of United States Bureau of Reclamation. For the 710 acres or 1.1% of the total area which lies below the Hudspeth District and above the Fort Quitman gaging station, the diversions were estimated.

From the gross diversions into the Franklin and Riverside canals there has been deducted the water spilled back to the river at 3 points, viz: 11.6, 19.0 and 26.4 river miles below the American Dam at El Paso. There is considerable re-use within this area of drainage and waste water from within the area. Final drainage water returns to the Rio Grande. This record began July, 1938.

The average annual evaporation from natural water surfaces in this region is approximately 66 inches per year. See Water Bulletin No. 5, page 58.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	155	745	744	839	847	846	960	485	341	231
2	0	0	150	697	632	808	857	945	851	588	309	257
3	0	0	168	857	615	749	876	941	904	526	245	201
4	0	0	294	862	592	826	900	902	1,142	550	249	217
5	0	0	418	901	632	837	914	890	1,036	546	243	116
6	0	0	356	693	664	876	943	599	1,038	604	245	112
7	0	0	470	723	648	951	861	773	1,005	550	263	222
8	0	52	449	751	665	918	842	893	934	401	228	209
9	0	66	381	757	753	900	794	922	852	333	248	183
10	0	304	456	839	815	752	780	880	813	419	233	167
11	0	482	389	995	802	849	1,002	851	869	434	250	187
12	0	300	404	927	692	831	886	951	853	423	230	184
13	0	328	405	848	720	902	859	889	902	504	202	116
14	0	218	419	720	718	830	847	903	851	405	295	183
15	0	302	505	790	725	836	963	899	532	474	414	177
16	0	416	491	894	825	803	848	781	71	443	371	241
17	0	302	473	941	839	924	920	893	265	297	373	179
18	0	418	528	937	785	959	923	801	316	266	391	315
19	0	597	714	861	763	982	931	760	459	300	445	339
20	0	439	885	874	739	974	869	726	537	350	296	395
21	0	333	832	772	683	895	883	870	548	394	229	412
22	0	332	807	845	685	866	945	881	443	382	278	314
23	0	306	851	860	728	911	990	945	457	475	252	287
24	0	224	831	850	747	917	999	948	431	444	245	241
25	0	253	743	843	785	962	955	816	465	449	274	302
26	0	202	671	838	780	873	921	712	495	352	314	112
27	0	151	698	789	838	934	1,005	700	496	327	346	5
28	0	148	816	855	723	899	996	739	513	331	262	0
29	0		827	840	785	902	903	798	402	287	278	21
30	0		731	826	737	903	841	881	373	267	214	0
31	0		808		809		863	857		364		0
Sum	0	6,173	17,125	24,930	22,668	26,408	27,963	26,192	19,813	12,970	8,563	5,925

Month	Rainfall in Inches		⊕Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
	Average 1939	Normal 1924 to 1939	High		Low			Total 1939	Period 1938-1939		
			Day		Day				Average	Maximum	Minimum
Jan.	.70	.36					0	0			
Feb.	.01	.27	19	597	‡ 1	0	220	12,200			
Mar.	.41	.27	20	885	2	150	552	34,000			
Apr.	.30	.28	11	995	6	693	831	49,400			
May	.12	.41	17	839	4	592	731	45,000			
June	.04	.41	19	982	3	749	880	52,400			
July	.58	1.52	27	1,005	10	780	902	55,500	49,850	55,500	44,200
Aug.	1.15	1.64	12	951	27	700	845	52,000	54,550	57,100	52,000
Sept.	1.10	1.25	4	1,142	16	71	660	39,300	30,900	39,300	22,500
Oct.	.76	.82	6	604	18	266	418	25,700	24,600	25,700	23,500
Nov.	.84	.38	19	445	13	202	285	17,000	14,550	17,000	12,100
Dec.	.13	.41	21	412	‡28	0	191	11,800	11,750	11,800	11,700
Yearly	6.14	8.02		1,142		0	545	394,300			
Average Irrigated Acreage								65,166			
Mean Acre Feet Per Acre								6.05			
Average Rainfall in Inches								6.14	ϕ 8.02	ϕ 13.09	ϕ 3.88

‡ And other days. ⊕ Mean Daily Extreme. ϕ Period 1924 to 1939.

DIVERSIONS FROM THE RIO GRANDE INTO THE ACEQUIA MADRE (MEXICAN CANAL)

Near Juárez, Chihuahua, Together With Corresponding ACREAGE CULTIVATED, WATER DUTY AND RAINFALL

1939

This canal diverts water from the Rio Grande at the Mexican Dam at Juarez, Chihuahua, 2.1 river miles below the American Dam at El Paso, Texas. The gaging station is an open channel rating station with water-stage recorder located between the head of the canal and the first spillway below that point, but no water passed from the spillway during this period.

The record is based upon 113 current meter measurements at this station during the year, 69 by the National Irrigation Commission, 42 by the Mexican and 2 by the United States Section of this Commission.

The water from the Acequia Madre was used to irrigate lands in the Juarez Valley of Chihuahua, lying under this canal. Some of this water, as well as all drainage water, passed from this area to lands below.

The average annual evaporation from natural water surfaces in this region is approximately 66 inches per year. See Water Bulletin No. 5, page 58.

This record began with June 1938, when the American Dam began operating.

Mean Daily Discharge in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	100	152	161	155	243	163	80.9	0	0
2	0	0	0	126	177	158	153	159	136	18.0	0	0
3	0	0	0	106	218	148	166	159	157	11.3	0	0
4	0	0	0	99.2	214	156	162	165	177	8.8	0	0
5	0	0	0	110	210	158	167	168	135	7.4	0	0
6	0	0	0	112	198	142	162	150	124	6.3	0	0
7	0	0	50.2	116	206	151	188	171	131	6.4	0	0
8	0	0	42.4	114	225	141	144	174	157	7.8	0	0
9	0	0	37.1	117	227	145	148	159	142	6.0	0	0
10	0	0	42.4	118	212	146	141	166	190	3.9	0	0
11	0	0	42.7	115	209	154	145	153	183	2.8	0	0
12	0	0	42.7	110	206	155	138	158	182	2.1	0	0
13	0	0	37.4	101	204	161	135	155	183	1.4	0	0
14	0	0	35.7	94.3	198	157	148	162	193	1.4	0	0
15	0	0	35.7	97.8	214	158	220	197	214	1.1	0	0
16	0	0	29.3	108	215	159	215	190	161	0	0	0
17	0	0	31.4	107	228	169	168	119	183	0	0	0
18	0	0	31.8	98.9	235	168	163	139	183	0	0	0
19	0	0	46.6	93.2	243	172	165	139	170	0	0	0
20	0	0	68.9	85.5	227	175	149	160	166	0	0	0
21	0	0	36.4	93.9	225	174	141	178	150	0	0	0
22	0	0	30.0	98.5	212	175	124	172	151	0	0	0
23	0	0	30.0	89.0	201	180	115	183	159	0	0	0
24	0	0	27.9	87.2	204	183	139	163	158	0	0	0
25	0	0	26.1	93.6	211	187	147	149	155	0	0	0
26	0	0	32.8	90.4	221	198	140	157	175	0	0	0
27	0	0	31.1	85.8	210	184	133	152	169	0	0	0
28	0	0	27.2	89.7	209	173	149	146	149	0	0	0
29	0	0	28.3	94.3	221	170	183	143	143	0	0	0
30	0	0	29.3	93.2	207	162	243	129	156	0	0	0
31	0	0	32.8		211		302	145		0	0	0
Sum	0	0	906.2	3,044.5	6,550	4,920	5,048	5,003	4,895	165.6	0	0

Month	Rainfall in Inches		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
	Average 1939	Normal 1924 to 1939	High		Low			Total 1939	Period 1938-1939		
			Day		Day				Average	Maximum	Minimum
Jan.	.70	.36					0	0			
Feb.	.01	.27					0	0			
Mar.	.41	.27	20	84.4	‡ 1	0	29.2	1,800			
Apr.	.30	.28	2	132	1	33.9	101	6,040			
May	.12	.41	19	284	1	84.8	211	13,000			
June	.04	.41	1	211	8	134	164	9,760	10,930	12,100	9,760
July	.58	1.52	15	* 353	8	129	163	10,000	8,955	10,000	7,910
Aug.	1.15	1.64	5	352	17	81.2	161	9,920	8,160	9,920	6,400
Sept.	1.10	1.25	4	264	16	70.6	163	9,710	5,975	9,710	2,240
Oct.	.76	.82	1	171	‡16	0	5.3	328	306	328	284
Nov.	.84	.38					0	0	0		
Dec.	.13	.41					0	0	0		
Yearly	6.14	8.02		* 353		0	83.6	60,558			
Acreage Irrigated								16,059			
Mean Acre Feet Per Acre								3.77			
Average Rainfall in Inches								6.14	ϕ 8.02	ϕ 13.09	ϕ 3.88

‡ And other days. ϕ Period 1924 to 1939. * Partly estimated.

DIVERSIONS FROM THE RIO GRANDE

INTO THE MAVERICK CANAL EXTENSION BELOW THE POWER PLANT

Near Eagle Pass, Texas, Together With Corresponding

ACREAGE CULTIVATED, WATER DUTY AND RAINFALL

The Maverick Canal diverts water, for power and irrigation, from the Rio Grande into Texas, 692.2 river miles below the American Dam at El Paso, Texas.

According to the Maverick County Water Control and Improvement District No. 1, the following acreages were irrigated from this canal above the power plant: 875 acres in 1933, 1,000 acres in 1934, 740 acres in 1935, 4,500 acres in 1936, 4,500 acres in 1937, 5,500 acres in 1938, and 5,760 acres in 1939.

From this canal extension, below the power plant, irrigation first began in June 1938. Measurement of the water entering the canal extension began April 1, 1939 and the record of this flow is set out below. Small amounts of this water sometimes reach the Rio Grande below the Eagle Pass gaging station.

The tail water from the power plant returns to the Rio Grande 9.0 miles above the Eagle Pass gaging station.

The average annual evaporation from natural water surfaces in this region is approximately 65 inches per year. See Water Bulletin No. 5, page 58.

Mean Daily Diversions in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				73.1	73.7	87.7	85.9	90.4	71.6	104	101	53.1
2				73.1	81.4	88.0	81.5	32.0	71.6	104	101	53.2
3				73.1	81.4	88.3	81.2	13.0	71.7	104	101	53.2
4				73.1	44.0	88.6	80.9	11.9	71.7	104	101	53.2
5				73.1	9.5	88.9	42.1	10.7	71.8	104	101	53.2
6				73.1	36.0	89.2	14.4	9.5	71.9	104	101	53.2
7				76.8	11.0	89.5	42.3	8.3	71.9	104	101	53.4
8				76.8	10.3	89.8	89.9	7.2	72.0	104	101	53.6
9				76.8	9.5	89.7	90.5	6.0	72.1	104	101	53.8
10				76.8	8.8	89.5	91.0	22.6	72.1	104	101	54.0
11				76.8	8.0	89.3	91.5	78.7	72.2	0	101	82.4
12				76.8	7.3	89.2	92.0	77.5	72.6	0	51.2	82.6
13				76.8	6.5	89.1	92.6	76.3	73.1	0	51.1	82.8
14				76.8	5.8	88.9	93.1	75.2	73.5	0	51.0	83.0
15				76.8	5.0	88.7	93.6	74.0	74.0	0	50.9	83.0
16				76.3	4.3	88.6	93.7	74.2	74.4	0	50.9	83.0
17				75.7	3.5	88.5	93.8	74.4	74.8	104	50.8	83.0
18				75.2	2.8	88.3	93.9	74.6	75.3	104	50.7	83.1
19				74.6	28.7	88.1	94.0	74.8	75.7	104	50.7	83.1
20				74.1	76.2	88.0	94.1	75.0	75.7	104	50.6	83.1
21				73.5	77.1	87.9	94.2	75.3	75.7	104	50.4	83.1
22				73.0	77.9	87.7	94.3	75.5	75.7	103	54.2	83.1
23				73.2	78.7	87.5	94.4	75.7	75.7	103	54.0	83.1
24				73.3	79.5	87.4	94.5	75.9	75.7	103	53.8	83.1
25				73.5	84.5	91.7	94.6	71.1	75.7	103	53.6	83.2
26				73.7	85.4	91.5	94.7	71.2	66.3	102	53.4	63.5
27				73.8	86.2	91.3	96.2	71.2	104	102	53.3	63.5
28				74.0	86.5	91.2	95.0	71.3	104	102	53.1	63.5
29				73.9	86.8	90.9	93.9	57.7	104	102	53.1	63.2
30				73.8	87.1	90.6	92.7	71.4	104	102	53.1	62.8
31					87.4		91.5	71.5		102		62.5
Sum	‡ 1,079	‡ 1,069	‡ 580	2,241.4	1,430.8	2,673.6	2,668.0	1,754.1	2,320.5	2,584.0	2,100.9	2,157.6

Month	Rainfall in Inches		⊕Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
	Average 1939	Normal 1924 to 1939	High		Low			Total 1939	Period 1924-1939		
			Day		Day				Normal	Maximum	Minimum
Jan.	1.37	.83					‡ 34.8	‡ 2,140			
Feb.	.15	.65					‡ 38.2	‡ 2,120			
Mar.	.55	.81					‡ 18.7	‡ 1,150			
Apr.	.32	1.45	‡ 7	76.8	22	73.0	74.7	4,450			
May	3.05	3.09	31	87.4	18	2.8	46.2	2,840			
June	.80	2.45	25	91.7	24	87.4	89.1	5,300			
July	2.08	2.02	27	96.2	6	14.4	86.1	5,290			
Aug.	2.83	1.38	1	90.4	9	6.0	56.6	3,480			
Sept.	1.45	2.89	‡27	104.0	26	66.3	77.4	4,600			
Oct.	2.11	1.61	‡ 1	104.0	‡11	0	83.4	5,130			
Nov.	1.54	.75	‡ 1	101.0	21	50.4	70.0	4,170			
Dec.	1.42	1.33	25	83.2	1	53.1	69.6	4,280			
Yearly	17.67	19.26		104.0		0	62.1	44,950			
Average Irrigated Acreage								6,242			
Mean Acre Feet Per Acre								7.20			
Average Rainfall in Inches								17.67	19.26	29.27	11.80

‡ Estimated. ⊕ Mean Daily Extreme. ‡ And other days.

DIVERSIONS FROM THE RIO GRANDE IN HIDALGO, CAMERON AND WILLACY COUNTIES, TEXAS

Together With Corresponding ACREAGE CULTIVATED, WATER DUTY AND RAINFALL

1939

Diversions from the Rio Grande for irrigation are made here almost entirely by pumping. For 92.8% of the irrigated area, diversions were measured at the diversion points. For the remaining 7.2%, the diversions were estimated. A very small part of the measurements were made by plant efficiency and power input; otherwise, measurements were by Venturi Meters, open channel rating stations and Deflection Meters developed by this Commission. There is some re-use within the area of drainage water from the area. Drainage water from this area does not return to the Rio Grande. During the year 58,400 acre feet of water were diverted and used on the new Willacy County Irrigation District, where 51,500 acres were cultivated of which 5,000 acres were irrigated. The cultivated area and water diverted to Willacy County are included in the tables below.

The cultivated areas shown here are supplied with irrigation facilities. More than one crop per year is often grown on some of the land. The area actually irrigated this year in Hidalgo and Cameron Counties was 81.4% of the cultivated area. The average annual evaporation from natural water surfaces in these counties is approximately 55 inches per year. See Water Bulletin No. 5, page 58.

Mean Daily Diversions in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	61	525	2,010	1,670	1,750	761	1,600	1,060	1,340	962	2,450	1,560
2	421	668	1,850	1,270	2,230	410	1,360	307	949	2,020	2,440	1,230
3	820	674	1,700	2,130	2,220	165	1,730	557	782	2,390	2,180	877
4	743	343	1,400	2,210	1,990	45	735	1,170	1,640	2,120	1,350	1,910
5	912	118	805	2,160	1,530	122	2,120	1,170	1,790	1,790	963	2,330
6	875	553	1,590	2,250	845	273	2,360	453	2,040	1,920	2,150	2,290
7	555	1,230	2,010	2,060	101	116	2,150	1,420	1,920	1,360	2,460	2,250
8	153	1,110	2,090	1,440	598	62	1,600	1,580	1,750	1,050	2,430	2,020
9	706	958	2,160	803	1,050	50	1,840	1,450	1,100	1,910	2,020	1,340
10	635	1,050	2,120	1,900	1,300	47	1,950	1,790	584	1,950	1,790	1,540
11	537	516	1,840	2,100	1,260	75	1,390	1,510	511	1,590	1,060	2,390
12	617	464	1,400	1,850	1,350	146	1,120	726	320	1,150	661	2,450
13	550	1,270	2,050	476	1,070	451	893	476	285	1,220	1,390	1,620
14	380	1,570	2,310	343	248	476	836	1,410	555	1,160	2,030	1,450
15	226	1,890	2,040	512	92	500	610	1,860	724	920	2,020	1,930
16	626	1,830	1,580	1,110	72	662	499	1,800	282	1,450	1,680	1,660
17	1,050	1,260	948	1,230	70	402	1,390	1,730	268	1,390	1,520	1,350
18	1,370	165	554	1,170	197	368	1,530	1,770	567	1,380	1,010	2,280
19	1,330	211	347	1,400	176	1,050	1,840	1,240	343	1,710	710	2,270
20	1,180	1,090	1,280	1,320	69	1,110	1,850	662	512	1,860	1,870	1,930
21	840	1,150	1,620	640	126	1,240	1,670	1,650	775	1,370	1,920	1,870
22	368	1,060	1,430	402	378	1,460	1,200	1,580	590	757	2,030	1,930
23	761	1,150	1,620	742	627	1,420	610	1,410	478	1,850	1,980	1,340
24	804	1,150	1,520	1,130	786	1,200	1,760	1,450	352	2,200	1,820	934
25	734	1,020	996	1,470	901	884	2,090	1,460	1,180	2,260	1,120	867
26	448	778	653	1,030	920	1,460	2,130	910	1,460	2,160	828	1,510
27	63	1,440	1,640	733	723	1,830	1,950	733	1,240	2,120	1,530	1,940
28	1.1	1,800	1,870	653	629	1,970	1,800	1,470	1,510	1,480	1,410	1,210
29	53		2,010	771	1,250	2,000	1,260	1,490	1,690	910	1,240	1,300
30	230		2,080	479	1,270	1,880	793	1,630	1,150	1,710	673	1,310
31	336		1,950		848		1,660	1,690		2,180		1,000
Sum	18,385.1	27,043	49,473	37,454	26,676	22,635	46,326	39,614	28,687	50,299	48,735	51,888

Month	Rainfall in Inches		⊕Extreme Second Feet — 1939				Average Second Feet	Acre Feet			
	Average 1939	Normal 1922 to 1939	High		Low		1939	Total 1939	Period 1922-1939		
			Day		Day				Normal	Maximum	Minimum
Jan.	1.51	1.41	18	1,370	28	1.1	593	36,500	37,023	71,000	7,690
Feb.	.17	1.06	15	1,890	5	118	966	53,600	59,868	134,000	6,950
Mar.	.54	1.10	14	2,310	19	347	1,600	98,100	81,381	156,000	23,900
Apr.	2.28	1.30	6	2,250	14	343	1,250	74,300	66,659	119,000	30,000
May	3.39	3.30	2	2,230	20	69	861	52,900	58,490	135,000	4,500
June	4.35	2.71	29	2,000	4	45	754	44,900	53,086	84,600	1,500
July	1.29	2.25	6	2,360	16	499	1,490	91,900	49,915	103,000	10,000
Aug.	1.22	1.77	15	1,860	2	307	1,280	78,600	64,131	98,000	19,100
Sept.	2.72	5.21	6	2,040	17	268	956	56,900	43,442	110,000	8,010
Oct.	.60	2.08	3	2,390	22	757	1,620	99,800	53,485	99,800	21,400
Nov.	.16	1.40	7	2,460	12	661	1,620	96,700	46,568	96,700	11,500
Dec.	.25	1.84	12	2,450	25	867	1,670	103,000	34,243	103,000	10,400
Yearly	18.48	25.43		2,460		1.1	1,230	887,200	648,291	887,200	484,750
Average Acreage Cultivated, Hidalgo, Cameron & Willacy Counties								425,000	326,389	425,000	216,000
Mean Acre Feet Per Acre								2.09	1.99	2.68	1.29
Average Rainfall in Inches								18.48	25.43	36.09	16.68

⊕ Mean daily extreme

DIVERSIONS FROM THE RIO GRANDE INTO THE RETAMAL CANAL

Near Rio Bravo, Tamaulipas
1939

The Retamal Canal was constructed by the Flood Control Works Commission of the Lower Rio Grande for the diversion of Rio Grande water to be utilized in irrigating agricultural lands. During floods this canal is used as a floodway. It empties into Culebrón Lake which serves as a reservoir. The spillway at Culebrón permits flood water to escape to the Gulf of Mexico through Floodway No. 1.

Retamal Canal has a capacity of 7,000 second feet. Its intake is 22.8 river miles below the Hidalgo-Reynosa bridge, near Hidalgo, Texas and 1,076 river miles below the American Dam at El Paso, Texas. About 1,000 feet below its intake there is a control gate .9 mile below which are several gages where gage readings are taken as often as required by the variations of flow. Measurements are made by current meter during low flows and by floats during floods. The records below are based upon 57 measurements by floats and 1 by meter during the year. The flow records of this canal began September 1, 1939. The 1939 record is fair. No records are available as to the area cultivated or irrigated or the duty of water for 1939.

Mean Daily Diversions in Second Feet 1939 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									0	86.9	353	81.9
2									0	92.2	302	61.8
3									0	57.9	225	65.7
4									0	36.7	189	69.6
5									0	63.9	154	54.1
6									0	54.1	126	48.8
7									0	35.7	100	47.3
8									0	32.2	81.9	44.5
9									0	15.2	81.9	48.8
10									0	0	86.9	65.7
11									0	44.1	89.3	69.6
12									0	3,280	104	50.5
13									0	5,190	123	47.3
14									0	4,660	97.1	55.8
15									0	2,030	74.2	48.7
16									0	992	79.5	44.5
17									0	639	100	51.9
18									0	480	123	57.9
19									0	403	231	36.7
20									0	338	256	33.2
21									0	294	150	34.6
22									130	268	97.1	35.7
23									759	243	79.5	34.6
24									353	231	65.7	48.7
25									184	220	57.9	54.0
26									162	220	69.6	54.0
27									142	220	86.9	42.7
28									113	220	71.7	33.2
29									84.4	219	69.6	36.7
30									71.7	219	74.2	39.9
31										250		47.3
Sum									1,999.1	21,134.9	3,799.0	1,545.7

Month	Rainfall in Inches		Extreme Second Feet — 1939				Average Second Feet 1939	Acre Feet			
	Average 1939	Normal 1924 to 1939	High		Low			Total 1939	Period 1924-1939		
			Day		Day				Normal	Maximum	Minimum
Jan.	1.51	1.41									
Feb.	.17	1.06									
Mar.	.54	1.10									
Apr.	2.28	1.30									
May	3.39	3.30									
June	4.35	2.71									
July	1.29	2.25									
Aug.	1.22	1.77									
Sept.	2.72	5.21	22	1,360	‡ 1	0	66.6	3,970			
Oct.	.60	2.08	13	5,350	10	0	682	41,900			
Nov.	.16	1.40	1	360	25	57.9	127	7,540			
Dec.	.25	1.84	1	86.9	28	31.1	49.9	3,070			
Yearly	18.48	25.43		⊕ 5,350		⊕ 0	⊕233	⊕ 56,480			
Average Rainfall in Inches								18.48	25.43	36.09	16.68

‡ And other days. ⊕ Period, September to December inclusive.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1939

Gravimetric Percentages of Dried Silt in the Rio Grande at San Marcial, New Mexico, as Determined from Water Samples During 1939

The gravimetric percentages of dry silt reported here were determined from water samples taken by the United States Section of 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 samples were analyzed at El Paso by the United States Section of the Commission by determining the silt in a single monthly composite sample which was composed by using from each daily sample an amount proportional to the river flow at the time the sample was taken.

For visualization 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. See Water Bulletin No. 7 for average density of Rio Grande silt in Elephant Butte reservoir.

Tons of Suspended Silt Passing San Marcial in the Rio Grande – 1939

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1925 to 1939		
					Normal	Maximum	Minimum
Jan.	69,600,000	84,900	.122	58.5	203.8	374.4	27.8
Feb.	56,920,000	54,600	.096	37.6	297.4	1,027	23.3
Mar.	162,080,000	534,900	.330	368.4	315.9	1,012	45.5
Apr.	177,060,000	374,000	.211	257.6	824.9	3,780	23.7
May	84,440,000	87,800	.104	60.5	1,386	4,483	5.8
June	4,730,000	3,500	.074	2.4	1,307	9,322	2.4
July	17,840,000	221,200	1.24	152.3	1,179	6,672	0
Aug.	35,960,000	899,000	2.50	619.1	2,062	11,710	83.4
Sept.	24,520,000	1,027,400	4.19	707.6	2,837	17,470	156.4
Oct.	25,200,000	147,900	.587	101.9	780.5	6,520	0
Nov.	11,430,000	10,500	.092	7.2	127.2	301.2	7.2
Dec.	45,080,000	125,800	.279	86.6	166.3	346.4	30.3
Yearly	714,860,000	3,571,500	.500	2,459.7	11,487.0	41,317.6	2,459.7

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1939 —continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Eagle Pass, Texas as Determined from Water Samples During 1939

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 every day, except as noted below, by the Mexican 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 below were computed in accordance with the foregoing.

For visualization 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. On page 63 of Water Bulletin No. 7 there is given some data showing the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.003	.003	000	.002	.007	.008	.062	.044	.024	.142	.099	.018
2	.001	.003	.002	.003	.047	.004	.062	.028	.045	.258	.108	.019
3	000	.001	.004	.006	.066	.018	.056	.026	.046	.180	.074	.010
4	000	.002	.003	* .001	.062	.018	.054	.030	.043	.090	.055	.008
5	000	.003	.001	.001	‡ .165	.015	.055	.403	.042	‡ .161	* .615	.010
6	.001	.001	.002	.002	‡ .330	.015	.057	.405	.046	.231	.506	.010
7	.001	.016	.003	.008	.263	.040	.135	.416	.042	.202	.047	.007
8	.010	.022	000	.002	.251	.033	.132	.388	.046	.363	.048	.009
9	.011	.018	.002	.003	.236	.040	.044	.378	‡ .040	.026	.062	.009
10	*.013	.020	.003	.009	.245	.025	.034	.733	‡ .034	.349	.052	.020
11	.009	.007	.003	.003	.304	.011	.051	.748	.028	.344	.075	.024
12	.015	.006	.002	.002	.231	.006	.046	.823	.016	.087	* .031	.007
13	000	.006	.001	.003	.153	.009	.072	.814	.021	.082	.022	.006
14	.001	.003	.001	.003	.036	.011	.074	.745	* .022	.056	.051	.008
15	.004	.001	.001	.001	.053	.009	.261	.713	‡ .032	.033	.068	.003
16	.003	000	.001	.001	.042	.010	.067	.840	‡ .041	.029	.170	.004
17	.008	.001	.001	.001	.020	.015	.073	.497	.051	.020	.167	.006
18	.001	.002	.002	.001	.019	.014	.073	.529	.041	.016	.123	* .007
19	.003	* 000	.001	000	.014	.010	.069	1.138	.057	.013	* .112	.003
20	.002	.001	.001	000	.016	.009	.082	1.133	.015	.011	.450	* .007
21	.001	.003	.002	.001	.015	.020	.065	1.135	.024	.007	.587	* .003
22	.003	000	.003	.001	.021	.009	.648	.843	.014	* .006	.566	.007
23	.003	.003	.003	.002	.013	.022	.194	.592	.051	.001	* .029	000
24	.001	.003	.144	.009	.019	.035	.202	.675	.045	.037	.031	000
25	.001	.006	.004	.002	.008	.032	.321	.309	.050	.040	.026	.008
26	.003	.004	.011	* .002	.006	.040	.206	.332	.042	.012	.008	.007
27	.002	000	.008	.001	.004	.032	.055	.350	.037	.153	.010	.006
28	.001	.007	.009	.008	.007	.033	.070	.280	.080	.047	.007	.008
29	.004		000	.011	.006	.043	.044	.174	.129	.059	.020	.001
30	.003		.003	.016	.007	.052	.050	.169	.125	.032	.013	.003
31	.004		.001		.003		.047	.277		.028		.004

Tons of Suspended Silt Passing Eagle Pass in the Rio Grande During 1939

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1939		
					Average	Maximum	Minimum
Jan.	212,100,000	7,763.3	.004	5.3	28.2	124.0	.1
Feb.	197,540,000	9,843.7	.005	6.8	8.4	14.6	2.6
Mar.	181,620,000	12,566.3	.007	8.7	42.2	187.9	4.7
Apr.	125,430,000	4,425.6	.004	3.0	20.7	37.6	3.0
May	211,100,000	228,841.5	.108	157.6	376.7	1,339.0	31.2
June	159,960,000	35,612.5	.022	24.5	1,626.0	3,821.0	24.5
July	188,460,000	187,846.3	.100	129.4	1,484.7	7,835.8	95.2
Aug.	518,400,000	2,922,839.1	.564	2,016.8	902.0	2,016.8	217.8
Sept.	188,160,000	88,192.5	.047	60.7	3,500.6	6,098.0	60.7
Oct.	224,790,000	275,904.9	.123	190.0	600.4	1,474.2	190.0
Nov.	217,340,000	296,720.3	.137	204.4	100.2	204.9	14.3
Dec.	185,810,000	14,837.3	.008	10.2	19.6	84.1	1.1
Yearly	2,610,710,000	4,085,393.3	.156	2,817.4	8,709.7	17,020.2	1,768.3

* Partly Estimated. ‡ Estimated.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES
1939 —continued

Gravimetric Percentages of Dried Silt in the Rio Alamo at Mier, Tamaulipas, as Determined from Water Samples During 1939

The gravimetric percentages of dry silt reported here were determined by the Mexican Section of the International Boundary Commission from 33 samples taken by that section during the year. 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 below were made in accordance with the foregoing.

