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WATER BULLETIN NUMBER 6

Flow of the Rio Grande and Tributary Contributions

From San Marcial, New Mexico to the Gulf of Mexico

1936

RECAPITULATED FLOW RECORDS AND NORMALS
AUTHENTICATED DISCHARGE RECORDS
1924 — 1936

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN
AND NORMALS 1924 — 1936

RUN-OFFS PER SQUARE MILE AND RELATIONS TO RAINFALL
1924 — 1935

SILT, CHEMICAL CONSTITUENTS, BACTERIA AND DISSOLVED OXYGEN
THE RIO GRANDE SALT BURDEN

FLOODS AT SAN MARCIAL AND EL PASO SINCE 1828
RATES OF FLOOD CREST TRAVEL BELOW FORT QUITMAN

EVAPORATION AND RAINFALL

CONTENTS

Page

Map of Rio Grande Basin 3

Foreword . . . . . 4 - 5

QUANTITY OF WATER

Stream Flow Records - 1936
Rio Grande at San Marcial Station 6
By-Pass Seepage at San Marcial Station 7
at El Paso Station 8
Tornillo Bridge Station 9
Fort Quitman Station 10
La Nutria Station 11
Upper Presidio Station 12
Lower Presidio Station 13
tributary - Alamito Creek Station 14
Terlingua Creek Station 15
at Johnson Ranch Station 16
Boquillas Station 17
Langtry Station 18
tributary - Pecos River Station 19
Goodenough Spring Station 20
Devils River Station 21
at Del Rio Station 22
tributary - San Felipe Creek Station 23
Pinto Creek Station 24
Rio San Diego Station 25
Rio San Rodrigo Station 26
at Eagle Pass Station 27
tributary - Rio Escondido Station 28
at Laredo Station 29
tributary - Dolores Creek Station 30
Rio Salado Station 31
at Zapata Station 32
tributary - El Tigre Arroyo Station 33
Rio Alamo Station 34
at Roma Station 35
tributary - Rio San Juan Station 36
Los Olmos Creek Station 37
at Rio Grande City Station 38
Hidalgo Station 39
Mercedes Bridge Station 40
Floodway Station - Rancho Viejo near Brownsville, Texas 41
at Matamoros Station 42
Lower Brownsville Station 43
tributary - Rio Conchos 44
Las Vacas 44

Stored Water In Large Reservoirs Of The Rio Grande Basin - 1936 and normals 45

Recapitulated Monthly and Annual Discharges with Normals - 1924 to 1935, inclusive . . . . . 46 to 61

Authenticated Discharge Records - 1924 to 1936, inclusive . . . . . 61 & 62

SOURCES OF RIVER FLOW

General Statement 63

Maps Showing Sources of River Flow . . . . . 63 - 65

QUALITY OF WATER

Silt Sampling for 1936 at San Marcial Station 66
Eagle Pass Station 67
Rio Alamo Station 68
Rio San Juan Station 68
Roma Station 69
Comparative Rio Grande Silt Burdens - 1924 to 1936 70

CONTENTS—continued

Page

Chemical Analyses of Water Samples from Rio Grande and Tributaries - 1936
Analyses Showing Monthly Salt Burden:
Rio Grande at San Marcial Station 71
El Paso Station 71
Fort Quitman Station 72
Rio Grande City Station 72
Lower Brownsville Station 72
Other Analyses:
Rio Grande at La Nutria Station 73
Upper Presidio Station 73
tributary - Rio Conchos 73
Alamito Creek Station 73
Pecos River Station 74
Devils River Station 74
Rio San Diego Station 74
Rio San Rodrigo Station 74
Rio Salado Station 74
Rio San Juan Station 74
Springs and Wells in the Region 61 Miles below Eagle Pass 75
Rio Grande Salt Burden, its Source and Concentration 76

Bacteriological Examinations of Rio Grande Water
Also Dissolved Oxygen in the River Flow near El Paso, Texas 77
Also Hardness and Alkalinity in the River Flow at Nuevo Laredo, Tamaulipas 78

FLOODS

Occurrence of Flood Peaks on the Rio Grande in the Past 108 years.
At San Marcial, New Mexico, and El Paso, Texas . . . . . 79 to 81

Approximate Travel Time of Flood Crests
From Fort Quitman to La Nutria 82
La Nutria to Upper Presidio 83
Lower Presidio to Johnson Ranch 83
Johnson Ranch to Langtry 84
Langtry to Del Rio 85
Del Rio to Eagle Pass 86
Eagle Pass to Laredo 87
Laredo to Zapata 88
Zapata to Roma 89
Roma to Rio Grande City 90
Aldamas to Santa Rosalia 91
Santa Rosalia to Rio Grande City 92
Rio Grande City to Hidalgo 93

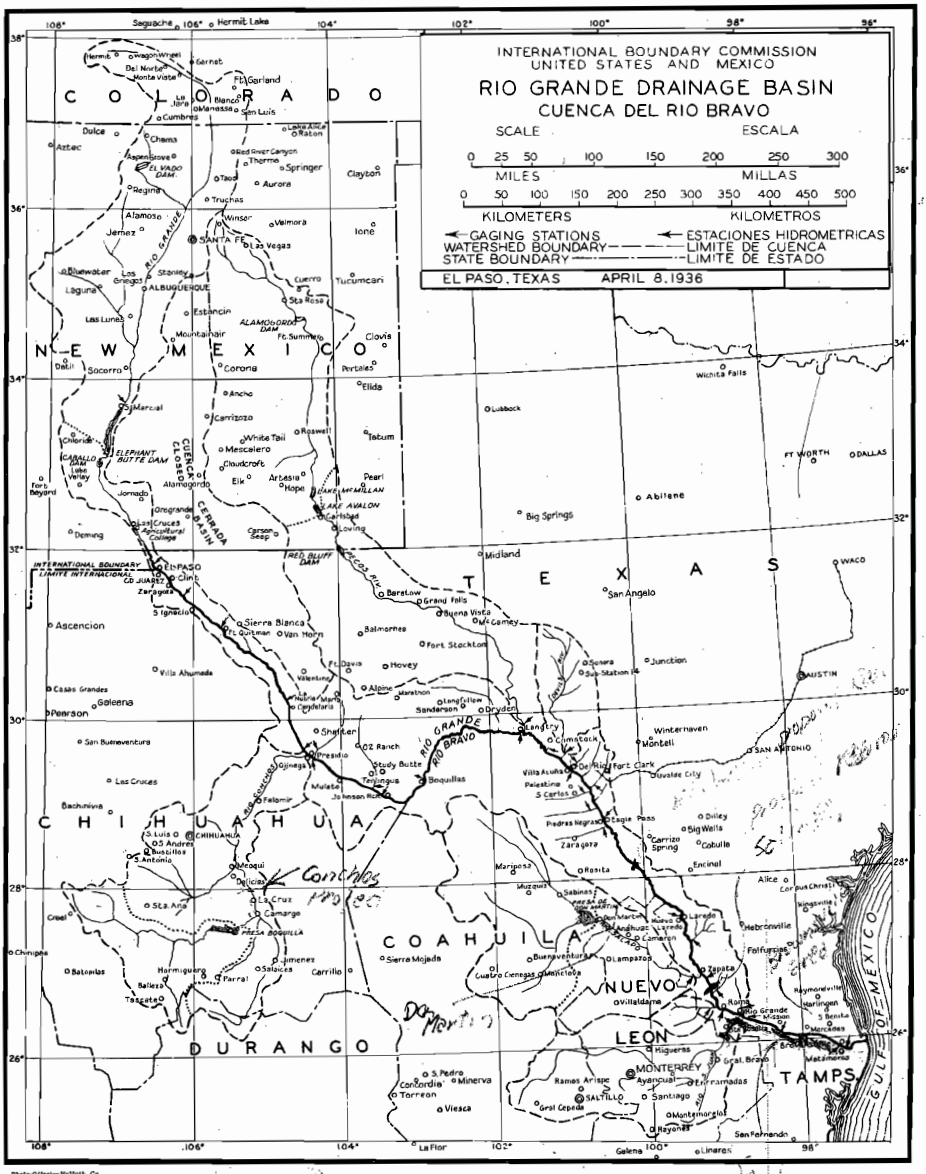
Flattening of Rio Grande Flood Peaks . . . . . 93 & 94

EVAPORATION

Evaporation From Free Water Surfaces in the Rio Grande Basin
Monthlys and Annuals With Normals for 16 Stations . . . . . 95 to 97

RAINFALL

Daily, Monthly and Annual Rainfall for Six Stations on the United States Side . . . . . 98 to 103



RIO GRANDE DRAINAGE BASIN

CUENCA DEL RIO BRAVO

FOREWORD

This compilation of stream discharge and related data is the sixth 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 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 1936, 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. In 1923 the work was resumed and carried on independently by the two countries until 1931, when the present cooperative work began.

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

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

Of stream gaging stations on the Rio Grande, those at Laredo, Texas, and Matamoros, Tamaulipas, were operated in 1936 by the Mexican Section of the Commission, the others by the United States Section. Each section operated the gaging stations on tributaries entering the Rio Grande from its own country, or on floodways or diversions within its borders.

ACKNOWLEDGMENTS

Some of the data published herein relative to 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, Agricultural and Mechanical College of Texas, State Engineer of New Mexico, Middle Rio Grande Conservancy District, Red Bluff Water Power Control District, 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., and the Mexican Department of Agriculture and Development. Specific acknowledgment is made where the data appears.

QUANTITY OF WATER

There are here shown for the year 1936:

Descriptions of gaging stations and their equipment with pertinent notes concerning station records, high and low flows in previous years, and factors modifying the stream discharge.

The mean daily discharges at points along the Rio Grande and the mean daily inflows from tributaries.

The Rio Conchos flow which was not measured directly, but its discharge was calculated and is shown.

Miscellaneous estimated flows in Las Vacas Creek near Villa Acuna, Coahuila.

Extreme monthly high and low gage heights and peak discharges also average monthly rates of discharge and total monthly and annual acre footages for each station.

There are also shown:

Monthly and annual normal discharges in acre feet up to and including 1936.

The amount of water in storage at the end of each month of 1936 in all large reservoirs of the Rio Grande basin together with the average amounts since 1924.

Recapitulated monthly and annual discharges in acre feet with normals for all gaging stations for the period 1924 to 1935, inclusive.

A table showing where may be found stream flow records authenticated by this Commission.

FOREWORD—continued

SOURCES OF RIVER FLOW
1924-1935

Five maps show by subdivisions of the Rio Grande basin (a) the amount of unused run-off, (b) the total water shed yield, (c) the total water shed yield with estimated deep spring flow eliminated, (e) and (f) the percentage of rainfall that appears in each of the two yields just mentioned. These maps show average annual amounts of water for the years 1924 to 1935 inclusive.

QUALITY OF WATER

With reference to the probable life of storage reservoirs there is shown the results of silt sampling at 3 points on the Rio Grande and on 2 tributaries as well as a graphic chart showing comparisons of silt load at the three Rio Grande stations, for the years 1924 to 1936, inclusive.

Showing the suitability of the water of the Rio Grande and tributaries for irrigation use, there is recorded here:

Detailed chemical analyses of water samples from seven important points on the Rio Grande and from seven tributaries in 1936.

A graphical representation of the salt burden along the river and its origin in 1936.

Throwing light upon underground water conditions in the vicinity of El Jardin dam site, there are shown descriptions of, and detailed chemical analyses of water samples from, springs and wells in that region.

With reference to the use of Rio Grande water for 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

With respect to Rio Grande floods there is shown:

The peak discharge of the greater floods at San Marcial and El Paso and the average number of years between them, during the past 108 years or since 1828.

The hours required for flood crests of various magnitudes to travel from gaging station to gaging station throughout the river from Fort Quitman to Hidalgo and on the Rio San Juan from Aldamas to Rio Grande City.

The flattening of flood crests as they pass down the river.

EVAPORATION AND RAINFALL

For its pertinent relation to floods, irrigation and losses from reservoirs there is brought together here from numerous sources, mostly unpublished, evaporation observations at points on both sides of the basin, also rainfall records from the United States side.

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. Zero of gage is 4,455.38 feet above United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 130 meter measurements, by wading, and from cable about 1,000 feet above railroad bridge. Computations by shifting channel methods. 1936 records good. Records available: January, 1895, to December, 1936.

REMARKS: A history of the locations and elevations of gages from January, 1895, to March, 1932, is given in Water Bulletin Number 4.

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. With all closed basins eliminated the drainage area above this station is 27,806 square miles, all in the United States.