For visualization 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. See Water Bulletin No. 7, page 63, for data as to the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	.016	.018	0	.041	0	0	0	0
2	0	0	0	0	0	.023	0	.065	0	0	0	0
3	0	0	0	0	0	1.101	0	.096	0	0	0	0
4	0	0	0	0	1.050	.100	0	.013	0	0	0	0
5	0	0	0	0	1.060	.021	0	0	0	0	0	0
6	0	0	0	0	.760	0	0	0	0	0	0	0
7	0	0	0	0	.096	0	0	0	0	0	0	0
8	0	0	0	0	.210	.018	0	0	.105	0	0	0
9	0	0	0	0	.118	.013	0	0	0	0	0	0
10	0	0	0	0	.023	0	0	0	0	.350	0	0
11	0	0	0	0	.013	0	.170	0	.530	1.500	0	0
12	0	0	0	.023	0	0	.065	0	.096	1.580	0	0
13	0	0	0	.800	.328	0	.011	0	.240	.860	0	0
14	0	0	0	.022	.500	0	0	0	.119	.100	0	0
15	0	0	0	0	.061	0	0	0	.018	.042	0	0
16	0	0	0	0	.018	0	0	0	0	.027	0	0
17	0	0	0	0	.011	0	0	0	.049	.019	0	0
18	0	0	0	0	0	0	0	0	.070	.015	0	0
19	0	0	0	0	0	0	0	.066	.476	.013	0	0
20	0	0	0	0	0	0	0	.360	.888	.011	0	0
21	0	0	0	0	0	0	0	.490	.818	0	0	0
22	0	0	0	0	0	0	0	.025	.157	0	0	0
23	0	0	0	0	0	0	0	0	.052	0	0	0
24	0	0	0	0	0	0	0	0	.020	0	0	0
25	0	0	0	0	0	.100	0	0	.011	0	0	0
26	0	0	0	0	.025	.052	0	0	0	0	0	0
27	.021	0	0	0	0	0	0	0	0	0	0	0
28	.039	0	0	1.500	0	0	0	0	0	0	0	0
29	0		0	.760	.123	0	0	0	0	0	0	0
30	0		0	.039	.358	0	0	0	0	0	0	0
31	0		0		.050		.084	0		0		0

Tons of Suspended Silt Passing Cd. Mier in the Rio Alamo— 1939

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1939		
					Average	Maximum	Minimum
Jan.	836,000	91.8	Trace	.1	3.6	21.8	0
Feb.	236,000	0	0	0	.1	.6	0
Mar.	183,000	0	0	0	3.8	18.2	0
Apr.	26,730,000	330,251.9	1.236	227.4	57.2	227.4	0
May	43,170,000	333,538.9	.773	229.7	58.8	229.7	7.0
June	5,104,000	37,589.7	.736	25.9	21.1	100.2	0
July	1,379,000	1,560.1	.113	1.1	25.0	73.8	0
Aug.	4,992,000	16,320.3	.327	11.2	108.6	396.0	0
Sept.	16,410,000	93,561.5	.570	64.4	41.0	79.7	1.5
Oct.	57,600,000	810,075.4	1.406	557.9	108.7	557.9	0
Nov.	554,000	0	0	0	2.0	5.2	0
Dec.	581,000	0	0	0	1.0	5.8	0
Yearly	157,775,000	1,622,989.6	1.029	1,117.7	430.9	1,117.7	154.5

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1939 —continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas, as Determined from Water Samples During 1939

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 by the United States Section of the International Boundary Commission until October 31, 1939. After this date samples were taken by the Mexican 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 below were computed in accordance with the foregoing.

For visualization 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. On page 63 of Water Bulletin No. 7, there is given some data showing the average density of Rio Grande silt in Elephant Butte reservoir.

CORRECTION: Because of arithmetical errors the following corrections should be made in the 1935 silt records for this station (see Water Bulletin No. 5, page 54): for the month of June 1935, total tons of silt should be 10,478,000, average percent silt should be .4850, total acre feet of silt should be 7,216. For the year 1935, total tons of silt should be 29,664,700, average percent silt should be .3772, total acre feet of silt should be 20,429.8.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.001	000	.001	* .003	.081	* .209	.003	.012	.507	.022	.050	.047
2	.001	.002	000	.003	.031	.126	.001	.116	.383	.020	.069	.036
3	000	.004	.002	.003	* .015	.289	.002	* .196	.287	.026	.056	.024
4	.001	.004	.002	.002	.802	.761	.001	.056	* .200	.020	.065	.024
5	.001	.003	* 000	.003	.701	.494	.009	.018	.153	.013	.044	.020
6	000	.003	.001	.001	.741	.249	.009	.009	.119	.010	.015	.016
7	.003	.003	.001	.001	.532	.126	.001	.452	.090	.024	.003	.012
8	.001	.001	.001	.001	.365	.059	000	1.075	.086	.006	.004	.018
9	.001	.001	.001	000	.162	.042	.001	* .651	.101	.015	.002	.020
10	.001	.002	.002	.001	.063	.034	000	.334	.059	.012	.002	.018
11	.002	.001	.001	.001	.026	.013	000	.362	.362	.773	.030	.014
12	000	.001	.001	.001	.020	.006	* .004	.800	.257	.383	.025	.010
13	.001	.001	.001	.359	.111	.001	.002	.541	.121	.407	.025	.014
14	000	* .001	.001	.015	.653	.001	.006	.667	.108	.315	.016	.011
15	000	.002	000	.002	.414	.001	.006	* .564	.058	* .172	.020	.001
16	.003	.001	.001	.001	.398	000	.003	.482	.055	.100	.038	.001
17	000	.001	.001	.003	.167	.002	.008	.372	.038	.064	.047	.001
18	.001	.001	.002	.001	.119	.001	.006	.606	* .068	.052	* .048	.001
19	000	000	.001	.001	.082	.001	.015	.736	.135	.051	.038	.003
20	.001	000	000	.001	.064	.002	.020	.861	.626	.052	.009	.003
21	000	.001	.001	.001	.045	.001	.037	.674	.296	.058	.006	.001
22	.001	000	.002	.002	.046	.001	.047	.698	.104	.046	.008	.003
23	.001	000	.001	.003	.040	.001	.068	.496	.076	.036	.010	.001
24	000	.001	.001	.001	.037	.001	* .035	.887	.092	.031	.011	.001
25	000	# .001	.001	000	.143	.013	.016	.559	.008	.021	.019	.003
26	.001	.001	.001	.001	.376	.006	.019	1.020	.006	.013	.041	.001
27	.009	000	.001	.001	.305	000	.020	.946	.004	.006	.048	000
28	.009	.001	.002	.708	.212	.001	.020	.968	.007	.012	.043	000
29	.003		000	.188	.060	# .002	.013	.806	.004	.058	.046	000
30	.002		.003	.073	.427	.004	.011	.724	.122	.076	.059	000
31	.001		000		.119		.008	.496		.057		.002

Tons of Suspended Silt Passing Roma in the Rio Grande During 1939

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1929 to 1939		
					Normal	Maximum	Minimum
Jan.	231,060,000	3,429.8	.001	2.4	40.0	168.7	.4
Feb.	200,560,000	2,694.6	.001	1.9	30.5	121.0	.8
Mar.	179,870,000	1,912.1	.001	1.3	42.5	184.5	1.3
Apr.	170,900,000	187,821.7	.110	129.4	298.9	1,345.0	.7
May	618,030,000	2,497,521.1	.404	1,720.1	1,102.5	2,474.0	88.6
June	262,890,000	592,371.1	.225	408.0	1,314.7	7,216.0	52.7
July	185,430,000	28,091.1	.015	19.3	1,428.0	9,070.0	19.3
Aug.	548,170,000	3,511,438.8	.641	2,418.3	1,115.3	3,251.2	113.2
Sept.	270,880,000	546,575.3	.202	376.4	4,560.4	17,998.0	42.8
Oct.	393,230,000	1,303,286.0	.331	897.6	1,960.7	9,241.0	133.0
Nov.	208,860,000	64,362.3	.031	44.3	113.1	293.0	4.8
Dec.	189,510,000	19,832.3	.010	13.7	67.0	319.0	1.0
Yearly	3,459,390,000	8,759,336.2	.253	6,032.7	12,073.6	30,839.0	2,314.0

* Partly Estimated. # Estimated.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1939 —continued

Gravimetric Percentages of Dried Silt in the Rio San Juan at Santa Rosalia, Tamaulipas, Mexico, as Determined from Water Samples During 1939

The gravimetric percentages of dry silt reported here were determined by the Mexican Section of the International Boundary Commission from samples taken by that section about every third day except at times of high flow when samples were taken more frequently. 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 below were made in accordance with the foregoing.

For visualization 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. See Water Bulletin No. 7, page 63, data as to the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	.0129	.1625	.0011	.0003	.0030	.0118	0	0
2	0	0	0	0	.0100	.0021	.0010	.0003	.0022	.0099	0	0
3	0	0	0	0	.0072	.0051	.0008	.0004	.0019	.0087	0	0
4	0	0	0	0	.0109	.0078	.0007	.0005	.0015	.0076	0	0
5	0	0	0	0	1.2971	.0106	.0006	.0009	.0013	.0060	0	.0001
6	0	0	0	0	.8665	.0098	.0004	.0014	.0011	.0044	0	.0001
7	0	0	0	0	.4360	.0091	.0002	.0018	.0010	.0039	0	0
8	0	0	0	0	.0054	.1163	.0002	.0016	.0009	.0034	0	0
9	0	0	0	0	.0074	.0612	.0002	.0013	.0007	.0029	0	0
10	0	0	0	0	.0094	.0062	.0001	.0040	.0006	1.7804	0	0
11	0	0	0	0	.0068	.0039	.0067	.0067	.0004	3.5579	0	0
12	0	0	0	0	.0042	.0016	.0032	.0054	.0003	1.8720	0	0
13	0	0	0	0	.9192	.0013	.0080	.0042	.0001	.4148	.0001	.0001
14	0	0	0	.0110	1.8342	.0010	.0083	.0030	.0001	.3401	.0001	.0001
15	0	0	.0001	.0077	.1234	.0010	.0086	.0023	0	.2668	0	0
16	0	0	0	.0044	.0812	.0011	.0046	.0016	.0012	.1928	0	0
17	0	0	0	.0011	.0391	.0009	.0007	.0009	.0012	.1591	0	0
18	0	0	0	.0009	.0313	.0007	.0010	.0011	.0012	.1253	0	0
19	0	.0001	0	.0008	.0237	.0006	.0013	.0014	.4358	.0916	0	0
20	0	.0001	0	.0007	.0185	.0018	.0011	.0076	.8704	.0641	0	0
21	0	.0001	0	.0006	.0135	.0030	.0010	.0138	1.1755	.0367	0	0
22	0	0	0	.0007	.0085	.0024	.0010	.0107	.5704	.0183	0	0
23	0	0	0	.0014	.0061	.0018	.0009	.0076	.3941	0	0	0
24	0	0	.0001	.0013	.0037	.0028	.0009	.0060	.2178	0	0	0
25	0	.0001	.0001	.0012	.0073	.0039	.0007	.0044	.0415	00	0	0
26	0	.0001	0	.0011	.0109	.0050	.0006	.0041	.0366	0	0	0
27	0	.0001	0	.0012	.0080	.0032	.0005	.0039	.0316	0	0	0
28	0	0	0	.0013	.0051	.0014	.0004	.0037	.0266	0	0	0
29	0		0	.0052	.0022	.0014	.0004	.0037	.0202	0	0	0
30	0		0	.0090	.0084	.0013	.0004	.0037	.0138	0	0	0
31	.0001		0		.0050		.0003	.0037		0		0

Tons of Suspended Silt Passing Santa Rosalia in Rio San Juan - 1939

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1939		
					Average	Maximum	Minimum
Jan.	35,790,000	1.0	T	T	6.8	26.9	0
Feb.	17,830,000	3.0	T	T	.3	1.8	0
Mar.	10,550,000	.9	T	T	.4	2.7	0
Apr.	36,280,000	1,709.0	.0047	1.2	8.2	43.5	0
May	163,380,000	1,542,009.7	.9438	1,062.0	339.6	1,062.0	1.6
June	50,230,000	18,622.6	.0371	12.8	112.6	617.2	0
July	23,830,000	1,274.4	.0053	.9	197.1	857.8	.9
Aug.	23,440,000	1,757.9	.0075	1.2	1,500.0	8,932.0	.1
Sept.	85,140,000	573,583.8	.6737	395.0	628.2	2,148.0	3.3
Oct.	241,030,000	4,549,227.9	1.8642	3,133.1	612.2	3,133.1	2.7
Nov.	22,760,000	1.2	T	T	20.5	67.3	0
Dec.	21,720,000	3.2	T	T	15.1	52.4	0
Yearly	734,980,000	6,688,194.6	.9100	4,606.2	3,441.0	9,395.5	246.6

T - Trace.

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES— 1939

The chemical analyses reported here were made by the United States Department of Agriculture at Riverside, California, from composite water samples made up periodically from independent water samples. This compositing and the determination of the specific electrical conductances of the independent water samples was done by the United States Section of the International Boundary Commission.

Water samples from the stations at Eagle Pass, Rio Salado and Rio San Juan were gathered by the Mexican Section of the Commission, the others by the United States Section. The composite samples were composed by taking from each sample an amount of water proportional to the acre footage of river flow represented by that sample.

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, 12.16; Na, 23; NO_3, 62.

Conductance, reported in the tables as (K x 10^5 at 25° C), is a relative measure of the total salt concentration in the water samples. (See Circular No. 232 U. S. Dept. Agr., July 1932.) It is a definite statement of an important physical property of the solution.

Water Samples from Rio Grande at San Marcial Station

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Jan.	30	0.81	41,390	91.3	0.22	7.9	48	24	3.57	1.22	4.49	3.11	3.71	2.16	0.02
Feb.	28	0.78	32,600	87.9	0.11	8.0	48	23	3.51	1.27	4.44	3.11	3.71	2.06	0.03
Mar.	31	0.72	85,680	77.3	0.17	8.2	46	18	3.18	1.11	3.68	2.78	3.62	1.39	0.02
Apr.	30	0.64	83,200	65.8	0.11	7.9	45	23	2.97	1.06	3.33	2.58	3.06	1.63	0.03
May	31	0.63	39,060	69.2	0.15	8.2	45	20	2.78	1.02	3.13	2.73	2.93	1.39	Trace
June	30	‡0.98	‡ 3,400	111		‡8.1	‡50	‡23	‡4.09	‡1.49	‡5.63	‡2.90	‡6.12	‡2.76	‡Trace
July	31	1.14	14,930	128		8.1	50	24	4.72	1.72	6.50	2.94	7.06	3.19	0.05
Aug.	41	1.65	43,560	164		8.3	45	14	7.40	2.40	7.89	2.84	12.36	2.51	0.01
Sept.	30	1.83	32,940	178		7.9	44	14	8.21	3.13	8.77	2.79	14.23	2.76	0.01
Oct.	30	1.12	20,720	119		8.3	48	23	4.64	1.72	5.83	3.12	6.49	2.82	0.01
Nov.	30	1.19	9,980	134	0.22	8.0	53	28	4.62	1.67	7.02	3.73	6.04	3.74	0.06
Dec.	31	0.97	32,110	111	0.19	7.9	47	24	4.34	1.51	5.17	3.48	4.96	2.57	0.04
Mean @	373 ϕ	0.84	439,570 ϕ	89.5		8.1	46	21	3.72	1.32	4.36	2.86	4.55	1.90	0.02
ϕ Period Average		0.76	653,000	86.1			43	18	3.62	1.24	3.68	2.81	4.20	1.58	
Tons of Constituents, 1939									53,000	11,400	71,400	62,100	155,000	47,500	
Average tons, period 1933-1939									84,300	17,600	98,800	98,300	235,000	65,600	

Water Samples from Rio Grande at Caballo Dam

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Jan. ‡		0.65	133	72.2	0.11	8.0	41	16	3.18	1.24	3.04	2.31	3.75	1.17	0.01
Feb. ‡		0.71	14,200	77.9	0.21	8.0	42	17	3.50	1.20	3.42	2.71	4.00	1.34	Trace
Mar. ‡		0.69	52,400	74.6	0.05	8.1	43	16	3.27	1.21	3.35	2.51	3.76	1.23	0.01
Apr.	30	0.73	77,400	81.4	0.11	7.9	44	21	3.46	1.16	3.60	2.53	3.89	1.70	0.01
May	31	0.71	74,600	77.7	0.15	8.0	43	18	3.33	1.25	3.48	2.53	3.91	1.44	0.01
June	30	0.72	87,100	78.9	0.13	8.2	44	19	3.27	1.26	3.57	2.53	3.90	1.54	Trace
July	31	0.68	87,000	76.6	0.14	7.9	44	20	3.14	1.14	3.32	2.58	3.74	1.54	Trace
Aug.	31	0.69	81,400	76.3	0.15	8.0	45	19	3.09	1.07	3.40	2.48	3.72	1.47	Trace
Sept.	30	0.69	53,000	79.6	0.12	7.9	45	17	3.17	1.18	3.49	2.63	3.67	1.32	Trace
Oct.	31	0.71	13,700	79.6	0.14	7.9	47	19	3.29	1.19	3.98	2.79	3.76	1.51	Trace
Nov.	30	0.74	7,470	82.9	0.16	8.1	47	20	3.55	1.34	4.31	2.94	3.95	1.71	Trace
Dec.	19	0.72	6,240	81.4	0.14	8.2	45	20	3.46	1.11	3.75	2.89	3.75	1.64	Trace
Mean @	263 ϕ	0.70	554,643 ϕ	78.4	0.13	8.0	44	19	3.25	1.18	3.50	2.62	3.81	1.52	
Period Average		0.77	592,100	82.5			44	17	3.58	1.27	3.80	2.86	4.38	1.49	
Tons of Constituents, 1939									69,700	15,300	86,400	85,800	196,000	57,700	
Average tons, period 1931-1939									75,000	16,200	91,600	90,100	220,000	55,500	

Water Samples from Rio Grande at Leasburg Dam

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Jan.	5	1.18	2,610	130.0	0.18	8.2	44	27	5.94	1.77	6.10	3.41	6.12	3.56	0.01
Feb.	4	0.81	13,500	88.8		8.2	45	22	3.74	1.40	4.13	2.66	4.32	1.95	0.01
Mar.	4	0.76	49,900	84.2	0.13	8.0	44	21	3.63	1.24	3.79	2.66	4.03	1.80	0.01
Apr.	30	0.78	75,200	86.4	0.13	7.9	44	22	3.72	1.08	3.77	2.68	4.13	1.90	0.01
May	31	0.76	71,400	82.4	0.13	7.7	44	19	3.57	1.27	3.82	2.73	4.13	1.59	0.01
June	30	0.77	85,100	83.0	0.14	7.9	43	19	3.53	1.31	3.69	2.73	4.10	1.63	0.01
July	31	0.71	85,400	80.1	0.12	8.1	45	18	3.13	1.20	3.60	2.68	3.70	1.44	Trace
Aug.	31	0.73	80,800	79.2	0.14	7.9	44	19	3.37	1.14	3.56	2.63	3.75	1.52	0.01
Sept.	30	0.76	58,600	81.2	0.13	8.1	44	18	3.44	1.14	3.62	2.73	4.07	1.52	0.01
Oct.	31	0.86	20,100	93.8	0.17	8.3	44	22	3.98	1.35	4.27	3.14	4.37	2.16	0.01
Nov.	30	0.99	11,000	113.0	0.18	7.9	51	30	4.21	1.34	5.75	3.41	4.57	3.38	0.01
Dec.	31	1.05	9,830	123.0	0.19	8.0	54	35	4.29	1.31	6.50	3.51	4.58	4.30	Trace
Mean @	288 ϕ	0.76	563,440 ϕ	83.8		8.0	44	20	3.52	1 22	3.79	2.73	4.01	1.71	
Period Average		0.83	619,206	88.5			45	20	3.87	1.37	4.22	3.01	4.60	1.92	
Tons of Constituents, 1939									70,500	14,700	87,400	83,400	193,000	60,800	
Average tons, period 1931-1939									78,400	16,900	98,300	91,600	224,000	69,200	

‡ Estimated - Composite sample broken in transit, conductance of composite tested in El Paso, Texas, various constituents estimated from conductance by United States Bureau of Plant Industry Laboratory at Riverside, California.

‡ No samples in January, February and March, composition estimated from Elephant Butte outflow data. ** Percent of Total Cations @ Weighted mean. ϕ Total. + Period 1931-1939. ϕ Period 1933-1939. *** Percent of Total Anions.

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1939—continued

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Water Samples from Rio Grande at El Paso, Texas															
Jan.	29	1.91	19,670	212	0.18	8.3	59	58	6.69	2.53	13.06	5.02	8.61	8.33	0.01
Feb.	28	1.44	22,610	160	0.22	8.2	56	54	5.41	2.04	9.45	4.07	6.82	5.60	0.01
Mar.	31	1.13	41,470	126	0.19	8.2	52	50	4.61	1.63	6.67	3.44	5.62	3.86	0.01
Apr.	30	1.07	59,920	120	0.20	8.3	49	29	4.50	1.57	5.91	3.33	5.25	3.41	0.03
May	31	1.07	63,770	118	0.19	8.2	51	27	4.32	1.57	6.05	3.39	5.45	3.26	0.01
June	30	1.07	68,590	120	0.17	8.3	50	28	4.43	1.52	5.93	3.41	5.37	3.44	0.03
July	31	1.04	76,440	118	0.19	8.0	50	28	4.30	1.60	5.96	3.25	5.38	3.29	0.01
Aug.	31	1.03	74,470	115	0.19	8.2	52	27	4.25	1.47	6.13	3.25	5.23	3.21	Trace
Sept.	30	1.08	66,100	121	0.21	7.9	50	29	4.49	1.68	6.23	3.46	5.36	3.58	0.01
Oct.	31	1.42	39,050	159	0.22	8.1	54	32	5.38	2.03	8.62	4.03	7.02	5.23	0.01
Nov.	30	1.64	29,850	185	0.26	8.0	55	35	6.19	2.21	10.40	4.48	7.99	6.62	0.11
Dec.	31	1.68	27,720	188	0.27	8.0	56	34	6.08	2.23	10.71	4.53	7.98	6.55	0.01
Mean @	363 ϕ	1.15	ϕ 589,660	129	0.20	8.1	51	29	4.64	1.67	6.77	3.52	5.74	3.88	0.02
Period+ Average		1.19	625,370	127			54	31	4.80	1.74	7.56	3.69	5.94	4.25	
Tons of Constituents, 1939									64,500	14,100	108,000	74,600	191,000	95,800	
Average tons, period 1931-1939									68,800	15,200	124,700	79,600	204,000	108,000	
Water Samples from Rio Grande at Fort Quitman, Texas															
Jan.	8	3.16	38,550	355	.28	8.0	62	57	10.12	3.90	22.47	4.42	11.14	20.41	.03
Feb.	10	2.86	33,750	327	.25	8.1	60	55	9.72	3.66	20.43	4.47	10.28	18.30	.04
Mar.	7	3.16	20,890	360	.38	8.3	61	58	10.17	4.08	22.37	4.20	11.11	21.33	.02
Apr.	9	3.30	22,010	373	.31	8.0	61	59	10.46	4.17	23.09	4.80	11.23	22.80	.02
May	9	3.30	26,100	379	.34	8.4	62	61	10.10	4.47	23.79	3.54	11.61	23.33	.01
June	8	3.84	19,510	435	.38	8.3	62	64	11.36	5.23	27.36	3.51	12.20	27.58	Trace
July	9	3.38	27,750	394	.39	8.2	63	62	10.09	4.26	24.43	3.41	11.28	24.09	.01
Aug.	10	2.57	58,850	298		8.3	62	57	8.36	2.88	18.21	3.62	9.13	17.02	Trace
Sept.	10	2.25	49,050	267	.27	8.1	59	55	7.49	3.08	15.43	3.30	8.47	14.23	.03
Oct.	9	3.00	47,000	339	.30	8.2	62	57	9.27	3.77	20.88	3.78	11.04	19.75	.01
Nov.	5	3.04	43,700	351	.35	8.2	61	56	9.76	3.74	21.18	4.53	11.05	19.75	.03
Dec.	9	2.89	43,640	332	.31	8.1	61	54	9.58	3.62	20.42	4.58	10.87	18.04	.02
Mean @	103 ϕ	2.91	ϕ 442,400	334		8.2	61	58	9.31	3.66	20.49	3.97	10.41	19.20	.02
Period+ Average		2.72	495,000	303			62	58	8.71	3.49	19.92	3.94	9.55	18.57	
Tons of Constituents, 1939									38,600	9,240	97,800	25,100	104,000	141,000	
Average tons, period 1931-1939									43,200	10,600	114,000	29,400	114,000	164,000	
Water Samples from Rio Grande at La Nutria															
Jan.	10	3.10	40,610	354	0.30	8.0	63	58	9.46	3.98	22.64	3.76	11.28	20.61	0.01
Feb.	16	2.97	28,780	337	0.31	8.3	63	56	9.12	3.82	21.82	3.76	11.15	19.22	0.02
Mar.	6	3.19	25,620	363		8.2	63	59	9.29	4.25	23.03	3.08	11.96	21.54	0.01
Apr.	4	3.89	17,780	433	0.42	8.2	63	62	11.40	5.26	27.97	2.98	13.97	27.50	0.01
May	4														
June	2	2.84	40,470	327		8.3	63	60	8.11	3.87	20.24	2.69	10.34	19.13	0.04
July	2														
Aug.	2	2.13	61,790	252		8.2	61	58	7.10	2.36	14.94	2.43	7.85	14.36	Trace
Sept.	1														
Oct.	2	2.59	83,140	295		8.2	61	58	7.98	3.18	17.79	2.42	9.81	17.19	0.02
Nov.	2	3.39	46,780	394		8.0	65	61	9.25	4.21	24.98	2.87	12.34	24.16	0.03
Dec.	2	2.97	46,930	346		8.2	63	56	8.92	3.86	21.84	3.58	11.43	19.45	0.03
Total Mean @	53	2.79	391,900	322		8.2	62	58	8.45	3.51	19.97	2.90	10.38	18.79	0.02
Average 1936 to 1939		2.43	447,000												
Water Samples from Rio Grande at Upper Presidio Station															
Jan.	4	3.28	37,720	373	0.20	8.2	62	59	10.25	4.28	23.65	3.56	12.05	22.10	0.01
Feb.	4	3.52	34,430	398	0.35	8.1	63	59	10.81	4.40	25.59	3.51	12.86	23.90	0.02
Mar.	5	3.53	22,420	395	0.46	8.2	61	59	10.99	4.66	24.88	3.44	13.14	23.90	0.01
Apr.	4	4.65	6,980	502	0.47	8.3	55	61	17.53	6.16	28.90	3.80	16.75	32.26	0.01
May	4														
June	5	2.92	14,660	318		8.2	59	60	9.41	3.66	18.48	2.53	10.11	18.82	0.01
July	4	2.26	4,680	258		8.2	55	56	8.56	2.85	13.91	2.12	9.07	13.61	0.02
Aug.	7	1.35	37,400	160		8.1	59	48	4.89	1.42	8.92	2.37	5.59	7.43	Trace
Sept.	3														
Oct.	4	2.35	61,100	267		8.3	60	55	7.72	3.00	16.12	2.97	9.16	14.67	0.02
Nov.	4	3.13	34,740	359	0.36	8.1	63	59	9.09	3.96	22.64	3.07	11.76	21.24	0.02
Dec.	4	3.06	38,250	356	0.37	8.0	63	58	9.00	3.86	22.36	3.12	11.84	20.51	0.01
Total Mean @	52	2.58	292,380	294		8.2	61	55	8.23	3.21	17.99	2.96	9.81	16.65	0.01
Average 1935 to 1939		2.08	324,000												

@ Weighted mean. ϕ Total. + Period 1931-1939. ** Percent of Total Cations. *** Percent of Total Anions.

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES— 1939—continued

Month	No. of Samples	Total Tons of		Mean	Boron	pH	%	%	Mean Milligram Equivalents per Liter						
		Per Acre Foot	Dissolved Solids	$K \times 10^5$ @25°C	p.p.m.		Na **	Cl ***	Ca	Mg	Na	$CO_3 + HCO_3$	SO_4	Cl	NO_3
Water Samples from Rio Conchos near Ojinaga, Chihuahua															
Jan.	4	0.77	44,430	84.9	0.17	7.9	40	16	4.21	1.17	3.58	3.16	3.96	1.29	0.03
Feb.	4	0.69	41,540	75.1	0.09	8.1	40	15	3.78	1.03	3.16	2.96	3.65	1.13	0.01
Mar.	4	0.75	36,450	82.0	0.13	8.3	39	16	4.18	1.08	3.43	3.03	4.13	1.39	0.01
Apr.	4	0.94	16,640	102.0	0.19	8.1	45	21	4.42	1.18	4.65	3.18	5.10	2.16	0.02
May	4	1.01	13,840	110.0	0.23	7.9	49	22	4.40	1.30	5.47	2.88	5.96	2.54	0.01
June	5	1.03	17,820	103.0	0.16	8.3	43	18	4.81	1.31	4.57	2.58	6.13	1.87	0.01
July	5	0.87	38,720	90.8	0.18	8.2	38	15	4.43	1.21	3.53	2.53	5.12	1.32	0.01
Aug.	4	0.58	107,300	61.5		8.1	35	11	3.49	0.77	2.33	2.53	3.03	0.70	Trace
Sept.	4	0.73	31,760	77.1	0.14	8.1	40	17	3.73	1.07	3.23	2.73	3.77	1.28	0.01
Oct.	4	0.68	39,850	71.2	0.12	8.2	41	12	3.40	1.06	3.07	2.82	3.70	0.92	0.01
Nov.	4	0.66	39,140	72.4		8.0	41	14	3.46	0.91	2.99	2.87	3.51	1.03	0.03
Dec.	4	0.80	34,560	86.9	0.18	8.0	42	15	3.93	1.16	3.75	3.12	4.42	1.31	0.02
Total Mean @	50	0.71	462,050	76.2		8.1	39	14	3.81	1.00	3.15	2.80	3.84	1.13	0.01
Average 1935 to 1939		0.54	551,000												
Water Samples from Rio Grande at Lower Presidio Station															
Aug.	3	0.59		61.5		8.1	37	15	3.59	0.73	2.50	2.16	3.15	0.90	0.01
Water Samples from Pecos River Station															
Jan.	4	4.60	92,920	502	0.27	8.2	58	60	12.82	9.14	30.87	2.86	18.35	31.51	0.03
Feb.	4	4.39	64,090	478	0.18	8.0	59	60	11.34	8.96	29.62	2.81	16.70	29.81	0.04
Mar.	4	4.86	77,760	524	0.35	7.9	60	61	12.00	9.88	32.93	2.73	18.40	33.51	0.04
Apr.	5	4.35	62,640	484	0.29	8.0	61	62	10.63	8.87	30.25	2.02	17.09	30.67	0.02
May	4	1.95	64,160	224	0.17	8.0	55	55	5.99	4.00	12.33	2.33	7.57	12.24	0.06
June	4	3.21	45,900	363	0.21	8.0	60	61	8.13	6.68	21.83	1.96	12.09	22.01	0.03
July	5	4.03	51,990	444	0.29	7.9	60	61	9.99	8.28	27.76	1.55	15.85	27.63	0.01
Aug.	5	2.99	73,550	336	0.23	8.0	57	58	8.61	6.08	19.47	2.01	12.04	19.68	0.01
Sept.	6	3.78	39,310	419	0.27	7.9	58	59	10.13	8.10	25.18	2.06	15.81	25.80	0.03
Oct.	3	3.82	62,270	421		8.3	58	59	10.57	7.89	25.41	2.72	15.35	25.65	0.04
Nov.	4	4.51	73,960	498	0.30	8.0	59	60	12.35	9.23	30.66	2.47	18.51	30.99	0.03
Dec.	5	5.18	91,170	567	0.33	8.0	59	60	13.75	10.55	34.57	2.77	20.70	35.53	0.04
Total Mean @	53	3.80	799,720	420		8.0	58	59	10.19	7.76	25.45	2.38	15.01	25.77	0.03
Average 1935 to 1939		3.10	1,068,000												
Water Samples from Rio Grande at Eagle Pass Station															
Jan.	3	1.41	219,960	161	0.15	8.2	50	45	5.63	2.77	8.25	2.96	5.78	7.14	0.04
Feb.	2	1.15	166,750	132	0.12	8.0	48	40	4.75	2.16	6.47	3.16	4.85	5.24	0.04
Mar.	3	1.24	164,920	143	0.11	8.1	49	43	4.83	2.59	7.26	3.13	5.01	6.17	0.07
Apr.	4	1.21	111,440	139	0.15	8.2	50	45	4.57	2.26	6.94	2.88	4.75	6.10	0.04
May	9	0.72	111,600	84.1	0.10	7.9	39	36	3.45	1.83	3.37	2.68	2.64	2.98	0.07
June	5	1.04	121,680	119	0.17	8.3	47	38	4.28	2.06	5.71	2.79	4.43	4.35	0.06
July	8	0.95	131,100	110	0.15	8.0	45	35	4.21	1.63	4.75	2.58	4.31	3.74	0.04
Aug.	8	0.66	251,460	71.4	0.14	8.3	47	25	2.85	1.14	3.48	2.37	2.82	1.76	0.01
Sept.	6	0.88	121,440	98.4	0.14	7.9	44	36	3.92	1.72	4.46	2.73	3.63	3.48	0.04
Oct.	7	0.94	155,100	109	0.11	8.0	46	40	4.04	1.88	4.96	2.67	3.92	4.31	0.04
Nov.	6	1.08	172,800	126	0.17	7.9	48	40	4.52	2.00	5.91	2.97	4.51	5.03	0.06
Dec.	9	1.27	172,720	149	0.21	7.9	50	44	4.83	2.48	7.38	3.02	5.23	6.35	0.04
Total Mean @	72	0.99	1,900,970	113	0.14	8.1	47	37	4.13	1.92	5.42	2.77	4.12	4.32	0.04
Average 1935 to 1939		0.83	2,641,000												
Water Samples from Rio Salado Station															
Jan.	5	1.91	2,180	197	0.49	7.5	43	35	7.97	4.11	9.02	1.81	11.92	7.25	0.03
Feb.	4	2.52	1,610	255	0.52	7.8	44	36	10.05	5.38	11.95	1.76	15.85	9.82	0.02
Mar.	5	3.87	778	381	0.86	8.2	44	34	15.67	9.02	19.10	1.92	27.08	15.06	0.04
Apr.	6	0.99	71,030	113	0.30	7.8	40	31	4.98	1.76	4.53	2.07	5.87	3.50	0.07
May	16														
June	6	0.67	7,700	77.7		8.0	40	32	3.53	1.06	3.01	1.54	3.49	2.38	0.03
July	4	2.49	568	256		8.0	46	37	9.92	4.72	12.32	1.55	15.11	9.92	0.05
Aug.	9	0.64	9,020	77.6	0.27	7.9	41	30	3.44	1.01	3.05	1.86	3.32	2.21	0.01
Sept.	13	0.39	7,840	45.8	0.15	7.9	27	23	2.79	0.63	1.24	1.96	1.52	0.92	0.11
Oct.	6	0.49	17,740	48.4		8.2	33	28	2.83	0.90	1.87	2.01	2.09	1.54	0.06
Nov.	4	0.28	105	35.3	0.07	7.9	30	19	1.88	0.59	1.07	2.07	0.84	0.62	0.06
Dec.	5	0.30	14	36.3		8.0	28	14	1.89	0.62	0.98	2.12	0.80	0.45	0.04
Total Mean @	83	0.76	118,585	85.1		7.9	37	29	4.01	1.34	3.33	1.98	4.14	2.58	0.05
Average 1935 to 1939		1.11	277,000												

@ Weighted mean. ** Percent of Total Cations. *** Percent of Total Anions.

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES— 1939 —continued

Month	No. of Samples	Total Tons of Per Acre Foot	Total Tons of Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Water Samples from Rio San Juan Station															
Jan.	5	0.91	23,930	95.9	0.16	7.8	30	19	4.86	2.28	3.05	2.71	5.27	1.85	0.02
Feb.	4	0.86	11,270	89.5	0.15	8.0	30	16	4.72	2.13	2.89	2.61	5.31	1.49	0.04
Mar.	5	0.99	7,660	100	0.21	8.0	31	16	5.06	2.51	3.33	2.48	6.54	1.64	0.05
Apr.	5	0.68	99,690	82.7	0.19	7.9	45	34	3.38	1.07	3.57	1.87	3.51	2.74	0.03
May	6														
June	5	0.57	21,030	66.6		8.1	38	25	3.02	1.10	2.49	1.86	2.98	1.62	0.03
July	4	1.08	18,900	111		8.1	37	21	5.17	2.08	4.33	1.75	7.25	2.38	0.05
Aug.	5	1.10	18,920	118		7.9	37	23	6.10	1.79	4.57	1.86	7.73	2.86	0.04
Sept.	6	0.57	35,620	64.2	0.17	7.9	38	22	3.30	0.98	2.59	2.27	2.89	1.43	0.03
Oct.	5	0.44	78,760	43.7		8.2	27	17	2.75	0.86	1.36	2.27	1.42	0.72	0.06
Nov.	5	0.90	15,030	94.9	0.17	7.9	31	19	4.70	2.26	3.06	2.47	5.73	1.85	0.04
Dec.	4	0.86	13,670	93.1	0.17	7.9	29	16	4.54	2.13	2.74	2.47	5.44	1.46	0.04
Total Mean @	59	0.64	344,480	70.3		8.0	35	23	3.49	1.22	2.62	2.15	3.26	1.68	0.04
Average 1935 to 1939		0.64	532,000												
Water Samples from Rio Grande at Rio Grande City															
Jan.	4	1.22	241,560	138	0.18	8.2	49	43	4.81	2.48	6.87	2.71	5.12	5.81	0.02
Feb.	4	1.15	187,450	132	0.16	7.9	50	41	4.49	2.36	6.79	2.66	5.12	5.45	0.04
Mar.	4	1.21	176,660	138	0.17	8.2	51	44	4.39	2.50	7.10	2.58	5.27	6.01	0.04
Apr.	5	1.12	175,840	128	0.15	7.6	49	41	4.14	2.34	6.31	2.22	5.20	5.23	0.03
May	5	0.66	421,080	80.6	0.16	7.9	44	36	3.33	1.06	3.48	2.18	2.90	2.78	0.05
June	5	0.69	160,080	79.6		8.2	43	33	3.21	1.22	3.37	2.02	3.09	2.53	0.04
July	3	1.09	165,680	125		8.0	49	41	4.02	2.03	5.77	2.17	5.07	4.96	0.13
Aug.	4	0.67	280,060	80.2		8.1	41	29	3.85	1.04	3.36	2.53	3.07	2.21	0.06
Sept.	4	0.64	181,760	74.7	0.13	8.0	42	31	3.30	1.10	3.21	2.27	2.79	2.25	0.04
Oct.	6	0.52	240,760	58.6		8.2	35	27	2.79	1.03	2.08	2.17	2.25	1.54	0.06
Nov.	3	1.02	180,540	118	0.16	8.3	47	38	4.18	1.98	5.49	2.67	4.58	4.41	0.06
Dec.	5	1.14	182,400	132	0.16	7.9	50	42	4.30	2.33	6.50	2.52	5.03	5.39	0.04
Total Mean @	52	0.81	2,593,870	94.7		8.0	44	35	3.68	1.51	4.29	2.34	3.61	3.38	0.05
Average 1935 to 1939		0.77	3,675,000												
Water Samples from Rio Grande at Lower Brownsville Station															
Mar.	5	1.11		136		8.0	50	43	4.83	2.78	7.55	3.08	5.48	6.37	0.04
Apr.	10	1.29		149	0.20	8.3	50	44	4.74	2.69	7.35	2.98	5.41	6.48	0.02
Water Samples from Rio San Juan Station															
Jan.															
Feb.															
Mar.															
Apr.															
May															
June															
July						CORRECTION TO 1938 RECORD									
Aug.															
Sept.															
Oct.															
Nov.															
Dec.	4	0.70	24,850	73.8	0.09	7.9	20	11	4.53	1.62	1.56	2.76	4.09	0.81	0.04
Total Mean @	56	0.53	711,700	60.1		‡ 8.0	‡ 29	‡ 19	‡ 3.22	‡ 0.94	1.89	‡ 2.31	‡ 2.48	‡ 1.20	‡ 0.04
Average 1935 to 1938		0.64	579,000												

@ Weighted mean. ‡ Eleven months. ** Percent of Total Cations. *** Percent of Total Anions.

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

San Marcial Station — 1939

Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C
Jan. 1	90.0	Feb. 13	86.1	Mar. 27	61.8	May 8	68.9	June 19	213	July 31	148	Sept. 1	132	Oct. 13	117	Nov. 25	133
Jan. 2	87.4	Feb. 14	83.6	Mar. 28	59.3	May 9	66.8	June 20	212	Aug. 1	145	Sept. 2	134	Oct. 15	114	Nov. 26	127
Jan. 3	94.0	Feb. 15	84.1	Mar. 29	62.5	May 10	61.5	June 21	212	Aug. 2	144	Sept. 3	135	Oct. 16	108	Nov. 27	134
Jan. 5	89.4	Feb. 16	84.9	Mar. 30	57.8	May 11	62.8	June 22	213	Aug. 3	137	Sept. 4	134	Oct. 17	110	Nov. 28	134
Jan. 6	85.4	Feb. 17	82.7	Mar. 31	57.1	May 12	63.0	June 23	213	Aug. 4	109	Sept. 5	174	Oct. 18	115	Nov. 29	132
Jan. 7	88.3	Feb. 18	89.8	Apr. 1	62.0	May 13	63.1	June 24	222	Aug. 5	163	Sept. 6	149	Oct. 19	107	Nov. 30	107
Jan. 8	85.6	Feb. 19	84.6	Apr. 2	58.5	May 14	63.0	June 25	222	Aug. 5	172	Sept. 7	173	Oct. 20	111	Dec. 1	105
Jan. 9	85.4	Feb. 20	85.0	Apr. 3	58.2	May 15	66.3	June 26	221	Aug. 5	186	Sept. 8	178	Oct. 21	110	Dec. 2	103
Jan. 10	114	Feb. 21	82.3	Apr. 4	61.5	May 16	65.3	June 27	204	Aug. 5	196	Sept. 9	171	Oct. 22	126	Dec. 3	101
Jan. 11	92.6	Feb. 22	89.7	Apr. 5	56.5	May 17	66.9	June 28	196	Aug. 5	200	Sept. 10	193	Oct. 23	127	Dec. 4	114
Jan. 12	86.8	Feb. 23	86.3	Apr. 6	56.5	May 18	74.3	June 29	160	Aug. 5	204	Sept. 11	191	Oct. 24	110	Dec. 5	115
Jan. 13	93.1	Feb. 24	84.2	Apr. 7	69.2	May 19	70.0	June 30	133	Aug. 6	200	Sept. 12	194	Oct. 25	134	Dec. 6	104
Jan. 14	105	Feb. 25	87.5	Apr. 8	66.9	May 20	71.3	July 1	172	Aug. 6	177	Sept. 13	222	Oct. 26	130	Dec. 7	106
Jan. 15	92.3	Feb. 26	121.0	Apr. 9	65.7	May 21	72.4	July 2	283	Aug. 6	179	Sept. 14	165	Oct. 27	126	Dec. 8	104
Jan. 16	92.0	Feb. 27	89.9	Apr. 10	64.6	May 22	81.6	July 3	289	Aug. 6	195	Sept. 15	189	Oct. 28	130	Dec. 9	106
Jan. 17	93.2	Feb. 28	89.6	Apr. 11	61.2	May 23	81.3	July 4	240	Aug. 6	186	Sept. 16	237	Oct. 29	129	Dec. 10	107
Jan. 18	87.7	Mar. 1	90.4	Apr. 12	58.0	May 24	79.5	July 5	237	Aug. 6	206	Sept. 17	219	Oct. 30	127	Dec. 11	105
Jan. 19	90.3	Mar. 2	84.3	Apr. 13	66.5	May 25	85.9	July 6	122	Aug. 7	196	Sept. 18	151	Oct. 31	139	Dec. 12	103
Jan. 20	91.1	Mar. 3	83.6	Apr. 14	66.8	May 26	86.8	July 7	92.9	Aug. 8	150	Sept. 19	135	Nov. 1	140	Dec. 13	104
Jan. 21	98.0	Mar. 4	81.5	Apr. 15	66.0	May 27	89.7	July 8	166	Aug. 9	138	Sept. 20	112	Nov. 2	139	Dec. 14	105
Jan. 22	86.5	Mar. 5	84.0	Apr. 16	69.5	May 28	100	July 9	95.8	Aug. 10	146	Sept. 21	107	Nov. 3	135	Dec. 15	102
Jan. 23	89.2	Mar. 6	99.8	Apr. 17	66.9	May 29	95.2	July 10	194	Aug. 11	153	Sept. 22	115	Nov. 4	139	Dec. 16	102
Jan. 24	99.0	Mar. 7	86.5	Apr. 18	66.6	May 30	96.0	July 11	95.5	Aug. 12	151	Sept. 23	122	Nov. 5	136	Dec. 17	107
Jan. 25	84.4	Mar. 8	84.9	Apr. 19	67.3	May 31	95.2	July 12	128	Aug. 13	153	Sept. 24	120	Nov. 6	136	Dec. 18	99.9
Jan. 26	85.5	Mar. 9	83.5	Apr. 20	64.0	June 1	94.5	July 13	125	Aug. 14	146	Sept. 25	121	Nov. 7	137	Dec. 19	99.5
Jan. 27	85.0	Mar. 10	85.0	Apr. 21	62.5	June 2	90.6	July 14	265	Aug. 15	144	Sept. 26	118	Nov. 8	138	Dec. 20	102
Jan. 28	85.1	Mar. 11	85.6	Apr. 22	70.2	June 3	94.1	July 15	141	Aug. 16	144	Sept. 27	125	Nov. 9	135	Dec. 21	104
Jan. 29	85.5	Mar. 12	96.1	Apr. 23	67.9	June 4	82.4	July 16	149	Aug. 17	149	Sept. 28	111	Nov. 10	135	Dec. 22	102
Jan. 30	86.9	Mar. 13	103	Apr. 24	64.1	June 5	118	July 17	158	Aug. 18	148	Sept. 29	117	Nov. 11	121	Dec. 23	110
Jan. 31	84.1	Mar. 14	77.1	Apr. 25	71.9	June 6	111	July 18	154	Aug. 19	169	Sept. 30	118	Nov. 12	158	Dec. 24	103
Feb. 1	85.1	Mar. 15	95.0	Apr. 26	60.4	June 7	113	July 19	121	Aug. 20	170	Oct. 1	118	Nov. 13	139	Dec. 25	110
Feb. 2	86.2	Mar. 16	107	Apr. 27	68.7	June 8	115	July 20	130	Aug. 21	177	Oct. 2	129	Nov. 14	136	Dec. 26	104
Feb. 3	87.8	Mar. 17	106	Apr. 28	70.6	June 9	138	July 21	99.6	Aug. 22	177	Oct. 3	127	Nov. 15	138	Dec. 27	105
Feb. 4	86.1	Mar. 18	101	Apr. 29	71.4	June 10	153	July 22	102	Aug. 23	232	Oct. 4	141	Nov. 16	136	Dec. 28	104
Feb. 5	89.8	Mar. 19	103	Apr. 30	66.9	June 11	151	July 23	102	Aug. 24	200	Oct. 5	139	Nov. 17	138	Dec. 29	103
Feb. 6	87.5	Mar. 20	78.2	May 1	68.9	June 12	162	July 24	130	Aug. 25	216	Oct. 6	125	Nov. 18	135	Dec. 30	107
Feb. 7	87.7	Mar. 21	76.1	May 2	68.9	June 13	159	July 25	130	Aug. 26	130	Oct. 7	114	Nov. 19	133	Dec. 31	106
Feb. 8	85.6	Mar. 22	70.5	May 3	60.7	June 14	191	July 26	166	Aug. 27	137	Oct. 8	113	Nov. 20	134		
Feb. 9	84.6	Mar. 23	80.7	May 4	64.3	June 15	184	July 27	167	Aug. 28	138	Oct. 9	104	Nov. 21	134		
Feb. 10	86.6	Mar. 24	62.8	May 5	62.3	June 16	121	July 28	165	Aug. 29	164	Oct. 10	131	Nov. 22	132		
Feb. 11	85.8	Mar. 25	64.7	May 6	66.7	June 17	200	July 29	104	Aug. 30	161	Oct. 11	126	Nov. 23	134		
Feb. 12	90.4	Mar. 26	71.2	May 7	63.6	June 18	202	July 30	97.8	Aug. 31	126	Oct. 12	122	Nov. 24	133		

El Paso Station — 1939

Jan. 1	205	Feb. 13	146	Mar. 26	122	May 6	116	June 16	125	July 27	115	Sept. 6	110	Oct. 17	181	Nov. 27	192
Jan. 2	206	Feb. 14	149	Mar. 27	124	May 7	117	June 17	116	July 28	114	Sept. 7	113	Oct. 18	193	Nov. 28	194
Jan. 3	208	Feb. 15	148	Mar. 28	118	May 8	117	June 18	118	July 29	114	Sept. 8	118	Oct. 19	180	Nov. 29	189
Jan. 4	210	Feb. 16	127	Mar. 29	119	May 9	114	June 19	122	July 30	112	Sept. 9	119	Oct. 20	174	Nov. 30	193
Jan. 5	211	Feb. 17	133	Mar. 30	122	May 10	115	June 20	123	July 31	105	Sept. 10	119	Oct. 21	159	Dec. 1	196
Jan. 6	207	Feb. 18	137	Mar. 31	119	May 11	119	June 21	112	Aug. 1	105	Sept. 11	122	Oct. 22	158	Dec. 2	197
Jan. 7	210	Feb. 19	125	Apr. 1	124	May 12	118	June 22	111	Aug. 2	111	Sept. 12	121	Oct. 23	141	Dec. 3	198
Jan. 8	204	Feb. 20	136	Apr. 2	121	May 13	118	June 23	114	Aug. 3	117	Sept. 13	117	Oct. 24	126	Dec. 4	179
Jan. 9	207	Feb. 21	145	Apr. 3	112	May 14	116	June 24	113	Aug. 4	118	Sept. 14	114	Oct. 25	149	Dec. 5	200
Jan. 10	207	Feb. 22	153	Apr. 4	116	May 15	116	June 25	114	Aug. 5	106	Sept. 15	106	Oct. 26	166	Dec. 6	201
Jan. 11	207	Feb. 23	163	Apr. 5	116	May 16	117	June 26	123	Aug. 6	99.3	Sept. 16	90.6	Oct. 27	178	Dec. 7	203
Jan. 12	208	Feb. 24	175	Apr. 6	119	May 17	114	June 27	120	Aug. 7	108	Sept. 17	103	Oct. 28	179	Dec. 8	201
Jan. 13	209	Feb. 25	191	Apr. 7	121	May 18	117	June 28	114	Aug. 8	105	Sept. 18	116	Oct. 29	185	Dec. 9	203
Jan. 14	210	Feb. 26	196	Apr. 8	125	May 19	114	June 29	111	Aug. 9	108	Sept. 19	140	Oct. 30	187	Dec. 10	201
Jan. 15	213	Feb. 27	204	Apr. 9	126	May 20	117	June 30	113	Aug. 10	117	Sept. 20	145	Oct. 31	182	Dec. 11	202
Jan. 16	210	Feb. 28	211	Apr. 10	122	May 21	117	July 1	116	Aug. 11	113	Sept. 21	148	Nov. 1	177	Dec. 12	201
Jan. 17	214	Mar. 1	203	Apr. 11	118	May 22	122	July 2	121	Aug. 12	113	Sept. 22	153	Nov. 2	189	Dec. 13	204
Jan. 18	214	Mar. 2	205	Apr. 12	112	May 23	116	July 3	117	Aug. 13	114	Sept. 23	141	Nov. 3	195	Dec. 14	205
Jan. 19	215	Mar. 3	208	Apr. 13	127	May 24	115	July 4	118	Aug. 14	113	Sept. 24	138	Nov. 4	195	Dec. 15	205
Jan. 20	215	Mar. 4	158	Apr. 14	118	May 25	119	July 5	109	Aug. 15	110	Sept. 25	140	Nov. 5	198	Dec. 16	205
Jan. 21	213	Mar. 5	136	Apr. 15	123	May 26	111	July 6	118	Aug. 16	110	Sept. 26	139	Nov. 6	194	Dec. 17	200
Jan. 22	215	Mar. 6	136	Apr. 16	114	May 27	116	July 7	121	Aug. 17	110	Sept. 27	137	Nov. 7	194	Dec. 18	172
Jan. 23	215	Mar. 7	126	Apr. 17	119	May 28	117	July 8	121	Aug. 18	120	Sept. 28	136	Nov. 8	194	Dec. 19	156
Jan. 24	217	Mar. 8	127	Apr. 18	117	May 29	117	July 9	123	Aug. 19	121	Sept. 29	141	Nov. 9	194	Dec. 20	147
Jan. 25	216	Mar. 9	127	Apr. 19	118	May 30	114	July 10	126	Aug. 20	125	Sept. 30	141	Nov. 10	194	Dec. 21	147
Jan. 26	# 215	Mar. 10	122	Apr. 20	111	May 31	114	July 11	119	Aug. 21	119	Oct. 1	142	Nov. 11	201	Dec. 22	150
Jan. 27	215	Mar. 11	123	Apr. 21	107	June 1	120	July 12	114	Aug. 22	116	Oct. 2	143	Nov. 12	203	Dec. 23	153
Jan. 28	219	Mar. 12	126	Apr. 22	113	June 2	121	July 13	118	Aug. 23	118	Oct. 3	142	Nov. 13	205	Dec. 24	174
Jan. 30	219	Mar. 13	129	Apr. 23	110	June 3	122	July 14	113	Aug. 24	117	Oct. 4	141	Nov. 14	189	Dec. 25	181
Feb. 1	223	Mar. 14	132	Apr. 24	118	June 4	125	July 15	110	Aug. 25	124	Oct. 5	139	Nov. 15	156	Dec. 26	183
Feb. 2	220	Mar. 15	127	Apr. 25	111	June 5	116	July 16	114	Aug. 26	124	Oct. 6	136	Nov. 16	156	Dec. 27	193
Feb. 3	221	Mar. 16	125	Apr. 26	108	June 6	117	July 17	118	Aug. 27	126	Oct. 7	131	Nov. 17	146	Dec. 28	186
Feb. 4	218	Mar. 17	123	Apr. 27	117	June 7	114	July 18	118	Aug. 28	128	Oct. 8	139	Nov. 18	151	Dec. 29	197
Feb. 5	223	Mar. 18	117	Apr. 28	116	June 8	119	July 19	122	Aug. 29	124	Oct. 9	147	Nov. 19	164	Dec. 30	202
Feb. 6	219	Mar. 19	113	Apr. 29	117	June 9	120	July 20	120	Aug. 30	125	Oct. 10	161	Nov. 20	185	Dec. 31	198
Feb. 7	218	Mar. 20	109	Apr. 30	109	June 10	122	July 21	120	Aug. 31	120	Oct. 11	170	Nov. 21	189		
Feb. 8	219	Mar. 21	108	May 1	120	June 11	121	July 22	119	Sept. 1	117	Oct. 12	168	Nov. 22	192		
Feb. 9	220	Mar. 22	115	May 2	120	June 12	119	July 23	114	Sept. 2	114	Oct. 13	169	Nov. 23	195		
Feb. 10	140	Mar. 23	113	May 3	113	June 13	119	July 24	118	Sept. 3	106	Oct. 14	171	Nov. 24	191		
Feb. 11	121	Mar. 24	113	May 4	123	June 14	129	July 25	116	Sept. 4	113	Oct. 15	173	Nov. 25	194		
Feb. 12	140	Mar. 25	119	May 5	118	June 15	122	July 26	117	Sept. 5	112	Oct. 16	174	Nov. 26	191		

Mean of 2 samples.

Fort Quitman Station — 1939

Jan. 4	344	Feb. 13	298	Mar. 27	358	May 8	423	June 19	401	Aug. 3	401	Sept. 5	419	Oct. 15	319	Dec. 5	356
Jan. 6	355	Feb. 14	272	Apr. 1	544	May 14	441	June 26	372	Aug. 5	169	Sept. 7	641	Oct. 17	351	Dec. 9	361
Jan. 10	336	Feb. 20	300	Apr. 3	396	May 15	365	June 29	488	Aug. 6	177	Sept. 11	587	Oct. 20	363	Dec. 12	356
Jan. 13	346	Feb. 23	307	Apr. 8	305	May 18	395	July 3	431	Aug. 7	229	Sept. 15	327	Oct. 24	312	Dec. 16	356
Jan. 17	365	Feb. 27	333	Apr. 10	392	May 22	360	July 6	488	Aug. 11	361	Sept. 16	158	Oct. 28	346	Dec. 19	372
Jan. 20	364	Feb. 28	358	Apr. 16	493	May 25	389	July 10	321	Aug. 14	293	Sept. 17	146	Oct. 31	379	Dec. 23	298
Jan. 27	377	Mar. 6	424	Apr. 17	420	May 29	379	July 13	659	Aug. 15	253	Sept. 22	292	Nov. 7	354	Dec. 26	299
Jan. 28	361	Mar. 8	336	Apr. 21	426	June 1	403	July 17	322	Aug. 18	240	Sept. 25	313	Nov. 8	362	Dec. 30	320
Feb. 2	389	Mar. 13	328	Apr. 24	376	June 5	365	July 20	516	Aug. 21	318	Sept. 28	361	Nov. 14	425		
Feb. 3	388	Mar. 14	326	Apr. 28	279	June 8	442	July 24	438	Aug. 24	400	Oct. 2	668	Nov. 21	329		
Feb. 7	380	Mar. 20	392	May 1	273	June 12	475	July 28	488	Aug. 28	529	Oct. 5	368	Nov. 28	341		
Feb. 8	380	Mar. 24	322	May 7	418	June 15	601	July 31	284	Sept. 1	729	Oct. 11	306	Dec. 2	358		

La Nutria Station — 1939

Jan. 8	346	Jan. 23	361	Feb. 5	376	Feb. 15	313	Feb. 27	298	Mar. 10	392	May 4	342	July 3	292	Oct. 20	318
Jan. 12	347	Jan. 24	360	Feb. 6	377	Feb. 16	312	Feb. 28	298	Mar. 19	389	May 5	327	July 17	134	Nov. 5	378
Jan. 14	315	Jan. 29	377	Feb. 7	379	Feb. 19	289	Mar. 3	398	Apr. 13	493	May 18	419	Aug. 1	174	Nov. 19	407
Jan. 17	352	Jan. 30	367	Feb. 9	373	Feb. 20	363	Mar. 5	346	Apr. 16	400	May 19	404	Aug. 1	379	Dec. 3	388
Jan. 21	360	Feb. 1	371	Feb. 12	313	Feb. 25	299	Mar. 8	394	Apr. 20	407	June 5	177	Sept. 17	266	Dec. 17	357
Jan. 22	368	Feb. 2	374	Feb. 14	317	Feb. 26	297	Mar. 9	394	Apr. 27	412	June 19	444	Oct. 1	339		

Mean of 2 samples.