COMPARATIVE FLOWS FROM PREVIOUS RECORDS: Momentary Peak: Max., Oct. 11, 1904, 50,000 sec. ft. with a water surface level of 4,459.5 feet on U.S.C.& G.S. datum[8] about 1/4 mile above the present station gage. This is the greatest peak flow in the past 108 years or since 1828 or before. Min., sometimes dry. See previous Water Bulletins for numerous peaks. Daily: Max., Oct. 11, 1904, 33,000 sec. ft. average. Min., sometimes 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 & 1906, 2,750 sec. ft. average. Min., 1899 & 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-two Years: Average 1,530 sec. ft.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,030	934	1,070	585	6,020	1,110	2.8	0	508	1,260	874	467
2	1,000	1,100	886	563	4,870	1,480	1.6	0	915	992	1,190	630
3	962	917	844	509	4,950	1,050	11.5	0	664	779	1,340	987
4	902	751	838	482	4,590	874	16.2	256	408	692	1,200	999
5	858	819	900	363	3,880	817	16.6	2,650	295	631	1,090	977
6	749	836	1,380	321	4,310	705	30.2	2,920	557	616	1,030	806
7	897	818	1,610	495	5,160	541	28.8	1,710	342	630	1,010	824
8	956	725	1,720	680	4,900	413	36.0	1,370	631	599	819	874
9	910	754	1,410	448	5,750	571	94.0	982	300	596	860	791
10	897	805	1,180	359	7,130	460	238	391	111	577	981	824
11	790	707	1,090	284	6,480	172	935	250	92	578	631	829
12	845	760	1,040	340	4,380	122	2,150	165	500	560	389	760
13	938	746	999	582	3,470	93.9	3,180	112	1,100	538	421	770
14	916	651	1,010	1,400	3,270	96.2	1,770	90	1,200	521	518	725
15	871	641	959	1,480	3,100	415	843	82	606	482	509	738
16	852	1,020	795	2,860	3,410	444	620	90	532	448	551	724
17	846	1,040	665	3,120	2,950	567	431	123	397	483	631	750
18	841	1,160	1,130	3,760	2,830	212	290	343	335	545	792	677
19	916	1,180	1,420	5,050	2,680	74.9	175	239	279	478	963	674
20	920	1,140	1,310	6,340	2,260	36.9	200	139	323	475	*868	778
21	818	1,020	1,260	6,500	2,450	*5.0	154	464	301	584	*783	814
22	845	830	1,330	6,160	2,670	0	94.4	2,760	701	478	746	850
23	766	757	1,070	6,340	2,140	0	74.2	2,190	1,320	573	845	865
24	745	786	1,220	7,220	2,050	*1.1	48.4	1,110	1,300	680	728	801
25	749	766	1,260	7,400	2,660	0	21.3	667	1,150	790	600	816
26	804	832	1,060	7,950	2,320	35.6	10.2	303	646	868	480	760
27	791	1,120	891	8,160	1,650	19.3	5.4	120	2,470	1,120	470	795
28	745	1,510	976	8,710	1,480	13.7	0	70	5,320	952	380	803
29	898	1,330	854	7,330	1,330	9.9	0	73	4,300	1,180	427	820
30	1,100		805	6,590	1,300	10.3	0	66	2,060	882	471	841
31	926		665		1,030		0	139		835		791

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	7.97	7.50	30	1,220	24	638	874	53,700	42,596
February	8.35	7.27	28	1,990	15	587	912	52,500	46,210
March	8.36	7.30	19	1,980	31	589	1,090	66,700	52,609
April	10.00	6.82	28	9,550	6	213	3,410	203,000	124,518
May	10.00	7.37	10	7,960	31	837	3,470	213,000	237,503
June	8.15		2	1,840	22	0	345	20,500	133,648
July	10.10		13	4,400	28-31	0	370	22,800	48,438
August	10.80		5	6,380	1-3	0	641	39,400	55,229
September	10.65	6.53	28	6,270	11	80	989	58,800	61,771
October	9.04	7.58	27	1,540	16	412	691	42,500	33,562
November	9.29	7.79	3	1,840	12	243	753	44,800	30,225
December	8.95	8.17	3	1,300	1	432	792	48,700	40,213
The Year	10.80			9,550		0	1,190	866,400	906,522

* Partly estimated

8 Revises W.B. No. 5 because of restudy of data, see page 79 of this bulletin.

BY-PASS SEEPAGE AT SAN MARCIAL STATION

There is a small amount of seepage water which comes to the surface west of the river channel and northward from the main road which crosses the river at San Marcial. This water joins the river flow below the San Marcial gaging station. By frequent meter measurements at the point where this water crosses the road, its mean daily and monthly flow has been estimated and is shown below.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					*6.3	*3.3	*.5	.4	.6	4.2	*4.9	*5.7
2					*6.3	*3.2	.5	*.3	*.4	4.0	*5.5	*5.6
3					*6.3	*3.0	*.4	*.3	*.3	*3.6	6.2	5.4
4					*6.3	*2.9	*.2	.2	.1	3.2	*5.5	*5.5
5					*6.3	*2.7	.2	*.2	*.1	*2.9	*4.8	*5.6
6					*6.3	*2.5	*.2	*.1	*.1	*2.6	4.1	5.7
7					*6.3	*2.4	*.1	.1	.1	2.3	*4.3	*5.6
8					*6.3	*2.2	0	*.1	*.1	*2.5	*4.6	*5.5
9					*6.3	*2.0	*.2	*.1	*.1	*2.8	4.8	5.4
10					*6.3	*1.9	*.6	".1	.1	3.0	*4.5	*5.0
11					*6.3	1.7	.8	*.1	*.1	*2.8	*4.2	*4.6
12					*6.3	*1.7	*1.4	*.1	*.1	*2.7	3.9	4.2
13					*6.3	*1.8	*1.4	".1	.1	2.5	*4.1	*4.7
14					6.3	1.8	1.4	*.1	.1	*2.6	*4.2	*5.1
15					*6.1	*1.7	*1.5	*.1	*.1	*2.7	4.4	5.6
16					*6.0	*1.5	*1.5	*.1	.1	2.8	*4.5	*5.7
17					*5.8	1.4	1.6	".1	*.1	*2.8	*4.7	*5.7
18					*5.6	*1.3	*1.5	*.1	*.1	*2.8	4.8	5.8
19					*5.5	*1.3	*1.3	*.1	.1	*2.7	*5.1	*5.5
20					*5.3	1.2	1.2	".1	*.1	2.7	*5.3	*5.3
21					*5.2	*1.2	*1.1	*.1	*.1	*3.7	5.6	5.0
22					*5.0	*1.1	*1.1	".1	.1	4.7	*5.5	*5.1
23					*4.8	1.1	1.0	".1	*.2	*4.7	*5.3	*5.1
24					*4.7	1.2	*.9	*.1	*.2	*4.8	5.2	5.2
25					*4.5	1.3	*.9	*.1	.2	4.8	*5.2	*5.5
26					*4.3	1.4	.8	0	*.2	*4.6	*5.1	*5.8
27					*4.2	*1.2	*.7	*.1	*3.1	*4.3	5.1	6.1
28					*4.0	*.9	*.6	*.1	6.0	4.1	*5.4	*5.9
29					*3.8	.7	.5	1.0	4.6	*4.1	*5.6	*5.8
30					*3.7	*.6	*.5	*.9	*4.4	*4.2	5.9	5.6
31					*3.5		*.4	*.7		4.2		*5.4

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Per Sq. Mile
	High	Low	Dates		Dates				
May			1	*6.3	31	*3.5	*5.49	*338	
June			1	*3.3	30	*.6	*1.74	*104	
July			17	1.6	11	0	*.81	*49.6	
August			29	1.0	26	0	*.20	*12.3	
September			28	6.0	4-22	.1	*.74	*43.8	
October			24-25	4.8	7	2.3	*3.43	*211	
November			3	6.2	12	3.9	*4.94	*294	
December			27	6.1	12	4.2	*5.41	*333	
The Period				6.3		0	*2.85	*1,385.7	

" Estimated
* Partly estimated

RIO GRANDE AT EL PASO STATION

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

RECORDS: Based upon 136 meter measurements during the year. Computation by shifting channel methods. 1936 records good. Records Available: 1889 to 1936, inclusive, when combined with records at old Fort Bliss and at Smelter pump house, 3 miles and 1 mile downstream, respectively.

REMARKS: El Vado reservoir on the Rio Chama and Elephant Butte reservoir on the Rio Grande, as well as many irrigation diversions in Colorado, New Mexico and Texas, completely modify the river flow. With all closed basins eliminated the drainage area above this station is 32,819 square miles, all in the United States.

COMPARATIVE FLOWS FROM PREVIOUS RECORDS: Momentary Peak: Max., June 12, 1905, 24,000 sec. ft. with 6.0 feet gage (present datum). This is the greatest peak flow in the past 108 years or more or since 1828. Min., sometimes dry. See previous Water Bulletins for numerous peaks. 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., 1927 to 1936, 754 sec. ft. average. Forty-eight Years: Average 1,010 sec. ft.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	157	153	252	722	800	1,140	1,030	1,290	1,100	491	216	192
2	151	150	294	715	945	1,070	982	1,280	1,030	455	206	202
3	151	141	326	728	1,090	1,020	905	1,140	1,070	469	201	190
4	152	130	379	716	1,340	963	869	1,080	1,060	432	202	189
5	142	129	310	738	1,190	968	974	1,080	938	405	197	190
6	138	128	305	808	1,150	940	1,180	1,050	791	359	190	186
7	140	122	304	842	1,130	957	1,200	997	916	329	187	182
8	133	126	218	862	1,120	985	1,270	1,030	928	302	190	186
9	134	128	182	838	1,050	918	1,310	1,320	894	285	195	181
10	138	254	178	807	949	926	1,710	1,310	868	265	196	175
11	140	254	217	776	960	996	1,580	1,240	904	248	221	169
12	144	259	252	804	938	1,210	2,370	1,200	869	258	265	168
13	140	232	270	822	839	1,180	1,380	1,170	924	267	282	159
14	137	267	373	1,070	868	1,210	1,230	1,150	884	249	296	152
15	142	287	455	850	866	1,180	1,350	1,130	804	240	313	163
16	139	271	452	831	844	1,160	1,410	1,080	770	227	275	158
17	132	230	482	853	872	1,220	1,310	1,210	718	228	245	154
18	127	228	499	867	1,020	1,210	1,250	1,150	685	230	220	185
19	130	187	568	888	940	1,050	1,210	1,240	651	268	205	252
20	127	161	666	1,010	867	988	1,160	1,450	688	263	203	300
21	131	149	648	944	923	1,020	1,030	1,360	741	291	195	352
22	135	141	705	895	990	1,150	1,190	1,200	788	311	182	304
23	139	131	808	920	1,070	1,040	1,160	1,320	737	281	179	238
24	143	128	751	795	1,090	983	1,060	1,520	734	237	178	227
25	139	127	666	823	1,070	931	1,030	1,210	874	241	173	192
26	136	141	644	883	1,080	920	1,080	1,090	881	230	172	175
27	132	215	627	907	1,150	1,010	1,120	1,130	1,010	228	176	181
28	132	246	663	988	1,140	1,070	1,270	1,150	837	220	181	177
29	138	259	728	1,010	1,080	1,160	1,250	1,840	744	222	189	170
30	153		801	911	1,040	1,100	1,270	3,140	598	224	175	158
31	148		779		1,120		1,450	1,610		235		152

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.29	1.14	1	160	27	130	139	8,600	11,357
February	1.72	1.08	15	314	26	123	185	10,700	22,065
March	2.80	1.24	23	855	10	171	477	29,400	40,183
April	3.22	2.36	14	1,250	4	648	854	50,800	63,732
May	3.24	2.55	4	1,490	1	782	1,020	62,500	68,065
June	3.30	2.67	17	1,320	25	851	1,060	62,800	69,988
July	4.62	2.71	12	3,000	4	804	1,240	76,500	82,762
August	5.25	2.82	30	3,910	7	901	1,300	79,700	90,079
September	3.56	2.41	27	1,150	30	564	848	50,500	64,000
October	2.41	1.58	1	543	28	216	290	17,800	26,433
November	2.09	1.57	15	324	26	167	210	12,500	18,668
December	2.23	1.60	21	373	18	146	195	12,000	16,905
The Year	5.25	1.08		3,910		123	653	473,800	574,237

RIO GRANDE AT TORNILLO BRIDGE STATION

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

RECORDS: Based upon 81 meter measurements during the year. Computation by shifting channel methods. 1936 records good. Records available: January, 1924, to December, 1936. Station maintained prior to August, 1928, by United States Bureau of Reclamation.