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

Upper Presidio Station — 1939

Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C	Date	Kx10⁵ @25°C
Jan. 6	356	Feb. 17	411	Mar. 31	489	May 12	433	June 23	150	Aug. 2	394	Aug. 31	314	Oct. 19	388	Dec. 7	343
Jan. 14	365	Feb. 24	377	Apr. 7	489	May 19	501	June 29	308	Aug. 3	289	Sept. 7	342	Oct. 28	398	Dec. 15	368
Jan. 20	381	Mar. 3	340	Apr. 14	500	May 26	526	July 6	298	Aug. 14	147	Sept. 14	353	Nov. 2	414	Dec. 21	367
Jan. 27	381	Mar. 10	401	Apr. 21	504	June 2	572	July 13	407	Aug. 17	121	Sept. 22	191	Nov. 9	365	Dec. 28	343
Feb. 3	394	Mar. 17	454	Apr. 28	506	June 9	549	July 20	161	Aug. 20	156	Oct. 5	348	Nov. 23	414		
Feb. 10	403	Mar. 24	359	May 5	235	June 16	549	July 27	344	Aug. 27	257	Oct. 12	324	Nov. 30	336		

Rio Conchos near Ojinaga, Chihuahua — 1939

Jan. 6	86.0	Feb. 17	70.1	Apr. 7	102	May 24	114	June 23	102	Aug. 3	76.6	Sept. 21	77.0	Nov. 8	67.9	Dec. 21	89.5
Jan. 13	83.7	Feb. 25	78.2	Apr. 14	100	May 29	107	July 6	103	Aug. 11	72.2	Sept. 30	71.4	Nov. 19	70.3	Dec. 29	87.5
Jan. 23	88.1	Mar. 3	79.1	Apr. 21	109	June 2	112	July 13	85.4	Aug. 27	45.5	Oct. 5	79.9	Nov. 23	73.6		
Jan. 28	79.0	Mar. 17	78.1	Apr. 28	97.4	June 9	108	July 27	78.8	Aug. 31	48.9	Oct. 17	69.0	Nov. 30	83.6		
Feb. 4	77.3	Mar. 29	85.7	May 5	107	June 16	94.6	July 29	93.4	Sept. 7	74.0	Oct. 27	66.4	Dec. 7	79.4		
Feb. 10	73.1	Mar. 31	88.6	May 20	108	June 21	91.6	July 31	76.4	Sept. 14	83.4	Oct. 31	63.8	Dec. 14	86.4		

Lower Presidio Station — 1939

Aug. 8	76.3	Aug. 17	75.6	Aug. 20	47.4										

Pecos River Station — 1939

Jan. 7	523	Feb. 18	479	Apr. 2	484	May 6	75.4	June 24	514	Aug. 4	381	Sept. 7	437	Oct. 21	531	Dec. 2	518
Jan. 14	656	Feb. 25	494	Apr. 8	526	May 13	280	July 1	568	Aug. 6	332	Sept. 10	417	Oct. 28	533	Dec. 9	567
Jan. 21	497	Mar. 4	472	Apr. 11	506	May 27	421	July 8	551	Aug. 18	244	Sept. 16	420	Nov. 4	432	Dec. 17	552
Jan. 28	549	Mar. 11	615	Apr. 22	482	June 3	169	July 15	218	Aug. 19	306	Sept. 28	408	Nov. 11	528	Dec. 23	579
Feb. 4	467	Mar. 18	544	Apr. 30	283	June 10	272	July 22	471	Aug. 26	491	Sept. 30	396	Nov. 18	530	Dec. 30	592
Feb. 11	467	Mar. 25	454	May 4	460	June 17	417	July 29	509	Sept. 2	468	Oct. 16	415	Nov. 25	513		

Eagle Pass Station — 1939

Jan. 5	149	Mar. 23	136	May 9	75.3	June 9	113	July 21	89.3	Aug. 22	72.7	Sept. 27	102	Oct. 31	132	Dec. 5	136
Jan. 12	144	Mar. 27	133	May 13	73.6	June 17	99.0	July 24	125	Aug. 26	68.6	Sept. 30	106	Nov. 6	146	Dec. 9	140
Jan. 19	188	Apr. 2	126	May 19	772.0	June 19	103	July 29	114	Aug. 29	67.8	Oct. 8	121	Nov. 11	120	Dec. 11	141
Feb. 2	128	Apr. 4	140	May 25	43.5	June 27	118	July 31	109	Aug. 31	73.7	Oct. 9	123	Nov. 17	104	Dec. 13	158
Feb. 28	128	Apr. 7	142	May 28	109	July 8	142	Aug. 4	117	Sept. 4	95.0	Oct. 14	71.0	Nov. 22	127	Dec. 16	150
Mar. 2	142	Apr. 19	131	May 27	139	July 11	126	Aug. 7	62.3	Sept. 8	92.5	Oct. 16	115	Nov. 25	144	Dec. 22	148
Mar. 8	133	May 2	155	May 29	116	July 14	86.3	Aug. 16	75.1	Sept. 14	90.7	Oct. 23	125	Nov. 28	131	Dec. 25	154
Mar. 16	155	May 6	72.4	June 5	128	July 17	86.8	Aug. 19	85.9	Sept. 22	108	Oct. 28	108	Dec. 2	137	Dec. 29	154

Rio Salado Station — 1939

Jan. 5	#159	Mar. 3	334	May 2	123	May 20	37.9	June 16	142	Aug. 11	110	Sept. 12	37.6	Oct. 6	53.2	Nov. 24	33.1
Jan. 6	172	Mar. 10	372	May 4	125	May 26	69.8	June 23	158	Aug. 12	64.5	Sept. 12	47.3	Oct. 11	29.8	Dec. 1	35.1
Jan. 13	230	Mar. 17	386	May 5	121	May 27	68.7	June 30	208	Aug. 13	56.9	Sept. 13	44.1	Oct. 12	36.8	Dec. 8	39.1
Jan. 20	248	Mar. 24	405	May 6	73.7	May 28	108	July 7	250	Aug. 18	72.8	Sept. 14	51.9	Oct. 13	108		
Jan. 27	212	Mar. 31	373	May 7	47.8	May 29	88.4	July 14	265	Aug. 25	77.0	Sept. 15	32.7	Oct. 20	32.0		
Feb. 3	188	Apr. 14	356	May 12	46.1	May 31	71.2	Aug. 2	198	Sept. 1	79.7	Sept. 20	36.4	Oct. 27	33.2		
Feb. 10	216	Apr. 29	391	May 13	41.9	June 1	71.5	Aug. 2	58.5	Sept. 9	78.7	Sept. 21	36.9	Nov. 3	33.6		
Feb. 17	281	Apr. 30	226	May 14	39.3	June 2	79.6	Aug. 3	31.5	Sept. 10	69.6	Sept. 22	63.8	Nov. 10	34.1		
Feb. 24	314	May 1	126	May 15	43.1	June 9	58.8	Aug. 4	36.4	Sept. 11	40.4	Sept. 29	41.9	Nov. 17	33.0		

Rio San Juan Station — 1939

Jan. 4	112	Feb. 15	94.1	Apr. 4	48.3	May 10	53.9	June 21	39.5	Aug. 9	94.3	Sept. 21	55.4	Oct. 25	84.7	Dec. 13	89.1
Jan. 7	#101	Feb. 22	88.4	Apr. 5	106	May 14	64.2	June 28	103	Aug. 17	103	Sept. 22	44.1	Nov. 1	101	Dec. 20	94.5
Jan. 13	93.6	Mar. 1	90.3	Apr. 12	109	May 17	49.8	July 6	139	Aug. 23	126	Sept. 28	46.8	Nov. 11	94.3	Dec. 27	103
Jan. 19	84.5	Mar. 8	88.2	Apr. 19	199	May 24	39.7	July 12	130	Aug. 31	136	Oct. 4	54.6	Nov. 15	92.4		
Jan. 25	80.8	Mar. 15	94.0	Apr. 26	129	June 1	75.3	July 19	50.7	Sept. 6	136	Oct. 12	37.1	Nov. 22	90.1		
Feb. 1	86.4	Mar. 22	95.7	May 4	167	June 8	58.1	July 26	53.0	Sept. 13	132	Oct. 13	49.8	Nov. 29	88.7		
Feb. 8	84.6	Mar. 29	107	May 5	65.2	June 14	41.8	Aug. 2	88.8	Sept. 20	91.3	Oct. 19	50.6	Dec. 6	89.0		

Rio Grande City Station — 1939

Jan. 3	126	Feb. 18	130	Apr. 1	144	May 15	99.1	June 19	92.6	Aug. 3	104	Sept. 21	69.6	Oct. 25	66.2	Dec. 9	122
Jan. 13	134	Feb. 27	133	Apr. 8	132	May 15	74.1	June 28	102	Aug. 11	61.2	Sept. 29	85.3	Oct. 31	127	Dec. 15	129
Jan. 19	129	Mar. 8	134	Apr. 18	128	May 16	48.8	June 30	117	Aug. 15	70.6	Oct. 10	92.3	Nov. 9	126	Dec. 22	137
Jan. 27	161	Mar. 11	133	Apr. 25	144	May 18	75.6	July 7	142	Aug. 28	89.5	Oct. 11	55.4	Nov. 18	116	Dec. 29	150
Feb. 3	143	Mar. 16	135	Apr. 29	90.5	June 2	60.3	July 19	131	Sept. 8	77.0	Oct. 12	57.0	Nov. 25	107		
Feb. 11	118	Mar. 27	148	May 6	87.4	June 16	97.4	July 31	94.8	Sept. 15	63.7	Oct. 14	62.9	Dec. 1	118		

Hidalgo Station — 1939

July 8	123	July 14	150												

Lower Brownsville Station — 1939

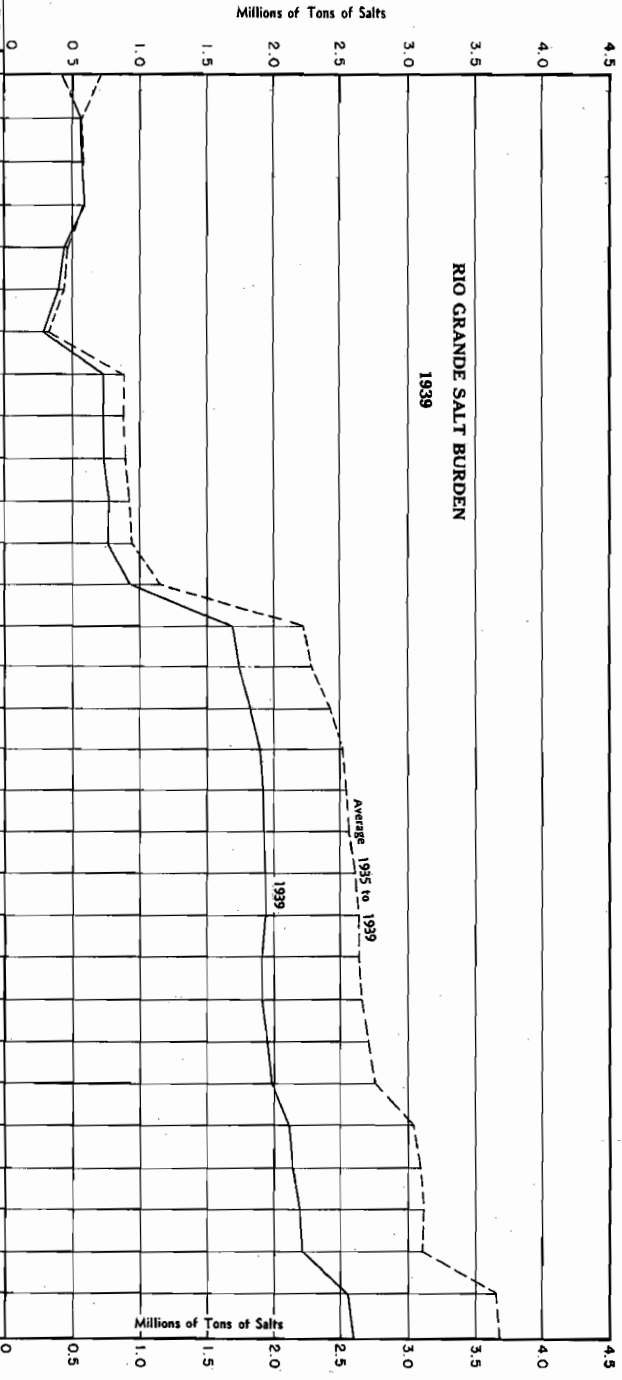
July 10	123	July 11	124												

Mean of 2 samples. ‡ Estimated.

RIO GRANDE SALT BURDEN

The graphical and tabular results below are based upon the chemical analyses shown on the preceding pages as well as upon similar data in previous Water Bulletins. For some tributaries the results are based upon curves showing the relationship between salt concentration and amount of stream flow. For other stations and tributaries the results are arrived at by secondary deductions. Small adjustments were required in the 1939 records for Upper Presidio, Rio Conchos and Pecos River to obtain a balance.

	Concentration Tons / Acre Foot	
	1939	Average 1935 to 1939
SAN MARCIAL	.84	.71
UNMEASURED		
CABALLO DAM	.70	.75
UNMEASURED		
LEASBURG DAM	.76	.82
UNMEASURED		
EL PASO	1.15	1.16
UNMEASURED		
FORT QUITMAN	2.91	2.61
UNMEASURED		
LA NUTRIA	2.79	2.43
UNMEASURED		
UPPER PRESIDIO	2.47	2.08
RIO CONCHOS	.68	.54
UNMEASURED		
LOWER PRESIDIO	.95	.75
ALAMITO CREEK	.39	.52
TERLINGUA CREEK	.59	.51
UNMEASURED		
JOHNSON RANCH	.90	.72
UNMEASURED		
LANGTRY	.80	.67
PECOS RIVER	3.65	3.10
GOODENOUGH SPRING	.58	.58
DEVILS RIVER	.34	.26
UNMEASURED		
DEL RIO	1.05	.87
SAN FELIPE CREEK	.59	.58
PINTO CREEK	.59	.59
RIO SAN DIEGO	.56	.34
RIO SAN RODRIGO	.44	.73
UNMEASURED		
EAGLE PASS	.99	.83
RIO ESCONDIDO	.54	.58
UNMEASURED		
EL JARDIN Estimated)	.96	.81
UNMEASURED		
LAREDO	.93	.80
RIO SALADO	.76	1.11
UNMEASURED		
ZAPATA	.90	.81
RIO ALAMO	.40	.38
UNMEASURED		
ROMA	.87	.80
RIO SAN JUAN	.64	.66
UNMEASURED		
RIO GRANDE CITY	.81	.77



RESULTS OF BACTERIOLOGICAL EXAMINATION OF WATER SAMPLES FROM THE RIO GRANDE NEAR EL PASO, TEXAS

The bacteriological examinations reported below were made by the City-County Health Unit, El Paso, Texas, from samples of Rio Grande water taken by the United States Section of the International Boundary Commission.

At El Paso Gaging Station

Date 1939	Hour 1939	Water Temperature °C. 1939	Mean Daily Second Feet River Flow 1939	Total Bacteria per c. c. in Agar-Agar at 37.5° C. 1939	Total Bacteria per c. c. in Agar-Agar at 37.5° C. Average 1937 to 1939	Escherichia Coli (B. Coli) Per 100 c. c. 1939	Escherichia Coli (B. Coli) Per 100 c. c. Average 1937 to 1939
January 11	12:40 P.M.	10.4	193	400		130	
January 25	8:25 A.M.	6.5	144	702	Jan. # 851	210	Jan. # 294
February 9	11:15 A.M.	5.5	229	546		170	
February 23	9:00 A.M.	7.0	307	156	Feb. ⊕ 47,417	490	Feb. ⊕ 558
March 8	10:45 A.M.	11.0	490	800		120	
March 22	11:15 A.M.	16.0	776	10,900	Mar. # 3,472	700	Mar. # 372
April 12	8:00 A.M.	13.5	923	936		790	
April 26	7:55 A.M.	15.5	973	800	Apr. ⊕ 2,539	220	Apr. ⊕ 467
May 10	8:05 A.M.	19.0	1,000	500		83	
May 24	7:50 A.M.	19.0	943	600	May # 3,150	460	May # 456
June 14	7:50 A.M.	24.0	959	200		1,100	
June 28	8:00 A.M.	23.0	1,130	300	June 48,192	330	June 833
July 12	8:00 A.M.	22.0	1,100	300		1,100	
July 26	7:50 A.M.	24.0	1,110	1,300	July 8,683	330	July 802
August 9	8:30 A.M.	22.0	1,190	900		110	
August 23	7:50 A.M.	24.5	1,050	2,100	Aug. 9,817	1,300	Aug. 1,235
September 13	8:00 A.M.	23.5	1,130	800		170	
September 27	8:00 A.M.	20.0	648	6,400	Sept. 15,144	3,500	Sept. 3,179
October 11	7:30 A.M.	16.0	421	22,750		3,500	
October 25	11:00 A.M.	18.5	466	1,200	Oct. 5,086	1,300	Oct. 1,755
November 14	8:50 A.M.	9.0	426	3,600		270	
November 28	10:30 A.M.	8.9	287	900	Nov. 4,185	78	Nov. 491
December 12	8:45 A.M.	13.0	215	800		170	
December 26	10:00 A.M.	7.1	258	1,400	Dec. 2,191	130	Dec. 345
Monthly Average		15.8		2,470	12,561	698	899

Just Above Ysleta-Zaragoza Bridge

January 11	1:15 P.M.	7.6	151	20,800		920,000	
January 25	9:45 A.M.	5.5	115	31,200	Jan. # 56,150	280,000	Jan. #755,000
February 9	12:35 P.M.	5.0	135	1,560,000		170,000	
February 23	9:50 A.M.	8.0	159	1,131,000	Feb. #694,500	110,000	Feb. #342,500
March 8	11:55 A.M.	13.0	277	24,000		170,000	
March 22	12:00 Noon	15.0	612	19,500	Mar. # 40,550	430,000	Mar. #397,500
April 12	9:00 A.M.	14.5	637	13,650		130,000	
April 26	8:55 A.M.	16.5	622	5,600	Apr. #140,062	79,000	Apr. #127,250
May 10	8:55 A.M.	20.0	564	10,900		49,000	
May 24	8:40 A.M.	19.5	483	41,000	May # 29,725	140,000	May # 85,500
June 14	8:55 A.M.	24.0	516	20,500		170,000	
June 28	9:00 A.M.	24.0	613	12,700	June 215,333	350,000	June 208,167
July 12	9:00 A.M.	23.5	598	17,400		150,000	
July 26	9:10 A.M.	24.5	618	20,600	July 190,317	170,000	July 145,000
August 9	9:20 A.M.	24.0	879	4,300		70,000	
August 23	8:40 A.M.	25.0	654	91,000	Aug. 114,017	1,600,000	Aug. 446,333
September 13	9:00 A.M.	24.0	635	16,300		180,000	
September 27	8:50 A.M.	20.0	356	157,500	Sept. 232,533	56,000	Sept. 303,556
October 11	8:25 A.M.	16.0	310	78,000		540,000	
October 25	9:20 A.M.	17.0	348	169,000	Oct. 154,467	540,000	Oct. 316,500
November 14	9:20 A.M.	11.2	140	65,000	Nov. 38,845	170,000	Nov. 103,717
December 5	7:40 P.M.	13.1	136	24,000		49,000	
December 12	8:30 P.M.	12.1	208	26,000		540,000	
December 26	8:10 P.M.	7.8	545	32,500	Dec. 36,700	540,000	Dec. 178,278
Monthly Average		16.3		151,248	161,933	334,444	284,108

DISSOLVED OXYGEN IN RIO GRANDE WATER NEAR EL PASO

The following determinations of dissolved oxygen in Rio Grande water near El Paso, Texas, were furnished by the Department of Water and Sewerage of the City of El Paso. The outfall into the river from El Paso City Sewage Disposal plant is 7.6 river miles below the El Paso Gaging Station.

Date 1939	Water Temperature C.	Dissolved Oxygen: Courchesne Bridge		Immediately above El Paso Sewage Outfall		Juarez Station		4.6 Miles Below Juarez Station		Ysleta-Zaragoza Bridge		Riverside Heading	
		Parts per Million	Percent Saturation	Parts per Million	Percent Saturation	Parts per Million	Percent Saturation	Parts per Million	Percent Saturation	Parts per Million	Percent Saturation	Parts per Million	Percent Saturation
May 17	21.1			4.34	48.4	3.10	34.6	3.10	34.6	4.30	48.0		
May 25	21.1	7.00	78.1										
June 21	27.8	7.50	94.2	6.60	82.9	4.80	60.3	6.60	82.9	5.76	72.4		
July 7	28.3	6.04	76.6	5.76	73.1	3.78	48.0	4.34	55.1	5.10	64.7		
July 13	26.1	6.80	82.8	5.95	72.5	3.96	48.2	6.32	77.0	7.17	87.3	6.89	83.9
July 31	28.9			5.34	68.5	3.16	40.5	5.73	73.5	4.84	62.1	5.04	64.6
Aug. 14	28.1	5.04	63.6	6.18	78.0	5.53	69.8	4.98	62.9	5.33	67.3		
Sept. 15	26.7			6.22	76.5	4.35	56.0	5.73	70.5	4.84	59.5	5.04	62.0
Oct. 2	23.3	6.93	80.3	6.80	78.8	5.70	66.0	6.10	70.7	5.53	64.1	6.48	75.1
Oct. 19	21.7	7.42	83.6	7.12	80.2	4.34	48.9	6.04	68.0	6.89	77.6	7.65	86.1
Nov. 8	17.8	8.65	90.3	7.80	81.4	4.49	46.9	6.73	70.3	8.54	89.1	8.54	89.1
Nov. 24	12.8	8.44	79.3	8.01	75.3	4.49	42.2			8.97	84.3	8.75	82.2
Dec. 8	15.0	9.46	89.8	8.91	88.7	5.23	53.3	6.62	64.4	8.44	82.1	8.33	81.0
Average 1936-1939	22.4		ϕ 81.9		75.1		51.0		68.1		72.5		ϕ 78.0

\# 1938 & 1939 only.
⊕ 1935, 1938 & 1939.
ϕ 1939 only.

RESULTS OF BACTERIOLOGICAL EXAMINATION OF WATER SAMPLES FROM THE RIO GRANDE AT NUEVO LAREDO, TAMAULIPAS

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.

Period	Chemical Analysis — Parts per Million					Bacteriological Analysis	
	Turbidity	Total Alkalinity	Phenolphthalein Alkalinity	Total Hardness	Magnesia	Total Bacteria Per c. c. in Agar-Agar at 37.5° C.	Bacilus Coli Per 100 c. c.
Average 1939							
January	24	161	5	377	49	165	19.6
February	36	160	5	335	46	151	25.7
March	32	148	5	346	48	83	30.1
April	114	133	5	326	45	382	160.8
May	471	123	5	257	27	1,043	441.9
June	374	124	5	253	32	517	413.3
July	499	148	7	309	32	343	524.3
August	6,687	125	6	228	22	4,747	1,142.2
September	1,644	133	7	234	28	1,137	949.3
October	1,046	131	6	263	30	2,609	582.9
November	595	150	6	281	35	503	393.7
December	142	147	5	344	44	306	144.2
Total	11,664	1,683	67	3,553	438	11,986	4,828.0
Average	972	140	5.6	296	36	999	402.3
Minimum	24	123	5	228	22	83	19.6
Maximum	6,687	161	7	377	49	4,747	1,142.2
Minimum 1939							
January	20	155	5	320	24	35	5.0
February	28	155	5	320	36	35	5.0
March	25	135	5	300	32	20	0
April	34	90	3	180	32	25	0
May	101	80	3	145	12	50	50.0
June	28	55	3	90	12	50	10.0
July	131	125	3	225	16	40	5.0
August	230	100	5	160	8	175	10.0
September	100	115	5	190	14	10	10.0
October	80	90	3	160	12	65	10.0
November	109	105	3	155	12	80	0
December	65	140	3	305	24	55	0
Maximum 1939							
January	35	175	5	455	80	690	100
February	48	167	8	350	65	1,365	100
March	55	165	8	380	60	300	100
April	1,109	150	5	370	60	4,250	1,000
May	4,600	160	8	715	60	5,000	1,000
June	5,720	150	8	340	56	5,150	1,000
July	1,813	180	8	390	44	1,100	1,000
August	12,940	150	8	310	32	20,050	10,000
September	3,820	145	10	290	44	8,000	1,000
October	4,425	145	8	390	48	12,600	1,000
November	2,000	170	8	350	52	1,700	1,000
December	370	160	5	370	60	1,500	1,000
Annual Averages 1932 — 1939							
1932	1,434	132	4.4	340	22.7	7,878	2,357
1933	644	133	5.0	297	23.4	2,193	499
1934	494	132	5.3	262	25.9	4,717	947
1935	1,298	128	5.7	245	30.0	7,878	1,858
1936	1,292	135	5.1	275	34.6	1,373	409
1937	1,920	127	5.0	330	40.0	2,670	581
1938	1,435	134	5.7	307	39.0	5,241	664
1939	972	140	5.6	296	36.0	999	402
1932 - 1939	1,186	133	5.2	294	31.4	4,119	965
Extremes							
Maximum	32,700	241	15	768	108	272,000	100,000
Dates	Sept.1937	Aug. 1934	Dec. 1937	July 1935	Dec. 1935	Apr. 1938	Sept. 1932†
Minimum	19	48	0	80	0.0	4	0
Dates	Jan. 1933	Apr. 1935	Nov. 1934†	May 1935	Sept.1932†	Jan. 1937	Jan. 1936†

† And other days

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE
THE PECOS AND DEVILS RIVERS AND LOZIER CREEK

By tables and graphs there are shown below the results of exhaustive research as to the peak discharge of floods on the Rio Grande at Langtry, Texas and on the Pecos and Devils Rivers near their mouths; also on Lozier Creek near its confluence with the Rio Grande. Similar results were shown for the Rio Grande at San Marcial and El Paso in Water Bulletin No. 6 and for Fort Quitman, Upper Presidio, Lower Presidio and intervening points in Water Bulletin No. 8.

Each tabulation is represented by an "Occurrence Curve". They show the average number of years between (average frequency of) floods having peak discharges equal to or in excess of various magnitudes. Some floods are shown in the tables that were not used in the curves because their "Order of Magnitude##" and "Period ⊕" are not known. The lower end of the Lozier Creek curve is dashed because the record for this region of the curve does not cover enough years to fully establish it.

In the lower discharge reaches of the Occurrence Curves shown here (excepting that for Lozier Creek) and in Water Bulletins Nos. 6 and 8, the records seem to cover a sufficient number of years to closely establish the curves. In the higher discharge reaches of the curves over 100 years more of records seem necessary for the establishment of the curves with a certainty comparable to that which now prevails in the lower reaches. From present knowledge it appears that future records for the higher discharge regions of the curves are much more likely to cause the curves to be moved to the right rather than to the left.

RIO GRANDE AT LANGTRY, TEXAS

75,058 Square Miles Of Watershed Above This Station

No.	Date	Peak ϕ Discharge In Second Feet	## Order of Magnitude	⊕ Period	** Average No. of Years
1	June 18, 1922	204,000	1	75	75
2	Sept. 16, 1919	152,000	2	75	37.5
3	Sept. 4, 1935	149,000	3	75	25
4	Sept. 13, 1904	138,000	4	75	18.7
5	Oct. 5, 1932	77,600	3	31	10.3
6	April 6, 1900	77,000	4	31	7.75
7	Sept. 29, 1932	64,100	5	31	6.20
8	Sept. 8, 1932	57,400	6	31	5.16
9	Sept. 26, 1938	57,300	7	31	4.43
10	Aug. 11, 1906	57,200	8	31	3.88
11	May 29, 1935	49,300	9	31	3.44
12	Aug. 9, 1928	46,400	10	31	3.10
13	Sept. 15, 1932	46,200	11	31	2.82
14	May 16, 1911	43,000	12	31	2.58
15	July 24, 1938	39,600	13	31	2.38
16	Sept. 9, 1902	39,000	14	31	2.21
17	May 29, 1925	38,500	15	31	2.07
18	Aug. 30, 1906	36,500	16	31	1.94
19	July 29, 1906	36,000	17	31	1.82
20	Sept. 8, 1925	36,000	18	31	1.72
21	June 30, 1905	33,000	19	31	1.63
22	Aug. 14, 1908	33,000	20	31	1.55
23	Sept. 24, 1936	32,600	21	31	1.47
24	July 30, 1938	30,800	22	31	1.41
25	Sept. 19, 1912	28,500	23	31	1.35
26	Aug. 12, 1925	28,300	24	31	1.29
27	Sept. 27, 1936	27,800	25	31	1.24
28	Oct. 19, 1904	27,500	26	31	1.19
29	Sept. 19, 1933	27,200	27	31	1.15
30	Sept. 8, 1904	27,000	28	31	1.11
31	Sept. 27, 1905	26,000	29	31	1.07
32	June 4, 1937	25,900	30	31	1.03

DEVILS RIVER NEAR DEL RIO, TEXAS

4,060 Square Miles Of Watershed Above This Station

No.	Date	Peak ϕ Discharge In Second Feet	## Order of Magnitude	⊕ Period	** Average No. of Years
1	Sept. 1, 1932	597,000	1	109	109
2	June 14, 1935	243,000	2	45	22.5
3	Oct. 21, 1914	220,000	3	45	15
4	Sept. 8, 1935	188,000	4	40	10.0
5	May 29, 1925	147,000	5	40	8.0
6	April 6, 1900	145,000	6	40	6.7
7	Sept. 16, 1919	140,000#			
8	Sept. 22, 1919	140,000#			
9	July 23, 1938	107,000	5	30	6.0
10	Oct. 6, 1930	101,000	6	30	5.0
11	June 18, 1922	100,000#			
12	Aug. 12, 1906	99,000	7	30	4.3
13	Sept. 2, 1916	94,000			
14	Sept. 4, 1935	81,400	8	30	3.8
15	Sept. 23, 1900	71,000	9	30	3.3
16	July 6, 1936	61,400	10	30	3.0
17	Oct. 14, 1930	50,000	11	30	2.7
18	Oct. 1, 1927	38,700	12	30	2.5
19	Sept. 17, 1936	38,300	13	30	2.3
20	April 29, 1931	38,200	14	30	2.1
21	Sept. 28, 1927	30,200	15	30	2.0
22	June 14, 1928	27,000	16	30	1.87
23	June 30, 1929	26,500	17	30	1.75
24	May 4, 1913	25,000	18	30	1.67
25	June 5, 1935	23,000	19	30	1.58
26	May 20, 1910	21,500	20	30	1.50
27	Sept. 24, 1932	21,000	21	30	1.43
28	April 29, 1926	20,900	22	30	1.36
29	May 29, 1935	20,000	23	30	1.30

PECOS RIVER NEAR COMSTOCK, TEXAS

35,243 Square Miles Of Watershed Above This Station

No.	Date	Peak ϕ Discharge In Second Feet	## Order of Magnitude	⊕ Period	** Average No. of Years
1	Sept. 1, 1932	116,000	1	40	40
2	April 6, 1900	107,000	2	40	20
3	Sept. 6, 1910	102,000	3	40	13.3
4	Sept. 1, 1916	97,000	4	40	10.0
5	Aug. 11, 1906	90,000	5	40	8.0
6	Sept. 16, 1919	87,000	6	40	6.7
7	Sept. 4, 1935	84,400	7	40	5.7
8	Aug. 6, 1906	78,000	8	40	5.0
9	June 18, 1922	77,000	9	40	4.4
10	June 27, 1904	72,000	10	40	4.0
11	July 7, 1908	68,000	11	40	3.6
12	Oct. 23, 1914	67,000	12	40	3.3
13	May 4, 1913	63,000	13	40	3.1
14	May 28, 1925	61,000	14	40	2.9
15	May 29, 1925	53,000	15	40	2.7
16	April 22, 1915	52,000	16	40	2.5
17	April 23, 1905	47,000	17	40	2.35
18	Sept. 20, 1904	47,000	18	40	2.20
19	June 5, 1935	45,700	19	40	2.10
20	Sept. 22, 1919	39,500	20	40	2.00
21	April 18, 1908	37,000	21	40	1.91
22	April 24, 1913	35,600	22	40	1.82
23	Sept. 7, 1904	35,500	23	40	1.74
24	May 29, 1935	34,200	24	40	1.66
25	Aug. 27, 1906	33,500	25	40	1.60
26	May 18, 1902	33,500	26	40	1.54
27	Sept. 22, 1932	33,000	27	40	1.48
28	May 30, 1935	32,000	28	40	1.43
29	July 24, 1938	31,500	29	40	1.38
30	June 2, 1935	31,000	30	40	1.33
31	Sept. 27, 1936	30,000	31	40	1.29
32	April 4, 1911	27,000	32	40	1.25
33	Sept. 8, 1935	22,500	33	40	1.21
34	July 6, 1936	20,000	34	40	1.18
35	May 13, 1928	19,800	35	40	1.14
36	June 13, 1921	18,500	36	40	1.11
37	July 27, 1928	16,600	37	40	1.08
38	June 13, 1927	14,600	38	40	1.05
39	Sept. 22, 1924	12,800	39	40	1.026
40	Aug. 1, 1925	12,300	40	40	1.00

LOZIER CREEK NEAR LANGTRY, TEXAS

1,728 Square Miles Of Watershed Above This Station

No.	Date	Peak ϕ Discharge In Second Feet	## Order of Magnitude	⊕ Period	** Average No. of Years
1	Sept. 4, 1935	197,000	1	40	40
2	Sept. 16, 1919	150,000	2	40	20
3	May 29, 1935	25,300	2	4	2
4	Sept. 29, 1932	14,500	3	4	1.33
5	July 4, 1932	11,900	4	4	1.00
6	Aug. 30, 1933	11,200	5	4	.80
7	June 5, 1935	10,400	6	4	.67
8	Aug. 31, 1935	9,700	7	4	.57

ϕ These are extreme peak discharges and not mean daily discharges.

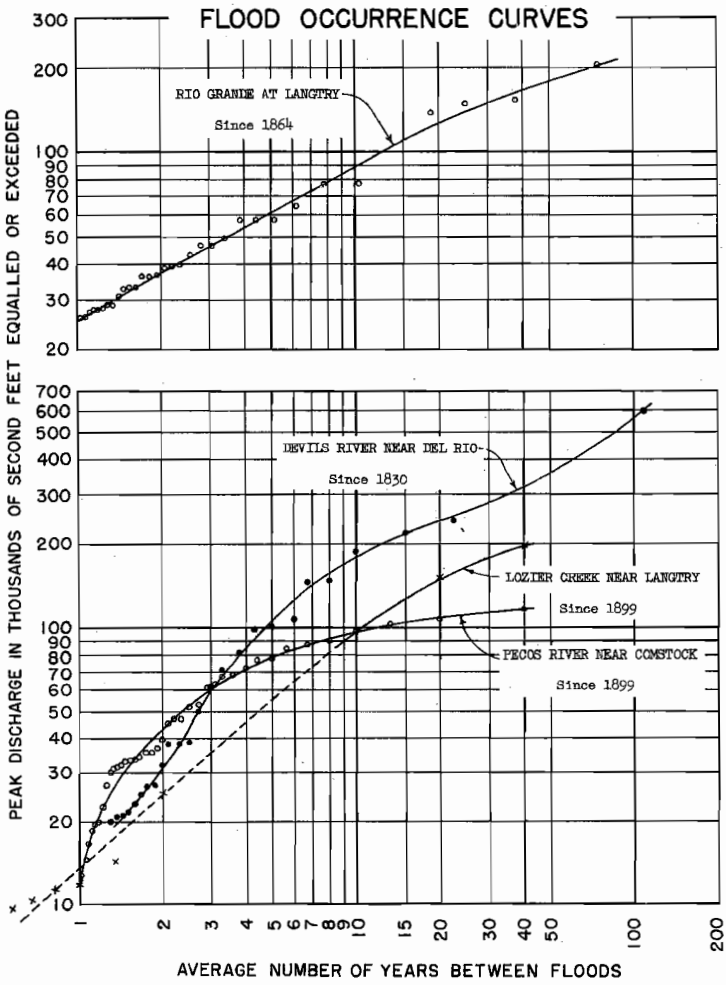
"Order of Magnitude" with reference to all other floods within the same period.

⊕ Period of years during which all floods are known which had peak discharges equaling or exceeding the lowest flood under consideration in the period.

** Average number of years between floods having a peak discharge equaling or exceeding any given magnitude, i.e., "Period" divided by "Order of Magnitude".

Not exceeding.

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE
THE PECOS AND DEVILS RIVERS AND LOZIER CREEK



OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE

Since 1829, at Lower Presidio

There were omitted from the two tables of floods at Lower Presidio Station published on page 72 of Water Bulletin No. 8 the floods shown in the two tables below. They were omitted because their "Order of Magnitude" and "Period" were not known. They still remain unknown. They are listed below in order to complete as far as possible the records of floods at Lower Presidio.

Assuming Boquilla and Elephant Butte Dams Operating			
Date	Peak Discharge In Second Feet	Date	Peak Discharge In Second Feet
Oct. 2, 1932	106,000	Sept. 2, 1919	56,000
Oct. 1868	100,000	Sept. 29, 1919	55,000
Sept. 12, 1932	83,000	Sept. 15, 1923	43,000
Sept. 11, 1904	80,000	Sept. 7, 1902	40,400
Sept. 22, 1938	68,000		

Assuming Boquilla and Elephant Butte Dams Not Built	
Date	Peak Discharge In Second Feet
Oct. 2, 1932	108,000
Sept. 22, 1928	84,000
Sept. 2, 1919	71,600
Sept. 29, 1919	70,300
Sept. 15, 1923	55,200
Sept. 7, 1902	52,000

RAINFALL ON UNITED STATES SIDE OF RIO GRANDE WATERSHED — 1939

INCHES

The rainfall records shown below have not been published elsewhere. The source of each record, and the type of rain gage used, is shown below. Elsewhere in this bulletin will be found a table showing the latitude, longitude, altitude and period of record for each rainfall station whose record has been published in these Water Bulletins. The automatic rain gages record by a float operated attachment on the water stage recorder of regular stream gaging stations. The rain gathering cone at these stations forms the roof of the instrument house, being some twelve feet in area. The rain tanks into which the rain is gathered, and on which the float rests, is automatically emptied by a syphon when full. Thus these gages may record unlimited amounts of rain. The graphic record shows the time and rate of the rainfall.

American Dam Near El Paso — 1939

Recording Gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1939
January							*.57			*.02																		*T				.59	.84
February								*.02																								.02	.12
March																			.04			.10										.14	.18
April																											.02	.20	T			.22	.11
May																																T	.00
June	T																					T						.01				.01	1.76
July			.14						.02			T							.20	.13										.01	.02	.52	1.10
August				.08	.06	.08					.14	.11	.01	.71								1.20										2.39	1.32
September												.04	.09	.29	.33																	.73	1.51
October								*.58	*.10													.10	.02									.80	.44
November										.10						.05								.51				.21				.85	.42
December																						.05			.09							.14	.14
Yearly																																6.43	7.99

Fort Bliss, Texas — 1939

Standard 8 inch rain gage. Record by U. S. Army.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1924-1939
January								.63	.09		.05	.02										T	T						.01			.80	.98
February		T			T				T									T				T	T									T	.34
March																			.06		T	.08	.01									.15	.27
April			T			T								T													T	.10				.10	.29
May				T																									.01	.01	T	.03	.94
June																						T	T									T	.34
July	T		.55	T			.02		.02		.11		T			T	T					.01		T			T	.07	.01	T	.03	T	.70	1.40
August		T	T	.02	T	.06						.03	.06	.06	.16	.01							.01									.49	1.95
September													.12	.57	.12	T	.01															.85	1.21
October						T	.76	.02														.02	.01									.81	.72
November								.03	.03	T													T	.60	.08		.02	.12	.20			1.08	.45
December																						.10			.11	T						.21	.40
Yearly																																5.21	8.49

Island Station — 1939

Recording Gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January							*.85	*.69																								*.54	
February																																0	
March																					.04	.08										.12	
April							T																				.02	.04	.07			.13	
May																													.07			.07	
June																																0	
July			.32				.01				.01		.13															.09				.55	
August															.43	.18																.62	
September													.41	.08	.32	.76																1.27	
October							.46	.08														.10										.64	
November								.10																.36					.22			.68	
December																						.02			.08							.10	
Yearly																																5.42	

County Line Station — 1939

Recording Gage Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1939
January							*.12	*.44			*.03																					*.61	1.06
February																																0	.13
March																			.14	.22		.29										.65	.46
April																											.06	.52				.58	.24
May																													.06			.06	.03
June																											.03					.03	.72
July			.10						.12		.15				.02					.02					.05							.31	.98
August				.14	.54									.12											.05							.95	1.00
September												.15		.06	.52		.83															1.01	1.62
October							.40	.22														.08			.05							.70	.42
November								.19																.45				.11	.23			.98	.50
December																									.14							.14	.16
Yearly																																5.84	7.32

Fort Quitman Station — 1939

Recording Gage Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1937-1939
January								.20			.10																					.30	.73
February																																0	.19
March																					.42		.04									.46	.20
April																											.12	.18	.41			.71	.51
May														T							.29											.29	.28
June						.10																.02			.02	.03			T	.01		.18	.38
July		.02	.01			.01	.10				.36		.15	.25	.01	1.30	.05	.07			T	.41	.14	.14	.01			.06	.06	.18		1.47	1.29
August				.18	.13										.22							.04										2.07	.93
September																																.22	1.28
October						.03	.64	.07																								.74	.89
November								.02	.20															.26					.09			.57	.30
December																								.11	.03							.14	.49
Yearly																																7.15	7.41

* Record from Smelter one-half mile distant. # Estimated.

RAINFALL ON UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

Candelaria, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1935-1939
January		.04					.85			.35															.22	.26						1.08	.46
February																																.04	.21
March																					.05											.05	.54
April						.20																					1.33					1.53	.43
May	.04			.16																												.20	.52
June																				.80						.17		.05				1.02	1.14
July			.13	.42																.10						.20	.11					.96	2.35
August			.16			.14	.07			.73			1.15			.50	.06															2.61	1.62
September										.33			.07			.10																.50	2.31
October						.04																	.38									.42	.43
November																.43								.17	.15				.14	.89		1.18	.50
December																								.28								.28	.63
Yearly																																9.87	11.04

Marfa, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Army.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1928-1939
January								.58			.16	.46										T		.07	.03	.68						1.98	.58
February			T																													T	.61
March																				.17				.04								.21	.21
April						T	.13																					.18				.31	.71
May	.02		.05	.04									.02															.46	.39	.01		.98	.88
June									T										.50		.38		.01				.37		.28			1.18	1.64
July		T	.36			.02	.34	T		T	.50		T	.25		.09	.06		.38	.33			T	.12			T	.50		.12		2.40	2.36
August	.03								T	.03				.75	.24								.22			T						1.89	2.83
September								T																			T					.03	2.22
October								.02	.08		.02													.02								.12	.73
November										.10						.51								.18	.10				.03	.35		1.27	.57
December																									.18							.58	.44
Yearly																																11.83	13.74

Crosson Ranch, Texas —— 1939

Standard 8 inch rain gage. Record by George F. Crosson

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1933-1939
January																																1.25	.36
February																																0	.25
March																																.65	.25
April																																.70	.29
May																																2.16	1.23
June																				.51				.06	.21	.09	.57					1.84	2.04
July					.40	.26							.65	.25			.07				.86								.09			2.49	2.73
August		.14			.07		.20	.98						.78	.55																	2.71	2.10
September																				.55												.55	2.38
October								.02			.17																					.19	.53
November										.70					.40			.07						.12	.10			.58	.23	.06		2.26	.65
December																					.30				.30							.60	.48
Yearly																																14.80	13.89

Terlingua, Texas —— 1936

Standard 8 inch rain gage. Record by Chisos Mining Company.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January											#.88																		#.13			# .13	
February																																# .28	
March																																# 0	
April																																T	
May		.14																		.04	T		.53	.13	.47	T		.55					1.86	
June			T			.83							T	.07	.18						T			.04					.01	T		1.33	
July	.16				.05	2.30	.37																	T		T					.26	3.14	
August			.35				.87														.33											1.77	
September		.52	.06	.09			.12	.05		.20		.07		.19					.05		.06	.78	.14		.11	.30						2.56	
October																												.18				.18	
November																							.20				.59	.06				.86	
December																										.06						.08	
Yearly																																12.18	

Terlingua, Texas —— 1937

Standard 8 inch rain gage. Record by Chisos Mining Company.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1936-1937
January																															T	T	* .06
February	.10	.01						.06										.18	T													.25	* .32
March					.26																	T										.26	* .13
April																																0	0
May					.10	.05					.69		T										T	.13	.35	.15					.62	2.17	2.02
June	.60	.33	T					.01						.51			.02			.08												1.47	1.40
July				.17								.05							1.35	.02												1.57	2.26
August					.09								.05						1.25	.02	.01			.03								1.45	1.61
September	T					.82						.07									.02	.05										1.46	2.01
October										.50	.07	.10				.11																.46	.32
November			.28								.05																					# .28	* .56
December				#.36										#1.15								#.53										#1.82	* .55
Yearly																																11.09	11.64

Johnson Ranch, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1933-1939
January							.10				.70													.30	.20	.20						1.50	.47
February																																0	.18
March																				.40												.40	.15
April						.70																					.30	.20				1.00	.42
May			.70	.40																									.30	.20		1.60	1.18
June																				.75												.75	1.00
July																															.62	.62	1.57
August					#.05			#.70								#.50	#.80				#.03											#1.50	.59
September																																# 0	1.38
October								#.20		#.45						#.60								#.30	#.20							#1.75	.60
November										#.80						#.20											#.25					#1.25	.24
December												.38											.43			.73						1.54	.61
Yearly																																12.11	8.31

Big Bend State Park—Green Gulch —— 1936

Standard 8 inch rain gage. Record by Park Custodian.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July																																	
August																																	
September		.25									.97		1.06				.08	.44		1.15	.04	.05	.89 .25		1.42	.19		.03			.19	1.14	
October																												.25				3.31	
November																																.25	
December																																	
Yearly																																	

* Estimated. + Partly Estimated. # Some months missing.

RAINFALL ON UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

Big Bend State Park—Green Gulch —— 1937

Standard 8 inch rain gage. Record by Park Custodian.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																0	
February		.17							.83										.48													.88	
March																																0	
April																																0	
May					.27	.35				.02	.02								.26	.24				.12		1.32						2.50	
June	.51	.35						.04		.01		.15	.02			.06		.28														1.07	
July			.03	.48	.06						.08		.25		.38				.06			.15	.17									1.56	
August														.06				1.12	.13		.98		.51	.18								2.96	
September											1.89								.10													1.99	
October											1.20					.35																1.55	
November								.42						2.50																		.42	
December		.17																				.50							.92			4.09	
Yearly																																17.04	

Big Bend State Park—Green Gulch —— 1939

Standard 8 inch rain gage. Record by Park Custodian

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1936-1939
January								.17		T	1.14	T											.02		.25						1.56	.92
February																																0	.47
March																				.06	T	.50										.56	.19
April					.33																											.50	.17
May		T	.12	.24															.02		T		.14	T	.04		T	.11	.04	.15		1.23	1.38
June		T															T		T		.78	T		.04			.26	T	.54			1.08	2.87
July				T	.16	1.92	T	1.30	T	T	T	.53	1.42	.06		T	.31	.20	.84				T	.30			T			.09		5.36	3.83
August				T	.16		.20	T	.33					.19		1.30	T		.19		.88											3.35	2.26
September								.50		T	.51	T										T	.64	T	.47							.91	3.30
October									T	1.60	T				T	.25	T						T	.11	T		T	.80				1.92	.96
November																						T	.80	T	.78							2.76	1.13
December																																1.58	1.94
Yearly																																20.83	19.42

Dryden, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Army.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1931-1939
January								.02	.14		.69	.15											T		.02	.03	.43	.08				1.50	.69
February			.06															.02														.06	.44
March																					.02		T		.02							.06	.39
April							.14																									.44	.85
May			T	T								1.82	.03	.27	.05			.02						.03					.51		T	2.71	2.11
June	T	.03	.08															.06														.17	.84
July		T																														1.85	1.55
August			.18		T	.15	.10	2.36	T			.24	1.53		T		T								.08				T	T	2.82	1.84
September													.03				T									.15						.25	2.23
October								2.18	T		.17					.04	T	.06		T			.18		.24						2.77	.94
November									.02	1.28	.03					.05	.13	T						.09	.07		.85	.22				2.34	.99
December												.01											.14		.14	.08						.57	.77
Yearly																																15.34	13.24

Pecos River Station —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1939
January			T						.35				.92														.28	.10				1.65	
February																																0	
March																																0	.04
April							.50																				.45					.95	.48
May				T								.49		.55					.05		.04				.05							1.14	.86
June		1.39																		.04												1.43	.56
July											.48		.49																			.97	2.32
August			.11			T			.65			1.50																				2.26	1.66
September																					.30				.10							.40	.20
October								.11	.20	.10													T	.20	.32							.95	.46
November										.20	.80	.05				.30							.60					.20		.10		2.25	1.12
December												T										.10			.98	.11						1.19	.82
Yearly																																13.17	

Comstock, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January	Record began May 4, 1939,																																
February	Estimated rate rainfall May 1 to 4, 1939.																																
March																																	
April																																	
May				T								2.00		.03	.03				.02		.41				.01					.59		2.68	
June		1.50																														1.91	
July												.52	.06																	.14		.72	
August							.56	.08	.52		.87	.04																				2.07	
September									.20	.15		.07	.04						.18						.78		.19					.48	
October											.18																					.31	
November										1.10	.20					.38						.20		.87	.48				.26			1.94	
December												T																				1.55	
Yearly																																	

Devils Lake, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January	Gage installed April 25, 1939,																																
February	Record began May 1, 1939.																																
March																																	
April																																	
May			.05	.04									1.50								.48											1.59	
June			.98																													1.46	
July												.57																				.57	
August				.30		.62						.92																				1.84	
September																											.69					.69	
October								.04			.06	.20												.01	1.06	.53						1.90	
November										.27	.69					.25								.35	1.35				.40			1.61	
December																																1.70	
Yearly																																	

Zapata, Texas —— 1939

Standard 8 inch rain gage. Record by U. S. Section I.B.C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1932-1939
January																										.30	.50					.80	.98
February																							.02								.02	.69
March																	.15															.15	.93
April																					.10						.03					.13	.92
May			1.98	1.05	1.26									1.18										.87					1.53			7.87	3.20
June		1.68	.90				1.10																									3.18	1.28
July										.13	.05	.19																				.37	.96
August	1.00															.92			.26													2.18	1.48
September								.40		.50		.31					.90		.10	.28	1.23											3.62	3.77
October										1.74	.40	.05										.16							.32			2.35	.96
November											.12																			.04		.48	.41
December																										.24						.24	1.90
Yearly																																21.39	16.67

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

1939

The rainfall records shown here have not been published elsewhere. The records are from the Meteorological Service and the National Irrigation Commission, both of Mexico. Monthly and annual records for many years back are shown here for some stations some of which constitute corrections to records formerly published in these Water Bulletins.

The normals shown for these monthly and annual records are based on all the available records which have been published and corrected in these Water Bulletins. See tables of precipitation records on page 95 of this Water Bulletin.

Standard 8 inch rain gage. **Juárez, Chih.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1905-1939
January							.53	T		.08	T										T							T				.53	.33
February	.01																	T				.35	T									.05	.37
March			T	T	T																						.04	.27				.31	.34
April																												T				.31	.39
May																							T									T	.44
June																																T	.70
July	T		.14	T					.02				.08		.20			T	.08			.10					.23	T		.08	T	.77	1.18
August			.31	T	T	.01							.10	T	.08	T																.60	1.46
September												.10	.57	.06	.43																	1.16	1.30
October						.01	.67															.43										1.11	.98
November								.08	.02							T							T	.47	T	.02		.30	T			.89	.63
December																						.05	.20									.25	.45
Yearly																																5.52	8.51

Standard 8 inch rain gage. **Villa Gonzalez, Chih.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1905-1939
January							.30																				T					.39	.28
February							.20																									.20	.31
March																			.77	.01		T										.78	.42
April																											.45	.79	T			1.24	.33
May																																0	.88
June					T																	.47						.67	.28			1.42	.58
July		T	.49	T					T			T	T	.30		T																.75	2.01
August				1.38					.10						.51	1.34	T															3.33	2.08
September												.30	.31	T	T	T	T															.61	1.63
October							.31	T																								.31	.66
November								T															T	.33								.33	.51
December																																0	.36
Yearly																																9.38	9.39

Standard 8 inch rain gage. **Chihuahua, Chih.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1900-1939
January							T			.21	.24													.16	.16	.12						.89	.25
February					T																											T	.26
March																	T	.89	.04		T	T										.31	.27
April																																0	.20
May		T																				T						T				T	.31
June					T		.06									T							T	.19	T	1.26		.20				1.71	1.55
July		.19	.29	.17	.37								.71	.10		T	.08	.20	.64	.18	T	T	T	.26	.04	T	.12		.11	.42	.02	3.84	3.72
August		T	.05	.10	T		.86	T	.20	.73	.20	.84	.06	.14	T	.59	.12			.27	T											3.46	3.59
September								.06					.02		.08		T		T	T						T						1.08	3.37
October							.04	T		T	T				T		.09				.02		.05									.83	.83
November									.61	.12				T	.89							.08	.10	T	T		T	.09				1.29	.56
December											T		.05	.08						.04	.66		.18	.12								1.13	.41
Yearly																																13.85	15.32

Standard 8 inch rain gage. **Delicias, Chih.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1935-1939
January										.10	.06												.24	.33	.08							.81	.22
February																																0	.14
March																			.47													.47	.12
April						.14																										.14	.29
May																							T					T				T	.21
June							T														T	T	.19	T	T			.21	.27			.67	1.44
July		T	.24	.24	.46	.41						T		T		.02	.01	.05	.39	.02	.01			.08	.27	.12	T	T	T	.14	.98	3.44	2.82
August	T		.04	.07				.20				.02	.31		.03	.20	.37	.11						T	T						1.35	2.39
September		T					T		.06	.21		.06	.30		T		T	.02		.54												1.19	2.37
October						.15		T		.23		.58						T			.10	T	.24		.06							1.36	.20
November										.76	.06				T						T	.12	.06						.24	.04		1.28	.45
December											.01		.01	.02	T						.41	.16	.17	T								.78	.33
Yearly																																11.49	11.38

Standard 8 inch rain gage. **El Mulato, Chih.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1926-1939
January							.06	T		.06	.29	T												.08	.05	.11	T					.65	.32
February		T																					T								T	.86
March																																T	.13
April						.08																				T						.17	.31
May																		.12										.12	.09			.28	.28
June							T												.03	.32							.22		.04			.57	.94
July				.31	.15	.05						T	.01	.60	T		.21															1.33	1.08
August					.59	T	.08	.71	T			T	.02	.01	.03	T	.24	.02															1.64	1.34
September														.06																			.06	1.15
October						.03	.01	.05	T	.05	T												.79	.01	T								.98	.92
November						.20	.90	T	T	T		T	.06	T	.04	T		.04	T	T			.04	.17				.05	.81	.08			2.41	.38
December	.04	T	T		T	T	T	T													.20	.29		.67	.01								1.21	.84
Yearly																																9.26	8.29

Standard 8 inch rain gage. **Nueva Rosita, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1905-1939
January	T										.59														.20	.59					1.38	.97
February																																0	.44
March																																0	.53
April				T																						T	.20	.71				.91	1.44
May			1.18																						.93				.39			2.50	2.69
June						T													2.95													2.95	2.02
July									T																							T	2.12
August				.61			.67										.12	.31							.59							2.30	1.49
September							.39																									.39	1.80
October									1.06		.33																		.39			1.89	1.57
November											T	T	T	.08	.14																	.22	.77
December																				T	1.65	T										1.65	.97
Yearly																																14.28	16.81

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

1939—continued

Standard 8 inch rain gage. **Nuevo Laredo, Tamps.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1909-1939
January														.04							T	.09			.14	.15	.28					.70	.80
February																	.04															.04	.78
March																	.05															.05	.79
April					T																						.05	.47				.52	1.01
May			.57	1.46									.49									.15										2.67	2.47
June		1.77	.57																													2.34	1.50
July										.47	1.10	.06																				1.63	1.15
August		1.47								.18																						1.65	1.03
September										.44	.99						.22	T	.24													1.89	2.91
October		1.57	.07														.03															1.67	1.04
November																								.10	.79							.89	.85
December																								.10	.79							.89	1.14
Yearly																																14.94	15.47

Standard 8 inch rain gage. **Muzquiz, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1913-1939
January							.20	.12																		.39	.59	T				1.30	.93
February																																0	.41
March																.20																.20	1.06
April																										.39	T					.39	1.00
May			1.26		.39										T				T	.79							1.18					3.62	3.56
June																	2.04	1.38	1.54	.20	T											5.16	2.95
July										.20	.39	.39									T											.59	2.30
August		.39	.59	.20	.39					.59	T						.20	T														2.36	2.72
September									.20						T	.39							.47									1.06	5.83
October		.31	T					.59								.20						.16	.39	T								1.65	2.61
November				.59	.39	.31	.20					.47	.20						.20	.55	T				T	T	.20					3.11	1.39
December																								.79	.39	T						1.18	1.37
Yearly																																20.62	26.13

Standard 8 inch rain gage. **Don Martin, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1927-1939
January											.35											.03				.74	.02					.94	.91
February																																0	.29
March																	T	.07				.01										.08	.67
April					T																					.01	.62	.42				1.05	1.39
May			.43	.82																				.08				.41				1.74	1.95
June		.17	.24				.02												T													.43	1.58
July									1.85		.13	.11																				2.09	1.57
August											T	.05			T		.24	.07	.08													2.22	1.71
September											T	.02	.45				.13	T	.02													1.11	2.99
October										.11	1.79	T	.03			.41		T	.42							.35	.45	.06	T			3.14	1.72
November											.26	T				T											.08					.40	.75
December																								.62	.25							.87	1.18
Yearly																																12.22	16.95

Standard 8 inch rain gage. **Anahuac, N. L.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1933-1939
January										.04	.05											T			.16	.55	.08				T	.88	.91
February																																0	.37
March																	.05	.25				.05										.65	.58
April					T																						1.52	.11				1.63	.97
May			.71	1.54									.14											2.32				1.38				6.09	3.02
June			.08			T												T		.08												.16	.72
July										.13	.01	.12	T																			.26	1.40
August	T	T	T			T	1.02										.27	.02	.04	2.36		T						.14				3.85	1.64
September										.10	.05	T	.39			T	T	.91		.02	.30												1.77	2.99
October										.68	.34	.08	T			T	.37									.02		.05				1.54	1.00
November											.02	.05												T	T			.20	.08			.35	.44
December																					T			.22	.09	T						.31	1.39
Yearly																																17.07	15.42

Standard 8 inch rain gage. **Monclova, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1897-1939
January											.08	.16														.98	.05					1.27	.50
February																																0	.46
March							T											T	T		T	.12										.12	.37
April			1.00	.18																								.55	.08	.05		.68	.65
May																				.59				.67					.05	.24	T	2.73	1.57
June	T																	T				T										T	1.03
July									T	.56	.50			.24					T													1.50	1.82
August	T			T	T			.98		.04	.05	T			T	.08	T	T										T		T		1.06	1.44
September										.32	1.96	.10	.16		T	T	T	.55	.24	.55				T		T	T	.04	T			1.43	2.93
October											.32					T	T																3.28	1.17
November																	T							T	T	T		T				.32	.56
December													T											.98	.20							1.18	.67
Yearly																																13.37	13.37

Standard 8 inch rain gage. **Saltillo, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1900-1939
January											T												.43		.70	.67						1.80	.54
February																																0	.38
March					T						.79	.19		.20	.16	.07	.12			.18	.12	.56				.06		.39	.08			.79	.40
April													T										.14	T								2.20	.77
May			.92	.43						.23													.07	.02	T		T					T	.86
June					.01												T	.51	.08	T												.69	1.05
July									.12	1.15	.08	T				T	.55	.18	T		T		.02		T			T			2.09	2.86
August	T							.03		T	.08	.07		.12			.47	.13	T													.27	2.14
September						.08			T	.08	T			.48	T							T										.83	2.31
October					T	.08	.37	.04		T	.04						T								T			T				.87	1.02
November																	T								T							.04	1.03
December																			.04	.04	.03	.04							T			.15	.66
Yearly																																11.45	14.61

Standard 8 inch rain gage. **Ramos Arizpe, Coah.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1907-1939
January											.08	.02											.02	.31	.79	.20						1.36	.52
February																																0	.38
March																.12	.04															.16	.37
April												.47												.04				.04	T			.55	.46
May			.24	.02																				.08						T		.34	.86
June		T															T	.87		T			.43	.79	.83	.24		.06				3.18	1.16
July										.35	1.18		.20	T			T			T										.28	T	2.01	1.73
August		T	T		T	.73		T	T	T	T	.12	T	.35	.43	T		1.37	.28									.12				3.60	1.42
September							T	.06			T	.20					.20	.63	.43	.08												1.60	1.62
October									.20	.67	.98	.01		.33	.01	.06		.04	T									.02				2.32	.63
November								T			T	.04				.08									.04	.01		T				.17	.48
December																			T						T							T	.59
Yearly																																15.29	10.22

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED
INCHES
continued

Santa Catarina, N. L.—1937

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July	Record began October 1, 1937.																																
August																																	
September																																	
October										.60			.31	.01									T									.92	
November					.39																											.39	
December	.15		1.05	.05		.01									.07		.02			.11								.24			.01	1.71	
Yearly																																	

Santa Catarina, N. L.—1938

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January				.02			T	T	T			.03										.02		.02	.09			.63				.07	
February							.04																									.74	
March	.35	.09																.78					.11									.39	
April	.05							.31	.06					.12	.13								1.42	.02								.97	
May							.07									.11				1.54	.13	.05					.26					2.66	
June																																2.16	
July																							.09	.79	.12		.78	7.55	.08	2.18	.02	3.20	
August																																8.41	
September					T			.06							1.07	.06	.04	.05	.38													1.66	
October																							.01									.01	
November																										.52						.52	
December																								.34	.34		.20			.28		1.76	
Yearly																																21.95	

Santa Catarina, N. L.—1939

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1937-1938
January										.06	.02															.99	.18					1.25	.66
February																																0	.37
March												1.39										.02	.07									.09	.24
April				.04											.01						.14											1.58	1.28
May			.54																													.54	1.50
June																.02			.08			.01		.25								.36	1.26
July									.05	.51	.11																					.65	1.92
August	.04	.16		T		.58		.79			.31					.20			.24		.31											2.63	5.52
September												.67			.33	.20	.26	.69	1.50	.67												4.38	2.99
October									.16	2.08	.39	.26		.08		.04								T			.55					3.56	1.50
November										.08				T			.18							.04		T						.30	.40
December																			.06				T		.03							.09	1.29
Yearly																																15.37	18.63