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

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 5, 1925, when the mean daily flow was 6,500 second feet. The river is sometimes dry. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	147	171	45.0	47.6	5.0	275.0	6.6	98.0	1,460	471	26.6	254
2	169	167	35.8	15.9	4.4	196.0	5.6	78.7	587	363	132	248
3	159	161	73.9	13.5	6.1	140.0	10.8	27.6	618	358	94.9	233
4	161	147	89.9	12.1	59.9	74.5	6.7	19.2	596	*332	19.2	225
5	163	142	75.6	42.8	186.0	94.0	6.2	17.1	482	*230	26.5	221
6	155	117	18.9	93.0	132.0	*19.9	10.3	15.6	336	*184	19.6	207
7	150	109	13.2	97.0	89.4	*3.3	4.9	17.4	202	*136	30.6	209
8	145	106	31.5	76.0	31.9	*2.8	6.2	14.8	334	*157	32.6	207
9	145	97	15.8	74.0	94.8	20.0	10.8	21.8	266	*111	48.7	198
10	143	100	*1.2	75.5	151.0	4.5	70.8	249.0	152	74.9	45.4	192
11	141	117	*.1	28.0	146.0	4.4	518	217	346	72.1	40.3	104
12	144	142	*1.3	16.6	36.2	1.8	745	124	328	87.8	58.4	66.6
13	144	135	*3.7	28.7	19.4	75.3	811	22.0	233	71.2	119	57.1
14	146	115	4.1	15.2	12.0	28.0	283	43.7	203	100	129	52.0
15	145	113	6.9	130.0	9.0	27.1	171	21.7	159	157	164	38.9
16	146	135	11.9	8.5	10.6	172.0	291	18.1	91.2	150	211	49.3
17	149	110	10.4	9.0	8.7	303.0	268	16.9	*59.4	142	173	157
18	144	101	33.3	5.1	11.1	288.0	269	10.1	55.3	139	116	150
19	139	83	9.8	21.4	14.4	166.0	194	14.3	31.6	141	133	168
20	141	92	24.2	32.2	13.4	95.5	148	168	80.7	89.7	148	211
21	145	110	76.2	18.1	14.3	176.0	103	316	320	*24.1	146	241
22	142	92	87.8	13.9	7.5	201.0	26.3	326	330	*21.2	156	178
23	141	*73.0	137.0	2.8	44.9	131.0	131.0	374	285	*22.7	159	114
24	141	*19.1	190.0	4.1	210	21.8	*73.8	440	390	36.2	161	90.6
25	142	*8.6	125.0	2.4	177	21.7	*19.8	484	921	36.1	*99.0	99.2
26	143	*10.9	77.6	13.5	144	6.0	*17.1	242	824	31.0	*38.1	74.9
27	143	*16.2	31.2	91.0	152	.4	*42.5	169	940	26.9	*16.9	52.7
28	144	29.6	27.7	10.4	144	13.2	18.5	200	1,200	15.2	*33.4	47.2
29	155	39.0	129.0	9.7	181	53.3	142.0	690	727	24.7	*135.0	78.6
30	170		91.1	52.4	172	3.7	*15.2	1,050	633	12.0	*142.0	91.9
31	174		82.0		221		21.5	1,560		11.9		58.0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	10.48	9.90	30	180	1	97.0	149	9,160	9,638
February	10.68	*8.72	3	198	25	*7.8	98.6	5,670	10,522
March	10.86	*8.18	24	256	11	*.0	50.4	3,100	9,402
April	10.88	8.51	15	227	25	.1	35.3	2,100	13,253
May	10.96	8.55	31	333	2	.8	80.9	4,980	17,081
June	11.25	8.50	17	547	10	.0	87.3	5,200	15,559
July	13.30	8.51	13	1,010	2	1.9	143	8,820	22,660
August	14.53	8.62	31	1,880	7	9.8	228	14,000	33,895
September	14.80	8.64	1	1,840	19	31.6	440	26,200	26,789
October	10.58	7.76	1	517	31	8.7	124	7,590	13,655
November	9.92	7.94	16	323	28	13.9	95.1	5,660	9,678
December	9.90	8.14	1	348	29	41.0	141	8,680	10,925
The Year	14.80	7.76		1,880		*.0	139	101,160	193,057

* Partly estimated

RIO GRANDE AT FORT QUITMAN STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located at lower end of El Paso Valley, 1-1/2 miles below Old Fort Quitman and 11-1/2 miles south of Finlay, in Hudspeth County, Texas. Zero of gage is 3,454.06 feet above mean sea level, United States Coast and Geodetic Survey datum. On April 22, 1936 this gaging station was temporarily moved a short distance to facilitate river rectification.

RECORDS: Based upon 75 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: January, 1923, to December, 1936.

REMARKS: El Vado reservoir on the Rio Chama and Elephant Butte reservoir on the Rio Grande, as well as many irrigation diversions in Colorado, New Mexico and Texas, completely modify the river flow. With all closed basins eliminated the drainage area above this station is 34,450 square miles; 33,616 being in the United States and 834 in Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 11, 1925, when the extreme mean daily gage height was 7.02 feet and the mean daily flow was 2,600 second feet. The lowest recorded flow occurred March 30, 1935, when the flow was 0 second feet. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	189	199	85	102	47.5	222	66.5	52.2	685	*1,230	184	286
2	186	200	104	99	51.0	238	40.3	75.8	787	*945	175	300
3	191	200	108	125	40.9	385	23.3	88.1	1,030	*656	178	296
4	200	192	113	113	61.5	312	24.8	131.0	960	*547	214	287
5	201	189	110	82	89.0	208	32.2	94.5	876	*506	218	259
6	190	180	115	103	118	140	34.2	44.7	807	*473	211	192
7	196	175	137	107	170	142	21.7	28.3	694	425	198	229
8	181	160	124	114	159	170	19.9	26.2	520	386	214	240
9	194	142	107	121	180	141	35.9	33.1	464	348	216	240
10	190	130	100	108	213	101	124.0	47.9	388	325	206	240
11	189	125	95	111	215	72.4	58.7	43.0	402	271	222	240
12	187	108	66	121	146	44.5	43.1	35.2	467	261	215	237
13	187	116	71	108	126	42.3	255	29.8	575	256	195	257
14	189	135	72	95	120	77.2	463	30.3	532	266	211	262
15	189	140	71	60	106	76.4	367	30.8	445	242	226	260
16	190	136	74	48	92.8	66.3	176	34.9	399	235	261	252
17	188	117	80	50	131.0	57.7	146	44.1	353	218	310	270
18	187	129	92	60	98.3	80.5	172	58.5	326	206	282	245
19	184	131	76	58	82.1	142	163	170	275	187	271	218
20	180	133	88	55	71.3	143	147	623	277	*171	242	221
21	179	126	90	41	82.3	133	136	*251	292	*164	239	260
22	175	120	77	55	95.4	155	108	213	416	*157	232	291
23	179	116	78	67	84.6	158	78.1	294	477	*159	233	295
24	176	112	63	58	96.0	138	44.2	307	515	173	248	287
25	175	125	71	48	155	134	48.7	393	839	197	242	250
26	177	127	110	47	184	110	102	384	946	218	268	266
27	182	96	122	48	172	89.0	109	290	*1,040	212	247	252
28	184	99	108	52	151	67.6	118	385	*859	195	250	222
29	179	69	101	46	188	84.5	82.3	270	*993	184	250	236
30	181		91	40	171	83.0	53.1	451	*1,210	191	255	170
31	194		101		188		51.3	586		171		126

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.77	1.40	5	209	8	161	186	11,400	11,894
February	1.69	.54	1	205	29	63	139	7,990	13,077
March	1.27	.46	7	144	24	60	94	5,750	11,583
April	1.15	.20	3	131	22	33.1	78	4,650	14,411
May	2.79	.60	11	233	2	36.8	125	7,710	17,428
June	1.75	-.22	3	411	13	39.1	134	7,960	15,540
July	2.50	-.77	26	816	9	13.6	108	6,630	19,123
August	4.76	-.80	20	1,840	8	22.0	179	11,000	32,818
September	3.44	.41	30	*1,280	20	220	628	37,400	31,531
October	*2.82	.42	1	*1,260	23	*136	328	20,200	22,176
November	1.12	.40	27	354	29	159	230	13,700	14,871
December	1.04	-.12	2	337	31	91.2	248	15,200	15,247
The Year	4.76	-.80		1,840		13.6	206	149,590	219,699

* Partly Estimated

RIO GRANDE AT LA NUTRIA STATION

DESCRIPTION: Water-stage recorder about 9-1/2 miles above Candelaria, Texas, and 64 miles above Presidio, Texas. Zero of gage is 2,871.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 19 meter measurements during the year for stages below 650 sec. ft. Station rating curve extended above 650 sec. ft. by means of water surface slopes shown by maximum stage pipe gages. Computations by shifting channel methods. 1936 records good. Records available: January, 1935 to December 31, 1936. Records estimated prior to June 15, 1935.

REMARKS: El Vado reservoir on the Rio Chama and Elephant Butte reservoir on the Rio Grande, as well as many irrigation diversions in the United States and Mexico, completely modify the river flow. With all closed basins eliminated the drainage area above this station is 36,292 square miles, 34,649 being in the United States and 1,643 in Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on August 31, 1935, when peak discharge was 7,480 second feet. The river is sometimes dry.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	194	174	93.2	67.0	20.8	152	23.9	182	345	754	165	254
2	187	175	137	62.0	22.8	108	102	65.1	671	744	163	240
3	186	181	127	53.0	57.7	116	20.9	39.5	1,820	668	159	279
4	185	184	97.2	59.7	49.9	130	12.1	27.9	1,410	578	152	262
5	187	187	100	59.6	24.8	140	10.1	18.8	926	514	155	256
6	189	185	101	64.4	19.8	226	8.3	11.9	682	508	168	249
7	196	178	98.3	79.8	17.0	187	4.5	10.4	868	490	195	238
8	185	172	96.7	79.7	12.8	132	2.8	25.3	589	446	190	227
9	184	164	95.1	65.5	12.3	90.3	1.6	21.1	501	405	192	221
10	186	161	111	82.3	45.0	72.0	46.4	12.7	422	369	177	208
11	176	151	115	74.2	76.8	78 9	266	8.8	510	343	196	207
12	187	137	108	83.7	92.2	72.3	141	5.5	774	330	183	200
13	184	128	96.8	78.1	106	56.8	85.7	6.0	430	292	188	202
14	180	120	91.0	70.2	101	51.8	30.8	3.4	417	276	192	200
15	176	107	82.6	70.2	86.2	45.0	36.0	2.1	418	265	180	208
16	177	102	71.9	70.1	75.1	30.8	96.6	1.0	405	269	191	196
17	176	122	67.0	62.8	69.7	22.3	204	.3	372	246	210	197
18	176	126	67.1	54.7	66.0	18.5	142	27.6	340	220	233	191
19	173	128	61.0	44.0	54.2	22.3	160	385	315	217	280	188
20	176	111	57 7	36.3	63.5	19.7	118	492	939	201	274	186
21	172	108	58.9	31.0	100	16.4	63.4	436	2,910	189	245	191
22	171	109	66.1	28.5	67.3	125	55.8	447	2,800	178	221	192
23	167	112	56.7	30.0	80.1	159	40.7	593	636	251	223	222
24	166	110	52.1	24.7	73.7	208	74.6	235	730	200	210	256
25	165	106	52.1	21.0	58.7	194	25.1	222	2,290	190	220	267
26	167	99.5	52.1	19.7	66.0	104	47.9	216	2,140	183	227	271
27	162	97.9	50.9	21.0	77.8	61.1	194.0	238	916	197	223	240
28	171	93.4	47.8	19.6	365	57.4	44.0	747	807	195	244	250
29	176	109	43.8	19.6	154	47.0	107	792	816	188	284	234
30	181		68.3	20.1	132	33.5	613	591	767	182	293	211
31	181		67.0		107		378	276		177		208

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Average 1935 to 1936
January	3.22	3.08	7	200	27	158	179	11,000	*7,000
February	3.27	2.60	4	193	28	87.5	136	7,810	*5,155
March	3.92	2.23	2	376	29	42.8	80.3	4,940	*2,720
April	2.63	1.91	12	90.8	29	16.4	51.8	3,080	*1,540
May	5.91	1.83	28	1,180	9	11.3	76.0	4,670	*2,335
June	5.90	1.81	22	1,200	18	14.2	92.6	5,510	*5,400
July	6.25	1.58	30	1,320	10	.1	102	6,260	4,520
August	6.86	1.67	23	1,720	18	.2	198	12,200	26,250
September	11.06	3.72	25	6,190	1	256	932	55,500	59,100
October	5.18	3.31	1	767	23	167	331	20,400	22,400
November	4.37	3.23	29	442	5	148	208	12,400	11,750
December	3.88	3.42	3	290	19	173	224	13,800	13,650
The Year	11.06	1.58		6,190		.1	217	157,570	161,820

* Partly estimated

RIO GRANDE AT UPPER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,575.82 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based on 51 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: April, 1900, to March, 1914; September, 1919, to March, 1920; August, 1923, to December, 1936.