Monterrey, N. L.—1939

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1896-1939
January											.02	.01											.03	.01		1.03	.10					1.20	.72
February																	.02															.02	.66
March																		.02	.04	.01	.32	.16	.01									.56	.77
April											.02	1.12															.80	.02				1.96	1.20
May			.63	.07				.04						.20																		.91	1.50
June								.05											.11	.14		.07		.34								.72	2.62
July										.71	.12	.01																				.84	2.45
August	.37	.04	.05			T		.13	T	.08	.01		T		.22				.09		1.60					.01					2.52	3.01
September								T	.08	.31	.09	.38				.02	.02	.16	1.46	.76												3.09	3.84
October			.10					.04	1.61	.36	.22			.06	.01	.31				.01	.02			.01			.09	.24				2.98	3.24
November									.14		T													.05	.30	.07	.33	.21				1.20	1.48
December																								.01	.01		.01					.03	.86
Yearly																																16.19	24.46

Higueras, N. L.—1939

Standard 8 inch rain gage. Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1906-1939
January																										1.86	.22					1.46	.87
February																		.06	.10				.05									.21	.58
March																		.12	.06		.16											.34	.52
April												.37									.08							1.48				1.93	1.32
May			1.81	.08						.06														.06	.14							2.23	1.65
June	.41		.18		.86			.26			.08									1.67			.31	.22								3.33	2.76
July										.05	.31																				.55	.91	2.58
August	.31							.22			.09							.20	.18	.55	.30											1.76	3.14
September										.22	.28								.87													1.37	4.26
October									.59	1.63	.25																					2.47	1.79
November																									T	.10	.38	.43	.04			.95	1.05
December																								.10								.10	.87
Yearly																																17.06	21.49

Villa de Santiago, N. L.—1939

Standard 8 inch rain gage. Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1923-1939
January											.31	.09											T			.76	.16					1.25	1.00
February																																0	1.18
March																.10	T	.03	.19	T	.14	.10	T	T								.56	.99
April						.06					.79	.46					.04				4.07						.08	.06	.48			6.04	1.70
May			.47	T				.10				.08	.25	.33																T		1.03	3.51
June	T		T		T	.01	.85	.06									.04	.03	1.00	.16	.01	.26	.08	T									2.50	5.15
July																		.01																
August	1.04	.29						.02	.35	.04	.06			.08				.71	.02	.39	.76	.21				1.72					.24	1.00	3.59
September										.20	.01	.02			.07	T			.97	1.00										.02		3.31	4.69
October							T	.05	1.15	.44	.55				.06	.06	.12	.70	.03	.03	.10												2.10	5.49
November			.07		T				1.90	.30	.12	T		.01	T						T			.02	.51	.09	.27	.06				2.82	5.01
December									.09		.05														.07		.15	.09		T		1.07	1.66
Yearly																											.45					.82	1.21
																																27.10	39.35

Las Enramadas, N. L.—1939

Standard 8 inch rain gage Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1926-1939
January																										1.02						1.02	1.15
February																											.01					.01	.60
March																		.45														.45	.63
April				T							.14	.28																				2.26	1.24
May			1.57					.31					.18	T											T	1.67	.17					2.15	3.74
June						.20		.37											T		.47	.20					.09					1.24	2.81
July									T	.51	.91	T						.01												.43		1.86	3.60
August	.59									.18																						.77	3.58
September								.12		.12	2.08	.04				.59	T	1.99	.69	1.22												6.69	5.54
October										.43	.12	.12				T									T							.67	1.41
November																									.16	.39	.55	.08	T			.98	.90
December																									.08	.04	.08					.20	.91
Yearly																																18.46	25.91

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

1939

Standard 8 inch rain gage. **Rayones, N. L.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1926-1939
January											.02	.01													1.11	.17						1.31	.89
February																																0	.68
March							.03							.08	.02	T					T											.13	.21
April											.04	.62	.01			.01					.46	.02	.01									1.17	.50
May	.01	.12	.17							.07		.01		.06					T								T	.01				.37	1.22
June	.29	.01	.01	.17	.02	.14	.01	T	.01							.09	.08															.83	2.50
July	.17								1.30	.05		.58																				2.14	1.35
August	.20	.05									.09		.05	.12				T	T	.67					1.01							2.19	3.20
September									.07	.35	.19	.48	T	T	.57	.63	.33	.67	.56	.51	.01											4.17	3.24
October									.75	.10	.26	.12	.20	.01	.11	.12					.16	.01	.01	.01				.19		.01		2.08	2.44
November			.03							.01	.08														.05							.11	.83
December							.12												.02			.03		.02	T							.19	.35
Yearly																																14.77	17.31

Standard 8 inch rain gage. **Montemorelos, N. L.** Record by Meteorological Service of Mexico.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1904-1939
January											.07													.22		1.12	.15					1.56	.76
February																	.02	.06	.01	.48												.57	.84
March		.18					.02				.10	.01	.09	.12	.10	.01	.02	.12			.06	.08	.03	.01			.57	.20	.26			.86	1.08
April				.01		.07					1.00	.26									.32								.01			2.89	2.38
May			.83	.07								.03	.67	.12	.09																	1.75	2.67
June							.25	.05										.02		1.57	.06		.06		.35							2.36	3.17
July									.02	.03	1.34										.07										.14	1.60	2.18
August	.22	.07								.06	.08			.04	.02	.10	.11	.21	.37							.02	.03					1.87	3.47
September									1.03	.06	.08	.71	.01			.19	.24	.18	.22	.92	1.66									.01		5.31	3.93
October									.01	2.39	.07	.14		.04			.64	.01									.03	.13				3.69	2.24
November			.08								.03							.03							.02	.09		.06	.07	.04		.35	2.06
December																		.01							.02	.03		.11	.10			.27	.92
Yearly																																22.43	25.70

Recording Gage. **La Tableta, N. L.** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July	Record began August 12, 1939.																																
August																																	
September														.35					.47														
October										.09	.70	.17			.51		.04	.34	1.37	1.11												4.33	
November										3.43	.09	.27													.15		.04	.09				3.74	
December																									.15		.21	.18				.37	
Yearly																																.34	

Recording Gage. **Mendez, Tamps.** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July	Record began August 19, 1939.																																
August																																	
September								.08										.55	1.22	.08								.46				1.91	
October										1.48		.06					.23										.04					1.75	
November																											.04	.16				.20	
December														.04											.02		.08					.54	
Yearly																																	

Recording Gage. **Topo Chico, N. L.** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July	Record began August 1, 1939.																																
August		.20				.08	.02	.63			.04				.27				.04	.04	.55				.04		.04	T	.02	.04	.04	2.09	
September										.69	.08	.51						.12	1.40	.79								1.02	.04			3.33	
October									.25	1.41	.04	.10			.04	.28												.23				3.38	
November																									.02		.08					.73	
December																																0	
Yearly																																	

Recording Gage. **Los Ramones, N. L.** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April																																	
May																																	
June																																	
July	Record began September 1, 1939.																																
August																																	
September											.90									.79												1.69	
October	No record October 1 to November 8, inclusive.																								.24			.24					
November	Estimated Zero rainfall November 1, to 5.																								.04		.12					.48	
December																																.16	
Yearly																																	

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED
INCHES
continued

Recording Gage. **Cienega de Flores, N. L. — 1938** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January	Record began March 11, 1938.																															
February																																
March											T	.01																				
April								.19	.44	.01													.18	.03								.89
May							.04	.13	.19	.07	.03													1.68			.31				2.39
June																		.02		.01	.03	.38	.09				.51				1.04
July																									2.44	.01				1.11	T	3.56
August		.73	.24																								.37	3.27	.96			5.57
September		.01								.02	.16																					.92
October															.69	.01	T	.01	.06													0
November																										.13		.09	.05			.20
December																											.07			.85		1.28
Yearly																																

Recording Gage. **Cienega de Flores, N. L. — 1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1938-1939
January																				.01						1.41	.09					1.51	
February																	.03	.06		.19			.04									.19	
March												.10	.65	.01		.01	T	.21	.04	.03	.12	.03										.44	
April													.02	.03											.02			.03		.01		1.02	.94
May				.55	.22			.20	.03																			.51	.67			2.63	2.51
June																							.01	.02	.87							.90	.87
July									.09		.30	.42								.02											.98	1.89	2.70
August		.33						.10			.33							.60	.02	.27	.86					.10						2.03	3.80
September									.10	.17	.18	.43	.07		1.38	.30	.33	.16	.47	.49	.01											4.09	2.50
October									1.46	2.74	.21	.06		.02	.08	.24																4.81	2.40
November																									.02							.43	.32
December	T	.01			T	T														.02	T	T	T	.02	.01	T	.16	.85	T			.12	.70
Yearly																																19.56	

Recording Gage. **El Cuchillo, N. L. — 1938** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January	Record began June 1, 1938.																															
February																																
March																																
April																																
May																																
June																			.45							.14						.59
July																							.01							.09	.35	.45
August	.02																										.15	3.55	.06			3.78
September							.02		.01	.06	.02	.04								2.89												2.44
October											.40																					.40
November																													.06			.38
December																							T	.15	T	.32	.10			.35		.40
Yearly																																

Recording Gage. **El Cuchillo, N. L. — 1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1938-1939
January											.02												.03	.10		.93	.24					1.29	
February																							.04									.04	
March																		.16	.27													.49	
April											.14	1.32				.04					.43							.01				1.99	
May			1.86		.13			.15	.03				1.14												.03				.04		1.41	4.81	
June		.52					1.73	.01										.01			.01											2.27	1.43
July									.02	1.12		1.75		.18																	3.07	1.76
August	.95													.01				1.19	T							.30						1.86	2.52
September										.10	.23				T	.24	.01		1.35	.58											3.50	2.97
October										2.41	.02	.10			.01	.02					T	T					.03				2.59	1.50
November																												.11				.26	.32
December																									T	.05	T	.01				.06	.25
Yearly																																21.47	

Recording Gage. **Villa Allende, N. L. — 1938** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began October 26, 1938.																															
August																																
September																																
October																																
November	.09						.01																.04									.54
December																							.04	.27	.11	.25	.47	.03	.01	.02	.17*	.85*
Yearly																																

Recording Gage. **Villa Allende, N. L. — 1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1938-1939
January											.09	.02													.04		.99	.19				1.33	
February																																0	
March															.25	.01	.08	.06	.04	.02	.16	.10	.04									.76	
April			T	.06		.06				T	.30	.65				T	.22				3.71						.25	.06	.31			5.80	
May		.02	.34	.08				.82			.01	.02	.44	.19		.01									.03			.09	.83	.01	.02	2.08	
June					.03	1.74	.02	.04									.02	T	2.12		.13	.33										4.44	
July									.08	.39	.62	.12		.13				.31	.01												.07	1.67	
August	1.22	T						.87			.46	.44	1.51		.22		.55	.12	.21	.95	.08					.35						5.87	
September								.13	.23	.95	.18	.37		T			.43	.54	.73	.78												4.90	
October									.01	2.33	.02	.08					.65			.04												3.64	
November			.03							.19	.02	.05	.01					.02								.64	.04	.20	.15	.02		1.18	.88
December																			.06						.07	.05		.17	.11	.01		.47	.66
Yearly																																32.34	

* Partly estimated. # Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Recording Gage. **Cerralvo, N. L.—1938** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began October 21, 1938																															
August																																
September																																
October																																
November																												.08				.08
December																								.46							.18	.64
Yearly																																

Recording Gage. **Cerralvo, N. L.—1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1938-1939
January											.03												.01			1.06	.12					1.21	
February																							.02				.02					.02	
March															.07	.06	.02			.02	.15						.15					.23	
April			.58	1.24							.03	.21															.38					.79	
May			.04				.42	.23				.05	1.10					.01	.42		.01				.02					1.50	.68	5.18	
June		.01																												T		.91	
July	.95	.01	.06					.21	.09		.59		.14			.01		.34		.11									.40		1.13	
August										.22	.18	.68	T		.35	.09		.23	.90	.82							.19	.02		.01	1.58	
September										3.22	.15	.03		.03	T												.07	.34				3.48	
October																											.05					3.64	
November																									.05							.41	.24
December																																.08	.36
Yearly																																18.61	

Recording Gage **San Pedro, N. L.—1939** Record by National Irrigation Commission

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began September 13, 1939.																															
August																																
September																																
October										2.52	.19	.14	.08		.69	.14	T.26	.78	.87	1.14	.14						.12					5.62
November			.08													.43																.08
December																			.39						.08		.10					.57
Yearly																																

Recording Gage. **Cuesta de los Fierros, N. L.—1939** Record by National Irrigation Commission

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began September 11, 1939																															
August																																
September											.08	.02				.02	.39	.59	.89	.30												
October									.21	.16	1.18	.14		.12	.04									.01		.10	.08			.01		1.86
November										.06	.19					.01												.04				.45
December																				.06												.10
Yearly																																

Recording Gage. **Campamento Comales, Tamps.—1938** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February	Record began March 1, 1938.																															
March	.15		T			.04	.51				T	T							T				.63	T							1.33
April																	1.51	T						.06								1.57
May						.89	.04	.14	.07															.04								1.48
June																.54	T			.54			.30			.02	.08					1.98
July																													2.99			2.99
August	.36																T															4.99
September						.13				T	.01					.05	.46	T						.29	.01		.42	4.01				.69
October										.01		T								.15			.01									.17
November						T								T		T							.07			.05			.02	T		.14
December						T										T	T						.04	.39	.03		.10			.07		.85
Yearly																																

Recording Gage. **Campamento Comales, Tamps.—1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1938-1939
January			T								T	T						.02				.05	T		.94	.18					1.17	
February																		.06					.01				.05				.10	
March			.61	.47	.01			.09				.25		1.48	.01	.04	.03			.02	.48			T	.02		1.36	.08		.94		2.19	.74
April																					T										.82	4.45	1.88
May		.50				T	1.61																	T	.18							2.89	2.96
June																																	2.14
July	.85	.18							.17	.05	.12		T						.08	.19												.34	1.66
August								.02	.09	.29	.67	.01	T		.06	T		.06	1.52	.78										.02		.04	.82
September										.52	.04													T		.10		.40	.29	.01		3.47	2.06
October																													.18			.78	.46
November																																.83	.18
December																																.50	.66
Yearly																																16.22	

Recording Gage. **Villagran, Tamps.—1939** Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began September 1, 1939.																															
August										.87	.47	1.42	.08	.24	.08	.39	.16	1.10	.23	.08													
September										4.49																	.39					4.41
October																																3.39
November																																0
December																											.08					.08
Yearly																																

\# Some months missing. # Estimated.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Standard 8 inch rain gage. **Juárez, Chih.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903		.67	.29	.61	.85	2.24		1.27	2.97			.08	
1904	.02	.04	.00	.00	.06	.94	.87	2.65	3.35	3.74	.02	1.08	12.77
1905		.13	1.26	1.48	.04	2.27	1.55	.40	1.75	1.57	3.01	.83	
1906	.68	1.23	.04	.41	.33	.00	2.48	2.45	.64	.49	1.20	1.15	11.10
1907	.28												
1908			.48	1.10	.49		1.54	3.91	.02	.07			
1909			.66			T	1.50	.80	.90	.07	T	.55	
1910	.08	.15	.01	.04	.01	.06	1.36	1.96	.45	.04	.01	.36	4.53
1912				1.26									
1913	.37												
1922					.26			.14		.29	.17	.07	
1923				T									
1925	.16	.47	T		2.13	.46	2.51	2.20	1.30	2.56	.04	.27	
1926	.60	.00	1.18	.81	.56			.65	2.05	1.02	.24	1.17	
1927	.03	.31	.35	.00	.00	.08	2.72	2.42	.51	T	.00	.51	6.93
1928			T	.20	.83	.00	.65	3.05	.12	.87	.77	.22	
1929	T	.16	.61	.00	1.40	.55	2.17	1.87	.08	1.28	.37	.24	8.73
1930	.10	.24	T	T	.41	.63	.53	.18	T	.59	.63	.39	3.72
1931	.73	1.28	.47	2.16	.01	.76	.68	1.29	1.16	.26	.49	.39	9.68
1932	.15	.30	.03	T	.98	.14	.80	1.11	3.46	2.07	.00	.48	9.52
1933	.27	.31	.00	.11	.02	1.75	.91	.14	.46	1.01	1.50	.00	6.48
1934	T	.55	.37	.03	.68	.26	.44	.45	.13	.79	.31	.23	4.24
1935	.09	.54	.24	T	.08	.14	.14	1.86	*1.75	* .31	*1.24	* .49	6.28
1936	.67	.05	.00	.13	.39	.12	.67	2.81	4.13	.39	1.47	.30	11.13
1937	.16	.32	.58	.00	.16	.45	.70	.89	.31	1.46	.85	.69	6.57
Normals	.33	.37	.34	.39	.44	.70	1.18	1.46	1.30	.92	.63	.45	8.51

Standard 8 inch rain gage. **Villa Gonzalez, Chih.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903				.00	.00	1.37	.34	2.03	1.02	.00	.00	.00	
1904	.00	.00	.00	.00	.00	.81	.41	2.02	4.94	.62	.00		
1905	.20	.98	4.18	.34	.08	1.17	2.72	1.06	1.44	.34	1.23	.22	13.96
1906	.06	1.38	.00	.59	.15	T	3.85	5.76	.65	.62	1.16	.61	14.83
1907	.28	.22	.23	.11	.00	.36	1.63	5.41	3.16	2.79	2.09	.00	16.28
1908	.24	.03	.31	.42	.04	.00	4.79	1.97	.01	.01	.34	.03	8.19
1909	.01	.18	.16	.00	.01	2.02	3.01	1.76	1.79	.01	.57	.05	9.57
1910	T	.15	.01	.19	.00	.90	2.06	2.32	1.57	.00	.22	.81	8.23
1911	.59	1.37	1.44	.76	1.63	2.51	5.79	1.69	3.18	.28		.05	
1912			.57										
1920									.80	.72	.20	.00	
1921	.12	.37	.20	.04	.08	.43	4.69	2.32	2.87	.02	.79	.43	12.36
1922	.00	.00	.34	.59	.43	.00	3.08	.67	.16	.59	.04	.00	5.90
1923	.28	.66	.08		.00	.83	1.21	4.44	1.06	.91	.19	.35	
1924	T	T	.60	.35	.12	T	2.23	1.65	.52	.46	.00	.81	6.74
1925	.02	.15	.02	.00	1.50	1.00	1.12	3.30	.13	1.14	T	.19	8.57
1926	.53	.33	1.11	1.13	.43	.41	1.20	47	1.94	1.06	.31	.95	9.87
1927	.03	.14	T	.00	.00	.12	2.78	2.14	1.39	T	T	.78	7.38
1928	T	.36	.09	.42	.98	.26	1.31	4.46	1.07	.39	.38	.60	10.32
1929	.02	.45	.17	T	1.24	.10	1.52	1.44	1.44	3.22	.30	.60	10.50
1930	.10	.34	.24	.24	.30	.10	2.03	.30	.26	.93	.38	.34	5.56
1931	.49	.46	.08	1.87	.37	.20	.96	.89	.95	.09	.38	.15	6.89
1932	.18	.38	.10	.06	T	.10	.69	.89	2.40	.11	T	.10	5.01
1933	.15	.10	T	.08	.33	.40	2.00	.91	.20	1.50	.08	.00	5.75
1934	.01	.05	.32	.09	.06	.33	.09	.98	T	.55	.37	T	3.05
1935	T	.13	.00	T	.00	.30	.09	.39	2.07	.70	1.18	.28	5.14
1936	.55	.00	.51	T	T	.20	1.97	.20	4.57	.79	1.54	.24	10.57
1937	.08	T	.01	T	T	.02	T	4.21	5.94	.91	2.05	2.57	15.79
Normals	.22	.31	.42	.33	.28	.58	2.01	2.08	1.63	.66	.51	.36	9.39

Standard 8 inch rain gage. **Chihuahua, Chih.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1900	.48	1.61	1.06	.00	.47	1.12	6.20	1.61	5.06	.52	.01	.02	18.16
1901	T	.16	.02	.05	.46	.58		2.15	2.34	2.29	.00	.00	
1902	.80	.00	.00	.56	.32	.64	6.66	5.30	3.68	.43	.59	.47	19.45
1903	.18	T	T		.31	3.34	.98	5.35	3.72	.97	.00	.20	
1904	.28	.00	.00	.00	.53	1.91	1.50	2.87	7.57	1.86	.18	.10	16.80
1905	.08	.48	2.94	.00	.16	4.78	2.63	2.30	2.40	.78	1.34	1.71	19.60
1906	.44	2.29	.00	.54	.11	1.21	7.52	6.16	1.12	.35	.24	.27	20.25
1907	.31	.01	.00	.00	.04	1.72	3.51	3.76	2.11	2.00	3.01	.00	16.47
1908	.24	.43	.00	.68	.00	.00	6.54	5.24	.87	.00	.00	.00	14.00
1909	.00	.00	.00	.00	.00	2.01	3.30	2.88	1.10	.00	.00	.12	9.41
1910	.00	.00	.28	.00	T	1.70	.98	1.59	2.04	.62	.49	.00	7.70
1911	.52	.45	.20	.00	.31	2.96	5.10	1.70	3.16	.55	.70	.16	15.81
1912	.04	.00	.00					4.34	3.70		.86	.18	
1913	.04	.00											
1916	.00	.55	.00	.00									
1917				.00	T	.04	3.18	2.16	2.44	.00	.00	.00	
1918	.56	.00	.28	T	.04	3.58	3.30	3.36	1.30	.41	.95	.13	13.91
1919	.30	.00	.06	.00	.11	.84	5.85	5.56	5.04	.86	1.20	.51	20.33
1920	.32	.16	.04	.30	1.00	3.11	1.18	8.42	3.82	.28	.48	T	19.11
1921	.00	.55	T	T	.37	.77	3.08	3.74	5.15	.39	.06	.02	14.13
1922	T	.04	.02	.15	T	1.60	3.48	.42	3.68	1.09	.04	T	10.52
1923	.37	.42	1.22	T	.02	2.12	3.63	6.29	7.10	.95	1.42	1.69	25.23
1924	.14	.47	T	.20	.04	T	2.44	3.07	1.85	.86	.18	1.21	10.46
1925	.02	.20	.36	.00	1.24	1.52	2.99	7.09	1.87	2.68	.20	1.71	19.78
1926	.16	.20	.10	1.65	.08	.53	2.60	4.42	1.98	2.89	.18	.31	15.10
1927	.04	.08	.50			.80	3.62	1.26	4.38	1.18	.04	.88	
1928	.35	T	.26	.10	1.26	.35							
1929	T	T											
1933	.20	.12										.00	
1934		.00	.05	.96	1.30	1.06	2.16	3.12	1.65	.31	.00		
1936	.02	.00	.30	T		.44	5.56	2.66	4.40	.26	1.94	T	
1937	T	.08	T	.00	.24	.16	1.68	2.00	5.42	.40	.70	1.20	11.88
Normals	.25	.26	.27	.20	.31	1.55	3.72	3.59	3.37	.83	.56	.41	15.32

Standard 8 inch rain gage. **Ojinaga, Chih.** By Max. Metro. Service

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1906											.44	.30	
1907	T	.00			.00				.20	1.77	1.29	.00	
1908	.00	.33	.49	.20	.11	.30	1.65	1.22	.54	.00	.00	.29	5.13
1909	T	.00	.00	.00	.00	.20	1.38	T	.00	.00	.00	.49	2.07
1910	.00	T	.96	.00	.33	.48	.46	.00	.92	.00	.09	.20	3.44
1911	.33	.96	.71	.39									
1922					.19	.85	2.19	.20	.48	4.21			
1923	.87	1.26	.91	.71	.00	.93	1.87	3.67	.93	T	1.16	1.48	13.79
1924	T	.74	.00	T	T	T					.00	.49	
1925	T	.00	.00	.00	.00		T	T	T	T		.98	
1926	T	T	.00	.00	.00	T	.09	2.30	1.67	.39	.00	.30	4.75
1927	T	T	.39	.00	.00	1.18	.65	1.97	4.98	.00	.00	T	9.17
1928	.00	.00	.00	T	T	T	1.51	2.17	1.93	.63	1.65	T	7.89
1929	T	.00	.00	.00	1.54	.61	.71	2.37	2.95	1.73	.16	T	10.07
1930	.16	T	.00	.12	.59	.18	1.50	1.36	.00	3.15	1.04	.67	8.77
Normals	.10	.25	.29	.12	.21	.43	1.09	1.39	1.22	.99	.49	.40	6.98

Standard 8 inch rain gage. **El Mulato, Chih.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926					1.03	1.44	.48	3.67	1.65	.08	.28	.83	
1927	.02	.04	.26	.18	.00	.51	1.59	.94	1.60	T	.00	1.04	6.18
1928	.37	.48	.00	.13	.39	.67	.00	.00	2.05	.77	1.01	.56	6.43
1929	.00	.08	.18	.24	1.22	2.30	.78	.82	1.88	1.34	T	.36	9.20
1930	.04	.08	.12	.16	.47	1.14	2.19	1.63	.24	1.30	1.13	.44	8.94
1931	2.11	1.28	.22	2.71	.87	.49	1.19	.56	.00	.13	.16	.58	10.30
1932	.10	.63	.31	.20	.30	.16	1.46	2.06	3.24	.15	.00	.80	9.41
1933	.08	T	.08	T	.05	.64	.98	1.18	.29	1.39	.02	.00	4.71
1934	.09	T	T	.13	.01	.44	1.17	1.23	.00	.00	.00	T	3.07
1935	.15	.62	.20	.00	.70	1.02	.33	1.73	2.43	.21	.13	.70	8.22
1936	.10	.00	.32	.00	2.81	.00	2.41	2.43	1.64	5.82	.08	.85	16.46
1937	.05	.14	T	.00	.26	1.13	.32	.61	1.41	.60	.17	1.54	6.23
Normals	.32	.26	.13	.31	.62	.94	1.08	1.34	1.35	.92	.38	.64	6.95

Standard 8 inch rain gage. **Delicias, Chih.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1933								4.35	.78	.61	T	.00	
1934	.00	.00	.08	.55	.55	.18	1.91	2.58	.73	.10	.08	.02	6.78
1935	.61	.31	T	.00	.10	1.20	1.36	2.62					
1936	T	.00	.16	.22	.12	.06	1.89	.85	4.33	.61	1.12	T	9.36
1937	.00	.22	.00	T	.16	.10	1.77	2.58	4.25	.20	.20	1.18	10.66
Average	.32	.14	.12	.29	.21	1.44	2.82	2.39	2.37	.50	.45	.33	11.38

Standard 8 inch rain gage. **La Mariposa, Coah.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1900	1.43	.01	3.51	1.87	3.68	2.63	3.66	4.63	2.30	3.21	.10	.11	27.14
1901	.23	.11	.00	4.74	2.20	.40	.60	.29	4.49	4.11	.89	.00	18.06
1902	.36	.17	.00	2.03	1.98	.00	.73	.00	4.95	.91	1.22	.97	13.32
1903	1.44	1.09	.20	.83	2.27	11.13	.95	1.25	7.25	.10	.02	.00	26.53
1904	.00	.00	.00	1.43	3.03	1.78	1.28	.24	19.30	1.91	1.56	1.46	31.99
1905	.15	.37	5.08	1.50	4.47	5.58	4.33	.77	4.66	1.96	2.10	1.78	32.75
1906	.00	2.39	.12	.74	1.82	.00	11.75	4.73	3.52	1.20	.30	1.46	28.03
1907	.10	.00	.00	.24	.36	3.44	1.49	.12	2.42	7.44	2.77	.00	18.38
1908	.16	.00	2.50	3.42	1.00	.97	3.61	4.91	1.35	.00	.20	.00	18.12
1909	.25	.00	.09	.00	.15	4.80	5.57	3.97	2.00	.30	.75	.47	18.35
1910	.33	.00	.50	.18	.50	2.92	.00	.00	5.44	1.27	.00	.25	11.39
1911	.25	.95	3.92	1.52	1.57	1.05	2.29	4.93	.26	.60	3.57	.33	21.24
1912	.00	.34	.18	.76	.50	3.93	.81	.35	1.90	1.08	2.75	1.26	13.86
1913	.27	.41	.19	.66	.71	6.03	.72	2.80	5.51	2.40	1.05	.35	21.10
1914	.00	.54	.72	3.20	12.77	4.90	.98	2.26	2.39	6.41	4.02	.66	38.04
1915	1.93	.12	.90	.81	3.45	1.10	.47	9.75	12.43	3.90	.05	.47	35.38
1916	.24	.16	.04	1.24	1.03	.00	6.33	3.74	1.89	.72	.00	.00	15.39
1917	.00	.00	.00	.00	.00	.20	.86	.63	4.51	.00	.00	.00	6.20
1918	.00	.00	.00	.70	2.19	3.02	.20	.60	.63	2.12	1.48	.00	10.94
1919	.83	.56	1.00	.89	.34	3.63	16.73	.40	7.93	2.38	.00	.43	35.12
1920	2.54	.10	.00	.02	5.12	2.75	1.78	7.40	2.58	1.44	.46	.00	24.19
1938	.80	.47	.70	.69	1.96	1.62	2.84	2.16	2.64	.58		.54	
Normals	.58	.44	.84	1.15	2.57	3.16	2.98	2.42	5.22	2.01	1.12	.57	23.06

Standard 8 inch rain gage. **Piedras Negras, Coah.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1907				.65	3.61	2.46	2.05	.02	5.36	5.70	3.53	.15	
1908	.20	.36	1.04	2.90	3.85	.52	1.01	3.97	.73	1.24	1.16	.15	17.13
1909	T	.26	.87	.69	1.92	.62	1.26	2.52	.60	.00	1.28	.40	10.42
1910	.07	.05	1.63	2.35	.91	.25	T	.70	1.69	.34	.12	.15	8.26
1911	.15	2.36	2.21	.99	.10	.09	.14	1.67	.00	6.29	2.57	1.50	18.07
1912	T	.53	.81	2.82	.39	8.42	2.38	.00	.89	3.27	1.22	2.08	22.81
1913	.35												
1922							.77	.04	4.41	.48	.63	T	
1923	.44	4.47	2.61	1.51	.28	1.66	2.35	1.27	3.31	1.65	2.75	1.23	23.53
1924	.40	.70	.44	2.07	6.22	.38	T	.00	3.24	.30	.00	.30	14.05
1925	T	.00	.68	.84	8.12	.20	.20	T	2.46	1.69	.95	1.17	16.28
1926	.85	T	1.13	7.37	2.40	.20	3.02	1.03	.61	2.59	.79	1.87	21.86
1927	.48	1.59	.83	.20	T	4.96	1.39	.99	1.64	1.88	.00	2.03	15.99
1928	.78	1.10	.14	1.01	4.42	1.10	1.33	2.70	14.59	.76	.78	.53	29.24
1929	.33	T	.51	.99	2.90	.16	1.73	T	7.56	2.93	.50	2.00	19.61
1930	T	.20	1.15	1.53	3.96	4.07	1.65	.00	T	4.29	3.11	.48	20.44
1931	5.43	.91	1.61	1.33	5.40	5.30	1.50	4.01	.00	T	.44	2.83	28.76
1932	2.56	1.75	.44	2.21	1.31	2.05	1.53	9.91	7.75	.81	1.38	.72	32.42
1933	.61	1.11	.60	.00	2.60	.00	.00	.00	.00				
1936	.08	.04	.32	1.19	2.78	19.87	.87	T	1.51	.28	.08	.00	27.02
1937	.00	.00	.48	.00	.20	.00	.83	.00					
Normals	.67	.86	.97	1.61	2.70	2.75	1.20	1.44	2.97	1.92	1.18	.98	19.25