REMARKS: El Vado reservoir on the Rio Chama and Elephant Butte reservoir on the Rio Grande, as well as many irrigation diversions in the United States and Mexico, completely modify the river flow. With all closed basins eliminated the drainage area above this station is 37,488 square miles, 35,229 being in the United States and 2,259 in Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on June 12, 1912, when peak discharge was 15,000 second feet. The river is sometimes dry. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	217	124	76.6	9.6	*.6	52.3	0	445	*442	*994	188	303
2	191	129	103	7.8	*1.0	42.7	0	193	*398	*914	174	261
3	188	133	340	7.0	1.0	45.3	0	*148	1,350	*889	158	239
4	178	133	228	6.3	45.6	34.9	0	*97.8	1,610	863	156	257
5	173	137	*152	5.3	20.1	30.9	0	*55.7	1,590	*770	157	248
6	172	139	*116	4.6	8.9	25.8	0	*24.0	*1,110	*654	153	*238
7	172	150	*104	4.5	2.6	21.8	0	*8.9	*890	*588	154	*232
8	173	143	98.2	4.2	0	45.2	0	*2.5	*1,020	*556	161	*226
9	171	138	94.0	4.2	0	47.8	0	.9	*753	*505	*172	*216
10	168	141	89.9	3.9	0	38.2	0	0	*514	*471	*172	*210
11	170	133	*83.9	3.6	0	30.9	0	0	*405	*412	176	*201
12	165	131	*83.9	3.3	0	23.6	0	0	526	*380	172	192
13	159	123	*82.1	3.6	0	18.2	5.2	0	720	*348	181	193
14	167	114	*78.6	3.3	0	13.2	1.6	0	*436	*324	173	194
15	157	112	76.3	3.1	0	8.9	0	0	*387	*313	*178	192
16	156	110	70.6	2.7	0	4.6	0	0	*409	*301	*182	195
17	150	109	65.1	2.6	0	2.3	0	0	*365	*286	*175	193
18	141	105	55.8	2.4	0	0	7.4	0	*321	*280	175	177
19	145	107	*41.1	2.4	0	0	95.4	0	*298	*266	192	175
20	157	106	*35.1	2.4	0	0	24.7	73.8	858	*250	213	172
21	160	103	31.6	2.3	0	0	11.3	338	1,850	*230	239	*173
22	152	102	29.0	1.8	126.0	0	5.8	395	1,990	*216	234	*164
23	144	103	27.0	1.8	38.0	0	0	647	2,010	*206	218	*162
24	140	106	25.9	1.8	24.5	0	0	509	2,150	229	212	*170
25	131	101	23.3	1.7	22.2	0	0	184	1,240	238	209	*192
26	135	100	19.0	1.5	27.7	0	0	238	2,350	204	209	220
27	134	94.9	15.5	1.3	44.7	0	8.4	95	2,520	196	210	235
28	131	85.3	15.0	1.0	34.0	0	123.0	226	*2,490	196	224	232
29	130	84.6	14.1	.8	149.0	0	47.0	865	*1,220	*212	225	216
30	129		13.2	*.6	94.8	0	94.4	855	*1,070	*202	245	208
31	128		11.9		63.2		995.0	635		*196		200

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.49	1.14	1	229	29	127	158	9,690	13,243
February	1.22	.82	7	157	28	83.6	117	6,740	12,274
March	2.41	.20	3	524	31	10.9	74.2	4,560	11,875
April	.20	*-.22	1	10.6	30	*.5	3.4	201	11,622
May	2.02		22	386	8-21	0	22.7	1,400	17,132
June	.79		8	60.9	18-30	0	16.2	965	15,852
July	4.22		31	1,510		0	45.8	2,810	17,532
August	4.41		29	1,210	10-19	0	195	12,000	39,539
September	7.33	*1.90	28	2,730	20	280	1,110	*66,000	39,145
October	*3.91	1.72	1	*1,040	31	189	409	*25,200	33,185
November	1.99	1.54	30	272	6	150	190	11,300	16,755
December	2.22	*1.54	1	331	22	*162	209	12,900	14,667
The Year	7.33			2,730		0	212	153,766	242,821

* Partly estimated

RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car and winch, located about 2-1/4 miles above the international highway bridge at Presidio, Texas, and 1-1/2 miles below the confluence of the Rio Conchos with the Rio Grande. Zero of gage is 2,556.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based on 52 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: May, 1900, to July, 1915; September, 1919, to March, 1920; August, 1923, to December, 1936.

REMARKS: Station moved to its present location on June 14, 1932. Previously it was located 6 miles farther downstream and 1/2 mile above the Alamito Creek confluence. See Water Bulletin Number 1 for description of the old station. The El Vado reservoir on the Rio Chama, Elephant Butte reservoir on the Rio Grande, and Boquilla reservoir on the Rio Conchos, as well as many irrigation diversions in the United States and Mexico, greatly modify the river flow. With all closed basins eliminated the drainage area above this station is 60,109 square miles of which 35,250 are in the United States and 24,859 in Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow occurred in September, 1904, with a peak flow estimated at 168,000 second feet at the present station. The lowest recorded flow was 3.5 second feet in May, 1904. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	631	527	758	192	105	167	46.8	971	2,560	6,770	1,220	1,480
2	557	522	742	167	86.6	347	43.6	695	2,610	5,500	1,000	1,400
3	495	592	1,080	144	132	471	41.5	449	*4,930	4,750	1,040	1,270
4	517	651	854	125	266	378	40.6	437	*5,730	4,310	1,070	1,090
5	508	696	677	123	453	333	41.4	480	7,070	3,830	959	1,290
6	596	549	607	119	362	434	38.9	299	5,580	3,520	966	1,390
7	550	612	514	113	207	277	36.9	360	5,490	3,140	963	1,180
8	474	584	487	111	196	220	37.8	256	5,540	2,490	1,070	1,340
9	456	570	470	109	201	243	38.6	272	4,710	2,300	961	1,140
10	491	715	460	107	159	191	44.1	233	*3,830	2,230	1,120	1,320
11	524	704	512	107	139	138	832	585	*2,940	1,940	950	1,130
12	486	730	448	*136	169	108	921	750	2,270	1,730	894	1,190
13	436	629	356	202	179	89.8	316	597	2,460	1,770	857	1,220
14	532	653	566	171	138	86.3	267	484	2,230	1,350	884	1,070
15	570	524	580	289	134	84.5	557	414	2,160	1,320	1,040	1,260
16	511	567	613	291	130	112	559	354	2,260	1,420	998	1,250
17	554	706	649	299	127	130	630	485	2,720	1,170	1,170	1,150
18	544	822	619	543	112	119	770	430	2,540	1,310	957	1,070
19	482	889	437	439	97.6	78.7	583	455	2,680	1,290	1,080	1,030
20	472	792	434	301	229	61.7	355	272	4,260	1,030	1,090	1,230
21	567	716	374	221	238	63.5	272	600	7,390	913	1,060	1,160
22	604	776	288	207	767	77.3	245	872	7,580	850	1,160	1,170
23	522	784	229	185	262	56.2	184	1,900	9,020	956	1,120	1,150
24	603	715	204	150	198	50.6	284	950	9,050	792	1,320	1,210
25	613	831	226	120	170	66.2	265	661	*16,200	899	1,080	1,080
26	713	746	284	*110	128	65.2	188	812	*23,600	806	1,130	1,050
27	655	644	234	130	156	61.6	252	657	18,300	829	1,010	1,220
28	564	578	208	121	138	56.7	238	1,880	*13,800	871	1,020	1,110
29	688	557	220	118	210	50.9	589	3,550	*10,900	1,050	1,270	1,120
30	553		215	115	188	44.4	1,850	2,700	*8,820	921	1,510	1,030
31	583		176		148		1,460	1,790		929		980

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.77	1.00	25	803	13	410	550	33,800	81,469
February	2.15	1.19	25	1,080	2	483	670	38,500	69,831
March	2.66	.31	3	1,470	31	159	468	28,800	64,800
April	1.51	.10	18	727	11	105	186	11,000	55,643
May	2.95	-.02	22	1,820	2	77.9	201	12,300	59,689
June	1.75	-.30	18	836	30	41.1	155	9,250	69,496
July	5.50	-.39	30	5,810	10	33.8	388	23,900	92,977
August	4.92	.45	28	4,490	11	180	827	50,900	171,438
September	12.66	2.85	26	26,700	1	1,600	6,640	395,000	259,061
October	5.97	2.11	1	7,500	26	750	2,030	125,000	199,700
November	3.00	2.04	30	1,710	13	756	1,070	63,400	84,169
December	2.93	2.12	1	1,640	31	940	1,190	73,000	80,216
The Year	12.66	-.39		26,700		33.8	1,190	864,850	1,288,489

* Partly estimated

ALAMITO CREEK STATION NEAR PRESIDIO, TEXAS

DESCRIPTION: Water-stage recorder, about 1,000 feet above confluence with the Rio Grande, and six miles below Presidio, Texas. Zero of gage is 2,541.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 15 meter measurements and previous rating curve, and by numerous estimates by the hydrographer at low flow. Computations by shifting channel methods. 1936 records good. Records available: January 1, 1932, to December 31, 1936.

REMARKS: The flow of this spring-fed creek is modified by a small irrigation reservoir 10-1/2 miles south of Marfa and by irrigation diversions. 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.

PREVIOUS EXTREME FLOWS: The greatest recorded flow occurred August 25, 1934, with a gage height of 4.04 feet and flow of 8,200 second feet. The lowest recorded flow was .87 second foot on several days in 1932. On October 2, 1932, backwater from the Rio Grande caused a gage height of 8.33 feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	6.1	11.0	4.5	*35.0	*4.0	*4.0
2	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	318.0	*3.0	4.5	*12.0	*4.0	*4.0
3	*3.8	*3.8	*3.8	*2.8	*3.0	*2.5	2.6	*3.0	290	*4.5	*4.0	*4.0
4	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	2.6	*3.0	561	*4.5	*4.0	*4.0
5	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	2.8	*3.0	141	*4.0	*4.0	*4.0
6	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	593	*3.0	6.6	*4.0	*4.0	*4.0
7	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	262	*3.0	90.2	*4.0	*4.0	*4.0
8	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	222	*3.0	67.0	*4.0	*4.0	*4.0
9	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	180	*3.0	9.7	*4.0	*4.0	*4.0
10	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	53.1	*3.0	4.5	*3.5	*4.0	*4.0
11	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	16.8	*3.0	12.2	*3.5	*4.0	*4.0
12	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	4.3	*3.0	21.3	*3.5	*4.0	*4.0
13	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	3.0	*3.0	46.9	*3.5	*4.0	*4.0
14	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	3.0	*3.0	58.1	*3.5	*4.0	*4.0
15	*3.8	*3.8	*3.8	*2.8	*2.5	*2.5	3.0	*3.0	20.4	*3.5	*4.0	*4.0
16	*3.8	*3.8	*3.8	*2.8	*2.5	373.0	3.0	*3.0	7.2	*3.5	*4.0	*4.0
17	*3.8	*3.8	*3.8	*2.8	*2.5	*2.8	3.0	*3.0	4.5	*3.5	*4.0	*4.0
18	*3.8	*3.8	*3.8	*2.5	*2.5	*2.6	15.0	*3.0	4.5	*3.5	*4.0	*4.0
19	*3.8	*3.8	*3.8	*2.5	*2.5	*2.5	2.8	75.0	4.5	*3.5	*4.0	*4.0
20	*3.8	*3.8	*3.8	*2.5	*2.5	*2.4	2.8	5.7	1,180.0	*3.5	*4.0	*4.0
21	*3.8	*3.8	*3.8	*2.5	264	*2.4	2.8	3.2	286	*3.5	*4.0	*4.0
22	*3.8	*3.8	*3.8	*2.5	1,280	*2.4	2.8	274	376	*3.5	*4.0	*4.0
23	*3.8	*3.8	*3.8	*2.5	*61.0	*2.4	2.8	218	786	*3.5	*4.0	*4.0
24	*3.8	*3.8	*3.8	*2.5	355	*2.4	9.9	33.0	1,180	*3.5	*4.0	*4.0
25	*3.8	*3.8	*3.8	*2.5	253	*2.4	2.8	13.5	1,070	*4.0	*4.0	*4.0
26	*3.8	*3.8	*3.8	*2.5	168	*2.4	137	40.5	1,530	*4.0	*4.0	*4.0
27	*3.8	*3.8	*3.8	*2.5	24.5	*2.4	393	124	1,100	*4.0	*4.0	*4.0
28	*3.8	*3.8	*2.8	*2.5	1,460	*2.4	25	600	670	*4.0	*4.0	*4.0
29	*3.8	*3.8	*2.8	*2.5	368	*2.4	18	327	265	*4.0	*4.0	*4.0
30	*3.8		*2.8	*2.5	6.5	*2.4	349	48	94	*4.0	*4.0	*4.0
31	*3.8		*2.8		2.5		231	6.2		*4.0		*4.0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1936
	High	Low	Dates		Dates				
January	2.13	2.06	1	-	31	-	*3.8	*234	171
February	2.10	2.05	17	-	8	-	*3.8	*219	167
March	2.69	2.05	1	*3.8	31	*2.8	*3.7	*226	180
April	2.39	2.33	1	*2.8	30	*2.5	*2.7	*159	163
May	5.11	1.31	28	7,120	20	*2.5	138	8,520	2,027
June	2.48	1.53	16	1,120	30	*2.4	*14.8	*882	2,629
July	5.93	.89	30	3,900	3	*2.6	92.7	5,700	3,341
August	4.10	.81	28	2,900	2	*3.0	59.0	3,630	5,930
September	5.90	1.64	24	3,320	7	*2.0	330	19,600	7,766
October	3.15	-	1	54	16	*3.5	*5.0	*310	810
November	2.74	2.72	1	-	7	-	*4.0	*238	214
December	2.75	2.72	1	-	12	-	*4.0	*246	212
The Year	5.93	.81		7,120		2.0	*55.0	*39,964	23,610

* Partly estimated

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, and 2-1/2 miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. Zero of gage is 2,191.04±.5 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 23 meter measurements, and previous rating curve. Computations by shifting channel methods. 1936 records fair. Records available: January 1, 1932, to December 31, 1936.