Standard 8 inch rain gage. **Monclova, Coah.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1897						1.38	1.10	5.47	.55				
1898											T	T	
1907							1.52					.10	
1908	.87	.63	.19	.56	1.39	.51	1.01	.55	.08	.08	.47	.00	6.34
1909	.08	.08	.04	.47	.08	.43	.91	1.06	.04	.08	.08	.43	3.78
1910	.08	T	.33	.12	.67	.47	.33	.04	5.24	.43	.00	.00	7.73
1911	.00	.39	2.13	1.46	1.69	.68	.84	3.83	.75	1.54	2.10	.13	15.54
1912	T	.55	.11	1.61	.12	2.54	.10	1.00	2.34	1.39	2.58	1.60	13.94
1913	.70												
Normals	.50	.46	.37	.65	1.57	1.23	1.82	1.44	2.93	1.17	.56	.67	13.37

Standard 8 inch rain gage. **Nuevo Laredo, Tamps.** By Max. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1909			1.31	1.23	2.30	2.35	1.76	3.56	.00	.45	.45	1.11	
1910	.30	T	1.02	.59	1.29	.43	.18	1.78	6.41	2.37	.26	.70	15.23
1911	.23	1.49	1.77	1.45	1.74	.00	1.10	.00					
1921		.12	1.19	.13	1.07	2.18	1.26	.00	.98	.00	.00	.31	
1922	T	.00	.01	1.50	1.93	4.40	.00	.00	1.51	.97	.24	T	10.56
1923	.18	3.94	1.97	.00	T	.64	.46	.00	11.66	2.31	2.15	2.33	25.64
1924	.69	1.04	.20	.08	2.13	.98	.00	T	1.16	.00	.00	.15	6.43
1925	.00	.00	.59	.20	.93	.08	T	2.04	8.83	.24	2.38	1.19	16.48
1926	1.09	.00	1.15	3.30	4.07	.55	2.19	.09	T	3.13	.34	1.82	17.73
1927	.35	.47	.78	.30	1.28	3.19	.15	.58	.90	.74	.42	.79	9.95
1928	2.02	1.99	.30	.47	3.65	.00	.85	.13	2.64	.78	1.88	2.06	16.77
1929	T	.39	1.38	1.46	4.31	.50	.61	T	1.14	.44	1.56	.56	12.35
1930	.04	.87	.63	1.76	2.62	1.20	.51	.00	.68	4.94	3.57	.04	16.86
1931	4.50	1.00	1.06	.39	8.51	1.52	4.41	3.65	.91	.03	.10	2.31	28.39
1932	1.09	.74	.40	1.96	2.72	1.58	.12	1.69	3.26	.30	T	.36	14.22
1933	T	1.19	.19	.73	.27	1.96	1.26	3.02	6.23	1.50	.43	.28	17.06
1934	2.79	.34	.34	2.02	.20	.00	3.09	.20	2.09	.28	.85	.54	12.74
1935	.27	1.85	1.87	1.44	3.92	5.74	2.43	.22	4.10	.74	1.95	2.81	27.34
1936	.09	.28	.32	2.85	6.64	2.76	1.87	2.06	4.34	.81	.30	.70	22.02
1937	.22	.17	.46	T	.65	.01	.64	.70	1.40	.18	.08	2.74	7.25
Normals	.80	.78	.79	1.01	2.47	1.50	1.15	1.03	2.91	1.04	.85	1.14	15.47

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Anahuac, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1933						.30	1.57	2.46	3.58	2.19	.93	.08	
1934	2.44	.20	.22	2.46	1.05	.02	1.73	T	3.09	.08	.00	.63	11.92
1935	.95	1.08	.93	.24	2.94	3.08	.57	.30	8.88	.59	.94	3.33	23.83
1936	.09	.19	.30	.76	4.83	.47	.54	2.68	.45	.72	.67	.68	12.58
1937	.24	.15	.53	.00	1.86	.03	.89	.25	.50	.89	.19	3.56	9.19
1938	.85	.60	.93	.71	1.35	.89	4.22	1.92	2.68	.95	T	1.17	16.28
Average	.91	.37	.58	.97	3.02	.71	1.40	1.64	2.99	1.00	.44	1.39	15.42

Ramos Arizpe, Coah.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1907				.11	.98			1.98		1.38	.29	.22	.33	
1908	T	.00	.62	1.44	1.05	.66	2.26	2.02	.72	.11	.22	.00	9.10
1909	.00	T	.00	T	.09	1.14	3.32	3.98	.48	.26	.00	.33	9.60
1910	.00	.00	.26	.12	.08	.30	.72	.90	3.89	.74	T	.22	7.25
1911	.00	.10	1.26	2.49	.31	T	T	1.99	.50	1.25	2.47	.90	11.27
1912	.75	.43	.08	T	T	1.72	T		.73	.39	.43	.39	
1913	.93												
Normals	.52	.38	.37	.46	.86	1.16	1.73	1.42	1.62	.63	.48	.59	10.22

Saltillo, Coah.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1900	2.29	.98	2.69	T	.26	.48	5.70	7.30	4.46	1.02	1.65	2.38	29.17
1901	.87	.47	.02	2.17	.47	.67	5.47	1.18	.63	.17	.82	.00	12.90
1902	T	.07	.00	.08	.47	.04	6.61	1.31	3.11	1.62	3.31	1.14	17.76
1903	.41	.00	.13	.00	1.14	.08	2.80	1.41	1.14	2.13	.00	.04	8.68
1904	T	.28	T	.42	.11	5.34	1.64	.78	1.84	T	.45	.51	11.37
1905	.10	.67	.00	.02	.91	1.09	2.54	.76	2.19	.68	3.61	1.16	13.73
1906	T	.56	.66	.17	.74	.47				1.69	.00	.47	
1907	.02	.02	.05	.23	1.28	1.04	2.87	1.20	2.62	1.65	1.24	.39	12.59
1908	.01	T	.47	1.65	.64	2.32	4.34	2.62	1.65	.18	.30	.01	14.13
1909	T	.01	T	.35	T	2.35	4.51	8.42	.69	.92	T	.44	16.69
1910	.03	T	.69	.33	.19	2.18	.94	2.72	3.07	1.07	.19	.48	11.89
1911	.02	.16	1.61	2.67	1.37	.47	1.78	1.61	1.19	1.91	2.81	1.13	16.73
1912	.88	.41	.07	1.74	.07	4.06	.95	2.75	2.41	1.61	1.94	1.24	17.65
1913	1.77	.87	.11	.32	.53		1.04	3.24	4.50	2.03	1.02	.68	
1914	.23	.41	.63	.96					4.02	1.39	4.11	.50	
1919									1.34	2.52	1.04	.15	
1920	.47	.01	T	.02		1.35	2.31	1.71	2.31	.26	.33	.41	
1921	.02	.16	.02	.37	.98	2.40	2.81	.56	1.88	.07	.91	.07	10.25
1922	.00	.00		.41									
1923									2.49	1.65	1.04		
1925				1.74	.48	3.09	3.03	2.73	.77	.68			
1927	.00	.22											
1928	.93	1.27	.37	T	.20	.46	2.72	1.27	2.03	.04	.33	.84	10.28
1929	.14	.06	.14	.60	1.35	.14	2.08	1.15	.67	.91	2.08	.79	10.08
1930	.70	.51	.23	.33	1.96	2.17	2.80	1.28	1.58	3.99	2.48	1.32	19.17
1931	2.38	1.62	.63	.48	1.47	2.67	3.07	2.52	.46	1.07	T	1.66	18.03
1932	.25	.24	.96	.29	.13	.27	2.93	.53	2.72	.26	.10	.06	9.00
1933	.49	1.03	.17	.06	.84	1.23	1.96	2.68		.20	.28	T	
1934	.94	.27	T	2.52	1.21	4.14	3.19	.41	1.39	1.03	T	.25	15.35
1935	.41	1.01	.26	.93	1.12	2.50	3.01	1.09	6.22	.16	.16	.69	17.56
1936	.08	T	.22	1.03	3.30	.84	2.81	1.94	4.07	.12	.74	.83	15.38
1937	.85	.39	.32	1.04	.91	2.27	1.86	1.19	4.12	.44	T		
1938								3.70	.50			1.48	
Normals	.54	.38	.40	.77	.86	1.65	2.85	2.14	2.31	1.02	1.03	.66	14.61

Higueras, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1906									3.34	2.46	.46	.44	
1907	.13	.75	.00	.28			3.19	2.98	2.47	3.47	3.78	.45	
1908	.35	.15	.77	4.52	1.72	.71	T	.64	2.41	.13	.62	.71	12.73
1909	.13	.30	.00	.94	.09	8.34	9.70	10.59	.42	.09	.22	.91	31.73
1910	.56	T	.92	.09	.56	.71	.79	3.79	2.91	3.01	.00	.16	13.50
1911	.00	.18	2.79	3.70	.57	.00	1.28	.00	.33	1.90	3.33	1.16	14.36
1912		.53	.68	1.72	1.52	7.74	.42				2.05	.49	
1913	.65	.00	.45	.06	.35		.00				1.10	.00	
1938	.71	1.69	1.18	2.18	.94	2.96	3.35	6.86	1.23	.00	.14	1.21	22.45
Normals	.87	.58	.62	1.32	1.65	2.76	2.58	3.14	4.26	1.73	1.05	.87	21.49

Villa de Santiago, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1923	.65	5.39	1.89	1.46	2.14	2.75	.58	4.34	21.12	4.09	3.19	2.16	49.76
1924	.83	1.69	.24	2.50	3.41	3.26	2.16	1.96	11.97	2.73	.66	1.03	32.46
1925	.30	.04	.67	2.63	1.37	6.90	.11	12.02	4.65	4.41	1.62	3.08	37.74
1926	.78	.25	1.63	3.37	2.24	7.99	8.39	4.72	5.52	3.91	.83	.71	40.32
1927	.22	1.15	.04	1.64	.67	11.75	3.71	3.13	5.94	2.25	2.61	.73	33.84
1928	1.41	1.67	.64	.02	5.57	1.06	4.26	.67	19.30	4.71	2.64	.96	48.91
1929	.76	1.37	3.60	.47	1.32	3.83	4.39	2.11	11.54	2.42	1.33	.16	33.50
1930	.54	.50	.17	.51	13.09	13.13	2.85	1.13	2.63	27.09	1.67	.63	65.92
1931	5.26	1.28	1.60	1.45	6.40	1.57	7.39	5.50	2.96	3.44	.40	1.94	39.19
1932	.29	.11	.26	1.23	2.17	2.05	2.40	5.37	18.98	3.74	.39	.00	36.89
1933	.00	.59											
1937				.05		2.33	7.10	1.99	7.11	2.56	5.51	2.98	
1938	.81	.38	.59	.78	2.50	7.85	2.29	12.66	6.57	.90	.04	1.18	36.51
Normals	1.00	1.12	.99	1.70	3.51	5.15	3.59	4.69	9.49	5.01	1.69	1.21	39.15

Cadereyta, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1904									7.94	1.51	3.97	.32	
1905		2.22	2.54	.59	2.16	5.27	4.34						
1906	.11	3.61	.68	3.59	3.14	.34	7.11	4.82	12.39	1.59	1.13	.61	39.12
1907	.52	.42	.08	2.01	4.44	1.48	2.10	1.49	3.63	2.63	3.30	.82	22.72
1908	.92	.28	.21	2.68	.43	.73	2.45	.19	1.75	.37	.51	.85	11.27
1909	.48	T	T	2.53	2.11	.73	4.16	15.47	2.41	.22	.72	1.08	29.91
1910	1.33	1.28	2.28	.07	1.30	1.27	.35	1.23	2.64	2.97	T	1.08	15.60
1911	.28	.39	9.24	4.44	5.04	.00	3.71	.98	.85	4.31	4.57		
1912		.30	1.69	3.03	.44	9.58	.05	.10	4.78	2.14	2.44	.79	
1913	.64	1.67	1.95	1.23	.63	5.61	.30	1.18	2.83	3.64			
1926												.46	
1927	.49	1.11	.05	.77	.47	26.02	7.05	1.70	1.36	.95	.00	1.68	41.65
1928	.87	1.67	.81	.47	2.50	.35	2.16	.43	8.00	1.50	3.17	.82	22.75
1929	.24	.48	3.24	1.22	2.17	.24	1.30	2.84	6.80	5.47	1.35	.13	25.48
1930	.28	.12	.17	1.66	7.13	7.73	2.06	1.61	4.77	9.76	2.01	.21	37.51
1931	4.91	1.15	.57	1.76	4.25	.32	5.50	7.73	8.58	1.12	.53	1.50	31.88
1937							8.17	2.56	1.10	4.30	1.97	1.83	
1938	.91	2.14	.20	2.37	1.95	1.71	1.54	3.72	3.09	.12	.31	.44	18.50
Normals	.92	1.13	1.58	1.90	2.54	4.09	3.27	3.07	4.14	2.65	1.72	.81	27.82

Sta. Rosalia, Tamps.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1924	1.03	.51	.22	.15	3.43	4.77	1.96	.05	3.81	.49	.14	2.80	19.36
1925	.06	.00	.80	1.10	.10	1.65	.33	1.50	12.93	3.97	.29	5.31	28.04
1926	1.53	.00	2.03	3.37	2.90	2.11	7.05	2.19	.63	3.84	.52	1.63	27.80
1927	.40	.31	.03	2.74	1.46	14.00	3.34	2.20	3.89	2.10	.01	.68	31.36
1928	1.03	2.32	.18	.76	4.30	1.14	1.10	1.02	3.26	.37	.57	1.09	17.16
1929	.67	.08	1.10	.33	.12	2.15	4.42	.73	.48	8.38	1.39	.96	14.81
1930	.19	.41	1.09	.78	5.81	2.68	.42	.85	3.50	2.84	5.72	.30	28.47
1931	3.79	.49	1.32	1.38	2.49	2.77	4.49	2.73	1.24	.70	.54	1.07	22.94
1932	.53	.32	.68	2.78	1.60	1.39	1.64	3.30	8.54	1.94	.00	.50	23.12
1933	.09	.71	.56	1.33	2.74	2.23	5.38	7.85	.00	1.16	2.39	.22	22.88
1934	3.21	3.81	.07	1.76	1.34	1.33	2.86	.51	.88	2.33	.00	.66	17.78
1935		.64			3.24	4.12	1.03		4.54	1.58	1.58	1.86	
1936	.18	.68	.39	.72	1.27	.00	4.11	3.06	.73	.69	.09	1.71	13.63
1937	.76	.55	.80	.06		T	1.91	T	2.33		.00	2.80	
1938	.96										.01	.68	
Normals	1.03	.78	.70	1.32	2.37	2.88	2.74	2.00	3.34	1.75	.80	1.44	21.15

Montemorelos, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1904									5.02	12.44	1.34		
1905	.76	1.72		3.43	1.29	5.38	4.45	.76	1.51	5.47	9.71	1.88	
1906	.49	3.96	.73	5.83		1.43	3.26	5.20	4.30	2.81	.88	.96	
1907	.47	.27	.23	4.37	3.04	2.84	2.58	.00	1.93	3.02	3.27	.28	21.44
1908	1.84	.13	1.44	2.89	1.86	1.90	2.77	.53	6.19	1.85	1.15	1.59	24.14
1909	.61	.14	.26	.76	3.83	.64	5.94	22.34	2.34	.16	.85	.82	38.29
1910	.80	.23	1.71	.28	3.74	1.08	.86	3.88	8.57	1.53	.02	1.19	24.03
1911	.89	.91	4.70	4.05	2.69	.10	2.16	.13	.12	2.15	4.58		
1912		.52	.86	4.80	.43	11.93	.78	.35	4.94	4.31	4.07	1.12	
1913	.85	1.43	1.11	1.81			.87						
1926								.06	2.39	3.83	.00	T	
1927	T	.79	.00	1.10	.55	9.89	T	.39	.18	1.02	T	.59	13.91
1928	T	.08	.14	.08	5.51	T	.00	.06	5.51	.06	1.81	.81	14.06
1929	1.58	.10	1.38	1.57	1.99	2.05	.49	1.75	3.09	1.81	1.99	.39	17.99
1930	.39	.61	1.58	.79	5.13	1.65	.59	.79					
1937							5.65	2.85	1.19	3.26	2.50	2.38	
Normals	.76	.84	1.08	2.38	2.67	3.17	2.18	3.47	3.93	2.84	2.06	.92	25.70

Gral. Bravo, N. L.

Standard 8 inch rain gage. By Mex. Metro. Service.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1906									4.80	1.00	.98	.00	
1907	.00	.00	.00	1.46	9.21	.58	7.20	.00	.41	.22	1.18	.62	20.78
1908	.00	.00	.86	2.16	4.94	.90	6.83	1.10	.81	1.82	5.22	1.43	26.17
1909	.00	.26	.00	.51	2.26	8.03	.25	10.20	4.41	.00	.60	1.00	27.52
1910	.00	.00	1.84	.93	2.46	.98	.92	2.48	1.91	.63	.59	.71	13.45
1911	.43	T	2.43	2.87	.76	.00	1.62	1.08	.30	.13	.92	.71	11.25
1912	.67	.62	.15	1.87	1.14	12.83	.00	.00	4.97	3.94	1.61	.49	28.29
1913		1.07	T	.41									
1938	1.02	.85	T	.18	1.69	1.06	.00	6.50	2.95	T	T	.71	14.94
Normals	.73	.41	.60	1.09	3.39	3.04	2.92	2.35	3.54	1.14	.98	.91	21.10

EVAPORATION IN THE RIO GRANDE BASIN

Four types of pans are used for determining evaporation in the Rio Grande basin below San Marcial, New Mexico. The results reported below are inches evaporation from such pans.

1. Circular land pan 4 feet in diameter and 10 inches deep, made of 22 gage galvanized iron, set on wooden platform on top of ground. Water in pan kept at about 7 to 8 inches depth. Measurements by micrometer hook gage. This type of pan was used at Elephant Butte, State College, Dilley and all Mexican stations.

2. Circular land pan 6 feet in diameter and 2 feet deep, made of 20 gage galvanized iron, set with top of pan 4 inches above ground. Water in pan kept at about 16 to 18 inches deep. Measurements by micrometer hook gage. This type of pan was used at Balmorhea and Weslaco.

3. Circular land pan 10 feet in diameter and 22 inches deep, set with the top edge of the pan about 1.5 inches above ground. Water in the pan is kept about 17 inches deep. Measurements by micrometer hook gage. This type of pan is used at Winterhaven.

4. Thirty-six inch square floating pan 18 inches deep kept filled to about 15 inches deep. Made of 20 gage galvanized iron with metal floats of the same material at each end. The top of the pan is kept about 3 inches above the water outside the pan. The pan floats in a metal water tank 5 feet deep and about 45 feet in diameter which is kept full within a few inches of the top. Measurement by fixed point gage in center of pan and a dipper of known volume for refilling the pan up to the gage point. This type of pan was used at Jornada, New Mexico.

An evaporometer developed by the United States Section of the International Boundary Commission and calibrated against a standard Weather Bureau pan, was used at Ysleta and Rio Grande City, Texas.

The United States Weather Bureau furnished the records for Elephant Butte, Jornada, Mesilla Park, Dilley and Balmorhea. From Texas A & M College come records for Winterhaven and Weslaco. Records for all Mexican stations are from the Meterological Service of Mexico.

In The United States

	Elephant Butte Dam, N.M.		Jornada, N. M.		State College, N. M.		Alamogordo Dam, N.M.		Ysleta, Texas	
	1939	Normal 1924–1939	1939	Normal 1929-1939	1939	Normal 1924–1939	1939		1939	
Jan.	3.51	2.86	2.96	2.91	3.67	3.03	4.32		‡ 4.50	
Feb.	4.28	4.34	3.71	4.12	4.80	4.45	3.62		⊕ 4.40	
Mar.	8.53	7.75	7.30	7.47	8.13	7.61	7.57		7.59	
April	11.35	10.36	11.32	9.98	10.07	9.66	10.60		11.54	
May	15.19	12.66	14.03	12.53	12.04	11.43	12.30		13.10	
June	17.68	14.62	16.60	13.49	14.06	12.61	16.10		16.85	
July	13.22	12.56	12.48	11.77	11.22	11.47	13.21		12.99	
Aug.	12.81	11.10	10.77	10.29	10.30	10.03	12.72		10.47	
Sept.	10.28	8.73	9.68	8.69	9.06	8.04	10.26		8.29	
Oct.	7.80	6.91	5.86	6.50	6.06	6.05	8.19		5.91	
Nov.	3.77	4.24	3.12	3.91	3.26	3.84	3.33		3.12	
Dec.	3.26	2.66	2.66	2.49	2.92	2.64	3.33		2.90	
Yearly	111.68	98.79	100.49	94.15	95.59	90.86	105.55		101.66	

	Balmorhea, Texas		Winterhaven, Texas		Dilley, Texas		Rio Grande City, Texas		Weslaco, Texas	
	1939	Normal 1926–1939	1939	Average 1931-1939	1939	Normal 1928–1939	1939		1939	Average 1932–1939
Jan.	2.54	2.59	2.11	1.89	2.50	2.64			2.49	2.44
Feb.	3.19	3.49	3.25	2.68	3.82	3.52			3.33	2.99
Mar.	4.98	5.32	5.22	4.83	6.30	5.96			4.56	4.45
April	6.10	6.44	7.18	5.77	9.04	7.28			5.38	5.42
May	7.48	7.51	6.63	6.50	8.71	8.06			6.04	5.98
June	8.61	8.15	8.32	8.08	9.70	9.60			6.45	6.84
July	6.94	7.73	9.26	8.50	12.04	10.57			8.09	6.79
Aug.	5.98	6.96	6.53	8.32	9.51	10.42	14.61		6.48	6.80
Sept.	6.20	5.43	6.54	6.19	8.79	7.48	11.47		4.92	4.49
Oct.	4.25	4.26	4.29	4.74	6.31	5.95	9.40		4.76	4.66
Nov.	1.78	2.95	2.37	3.04	3.50	3.54	5.97		3.25	3.33
Dec.	2.20	2.09	1.98	1.84	3.10	2.55	6.28		2.76	2.39
Yearly	60.25	62.92	63.68	62.38	83.32	77.57			58.51	56.58

‡ Estimated. ⊕ United States Weather Bureau.

EVAPORATION FROM FREE WATER SURFACES IN THE RIO GRANDE BASIN

continued

In Mexico

Month	San Buenaventura, Chih.		Las Cruces, Chih.				La Junta, Chih.				
	1939	Normal 1928 1939	1928	1929	1930	Average 1928-1930	1936	1937	1938	1939	Average 1936-1939
Jan.	3.49	3.80		4.29	3.53	3.91		3.63	2.84	3.13	3.20
Feb.	4.32	4.70	6.59	4.55	5.47	5.54		3.63	4.02	4.59	4.08
Mar.	6.92	7.29	9.10	7.22	6.65	7.66		6.82	7.28	7.50	7.20
Apr.	8.52	9.13	12.96	9.76	7.43	10.05	9.31	10.62	9.52	9.57	9.78
May	10.52	10.74		9.96	9.74	9.85	11.02	11.40	12.60	10.75	11.44
June	12.63	11.12		10.92	9.57	10.24	10.51	11.07	10.64	10.30	10.63
July	8.64	8.90		7.38	6.62	7.00	7.27	8.04	6.96	5.64	6.98
Aug.	7.89	7.52		5.56		5.56	5.65	7.27	6.95	5.67	6.38
Sept.	7.20	6.89	5.80	5.31		5.56	5.04	4.52	4.96	5.27	4.95
Oct.	5.92	5.99	5.17	4.83		5.00	5.41	5.15	5.30	4.03	4.97
Nov.	3.10	4.11	3.55	3.66		3.60	3.69	4.20	3.82	2.34	3.51
Dec.	2.67	3.06	3.24	3.83		3.54	2.17	2.91	3.20	2.06	2.58
Yearly	81.82	83.25		77.27		77.51		79.26	78.09	70.85	75.70

Month	Carrillo, Chih.								
	1923	1924	1925	1926	1927	1928	1929	1930	Average 1923-1930
Jan.		4.53	5.72	5.17	8.01	10.15	11.36	11.07	8.00
Feb.		5.93	7.28	6.19	7.29	8.52	10.31	9.21	7.82
Mar.		9.21	10.41	8.37	10.03	10.88	10.69	11.00	10.08
Apr.		10.05	11.09	10.65	11.75	12.39	11.15	10.39	11.07
May		10.84	12.17	12.57	12.01	11.08	11.53	11.32	11.65
June		15.55	12.82	11.31		12.37	12.53	10.82	12.57
July	13.54	14.31	14.34		9.79	11.54	12.31	9.31	12.16
Aug.	11.19	13.06		10.20	11.85	12.81	10.19		11.55
Sept.	7.46			10.73	9.76	9.93	10.26		9.63
Oct.		9.94	10.78	11.05	10.11	11.27	11.27		10.74
Nov.	3.28	7.60		8.25	10.15	11.05	9.34		8.28
Dec.		7.19		8.32	9.70	11.48	9.79		9.30
Yearly						133.47	130.73		122.85

Month	Hda. Minerva, Coah.			Palestina, Coah.						Zaragoza, Coah.		
	1934	1935	Average 1934-1935	1931	1932	1933	1934	1935	Average 1931-1939	1933	1935	Average 1933-1935
Jan.		3.63			4.21		7.31	5.81	5.58			
Feb.	3.28	3.19	3.24	3.50	3.92	3.96	5.79	5.82	4.88	2.85		
Mar.	4.39	4.50	4.44	6.55	8.62	5.56	8.58	8.93	7.83	4.89		
Apr.	4.24	3.92	4.08	5.86	10.85		10.31	10.44	9.48	5.59		
May	5.39	3.98	4.68	7.97	11.22	8.21	12.94	11.80	10.43	6.06		
June	6.27	3.83	5.05	9.40	15.02	9.38	14.20	12.43	11.58	6.00		
July	6.61			10.03	14.56	10.42	17.69	13.37	12.46	7.13		
Aug.	6.42			11.47	12.92	11.64	16.36	11.10	12.53	4.82	4.93	4.88
Sept.	5.84			11.69	5.89	11.37	10.13	9.40	9.46	3.76	4.32	4.04
Oct.	5.50			9.04	5.35	10.39	10.18		8.68	1.81	4.84	3.32
Nov.	4.30			5.41	4.40	8.68	10.41		7.27	1.46		
Dec.	3.60			3.02	2.72	7.66	8.57		5.74	1.85		
Yearly					99.68		132.47		105.92			

Month	Don Martin, Coah.		Cd. Anahuac, N. L.		Saltillo, Coah.			
	1939	Average 1927-1939	1939	Average 1933-1939	1937	1938	1939	Normal 1929-1939
Jan.	3.76	3.68	2.72	2.60	6.38	5.17	4.96	5.46
Feb.	5.63	4.79	4.44	3.59	5.33		5.41	5.30
Mar.	8.22	8.24	6.83	6.28	6.41		4.39	7.28
Apr.	10.32	9.95	8.59	7.97	10.39	10.60		9.33
May	10.28	11.30	9.11	8.98	9.18	10.96		9.46
June	12.39	13.20	10.24	11.06	10.87		7.99	10.30
July	14.33	13.47	14.06	11.22		9.34	8.23	8.84
Aug.	10.59	13.00	10.57	10.83	10.31			9.52
Sept.	9.73	9.27	9.67	7.36	5.60	7.56		7.30
Oct.	6.25	6.98	7.62	5.55	7.40	6.38		6.67
Nov.	3.31	4.58	3.56	3.50	6.43			5.47
Dec.	3.99	3.32	2.89	2.37	5.11	5.00		5.65
Yearly	98.80	101.78	90.30	81.31				90.58

DRAINAGE BASIN AND IRRIGATED AREAS

Along the Rio Grande and Tributaries—1939

The drainage basin areas tabulated below are taken from the best available sources including topographic maps. The total area within the outer rim of the Rio Grande Basin is about 335,500 square miles. But, in many places, and particularly along the southwestern side of the basin large areas yield no run-off to the Rio Grande. Such non-yielding areas constitute about 48.8% of the total area encompassed by the outer rim of the basin leaving 171,781 square miles of productive watershed.

The irrigated acreages listed below include only areas below San Marcial gaging station on the Rio Grande and below the Red Bluff Dam on the Pecos River. These figures are from the most reliable sources and are the best figures available. On the Mexican side, however, they are not the 1939 figures. On the United States side below Rio Grande City the figures are for cultivated acreages all of which has irrigation facilities, but a small part of which is farmed without irrigation in favorable seasons.