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

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 and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.4	*2.1	*2.1	1.0	*2.1	‖5.0	259	*52.3	9.1	23.1	‖3.0	‖3.0
2	*1.4	*2.1	*46.8	1.0	*2.4	‖3.0	50.5	‖3.7	6.5	16.5	‖3.0	‖3.0
3	*1.4	1.2	*10.1	1.0	*1,290	‖3.0	17.3	‖3.0	17.2	12.0	3.0	‖3.5
4	*1.4	1.0	*6.2	1.0	*430	‖3.0	17.3	‖3.0	217	9.1	3.0	‖3.5
5	*1.4	.8	*20.9	1.0	*30.7	‖3.0	55.9	‖3.0	605	*6.5	3.0	‖3.9
6	*1.4	1.0	*32.6	1.2	*312	*694	725	‖3.0	113	*3.8	3.0	‖3.9
7	*1.4	1.4	*12.9	1.2	*3.4	*139	311	*375	47.3	*3.4	3.0	‖3.9
8	*1.4	1.9	*11.7	1.0	*1.6	‖3.0	*4.9	*112	19.8	*3.4	3.0	3.9
9	*1.4	2.4	*9.4	1.0	*1.4	‖3.0	*21.0	*5.6	12.5	‖1.9	3.0	3.8
10	*1.4	2.7	*7.2	1.2	*1.6	‖3.0	*10.1	*28.4	*10.2	‖1.9	3.0	3.7
11	*1.4	2.1	*5.8	1.2	.8	‖3.0	‖4.6	*10.8	*10.2	‖1.9	3.0	3.6
12	*1.4	1.6	*4.9	1.4	39.8	‖3.0	‖4.6	‖3.0	‖150	‖1.9	3.0	3.6
13	*1.4	1.4	*3.7	1.4	16.1	‖5.0	‖4.6	‖3.0	‖300	‖1.9	3.0	3.5
14	*1.4	1.6	*2.4	1.2	*4.9	60.4	‖4.6	‖3.0	‖50	‖1.9	3.0	3.4
15	*1.4	*1.2	*1.9	1.2	*2.4	69.0	*7.8	‖3.0	‖500	‖1.9	3.0	3.3
16	1.4	*1.2	*1.9	1.0	1.9	*84.8	*31.1	‖3.0	‖200	‖1.9	3.0	3.2
17	1.4	*1.2	*1.6	1.0	1.6	‖20.0	*194.0	‖3.0	‖100	‖1.9	3.0	3.1
18	1.4	*1.4	1.2	1.0	1.6	‖5.0	*32.9	‖3.0	‖50	‖1.9	3.0	3.0
19	1.4	*1.4	1.4	1.2	1.6	‖3.0	‖4.6	‖3.0	‖50	‖1.9	3.0	3.0
20	1.2	*1.4	1.2	1.2	1.6	‖3.0	‖4.6	‖3.0	‖100	‖1.9	3.0	2.9
21	1.2	*1.4	1.4	1.0	2,350	‖3.0	‖4.6	‖3.0	‖500	‖1.9	3.0	2.8
22	*1.2	*1.4	1.4	1.0	1,090	‖3.0	‖4.6	*16.2	‖1,400	‖1.9	3.0	2.7
23	*1.4	*1.6	1.4	1.2	717	‖3.0	*13.8	*365	‖1,400	1.9	3.0	5.2
24	*1.4	*1.6	1.9	1.2	474	*23.7	*8.8	*25.1	772	‖2.0	3.0	5.4
25	*1.6	*1.6	2.1	2.1	1,270	‖10.0	‖3.0	*12.0	1,200	‖2.1	3.0	5.4
26	*1.6	*1.6	1.9	1.2	913	‖3.0	*518	*6.0	2,740	‖2.2	3.0	5.7
27	*1.9	*1.6	1.6	*78.6	1,820	‖3.0	*240	*39.0	575	‖2.3	3.0	5.4
28	*1.9	*1.9	1.2	*3.4	2,070	‖3.0	*35.6	*15.9	101	‖2.4	5.7	6.0
29	*1.9	*1.9	1.0	*2.7	192	‖3.0	*30.4	*13.0	51.3	‖2.5	6.5	4.7
30	*1.9		1.0	*2.1	*65	*37.1	*63.0	*11.1	33.4	‖2.6	2.7	2.3
31	*2.1		1.0		‖10		*79.3	*10.2		‖2.7		3.6

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1936
	High	Low	Dates		Dates				
January	*.19	.13	31	*2.1	20	1.01	*1.48	*91.0	*140
February	.20	.12	20	3.0	3	.70	*1.60	*90.6	*121
March	2.45	.30	2	706	31	.82	*6.50	*400	*180
April	2.74	.30	27	804	17	.82	*3.90	*232	*144
May	15.40	.20	27	29,500	20	1.60	*423	*26,000	*6,504
June	7.95		6	7,050		‖3.00	*40.2	*2,390	*5,422
July	9.50		26	9,500	25	‖3.00	*89.2	*5,490	*3,932
August	7.50	-.40	7	5,660	27	*2.90	*36.9	*2,270	7,533
September	8.50	.37	26	6,390	1	5.70	*378	*22,500	*14,124
October	.80		1	27.1	23	*1.90	*4.0	*248	*3,552
November	.62	.23	28	15.9	30	*2.50	*3.2	*190	182
December	.62	.35	28	7.3	30	1.30	*3.8	*234	162
The Year	15.40	-.40		29,500		.70	*82.8	*60,135.6	*41,996

‖ Estimated
* Partly estimated

RIO GRANDE AT JOHNSON RANCH STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located about 2 miles above Johnson Ranch, Brewster County, Texas, and about 14 miles below Castolon, Brewster County, Texas. Zero of the gage is 2,046.00 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 28 meter measurements during the period. Computations by shifting channel methods. 1936 records good. Records available: April to December, 1936.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated the drainage area above this station is 67,326 square miles; 39,263 being in the United States and 28,063 in 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 and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				*157	100	*545	312	1,550	1,850	7,550	1,060	1,520
2				*164	590	*497	506	934	2,290	5,850	1,210	1,700
3				167	1,550	*428	100	651	4,340	4,990	1,190	1,610
4				170	475	*388	286	423	8,060	4,630	1,070	1,490
5				151	307	*310	304	310	10,600	4,150	1,170	1,230
6				136	220	*309	1,060	319	6,980	3,810	1,130	1,300
7				*117	468	*2,300	3,700	346	5,970	3,510	1,040	1,360
8				*122	446	*622	*1,180	906	6,320	3,310	1,070	1,300
9				112	342	*340	*541	344	5,640	2,800	1,060	1,330
10				99.8	256	*296	*393	264	4,490	2,610	1,120	1,280
11				91.0	245	*235	*262	243	3,510	2,490	1,070	1,260
12				89.1	232	*178	*153	231	3,620	2,210	1,150	1,240
13				91.3	234	*148	*1,320	553	3,570	1,970	934	1,200
14				86.7	177	*133	*679	638	2,680	1,990	993	1,220
15				104	145	214	*383	508	3,500	1,670	879	1,180
16				139	130	424*	*305	421	2,920	1,520	996	1,120
17				124	116	492	756	380	2,790	1,640	1,090	1,220
18				175	107	301	*766	936	2,940	1,400	1,120	1,170
19				162	104	150	*723	611	2,850	1,450	1,130	1,070
20				231	136	105	*724	438	3,070	1,510	*1,020	1,000
21				303	3,170	80.7	*471	463	10,000	1,330	*1,070	1,060
22				239	3,290	66.7	*329	644	12,100	1,120	*1,090	1,190
23				192	2,840	59.7	*257	6,390	13,800	1,020	*1,120	1,110
24				165	*889	48.5	*257	2,360	16,800	1,030	*1,140	1,150
25				168	1,700	56.7	*244	1,360	21,800	1,030	*1,210	1,150
26				149	1,570	48.5	*639	876	23,300	1,010	*1,120	1,120
27				138	*1,110	42.4	*2,190	1,160	28,000	953	1,100	1,050
28				254	6,060	38.0	*1,390	1,780	19,500	977	1,160	‼1,150
29				131	2,290	34.3	*613	4,320	13,100	1,000	1,110	‼1,100
30				105	*986	31.4	*1,960	5,300	9,620	1,040	1,170	‼1,100
31					*636		*3,040	2,710		1,160		‼1,050

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Per Sq. Mile
April **	2.05	1.22	28	386	15	80.0	151	8,990	
May	8.52	1.32	28	15,700	1	100	997	61,300	
June	6.53	.78	7	8,660	30	28.9	*297	*17,700	
July	9.34	.79	7	17,900	1	29.7	*834	*51,300	
August	8.16	1.62	23	14,100	13	205	1,240	76,100	
September	14.15	3.66	27	32,400	1	1,610	8,530	508,000	
October	7.22	2.38	1	8,910	23	885	2,350	144,000	
November	2.90	2.38	2	1,400	15	853	1,090	65,000	
December	3.19	*2.50	2	1,760	31	*903	1,230	75,400	
The Period	14.15	.78		32,400		28.9	1,850	1,007,790	15.0

** Discharge record began April 1, 1936
* Partly estimated
‼ Estimated

RIO GRANDE AT BOQUILLAS STATION

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

RECORDS: Based on 5 meter measurements during the period. Computations by shifting channel methods. 1936 records good. Records available: From June, 1928, to April 21, 1936.

REMARKS: Large reservoirs and many irrigation diversions in the United States and Mexico greatly modify the river flow. With all closed basins eliminated the drainage area above this station is 69,373 square miles; 39,734 being in the United States and 29,639 in Mexico.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on October 4, 1932, when the extreme gage height was 24.50 feet and the extreme flow was 95,030 second feet. An extreme gage height of 32.4 was reported by local residents to have occurred in September 1904, discharge estimated to have been about 158,000 second feet. The lowest flow ever recorded was on May 16, 1935, when the extreme gage height was 0.00 foot and the extreme flow was 86.4 second feet. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	662	750	731	250								
2	712	671	968	243								
3	729	678	818	240								
4	728	652	1,120	221								
5	643	626	1,110	210								
6	603	709	1,200	199								
7	634	802	883	194								
8	595	745	711	181								
9	982	691	605	172								
10	616	704	548	164								
11	555	667	519	156								
12	540	745	506	151								
13	583	789	477	153								
14	597	845	516	155								
15	559	736	459	153								
16	537	770	433	151								
17	618	694	552	165								
18	691	632	594	169								
19	593	679	579	184								
20	639	778	684	203								
21	630	909	566	204								
22	567	918	449									
23	590	810	437									
24	695	730	407									
25	685	825	359									
26	693	842	321									
27	701	849	286									
28	791	923	272									
29	848	793	294									
30	752		296									
31	760		272									

Month	Mean Daily Gage Height—Feet		Mean Daily Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1935
	High	Low	Dates		Dates				
January	2.80	2.33	29	919	16	523	653	40,100	*84,622
February	2.98	2.44	27	1,060	5	587	757	43,600	*67,019
March	3.38	1.96	2	1,490	31	259	580	35,600	*63,821
** April 1-21	2.07	1.60	2	316	16	151	187	7,770	56,892
									75,169
									79,157
									100,076
									198,122
									283,418
									213,377
									85,012
									77,051
The Period	3.38	1.60		1,490		151	599	127,070	1,383,736

** Daily discharge record discontinued April 21, 1936

* Normals for these months are for the period 1924 to 1936.

RIO GRANDE AT LANGTRY STATION, TEXAS

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

RECORDS: Based upon 29 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: May, 1900, to October, 1914; December, 1919, to March, 1920; and January, 1924, to December, 1936.

REMARKS: Large reservoirs and many irrigation diversions in the United States and Mexico, greatly modify the river flow. With all closed basins eliminated, the drainage area above this station is 77,518 square miles; 45,779 being in the United States and 31,739 in Mexico.

PREVIOUS EXTREME FLOWS: The 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 about 200,000 second feet. The lowest flow ever recorded was in May 1903, with an extreme of 270 second feet. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,040	1,110	1,290	641	494	*1,810	351	2,290	4,060	12,300	1,440	1,550
2	1,070	1,070	1,350	626	521	*1,270	469	2,910	2,910	*10,100	1,500	1,500
3	1,070	1,120	1,660	578	514	*973	498	1,880	2,310	*8,250	1,490	1,620
4	1,080	1,020	1,410	578	477	*788	862	1,740	5,070	*7,220	1,400	1,870
5	1,100	1,000	1,160	577	2,070	*714	703	1,350	6,030	*6,180	1,580	1,910
6	1,130	972	1,380	557	1,450	648	661	1,180	7,830	5,710	1,530	1,820
7	1,080	957	1,380	531	1,040	1,040	595	1,030	9,330	5,100	1,490	1,700
8	1,010	1,010	1,510	512	705	1,880	2,150	957	6,360	4,670	1,550	1,530
9	1,010	1,080	1,290	503	582	2,210	2,900	747	6,340	4,320	1,480	1,610
10	1,000	1,090	1,140	493	504	1,250	1,420	793	6,410	3,950	1,450	1,710
11	1,040	1,020	1,040	490	557	934	1,330	1,100	5,460	*3,590	1,470	1,600
12	1,050	1,040	955	481	715	767	1,160	787	*5,030	*3,300	1,490	1,670
13	977	1,020	921	472	1,020	667	874	664	6,030	*3,200	1,500	1,570
14	926	1,020	907	469	648	611	727	599	6,660	*2,900	1,500	1,650
15	921	1,110	893	453	544	585	586	538	"2,800	*2,800	1,500	1,580
16	953	1,150	879	444	520	617	733	522	"3,000	*2,600	1,340	1,580
17	939	1,120	872	435	529	641	1,190	831	"3,600	*2,300	1,360	1,620
18	901	1,070	817	420	523	546	832	793	"3,700	*2,100	1,280	1,540
19	915	1,050	845	405	687	497	675	732	"3,700	*2,050	1,420	1,560
20	969	978	930	396	502	621	804	911	"3,200	1,980	1,490	1,620
21	961	985	965	1,130	454	716	1,140	1,210	"3,100	1,820	1,500	1,570
22	945	1,100	1,000	687	682	621	1,030	940	"8,000	1,880	1,480	1,480
23	968	1,190	1,000	503	2,460	527	944	760	12,500	1,840	1,380	1,410
24	945	1,260	869	471	3,290	479	890	1,930	20,600	1,690	1,470	1,480
25	907	1,180	794	571	3,310	507	772	5,240	13,900	1,540	1,490	1,560
26	975	1,100	794	571	4,380	416	862	3,100	21,100	1,530	1,470	1,520
27	1,030	1,140	747	1,360	3,840	389	638	2,020	26,500	1,500	1,540	1,540
28	991	1,140	701	1,270	3,100	379	682	1,720	25,900	1,450	1,670	1,560
29	1,040	1,120	671	593	5,560	371	1,550	1,440	24,600	1,500	1,600	1,510
30	1,060		648	526	4,230	355	2,020	1,570	17,100	1,420	1,550	1,450
31	1,140		633		2,850		1,540	4,520		1,430		1,470

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	.93	.59	31	1,140	18	879	1,000	61,800	105,298
February	1.09	.69	24	1,280	7	949	1,080	61,900	85,428
March	2.14	.31	3	2,340	31	633	1,010	62,400	84,262
April	2.34	.00	27	2,570	20	396	591	35,200	73,562
May	4.93	.02	29	6,750	21	442	1,570	96,700	104,235
June	2.60	-.04	9	2,880	30	355	794	47,300	96,882
July	4.47	-.06	8	5,660	1	340	1,020	62,700	118,995
August	5.24	.24	25	7,320	16	508	1,510	92,800	216,800
September	16.98		24	32,600	21	"3,000	*9,100	*542,000	371,544
October	9.05	1.42	1	14,800	30	1,380	*3,620	*223,000	240,601
November	1.74	1.30	28	1,750	18	1,260	1,480	88,100	104,737
December	1.92	1.38	4	1,940	24	1,360	1,590	97,900	97,381
The Year	16.98	-.06		32,600		340	2,030	1,471,800	1,699,725

" Estimated
* 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 of the Southern Pacific Railroad 12 miles northwest of Comstock, Val Verde County, Texas, and 5-1/2 miles above the confluence with the Rio Grande. Zero of gage is 1,058.01 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 13 meter measurements during the year and one slope-area determination during 1935 flood. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1936 records good. Records available: March 17, 1898, to December 3, 1898; and May, 1900, to December, 1936.

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. With all closed basins eliminated, the drainage area above this station is 38,283 square miles, all in the United States.

PREVIOUS EXTREME FLOWS: The greatest 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. These extreme discharges are based upon additional data and correct the figures published in previous Water Bulletins. 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. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	437	342	267	237	360	260	205	227	213	758	316	310
2	427	342	3,100	233	291	208	592	227	222	678	316	313
3	383	325	1,260	233	267	237	248	227	205	622	313	322
4	355	312	665	227	245	260	248	213	316	628	301	313
5	351	299	479	230	237	241	216	208	263	659	305	297
6	355	295	528	227	233	241	7,280	208	227	603	302	301
7	351	275	432	227	233	230	3,720	205	211	511	306	297
8	342	267	374	233	233	241	991	205	211	360	306	297
9	342	267	355	233	230	224	678	208	222	458	291	293
10	333	267	338	237	219	230	494	208	224	402	324	297
11	333	267	312	237	216	224	442	205	227	402	325	292
12	333	267	307	237	484	241	388	205	227	393	308	292
13	333	267	295	237	422	237	393	205	211	379	308	292
14	333	267	295	233	303	227	397	200	197	335	308	288
15	333	267	291	237	233	696	379	200	200	322	304	288
16	333	267	287	233	233	585	351	200	208	315	303	285
17	346	267	275	233	227	329	346	202	379	315	295	281
18	346	267	267	227	227	256	307	197	438	311	295	289
19	355	267	267	227	818	237	291	187	275	307	299	297
20	360	267	267	233	241	227	299	179	360	295	299	290
21	360	267	260	233	233	222	279	179	279	292	307	282
22	351	267	260	233	245	219	271	174	275	284	307	286
23	342	267	260	233	405	219	263	176	267	347	319	283
24	333	267	263	233	472	230	267	174	252	309	287	287
25	325	267	256	227	660	213	267	179	248	322	286	287
26	333	267	252	224	371	202	267	237	263	336	290	299
27	342	267	245	520	303	205	263	241	18,800	323	294	296
28	333	267	237	968	325	230	245	211	4,740	314	306	296
29	342	267	233	698	275	233	233	205	1,500	377	294	284
30	333		237	422	267	219	230	211	977	346	310	293
31	333		241		263		230	211		328		289

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	.88	.64	1	437	25	325	349	21,400	23,750
February	.70	.50	2	351	29	267	278	16,000	18,554
March	8.70	.40	2	10,400	29	233	432	26,600	18,424
April	3.20	.36	28	2,110	26	222	288	17,100	16,593
May	3.40	.34	19	2,300	11	216	315	19,400	44,567
June	3.40	.28	15	2,300	26	200	261	15,500	33,495
July	12,70	.30	6	20,000	1	205	680	41,800	19,495
August	.56	.18	27	291	22	174	204	12,500	18,733
September	16,30	.26	27	31,100	14	195	1,090	64,700	59,448
October	1.50	.52	1	788	22	280	407	25,100	40,913
November	.64	.52	10	337	25	286	304	18,100	23,307
December	.62	.50	3	326	17	277	294	18,100	22,803
The Year	16.30	.18		31,100		174	408	296,300	340,082

GOODENOUGH SPRING STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder, located 1/2 mile above confluence with Rio Grande and 11-3/4 miles southwest of Comstock, Val Verde County, Texas. Zero of gage 971.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 11 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: February, 1929, to December, 1936.

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

PREVIOUS EXTREME FLOWS: The highest 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 gage height 17.30 on September 1, 1932.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*147	139	139	137	133	149	147	144	140	148	155	155
2	*147	139	139	133	132	148	148	145	141	146	155	155
3	*147	140	140	133	132	147	146	145	140	148	149	153
4	*147	138	*140	136	131	147	146	144	143	148	149	152
5	*147	139	*139	137	131	147	146	144	154	148	150	152
6	*146	139	*139	133	132	147	146	145	151	151	152	149
7	*146	138	*139	133	132	147	139	145	147	148	152	150
8	*146	139	*138	135	131	147	137	145	146	149	149	150
9	*146	138	*136	136	130	147	137	144	144	149	150	149
10	*145	138	*136	135	130	146	137	144	144	149	150	147
11	*145	*139	*136	135	130	146	137	144	144	*148	150	146
12	*145	*140	*135	136	130	146	137	144	143	*148	150	146
13	*145	*140	*135	136	129	146	137	143	143	*146	149	144
14	*144	*140	*135	136	129	147	137	143	143	146	149	144
15	*144	141	*135	136	130	147	138	143	141	148	149	146
16	*144	140	*134	136	130	147	139	143	144	148	147	146
17	*143	140	*134	134	130	146	140	142	144	148	149	144
18	*143	138	*134	134	130	146	142	142	142	148	149	139
19	*143	140	*135	134	129	146	144	142	152	148	147	138
20	*142	141	*135	134	129	146	144	142	157	148	147	138
21	*142	139	*136	134	129	147	144	142	155	146	147	138
22	*142	138	*137	134	130	148	144	141	152	146	147	135
23	*141	139	136	134	142	147	144	141	151	146	149	135
24	140	139	134	134	132	147	144	142	149	148	156	135
25	140	139	135	134	139	147	145	142	149	149	155	135
26	139	139	135	134	144	146	145	142	149	146	155	*135
27	137	138	134	134	145	146	145	141	212	149	153	*135
28	138	138	135	134	147	147	145	140	162	150	155	*135
29	139	139	135	133	147	148	145	140	149	152	155	135
30	139		135	133	147	148	145	140	148	153	155	133
31	139		136		148		144	140		155		132

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	*.71	.58	1	*148	27	136	*143	*8,800	9,619
February	.64	.55	3	143	17	137	139	8,000	8,590
March	.64	.55	3	143	24	134	*136	*8,370	8,977
April	.65	.52	16	146	2	131	135	8,010	8,276
May	2.22	.46	23	380	24	122	134	8,250	8,925
June	.75	.68	22	152	18	145	147	8,740	9,266
July	1.57	.64	6	269	10	136	142	8,760	9,486
August	.79	.72	3	146	31	138	143	8,780	9,205
September	1.93	.75	27	324	18	132	149	8,880	12,906
October	1.26	.85	6	211	14	145	148	9,120	11,154
November	.93	.85	24	158	4	146	151	8,970	10,218
December	.92	.75	1	156	31	130	143	8,780	9,986
The Year	2.22	.46		380		122	143	103,460	116,608

* Partly estimated

DEVILS RIVER STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder on main highway bridge, 12 miles northwest of Del Rio. 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 12 meter measurements, during the year. Computations by shifting channel methods. 1936 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, 1936, 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 drainage area above this station is 4,060 square miles, all in the United States.

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. This is a corrected figure from that given in previous Water Bulletins as a result of additional data. 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, when the extreme gage height was .84 foot and the extreme flow 0 second feet. Numerous records of extreme flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	572	540	466	459	420	533	‡500	*527	464	905	495	470
2	585	539	545	459	420	545	‡501	*516	464	751	576	479
3	585	551	532	440	410	533	‡502	*503	454	674	572	476
4	573	539	521	460	410	522	‡502	*503	577	635	471	457
5	561	527	486	493	399	522	‡503	*492	566	598	427	473
6	573	527	486	461	399	522	*15,500	*480	554	598	542	422
7	556	527	498	452	410	522	8,960	*469	475	635	502	539
8	573	537	509	415	420	466	3,760	*468	464	587	365	347
9	572	503	485	443	410	522	1,420	*458	444	575	559	490
10	571	481	497	463	410	466	947	*447	433	575	483	475
11	571	480	485	432	420	487	791	*436	433	552	362	481
12	571	490	464	453	410	470	726	*435	454	552	536	452
13	570	490	464	463	410	467	676	*424	454	552	531	441
14	558	480	475	463	410	467	676	*423	444	552	518	456
15	558	489	474	421	407	468	767	497	543	564	381	449
16	557	501	484	390	452	458	741	423	4,330	*564	563	444
17	545	535	432	432	420	448	691	434	28,000	*564	454	459
18	647	524	484	443	410	439	628	465	17,500	*564	463	483
19	536	501	475	443	827	450	640	365	6,150	*564	449	493
20	556	501	443	443	667	451	615	485	1,900	*564	439	436
21	544	488	454	453	543	441	614	423	1,020	*564	448	451
22	555	488	486	421	420	479	591	422	806	*564	397	446
23	555	500	468	432	‡2,750	453	579	496	724	*564	526	447
24	554	500	477	421	‡7,000	475	579	464	674	*552	479	445
25	554	500	456	422	‡3,000	‡496	554	422	648	*552	465	450
26	542	500	478	886	‡2,500	‡497	*554	444	661	*552	366	452
27	541	496	447	1,610	*603	‡497	*553	362	8,610	529	529	444
28	588	487	447	481	*568	‡498	*552	464	7,230	573	487	451
29	565	499	469	441	*557	‡499	*552	471	2,630	529	389	460
30	540		458	410	*557	‡500	*540	464	1,300	516	534	461
31	540		458		*545		*540	464		511		441

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.73	1.01	18	783	28	87	562	34,500	25,912
February	1.65	.95	4	673	27	48	508	29,200	23,377
March	1.69	.95	2	717	2	48	478	29,400	24,511
April	3.95	.89	27	6,490	24	22.4	497	29,600	28,231
May	4.91	1.16	24	10,700	23	152	*903	*55,500	55,472
June	1.91	.96	28	1,040	21	59	486	28,900	53,015
July	11.05	‡1.50	6	61,400	1	‡500	*1,490	*91,700	33,638
August	6.71	.70	20	754	20	‡0	*456	*28,100	26,580
September	8.80	.82	17	38,300	15	1.0	*2,980	*177,000	134,148
October	1.90	1.22	1	1,020	7	229	*585	*36,000	61,697
November	1.74	.73	5	788	5	‡0	477	28,400	28,365
December	1.68	.77	23	702	8	‡0	457	28,100	27,775
The Year	11.05	.70		61,400		0	822	596,400	522,721