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres		
	In		Total	In		Total
	United States	Mexico		United States	Mexico	
Above San Marcial Station	24,717	0	24,717			
San Marcial to Elephant Butte Dam	1,747	0	1,747	0	0	0
Above Elephant Butte Dam	26,464	0	26,464			
Elephant Butte Dam to Caballo Dam	1,290	0	1,290	84	0	84
Above Caballo Dam	27,754	0	27,754	84	0	84
Caballo Dam to El Paso	1,513	0	1,513	88,675	0	88,675
Above El Paso Station	29,267	0	29,267	88,759	0	88,759
El Paso to American Dam	4	0	4	0	0	0
Above American Dam	29,271	0	29,271	88,759	0	88,759
American Dam to Juarez	41	47	88			
Above Juarez Station	29,312	47	29,359			
Juarez to Island	146	472	618			
Above Island Station	29,458	519	29,977			
Island to County Line	485	186	671			
Above County Line Station	29,943	705	30,648			
Guayuco Arroyo, above U. S. 80 Highway Bridge	164	0	164			
County Line to Ft. Quitman, excluding Guayuco Arroyo	499	679	1,178			
County Line to Ft. Quitman, including Guayuco Arroyo	663	679	1,342			
El Paso Station to Ft. Quitman Station, total	1,339	1,384	2,723	65,166	46,178	111,344
Above Ft. Quitman Station	30,606	1,384	31,990	153,925	46,178	200,103
Quitman Arroyo (I.B.C. name) above measuring point near its mouth	36	0	36			
Quitman Arroyo (I.B.C. name) above rocky canyon	18	0	18			
Red Light Arroyo (I.B.C. name) (Quitman Arroyo on U.S.G.S. Maps) above measuring point near its mouth	260	0	260			
Van Horn Creek, above measuring point near its mouth	117	0	117			
Ft. Quitman to La Nutria, excluding Quitman Arroyo, Red Light Arroyo, and Van Horn Creek	628	886	1,514			
Ft. Quitman to La Nutria, total	1,041	886	1,927	1,329	5,508	6,837
Above La Nutria Station	31,647	2,270	33,917	155,254	51,686	206,940
Capote Creek, above measuring point near its mouth	93	0	93			
La Nutria to Upper Presidio, total	580	503	1,083	3,233	7,063	10,296
Above Upper Presidio Station	32,227	2,773	35,000	158,487	58,749	217,236
Rio Conchos, above Boquilla Dam	0	7,322	7,322			
Rio Conchos, below Boquilla Dam, excluding area above Boquilla Dam	0	17,419	17,419			
Rio Conchos, total	0	24,741	24,741	0	118,600	118,600
Upper to Lower Presidio, excluding Rio Conchos	21	5	26	1,258	0	1,258
Upper Presidio to Lower Presidio, total	21	24,746	24,767	1,258	118,600	119,858
Above Lower Presidio Station	32,248	27,519	59,767	159,745	177,349	337,094
Alamito Creek, above gaging station	1,504	0	1,504	1,065	0	1,065
Terlingua Creek, above gaging station	1,070	0	1,070	610	0	610
Lower Presidio to Johnson Ranch, excluding Alamito and Terlingua	1,439	2,671	4,110			
Lower Presidio to Johnson Ranch, total	4,013	2,671	6,684	5,833	1,754	7,587
Above Johnson Ranch Station	36,261	30,190	66,451	165,578	179,103	344,681
Johnson Ranch to Boquillas	471	3,735	4,206	520	0	520
Above Boquillas Station	36,732	33,925	70,657	166,098	179,103	345,201
Maravillas Creek, above proposed gaging station	2,192	0	2,192	0	0	0
Lozier Creek, above gaging station	1,728	0	1,728	0	0	0
Boquillas to Langtry, excluding Maravillas and Lozier	2,125	2,595	4,720	0	0	0
Boquillas to Langtry, total	6,045	2,595	8,640	0	0	0
Johnson Ranch to Langtry, excluding Maravillas and Lozier	2,596	6,330	8,926			
Johnson Ranch to Langtry, total	6,516	6,330	12,846			
Above Langtry Station	42,777	36,520	79,297	166,098	179,103	345,201

DRAINAGE BASIN AND IRRIGATED AREAS

—continued—

Along the Rio Grande and Tributaries—1939

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres		
	In		Total	In		Total
	United States	Mexico		United States	Mexico	
Pecos River, above Red Bluff Dam	20,699	0	20,699			
Pecos River, Red Bluff Dam to I.B.C. gaging station	14,544	0	14,544			
Pecos River, above I.B.C. gaging station	35,243	0	35,243	52,040	0	52,040
Goodenough Spring, above gaging station	1	0	1	0	0	0
Devils River, above Juno gaging station	2,733	0	2,733	0	0	0
Devils River, below gaging station near Juno to I.B.C. gaging station	1,327	0	1,327	0	0	0
Devils River, above I.B.C. gaging station	4,060	0	4,060	0	0	0
Cienegas Creek, above gaging station	18	0	18	0	0	0
Langtry to Del Rio, excluding above tributaries	398	2,495	2,893	420	0	420
Langtry to Del Rio, total	39,720	2,495	42,215	52,460	0	52,460
Above Del Rio Station	82,497	39,015	121,512	218,558	179,103	397,661
Las Vacas Arroyo, above gaging station	0	146	146	0	620	620
San Felipe Creek, above gaging station	62	0	62	1,059	0	1,059
Sycamore Creek, above gaging station	524	0	524	150	0	150
Pinto Creek, above gaging station	229	0	229	100	0	100
Rio San Diego, above gaging station	0	931	931	0	18,600	18,600
Las Moras Creek, above gaging station	162	0	162	684	0	684
Rio San Rodrigo, above gaging station	0	586	586	0	6,400	6,400
Del Rio to Eagle Pass, excluding above tributaries	527	581	1,108	12,308	6,095	18,403
Del Rio to Eagle Pass, total	1,504	2,244	3,748	14,301	31,715	46,016
Above Eagle Pass Station	84,001	41,259	125,260	232,859	210,818	443,677
Rio Escondido, above gaging station	0	1,130	1,130	0	2,800	2,800
Arroyo Amole, total	0	482	482	0	0	0
Eagle Pass to El Jardin, excluding above tributaries	736	1,191	1,927	2,520	250	2,770
Eagle Pass to El Jardin, total	736	2,803	3,539	2,520	3,050	5,570
Above El Jardin Dam Site	84,737	44,062	128,799	235,379	213,868	449,247
Santa Isabella Arroyo, above river road	350	0	350	0	0	0
El Jardin to Laredo, excluding Santa Isabella	387	1,079	1,466	3,123	650	3,773
El Jardin to Laredo, total	737	1,079	1,816	3,123	650	3,773
Eagle Pass to Laredo, excluding above tributaries	1,123	2,270	3,393	5,643	900	6,543
Eagle Pass to Laredo, total	1,473	3,882	5,355	5,643	3,700	9,343
Above Laredo Station	85,474	45,141	130,615	238,502	214,518	453,020
Dolores Creek, above gaging station	606	0	606	0	0	0
Rio Salado, above Don Martin Dam	0	13,819	13,819			
Rio Salado, below Don Martin Dam	0	7,709	7,709			
Rio Salado, above gaging station	0	21,528	21,528	0	15,000	15,000
Laredo to Zapata, excluding above tributaries	491	942	1,433	3,344	1,210	4,554
Laredo to Zapata, including Dolores and excluding Salado	1,097	942	2,039	3,344	1,210	4,554
Laredo to Zapata, total	1,097	22,470	23,567	3,344	16,210	19,554
Above Zapata Station	86,571	67,611	154,182	241,846	230,728	472,574
El Tigre Arroyo, above gaging station	261	0	261	0	0	0
Rio Alamo, above gaging station	0	1,675	1,675	0	10,300	10,300
Zapata to Roma, excluding above tributaries	771	315	1,086	713	0	713
Zapata to Roma, including El Tigre and excluding Alamo	1,032	315	1,347	713	0	713
Zapata to Roma, total	1,032	1,990	3,022	713	10,300	11,013
Above Roma Station	87,603	69,601	157,204	242,559	241,028	483,587
Rio San Juan, above gaging station at Santa Rosalia	0	12,013	12,013	0	200,070	200,070
Los Olmos Creek, above gaging station	535	0	535	0	0	0
Roma to Rio Grande City, excluding above tributaries	143	847	990	74	0	74
Roma to Rio Grande City, including Los Olmos and excluding San Juan	678	847	1,525	74	0	74
Roma to Rio Grande City, total	678	12,860	13,538	74	200,070	200,144
Above Rio Grande City Station	88,281	82,461	170,742	242,633	441,098	683,731
Rio Grande City to Hidalgo	553	430	983			
Above Hidalgo Station	88,834	82,891	171,725			
Hidalgo to Mercedes Bridge Station	15	15	30			
Above Mercedes Bridge Station	88,849	82,906	171,755			
Mercedes Bridge to Matamoros Station	11	11	22			
Above Matamoros Station	88,860	82,917	171,777			
Matamoros to Lower Brownsville Station	2	2	4			
Rio Grande City to Lower Brownsville Station	581	458	1,039	‡425,258	5,000	430,258
Above Lower Brownsville Station	88,862	82,919	171,781	667,891	446,098	1,113,989

‡ Cultivated acres, see heading on preceding page.

AUTHENTICATED DISCHARGES AND RELATED RECORDS

In the four following pages there have been brought together references to all Water Bulletins in which have been published authenticated discharge records or other records related thereto. These records are assembled under subject headings. When used in connection with these tabulations the index on pages 96 to 100 inclusive, gives ready reference to all matter reported in the Water Bulletins.

The authenticated discharge table below covers all of the years or record for San Marcial and El Paso gaging stations. For stations below El Paso the table covers only the years of record within the two periods: 1900 to 1913 and 1924 to 1939.

AUTHENTICATED DISCHARGE RECORDS

Name of Gaging Station	Records Within The Period	Where Published
San Marcial	1895 - 1923	W.B. 7; W.S.P. 358, 388, 408, 438, 458, 478, 508, 528, 628
	1924 - 1930	W.B. 6; W.S.P. 628, 688, 703, 718
	1931, 1932* - 1939	W.B. 1 thru 6* thru 9
Below Elephant Butte Dam	1938 and 1939	W. B. 8, 9
Below Caballo Dam	1938 and 1939	W. B. 8, 9
El Paso	1889 - 1923	W.B. 7; W.S.P. 358, 388, 408, 568, 588
	1924 - 1928*-1930	W.B. 6*; W.S.P.588, 608, 628, 648, 668e, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Below American Dam	June 1938 - 1939	W. B. 8, 9
El Paso Sewage Outfall	1936 - 1939	W. B. 8, 9
Cd. Juarez	Apr. 1938 - 1939	W. B. 8, 9
Island	Aug. 1938 - 1939	W. B. 8, 9
Tornillo Bridge	1924 - 1930	W. B. 5, 6; W.S.P. 668, 688, 703, 718
	1931 - 1937	W. B. 1 thru 7
County Line	1938 and 1939	W. B. 8, 9
Ft. Quitman	1924 - 1930	W.B. 6; W.S.P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
La Nutria	June 1935 - 1939	W. B. 5 thru 9
Upper Presidio	1900 ‡ 1913	W. B. 7*
	1924 - 1926*-1930	W. B. 3, 4*, 6; W.S.P.588, 608, 628
	1927* and 1932*	W. B. 9*
	1931 - 1933*-1939	W. B. 1 thru 4* thru 9
Rio Conchos	1900 - 1913	W. B. 7
	1924 ‡ 1932	W. B. 6, 7*
	1933 - 1939	W. B. 5 thru 9
Lower Presidio	1900 ‡ 1913	W. B. 7*
	1924 ‡ 1932‡	W. B. 6*. 7*
	1933 - 1939	W. B. 3 thru 9
Alamito Creek	1932 - 1939	W. B. 2 thru 9
Terlingua Creek	1932 - 1936	W. B. 2 thru 6
	1937*	W. B. 7, 8*
	1938 and 1939	W. B. 8, 9
Johnson Ranch	Apr. 1936 - 1939	W. B. 6 thru 9
Boquillas	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 6; W.S.P. 688, 703, 718
	1931 - Apr. 1936	W. B. 1 thru 6
Lozier Creek	1932 - 1935	W. B. 2 thru 6
Langtry	1900 ‡ 1913	W. B. 7*, 9*
	1924* - 1927	W. B. 4*, 6
	1928 - 1930	W. B. 6; W.S.P. 668, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Pecos River	1900 - 1913	W. B. 7
	1924 - 1930	W. B. 6; W.S.P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Goodenough Springs	1924 - 1929	W. B. 5, 6
	Feb. 1929 - 1930	W. B. 6; W.S.P. 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Devils River	1900 - 1913	W. B. 7
	1924 - 1930	W. B. 6; W.S.P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1932*	W. B. 1, 2, 5*, 6
	1933* - 1934*	W. B. 3, 4, 5*, 6
	1935 - 1939	W. B. 5 thru 9

W. S. P. - Water Supply Paper of the U. S. Geological Survey. ‡ Station moved June, 1932.
W. B. - Water Bulletins of this Commission. * Partly revised in Water Bulletin marked thus *.
e - The monthly totals for the year 1928 are slightly revised on page 46, Water Bulletin No. 6.

AUTHENTICATED DISCHARGES AND RELATED RECORDS—continued

AUTHENTICATED DISCHARGE RECORDS—continued

Name of Gaging Station	Records Within The Period	Where Published
Cienegas Creek	Sept. 1931 - June 1935	W. B. 1 thru 6
Del Rio	1900 * 1913	W. B. 7*
	1924*	W. B. 4*, 6; W.S.P. 588, 608
	1925 - 1930	W.B. 6; W.S.P. 608, 628, 648, 668, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Arroyo Las Vacas	Partial Records June 1935 - Mar. 1938	W. B. 6, 7, 8
	Apr.1938-Dec.1939	W. B. 8, 9
San Felipe Creek	Sept. 1931 - 1939	W. B. 1 thru 9
Sycamore Creek	1932 - May 1935	W. B. 2 thru 6
Pinto Creek	Nov. 1928 - 1930	W.B. 6; W.S.P. 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Rio San Diego	Oct. 1932 - 1939	W. B. 2 thru 9
Las Moras Creek	1932 - 1934*	W. B. 2 thru 5*, 6
	1935	W. B. 5, 6
Rio San Rodrigo	1932 - 1939	W. B. 2 thru 9
Eagle Pass	1900 * 1913	W. B. 7*
	1924* - 1926	W. B. 4*, 6
	1927 - 1930	W.B. 6; W.S.P. 648, 668, 688, 703, 718
	1931 - 1939	W. B. 1 thru 9
Rio Escondido	1932 - 1939	W. B. 2 thru 9
Laredo	1900 * 1913	W. B. 7*
	1924 - 1925*	W. B. 4*, 6
	1926*	W. B. 4, 5*, 6
	1927 - 1928	W. B. 4, 6
	1929 - 1930	W. B. 3, 6
	Sept. 1934*	W. B. 9*
	1931 - 1939	W. B. 1 thru 9
Dolores Creek	1932 - May 1936	W. B. 2 thru 6
Rio Salado	1900 - 1913	W. B. 7
	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1939	W. B. 1 thru 9
Zapata	1932 - 1939	W. B. 2 thru 9
El Tigre Creek	1932 - Apr. 1936	W. B. 2 thru 6
Rio Alamo	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1939	W. B. 1 thru 9
Roma	1900 * 1913	W. B. 7*
	1924 - 1929	W. B. 5, 6
	Mar. 1929 - 1930	W.B.6; W.S.P. 688, 703, 718
	1931	W. B. 1, 6
	1932*	W. B. 2, 3*, 6
	1933 - 1939	W. B. 3 thru 9
Rio San Juan	Oct. 1900 - 1913	W. B. 7
	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931, 1932* - 1939	W. B. 1 thru 8*, 9
Los Olmos Creek	1932 - Mar. 1936	W. B. 2 thru 6
Rio Grande City	1924 - 1931	W. B. 5, 6
	1932* - 1939	W. B. 2 thru 8*, 9
N. Floodway	1932 - 1939	W. B. 2, 3, 5, 8
S. Floodway	1932 - 1939	W. B. 2, 3, 5, 8
Hidalgo	July 1928 - 1930	W.B. 6; W.S.P. 668, 688, 703, 718
	1931	W. B. 1, 6
	Partial Records 1932 - 1936	W. B. 2 thru 6
	May 1938 - Nov. 1939	W. B. 8, 9
Retamal ⊕	1939	W. B. 9
Mercedes Bridge	Sept. 1932 - Oct. 1932	W. B. 2
	Partial Records 1935 - 1936	W. B. 5, 6
	Nov. 1937 - Dec. 1937	W. B. 7
	Partial Records 1938 and 1939	W. B. 8, 9
Rancho Viejo Floodway	1935 - 1939	W. B. 5, 6, 8, 9
Matamoros	1900 - 1913	W. B. 7
	1924 - Sept. 1926	W.B. 6; W.S.P. 588, 608, 628
	Oct. 1926 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1939	W. B. 1 thru 9
Lower Brownsville	1934 - 1939	W. B. 4 thru 9

W. B. - Water Bulletins of this Commission.
W.S.P. - Water Supply Papers of the U. S. Geological Survey.
* Partly revised in Water Bulletins marked thus *. ⊕ Retamal Canal is sometimes used as a floodway.

AUTHENTICATED DISCHARGES AND RELATED RECORDS—continued

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN		
Reservoirs	**Records Within The Period**	**Published In Water Bulletins**
All Reservoirs	1908-1937	4,7
ON THE UNITED STATES SIDE		
El Vado	1935-1939	5,6,7,8,9
Elephant Butte	1924-1939	2 thru 9
Caballo	1938-1939	8,9
Alamogordo	1937-1939	7,8,9
McMillan and Avalon	1924-1939	2 thru 9
Red Bluff	1936-1939	6,7,8,9
ON THE MEXICAN SIDE		
Boquilla	1924-1939	2 thru 9
Centenario & San Miguel	1934-1938	6,7,8
Don Martin	1930-1939	2 thru 9

DIVERSIONS FROM THE RIO GRANDE		
Diversions Into	**Records Within The Period**	**Published In Water Bulletins**
TO THE UNITED STATES		
American Canal at El Paso, Texas	1938 & 1939	8,9
El Paso Valley of Texas	1938 & 1939	8,9
Maverick Irrigation District Canal, Above Power Plant	1939	9
Maverick Irrigation District Canal, Below Power Plant	1939	9
Hidalgo, Cameron & Willacy Counties, Texas	1922-1939	7,8,9
TO MEXICO		
Acequia Madre (Mexican Canal)near Juarez, Chih.	1938 & 1939	8,9
Retamal Canal	1939	9

SOURCES OF RIVER FLOW		
Drainage Basin Areas	**Records Within The Period**	**Published In Water Bulletins**
Basin Sub-divisions astride the Rio Grande	1900 to 1939	6,7,8,9
Basin Sub-divisions on the United States side	1900 to 1939	6,7,8,9
Basin Sub-divisions on the Mexican side	1900 to 1939	6,7,8,9

SILT SAMPLING OF THE RIO GRANDE AND TRIBUTARIES		
Sampling Points	**Records Within The Period**	**Published In Water Bulletins**
ON THE RIO GRANDE		
San Marcial, New Mexico	1925-1939	2 thru 9
Elephant Butte Reservoir	1916-1935	7
El Paso, Texas	1923-1932	1,2
Fort Quitman, Texas	1923-1932	1,2
Upper Presidio Station	1924-1926	1
Lower Presidio Station	1924-1926	1
Boquillas, Texas	1928-1930	1
Eagle Pass, Texas	1934-1939	4 thru 9
Laredo, Texas	1924-1931	1
Roma, Texas	‡1924-1939	1 thru 9
Matamoros, Tamps.	1924-1926	1
MEXICAN TRIBUTARIES		
Rio Alamo at Mier, Tamps.	1934 -1939	4 thru 9
Rio San Juan at Santa Rosalia, Tamps.	1934 -1939	4 thru 9

‡ Revised in Water Bulletin No. 9

CHEMICAL ANALYSES, SALT CONTENT AND ELECTRICAL CONDUCTANCE OF WATER SAMPLES		
Sampling Points	**Records Within The Period**	**Published In Water Bulletins**
ON THE RIO GRANDE		
San Marcial Station	1924 to 1939	1 thru 9
Below Caballo Dam	1939	9
Leasburg Dam	1939	9
El Paso Station	1924 to 1939	1 thru 9
Fabens, Texas	1929 to 1933	1,2,3
County Line Station	1938	8
Fort Quitman Station	1927 to 1939	1 thru 9
La Nutria Station	1936 to 1939	6 thru 9
Upper Presidio Station	1931 to 1939	1,5,6,7,8,9
Lower Presidio Station	1935 to 1939	5,8,9
Boquillas Station	1930	1
Langtry Station	1930	1
Eagle Pass Station	1930 to 1939	1,8,9
Nuevo Laredo, Tamps.	1932 to 1939	2 thru 9
Roma Station	1930 to 1933	1,2,3
Rio Grande City	1933 to 1939	3 thru 9
Hidalgo Bridge Station	1939	9
Lower Brownsville Station	1934 to 1939	4,5,6,7,9
ON THE UNITED STATES SIDE		
Alamito Creek Station	1935 to 1936	5,6
Terlingua Creek Station	1935	5
Pecos River Station	1930 to 1939	1,5,6,7,8,9
Pecos River at Shumla Bend, Texas	1932	2
Springs on Rio Grande near Shumla Bend, Texas	1932	2
Devils River Station	1930 to 1936	1,5,6
Some Springs on Devils and Pecos Rivers and San Felipe Creek	1933	3
Springs and Wells near El Jardin Dam Site, 61 River Miles Below Eagle Pass	1936	6
ON THE MEXICAN SIDE		
Rio Conchos near Ojinaga, Chih.	1935 to 1939	5 thru 9
Rio San Rodrigo Station	1935 to 1936	5,6
Rio San Diego Station	1935 to 1936	5,6
Rio Salado Station	1935 to 1939	5 thru 9
Rio San Juan Station	1935 to 1939	5 thru 9
Various Springs in Region West of Piedras Negras, Coah.	1933	3
Springs and Wells near El Jardin Dam Site, 61 River Miles Below Piedras Negras, Coah.	1936	6

SANITARY ASSAYS OF RIO GRANDE WATER SAMPLES.		
Sampling Points	**Records Within The Period**	**Published In Water Bulletins**
El Paso, Texas & Vicinity	1935-1939	6,7,8,9
Nuevo Laredo, Tamps.	1932-1939	2 thru 9

FLOOD OCCURRENCES ON THE RIO GRANDE AND TRIBUTARIES		
Measuring Points	**Records Within The Period**	**Published In Water Bulletins**
Rio Grande at San Marcial	1828-1939	6,7,8,9
El Paso, Texas	1828-1939	6,7,8,9
Fort Quitman, Texas	1828-1939	8,9
Box Canyon, Texas	1828-1939	8,9
Van Horn Arroyo at Mouth	? -1938	8
Rio Grande at La Nutria at Upper Presidio	? -1939	8,9
Rio Conchos at Boquilla	1900-1939	8,9
Rio Grande at Lower Presidio	1829-1939	2,8
Lozier Creek Station	1829-1939	2,8,9
Rio Grande at Langtry	1899-1939	2,5,9
Pecos River near Comstock	1899-1939	2,5,9
Devils River near Del Rio	1899-1939	2,5,9
	1830-1939	2,5,8,9

AUTHENTICATED DISCHARGES AND RELATED RECORDS—continued

EVAPORATION RECORDS

IN THE UNITED STATES			IN MEXICO		
Stations	Records Within The Period	Published In Water Bulletins	Stations	Records Within The Period	Published In Water Bulletins
Santa Fe, New Mexico	1924-1933	3	San Buenaventura, Chih.	1928-1939	6, 7, 8 & 9
Alamogordo Dam, New Mexico	1939	9	Las Cruces, Chih.	1928-1930	9
Elephant Butte Dam, New Mexico	1924-1939	3,4,6,7,8 & 9	La Junta, Chih.	1936-1939	9
Jornada, New Mexico	1929-1939	6,7,8 & 9	Carrillo, Chih.	1923-1930	9
State College or			Hda. Minerva, Coah.	1934-1935	9
Mesilla Park, New Mexico	1924-1939	3,4,6,7,8 & 9	Palestina, Coah.	1931-1939	6, 7, 8 & 9
American Dam, Texas	1938	8	Zaragoza, Coah.	1933-1935	9
Yaleta, Texas	1939	9	El Nogal, Coah.	1935-1937	6 & 7
Balmorhea, Texas	1926-1939	3,4,6,7,8 & 9	Don Martin, Nuevo Leon	1927-1939	3, 4, 6, 7, 8 & 9
Winterhaven, Texas	1931-1939	3,4,6,7,8 & 9	Cd. Anahuac, Nuevo Leon	1933-1939	6, 7, 8 & 9
Dilley, Texas	1928-1939	3,4,6,7,8 & 9	Saltillo, Coah.	1929-1939	3, 4, 6 & 9
Rio Grande City, Texas	1939	9	Monterrey, Nuevo Leon	1924-1935	3, 4 & 6
Weslaco, Texas	1932-1939	3,4,6,7,8 & 9	Santa Rosalia, Tamps.	1924-1937	6 & 7
			Linares, Nuevo Leon	1935-1938	6, 7 & 8

PRECIPITATION RECORDS

Stations	Location			Records Within The Period	Published In Water Bulletins
	Latitude	Longitude	Elevation		
ON THE UNITED STATES SIDE OF THE RIO GRANDE WATERSHED					
American Dam near El Paso, Texas	31° 47'	106° 32'	3,730	1938 and 1939	8 & 9
Fort Bliss, Texas	31° 49'	106° 25'	3,890	1924 to 1939	6, 7, 8 & 9
Island Station, Texas	31° 32'	106° 14'	3,630	1939	9
County Line Station, Texas	31° 23'	105° 59'	3,550	1938 and 1939	8 & 9
Fort Quitman, Texas	31° 06'	105° 37'	3,450	1937 to 1939	7, 8 & 9
Candelaria, Texas	30° 08'	104° 41'	2,850	1935 to 1939	6, 7, 8 & 9
Marfa, Texas	30° 19'	104° 01'	4,670	1928 to 1939	6, 7, 8 & 9
Crosson Ranch, Texas	30° 03'	103° 41'	4,750	1933 to 1939	8 & 9
Terlingua, Texas	29° 19'	103° 37'	2,900	1936 and 1937	9
Johnson Ranch, Texas	29° 01'	103° 23'	2,050	1933 to 1939	6, 7, 8 & 9
Big Bend State Park, Texas	29° 16'	103° 18'	5,150	1936 to 1939	8 & 9
Dryden, Texas	30° 03'	102° 07'	2,140	1931 to 1939	6, 7, 8 & 9
Pecos River Station, Texas	29° 45'	101° 21'	1,060	1938 and 1939	8 & 9
Comstock, Texas	29° 41'	101° 11'	1,525	1939	9
Devils Lake, Texas	29° 34'	100° 59'	1,080	1939	9
Zapata, Texas	26° 53'	99° 20'	270	1932 to 1939	6, 7, 8 & 9
ON THE MEXICAN SIDE OF THE RIO GRANDE WATERSHED					
Ciudad Juarez, Chihuahua	31° 44'	106° 29'	3,753	‡ 1903 to 1939	7, 8 & 9
Villa Gonzalez, Chihuahua	30° 37'	106° 31'	3,875	‡ 1903 to 1939	7, 8 & 9
San Luis, Chihuahua	28° 46'	106° 18'	5,577	1928 to 1937	7
Chihuahua, Chihuahua	28° 38'	106° 04'	4,692	‡ 1900 to 1939	7, 8 & 9
Hormiguero, Chihuahua	27° 00'	105° 42'	5,905	1938	8
Delicias, Chihuahua	28° 11'	105° 31'	3,707	‡ 1933 to 1939	7, 8 & 9
Ojinaga, Chihuahua	29° 33'	104° 26'	2,625	1906 to 1930	9
El Mulato, Chihuahua	29° 23'	104° 10'	2,625	‡ 1926 to 1939	7, 8 & 9
Palestina, Coahuila	29° 09'	100° 59'	1,080	1938	8
Piedras Negras, Coahuila	28° 41'	100° 31'	722	‡ 1907 to 1937	7 & 9
Nueva Rosita, Coahuila	28° 09'	100° 53'	1,392	1925 to 1939	7, 8 & 9
Nuevo Laredo, Tamaulipas	27° 30'	99° 30'	561	‡ 1909 to 1939	7, 8 & 9
La Mariposa, Coahuila	28° 09'	101° 45'	3,675	1900 to 1938	7, 8 & 9
Muzquiz, Coahuila	27° 53'	101° 31'	1,654	1923 to 1939	7, 8 & 9
Don Martin, Coahuila	27° 32'	100° 37'	794	1927 to 1939	7, 8 & 9
Anahuac, Nuevo Leon	27° 15'	100° 08'	650	1933 to 1939	8 & 9
Monclova, Coahuila	26° 54'	101° 25'	1,923	1897 to 1939	7, 8 & 9
Saltillo, Coahuila	25° 26'	101° 00'	5,246	‡ 1900 to 1939	7 & 9
Ramos Arizpe, Coahuila	25° 33'	100° 57'	4,593	1907 to 1939	7, 8 & 9
Santa Catarina, Nuevo Leon	25° 41'	100° 26'	1,968	1937 to 1939	9
Monterrey, Nuevo Leon	25° 40'	100° 18'	1,752	1896 to 1939	7, 8 & 9
Higueras, Nuevo Leon	25° 58'	100° 01'	1,640	1906 to 1939	7, 8 & 9
Villa de Santiago, Nuevo Leon	25° 26'	100° 08'	1,460	‡ 1923 to 1939	7, 8 & 9
Cadereyta, Nuevo Leon	25° 35'	99° 59'	1,181	‡ 1904 to 1938	7, 8 & 9
Las Enramadas, Nuevo Leon	25° 29'	99° 31'	732	1926 to 1939	7, 8 & 9
Rayones, Nuevo Leon	25° 02'	100° 05'	1,968	1926 to 1939	7, 8 & 9
Montemorelos, Nuevo Leon	25° 12'	99° 50'	1,417	‡ 1904 to 1939	7, 8 & 9
La Tableta, Nuevo Leon	25° 51'	99° 26'	820	1939	9
Mendez, Tamaulipas	25° 07'	98° 35'	420	1939	9
Topo Chico, Nuevo Leon	25° 49'	100° 20'	1,640	1939	9
Los Ramones, Nuevo Leon	25° 42'	99° 13'	272	1939	9
Cienega de Flores, Nuevo Leon	25° 58'	100° 10'	1,765	1938 and 1939	9
El Cuchillo, Nuevo Leon	25° 43'	99° 16'	591	1938 and 1939	9
Gral. Bravo, Nuevo Leon	25° 48'	99° 11'	394	1906 to 1938	7, 8 & 9
Allende, Nuevo Leon	25° 17'	100° 01'	2,211	1938 and 1939	9
Cerralvo, Nuevo Leon	26° 06'	99° 37'	1,132	1938 and 1939	9
San Pedro, Nuevo Leon	25° 24'	100° 07'	3,281	1939	9
Cuesta de los Fierros, Nuevo Leon	25° 32'	100° 42'	6,890	1939	9
Zaragoza, Nuevo Leon	23° 58'	99° 48'	4,921	1938	8
Campamento Comales, Tamaulipas	26° 14'	98° 54'	250	1938 and 1939	9
Villagran, Tamaulipas	24° 29'	99° 29'	1,263	1939	9
Santa Rosalia, Tamaulipas	26° 09'	99° 00'	260	‡ 1924 to 1938	7 & 9
Matamoros, Tamaulipas	25° 53'	97° 31'	33	1913 to 1938	7 & 8

‡ Revised in Water Bulletin No. 9.

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