* Partly estimated
‡ Estimated

RIO GRANDE AT DEL RIO STATION

DESCRIPTION: Water-stage recorder, located 900 feet upstream from international highway bridge at Del Rio, Val Verde County, 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 26 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: December, 1923, to December, 1936. Records are also available for station 11 miles upstream from May, 1900, to April, 1915; and for station 7-1/2 miles upstream at McKee's Switch from December, 1919, to March, 1920. Several springs but no important tributaries enter the river between the various station sites.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated, the drainage area above this station is 123,164 square miles; 88,539 being in the United States and 34,625 in 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 foot and the extreme flow 938 second feet. Numerous records of previous flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,410	2,230	2,150	1,680	1,800	3,770	1,720	2,700	6,170	18,000	2,720	2,720
2	2,370	2,240	2,330	1,650	1,660	2,920	2,870	3,760	4,940	14,300	2,800	2,750
3	2,360	2,210	5,430	1,640	1,600	2,510	2,440	3,870	3,930	12,100	2,790	2,700
4	2,360	2,250	3,220	1,610	1,580	2,250	2,020	*3,080	4,580	9,790	2,710	2,790
5	2,320	2,180	2,830	1,600	1,520	2,100	2,090	*2,850	5,910	8,360	2,590	3,050
6	2,340	2,150	2,430	1,590	2,740	2,010	10,900	*2,500	8,100	7,510	2,830	3,020
7	2,330	2,120	2,620	1,560	2,400	1,950	19,900	2,400	*9,650	7,050	2,770	3,090
8	2,310	2,110	2,590	1,510	2,030	1,910	3,990	2,240	*9,590	6,330	2,590	2,870
9	2,220	2,080	2,660	1,510	1,730	2,820	5,870	2,160	7,070	5,910	2,760	2,800
10	2,200	2,120	2,480	1,510	1,580	3,190	4,770	‡1,800	7,150	5,520	2,690	2,870
11	2,190	2,150	2,280	1,530	1,510	2,500	3,340	‡1,850	7,060	5,110	2,590	2,940
12	2,190	2,100	2,140	1,500	1,460	2,150	3,030	‡2,050	6,110	4,630	2,710	2,830
13	2,190	2,100	2,060	1,490	1,820	1,990	2,640	‡1,850	5,360	4,420	2,710	2,860
14	2,110	2,080	2,030	1,490	1,990	1,860	2,400	‡1,700	7,030	4,280	2,670	2,800
15	2,070	2,060	2,000	1,470	1,700	1,770	2,310	‡1,700	*7,660	4,070	2,550	2,860
16	2,040	2,160	1,960	1,460	1,560	2,050	2,250	‡1,700	*7,280	3,840	2,660	2,800
17	2,080	2,180	1,880	1,440	1,480	1,980	2,200	‡1,600	27,200	3,710	2,440	2,810
18	2,150	2,210	1,920	1,450	1,460	1,860	2,560	‡1,800	25,200	3,620	2,430	2,820
19	2,030	2,140	1,870	1,430	2,110	1,740	2,230	*1,900	12,400	3,350	2,350	2,790
20	2,070	2,120	1,820	1,420	2,190	1,660	2,060	*1,880	6,280	3,300	2,450	2,730
21	2,100	2,070	1,870	1,430	1,700	1,700	2,040	*1,890	4,850	3,260	2,540	2,790
22	2,120	2,030	1,940	1,830	1,570	1,900	2,360	*2,100	4,550	3,130	2,480	2,720
23	2,090	2,090	1,960	1,820	2,410	1,760	2,240	*1,860	*9,000	3,150	2,610	2,650
24	2,100	2,210	1,990	1,530	12,000	1,720	2,180	*1,780	*15,600	3,100	2,470	2,600
25	2,070	2,290	1,880	1,490	7,340	1,770	2,140	3,030	*18,300	3,040	2,540	2,630
26	2,020	2,230	1,800	2,210	6,940	1,670	2,040	6,000	16,900	2,920	2,490	2,700
27	2,040	2,130	1,790	4,310	6,150	1,540	2,090	3,770	*34,500	2,860	2,630	2,650
28	2,110	2,150	1,750	2,940	4,980	1,540	1,930	2,880	*46,300	2,880	2,660	2,690
29	2,110	2,150	1,730	3,100	5,030	3,720	1,900	2,660	*29,600	2,850	2,700	2,700
30	2,150		1,720	2,100	6,350	2,010	2,570	2,450	*23,900	2,890	2,790	2,640
31	2,160		1,700		5,020		3,110	2,550		2,760		2,580

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.86	1.50	1	2,550	19	1,840	2,170	134,000	180,059
February	1.81	1.51	25	2,310	15	1,900	2,150	124,000	149,345
March	4.43	1.30	3	8,030	31	1,660	2,220	137,000	151,428
April	4.75	1.10	26	9,020	22	1,400	1,780	106,000	140,488
May	6.74	1.07	24	15,900	12	1,390	3,080	189,000	230,234
June	3.88	1.02	29	7,260	27	1,480	2,140	128,000	220,694
July	11.13	1.15	6	33,900	1	1,670	3,590	221,000	194,801
August	3.88		26	7,400	17	‡1,550	*2,460	*151,000	283,259
September	15.77	2.18	28	66,200	1	3,360	*12,700	*758,000	628,467
October	7.41	1.45	1	20,500	31	2,510	5,420	333,000	392,151
November	1.77	1.20	6	3,010	19	2,060	2,620	156,000	186,131
December	1.86	1.26	6	3,290	31	2,300	2,780	171,000	175,165
The Year	15.77	1.02		66,200		1,390	3,590	2,608,000	2,932,222

‡ Estimated

* Partly estimated

SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder at Silos farm road bridge 1-3/4 mile south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande, and 4 miles below the Del Rio gaging station on the Rio Grande. Zero of gage is 875.05 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 9 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records Available: September 1, 1931, to December 31, 1936.

REMARKS: The flow of this spring-fed creek is greatly modified by irrigation and municipal diversions above this station. The drainage area above this station is 62 square miles, all in the United States.

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 72 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 reached a gage height of 15.05 feet on September 1, 1932.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	88.9	95.5	58.5	57.4	*70.2	81.6	*83.7	56.6	66.5	61.1	70.2	73.7
2	87.7	95.5	71.8	57.4	*70.2	93.1	*83.8	55.7	57.7	60.1	69.3	75.8
3	87.6	95.6	73.0	60.1	*70.2	93.1	*83.9	54.7	53.1	60.0	70.4	74.8
4	88.6	96.8	76.1	57.4	*70.2	94.3	*83.9	55.6	61.4	61.0	67.3	74.8
5	88.5	96.9	69.9	58.4	*70.2	93.1	*83.9	57.3	54.8	61.9	65.4	74.9
6	101	98.1	69.9	59.3	*70.2	92.0	*81.7	58.2	54.7	62.8	65.4	75.9
7	108	99.4	71.9	60.2	*70.2	90.9	*79.7	58.1	53.8	65.7	66.5	74.9
8	107	95.8	72.0	61.1	*70.2	88.6	*77.6	58.0	54.6	66.7	69.6	71.6
9	107	89.0	72.0	63.0	*70.2	83.0	*75.4	59.0	54.6	65.6	71.8	73.9
10	107	87.9	74.1	61.1	*70.2	76.6	*73.4	57.9	54.5	64.6	73.0	75.0
11	106	72.7	74.1	63.0	*68.2	76.6	*71.4	56.1	54.5	64.5	73.0	75.0
12	106	68.9	73.2	63.9	67.2	76.6	*69.4	56.0	55.3	65.5	75.2	76.0
13	106	70.9	69.2	64.9	68.2	74.4	*67.4	56.9	58.1	65.4	77.3	77.1
14	104	69.0	69.2	62.0	64.3	74.5	*68.5	57.7	58.9	66.4	77.4	75.1
15	104	76.2	73.2	54.0	65.2	75.6	*68.6	58.7	61.9	66.3	77.4	68.7
16	103	75.3	68.2	59.0	64.3	69.3	130	59.5	63.7	66.3	73.3	67.7
17	104	70.1	68.3	57.5	63.3	64.5	72.7	56.6	69.8	66.2	71.1	65.7
18	103	71.2	64.5	54.9	63.3	63.5	67.7	55.6	207	66.2	72.2	67.8
19	103	65.4	64.5	54.9	151	62.5	62.9	56.5	70.7	65.1	73.4	68.8
20	103	63.1	63.5	54.0	79.7	62.5	62.9	56.5	67.5	66.1	74.5	66.8
21	103	57.2	63.5	59.3	77.6	63.6	60.0	57.3	66.5	65.0	73.4	67.8
22	103	58.1	66.5	57.5	81.9	62.6	60.9	57.3	67.4	66.0	73.4	67.9
23	103	59.1	65.5	58.4	132	61.6	60.8	58.2	65.4	65.9	75.6	66.9
24	102	53.8	59.9	59.3	130	99.0	59.9	58.2	62.4	71.1	75.6	68.9
25	103	58.3	66.5	59.3	110	68.6	60.7	63.9	62.4	71.0	75.6	71.0
26	106	60.1	71.3	377	93.3	63.7	60.7	69.8	62.4	68.9	73.5	72.1
27	106	56.6	64.7	*1,020	86.4	62.7	59.7	60.8	83.9	66.9	70.4	72.1
28	94.0	57.5	64.7	*72.3	241	66.7	59.7	60.8	83.8	72.2	71.4	70.1
29	95.3	59.4	65.6	*70.2	91.8	*682	59.6	62.7	64.1	78.7	72.5	68.0
30	97.7		65.6	*70.2	87.3	*83.7	59.5	71.2	63.1	78.7	72.5	70.2
31	95.4		63.8		78.4		58.5	78.0		77.7		66.1

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Average 1931 to 1936
January	1.76	1.36	6	112	28	65.2	101	6,190	4,265
February	1.68	1.00	7	100	20	34.2	74.9	4,310	3,275
March	1.77	1.13	2	113	24	46.3	68.2	4,190	2,994
April	11.95	1.15	27	6,060	15	48.4	*103	*6,120	2,943
May	6.85	1.20	28	1,800	17	60.3	86	5,290	4,332
June	9.22	1.19	29	3,440	20	59.6	96.7	5,750	12,266
July	3.07	1.14	16	361	31	55.8	71.2	4,380	3,696
August	1.79	1.09	26	129	3	51.0	59.3	3,650	3,678
September	4.93	1.10	18	882	3	50.3	67.2	4,000	7,187
October	1.42	1.19	29	79.9	1	57.2	66.8	4,110	4,247
November	1.40	1.26	1	77.7	6	63.4	72.3	4,300	3,652
December	1.40	1.22	13	79.2	31	61.2	71.5	4,390	3,748
The Year	11.95	1.00		6,060		34.2	78.1	56,680	56,283

*Partly estimated

PINTO CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder, cable with sit down cable car, and concrete control dam, 500 feet above Del Rio-Eagle Pass highway and 5-1/2 miles above confluence with Rio Grande. Zero of gage is 854.61 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 10 meter measurements and permanent rating curve. 1936 records good. Records available: November, 1928, to December, 1936.

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

PREVIOUS EXTREME FLOWS: The greatest 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. The creek is often dry.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*26.0	*23.0	18.5	14.0	9.0	7.6	30.0	3.0	3.1	9.6	13.5	16.4
2	*26.0	*23.0	25.0	13.0	8.7	7.2	52.7	3.0	3.0	9.3	13.5	17.0
3	*25.0	*23.0	29.0	11.5	8.3	7.2	24.8	2.9	3.0	9.0	12.5	17.0
4	*25.0	*23.0	19.5	10.4	7.8	6.7	18.9	2.8	3.1	8.7	13.5	16.4
5	*25.0	*21.5	18.5	10.4	7.4	6.0	13.9	2.7	2.9	8.7	13.0	17.0
6	*24.0	*21.5	18.5	9.4	6.9	5.8	11.1	2.7	3.0	9.0	12.5	17.7
7	*24.0	*21.5	18.5	11.0	6.7	5.3	9.5	2.7	3.1	9.3	13.0	17.0
8	*23.0	*21.5	17.5	11.0	6.6	5.0	8.4	2.7	3.0	10.6	12.5	17.0
9	*23.0	*21.5	17.5	11.0	7.6	4.8	7.9	2.6	3.0	10.6	12.5	15.6
10	*24.0	*21.5	17.5	10.4	11.7	4.6	7.2	2.6	2.9	10.0	14.5	16.4
11	*24.0	*21.5	17.5	10.0	11.7	*4.5	7.0	2.6	2.9	9.6	15.5	16.4
12	*24.0	*21.5	17.5	8.7	11.2	*4.3	6.6	2.5	2.9	9.3	16.4	15.0
13	*23.0	*20.5	17.5	7.4	8.5	4.5	7.4	2.5	2.9	9.0	15.5	15.0
14	*23.0	*20.5	17.5	6.6	8.3	6.9	6.3	2.5	3.0	9.0	15.0	15.0
15	*23.0	*20.5	17.5	6.2	6.4	7.4	7.4	2.4	3.2	9.0	14.5	14.5
16	*23.0	*20.5	15.5	16.4	6.1	7.0	23.4	2.3	31.5	9.0	14.0	14.5
17	*23.0	*20.5	14.5	11.5	5.5	6.4	12.6	*2.2	17.0	9.3	14.0	15.0
18	*23.0	*20.5	14.5	10.7	4.8	5.5	8.9	*2.2	33.0	9.0	14.5	14.5
19	*23.0	*19.5	15.5	11.7	17.3	5.0	7.9	*2.1	5.6	8.4	15.0	14.5
20	*23.0	*19.5	15.5	13.0	14.0	4.9	6.4	*2.1	4.6	7.9	15.0	14.5
21	*23.0	*19.5	15.5	13.0	6.6	4.9	5.1	*2.0	4.4	8.1	15.5	15.0
22	*23.0	*19.5	15.5	13.0	10.6	5.2	5.1	*2.0	4.4	8.7	15.5	15.0
23	*23.0	*19.5	15.5	13.0	7.2	4.9	4.4	2.1	4.4	10.0	16.4	*15.0
24	*23.0	*19.5	15.5	13.0	63.0	4.7	4.2	2.5	5.1	13.0	16.4	*14.5
25	*23.0	*19.5	15.5	13.0	24.0	5.2	4.2	2.3	7.9	15.6	16.4	*14.5
26	*23.0	19.5	15.5	14.0	14.0	4.8	3.7	2.2	7.9	14.0	16.4	*14.0
27	*23.0	19.5	14.5	30.4	10.2	4.6	3.5	2.4	15.0	12.2	16.4	*14.0
28	*23.0	18.5	14.0	11.5	47.9	23.8	3.4	2.5	17.0	14.0	16.4	*13.5
29	*23.0	18.5	14.0	10.7	15.5	886	3.3	2.6	13.0	15.6	16.4	*13.5
30	*23.0		13.0	9.5	11.2	33.0	3.2	3.0	10.2	15.6	16.4	*13.5
31	*23.0		14.0		8.3		3.2	3.0		15.0		*13.0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1928 to 1936
	High	Low	Dates		Dates				
January	*3.65	*3.62	1	*26.0	31	*23.0	*23.5	*1,450	658
February	*3.63	3.57	1	*24.0	28	17.5	*20.7	*1,190	565
March	3.76	3.52	2	43.0	30	13.0	17.0	1,040	814
April	4.12	3.34	16	155	16	6.0	11.8	705	973
May	4.31	3.14	28	225	19	4.7	12.7	780	3,741
June	7.75	3.00	29	5,600	13	*4.0	36.5	2,170	4,366
July	4.11	2.71	2	145	31	3.1	10.4	638	1,512
August	2.71	2.31	1	3.1	22	2.0	2.5	154	6,382
September	4.37	2.62	18	250	13	2.8	7.5	448	3,858
October	3.49	3.28	25	15.6	20	7.6	10.5	647	1,558
November	3.51	3.41	23	17.0	3	11.8	14.8	878	700
December	3.52	*3.44	6	17.7	31	*13.0	15.2	936	766
The Year	7.75	2.31		5,600		2.0	15.2	11,036	25,893

* Partly estimated

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 617 second feet. The station is located 4.4 miles west of Jimenez, Coahuila, and five miles above the confluence with the Rio Grande.

RECORDS: Based upon 39 meter measurements. Computations by shifting channel methods. Records for 1936 good. Records available: 1924 to 1936.

REMARKS: This station was constructed by the Mexican Section of the Commission and completed in November, 1932. From 1924 to 1932 there was a staff-gage at Paso del Salto, 3.1 miles upstream from the present station. Readings were made by agents of the Department of Agriculture, Monterrey, N. L. There is another gaging station on Rio San Diego at "Cabeceras", 31 miles upstream from the present station which is operated by the Mexican National Irrigation Commission. The flow of this spring-fed stream is modified by small storage reservoirs at San Miguel and Centenario on the National Irrigation System No. 6 at San Carlos, Coahuila, and by irrigation of Dolores Hacienda just above this station. One-fourth mile downstream from this gaging station water is diverted for the Jimenez Community. The drainage area above this station is 840 square miles, entirely in Mexico.

PREVIOUS EXTREME FLOWS: From reports by local inhabitants, the water level in 1905 reached a height of 20.67 feet on the present gage scale, the discharge being unknown. The stream never runs dry. The lowest flow recorded was 15.9 second feet on June 20, 1934.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	262	149	103	93.6	66.7	231	216	84.0	75.2	137	137	84.0
2	262	161	188	93.6	66.7	231	254	84.0	75.2	137	125	103
3	279	174	188	93.6	66.7	216	292	75.2	75.2	137	125	103
4	279	175	149	103	66.7	216	311	66.7	75.2	149	103	93.6
5	279	174	125	93.6	66.7	216	188	66.7	75.2	149	93.6	93.6
6	279	175	125	75.2	66.7	231	149	58.6	66.7	161	93.6	93.6
7	279	161	125	75.2	66.7	247	137	66.7	66.7	174	103	93.6
8	262	161	125	66.7	66.7	231	125	66.7	66.7	175	149	93.6
9	247	161	161	66.7	66.7	231	125	75.2	66.7	174	161	75.2
10	247	161	188	58.6	100	231	125	66.7	58.6	175	161	75.2
11	231	161	216	58.6	137	202	125	75.2	58.6	174	161	84.0
12	231	161	247	66.7	114	202	125	75.2	58.6	175	174	84.0
13	247	161	247	66.7	103	188	137	66.7	58.6	174	175	84.0
14	262	161	247	66.7	84	161	137	66.7	58.6	175	174	84.0
15	262	161	247	66.7	84	114	137	66.7	51.2	174	161	84.0
16	231	149	247	66.7	75.2	93.6	137	66.7	58.6	175	137	84.0
17	216	137	231	75.2	84.0	93.6	137	66.7	66.7	174	137	84.0
18	216	137	202	75.2	93.6	93.6	137	66.7	75.2	175	137	84.0
19	231	125	161	75.2	84.0	84.0	125	58.6	114	161	137	84.0
20	188	104	137	75.2	75.2	84.0	125	58.6	103	149	137	84.0
21	174	93.6	125	66.7	66.7	84.0	125	58.6	84.0	125	125	84.0
22	174	93.6	125	66.7	93.6	75.2	125	51.2	84.0	84.0	114	84.0
23	174	93.6	114	66.7	93.6	75.2	125	44.1	84.0	84.0	114	84.0
24	161	93.6	114	66.7	137	75.2	114	44.1	84.0	103	114	84.0
25	161	93.6	114	66.7	247	75.2	114	58.6	84.0	103	114	84.0
26	161	103	104	111	188	75.2	114	51.2	93.6	103	125	84.0
27	161	93.6	93.6	94.3	295	75.2	103	51.2	114	103	125	84.0
28	161	103	93.6	66.7	327	123	93.6	51.2	125	114	125	84.0
29	161	104	93.6	66.7	311	5,050	75.2	66.7	125	125	103	84.0
30	149		93.6	66.7	262	434	84.0	58.6	137	137	103	84.0
31	149		93.6		247		84.0	75.2		137		84.0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1933 to 1936
	High	Low	Dates		Dates				
January	2.62	2.33		279		149	218	13,400	15,082
February	2.39	2.17		174	24	84	137	7,900	9,932
March	2.69	2.17	2	311		93.6	156	9,570	9,075
April	3.84	2.03	26	978		58.6	75.1	4,470	9,892
May	2.76	2.07	10	420	-	66.7	126	7,740	36,432
June	10.17	2.07	29	18,900	25-26	66.7	324	19,300	23,160
July	3.22	2.10	3	572	29-30	75.2	142	8,730	11,022
August	2.13	1.97	1-2	93.6	23-24	44.1	64.2	3,950	12,050
September	2.30	1.97	30	137	16	44.1	80.7	4,800	23,755
October	2.56	2.10	6	247	22-23	75.2	145	8,910	39,632
November	2.39	2.13		174	30	84.0	131	7,820	21,938
December	2.20	2.10	2	103		75.2	86.2	5,300	15,488
The Year	10.17	1.97		18,900		44.1	140	101,890	227,458

RIO SAN RODRIGO STATION NEAR EL MORAL, COAHUILA

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

RECORDS: Based upon 51 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: 1922 to 1936.

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

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 July 21, 1934, when discharge was 1.4 second feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	108	91.5	49.1	53.7	77.3	70.6	125	49.1	59.3	59.3	64.6	49.1
2	108	91.5	108	53.7	64.6	70.6	125	44.5	53.7	59.3	59.3	49.1
3	117	84.4	99.2	49.1	59.3	64.6	108	44.5	49.1	59.3	53.7	49.1
4	108	84.4	64.6	49.1	49.1	64.6	99.2	44.5	44.5	59.3	53.7	49.1
5	108	77.3	59.3	49.1	44.5	64.6	91.5	44.5	44.5	59.3	53.7	53.7
6	117	70.6	59.3	49.1	44.5	64.6	91.5	44.5	44.5	59.3	53.7	49.1
7	117	70.6	59.3	49.1	44.5	64.6	84.4	44.5	44.5	59.3	53.7	49.1
8	117	70.6	59.3	49.1	40.3	64.6	84.4	44.5	44.5	59.3	53.7	49.1
9	117	70.6	59.3	49.1	44.5	64.6	77.3	44.5	44.5	59.3	53.7	53.7
10	117	70.6	59.3	44.5	59.3	64.6	70.6	44.5	44.5	53.7	53.7	53.7
11	125	77.3	59.3	44.5	77.3	64.6	64.6	44.5	40.3	53.7	59.3	53.7
12	125	70.6	53.7	44.5	49.1	64.6	64.6	44.5	40.3	53.7	64.6	49.1
13	117	70.6	53.7	44.5	49.1	64.6	70.6	44.5	40.3	53.7	64.6	49.1
14	117	70.6	53.7	44.5	53.7	64.6	77.3	44.5	44.5	59.3	59.3	49.1
15	108	70.6	49.1	40.3	49.1	64.6	64.6	44.5	44.5	59.3	59.3	49.1
16	99.2	70.6	49.1	40.3	44.5	64.6	64.6	44.5	44.5	59.3	59.3	44.5
17	91.5	64.6	49.1	40.3	44.5	64.6	64.6	44.5	49.1	59.3	59.3	44.5
18	91.5	59.3	49.1	36.4	44.5	64.6	59.3	44.5	91.5	59.3	59.3	44.5
19	91.5	59.3	49.1	36.4	44.5	59.3	59.3	40.3	59.3	53.7	59.3	44.5
20	99.2	59.3	49.1	36.4	40.3	59.3	53.7	40.3	53.7	53.7	59.3	44.5
21	99.2	64.6	49.1	36.4	40.3	59.3	53.7	40.3	53.7	59.3	53.7	44.5
22	99.2	64.6	49.1	40.3	260	59.3	53.7	40.3	53.7	59.3	53.7	44.5
23	99.2	59.3	49.1	36.4	125	53.7	53.7	40.3	53.7	64.6	53.7	49.1
24	99.2	59.3	49.1	36.4	155	59.3	53.7	40.3	53.7	64.6	53.7	44.5
25	99.2	59.3	53.7	36.4	260	59.3	53.7	40.3	53.7	64.6	53.7	44.5
26	99.2	59.3	53.7	36.4	168	59.3	49.1	44.5	53.7	64.6	49.1	44.5
27	99.2	53.7	53.7	180	117	59.3	49.1	40.3	64.6	64.6	49.1	44.5
28	99.2	49.1	53.7	406	99.2	167	49.1	40.3	64.6	77.3	53.7	44.5
29	99.2	44.5	53.7	212	84.4	625	49.1	44.5	59.3	77.3	53.7	44.5
30	99.2		53.7	117	77.3	168	49.1	53.7	59.3	77.3	49.1	44.5
31	91.5		53.7		77.3		49.1	59.3		70.6		40.3

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1936
	High	Low	Dates		Dates				
January	1.90	1.74	11	125	8	84.4	106	6,510	5,964
February	1.77	1.51		91.5	29	44.5	67.8	3,900	4,174
March	2.00	1.54	2	157		49.1	56.9	3,500	4,139
April	3.15	1.41	27	646	25	32.5	68.1	4,050	3,543
May	3.44	1.48	22	840		40.3	80.2	4,930	11,714
June	4.33	1.57	29	1,660		53.7	88.7	5,280	10,107
July	1.97	1.54	2	145		49.1	69.8	4,290	4,696
August	1.64	1.44	30	64.6	25	36.4	44.2	2,720	3,774
September	1.90	1.48	18	125		40.3	51.8	3,080	56,704
October	1.71	1.57		77.3		53.7	61.1	3,760	20,718
November	1.67	1.54	12	70.6		49.1	56.0	3,330	8,460
December	1.61	1.48	10	59.3		40.3	47.3	2,910	6,812
The Year	4.33	1.41		1,660		32.5	66.5	48,260	140,805

RIO GRANDE AT EAGLE PASS STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located 1/2 mile above the international highway bridge at Eagle Pass, Texas. Zero of gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 32 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: May, 1900, to April, 1916; November, 1923, to December, 1936.

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

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on September 2, 1932, when the extreme gage height was 49.00 feet, discharge 569,000 second feet. The lowest flow ever recorded was on May 14, 1935, when the extreme gage height was 2.85 feet and the extreme flow 924 second feet. Numerous records of extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,130	2,620	2,450	1,920	2,380	5,380	4,330	3,330	3,600	21,100	3,050	3,150
2	3,100	2,730	*2,760	1,840	2,090	4,150	2,680	2,920	6,380	15,700	2,960	3,020
3	3,070	2,720	4,000	1,790	1,930	3,450	4,170	4,350	4,870	13,200	3,030	3,060
4	3,060	2,630	5,320	1,770	1,850	3,010	3,270	3,830	4,410	11,000	2,940	2,950
5	3,040	2,620	3,580	1,790	1,810	2,730	2,480	*3,360	5,880	9,380	2,900	3,000
6	3,040	2,530	3,220	1,740	1,760	2,540	2,230	*3,000	6,420	8,400	2,760	3,270
7	3,030	2,460	2,880	1,720	3,060	2,400	18,600	*2,650	8,640	8,180	3,050	3,330
8	2,990	2,440	3,280	1,700	2,630	2,250	16,900	2,510	9,870	7,300	2,910	3,260
9	2,950	2,420	2,990	1,650	2,270	*2,390	6,600	2,370	8,120	6,690	2,850	3,070
10	2,900	2,410	2,990	1,650	*1,990	3,440	6,320	2,260	6,990	6,250	3,180	2,950
11	2,900	2,490	2,830	1,640	*1,990	3,160	4,530	*2,060	*7,200	5,900	3,080	2,960
12	2,910	2,510	2,700	1,650	*1,790	2,580	3,590	*2,260	6,930	5,500	2,970	3,060
13	2,900	2,430	2,580	1,600	*1,690	2,260	3,340	*2,310	6,150	5,050	3,170	2,920
14	2,900	2,400	2,510	1,590	2,130	2,090	2,900	*2,180	6,160	4,910	3,190	2,990
15	2,800	2,380	2,470	1,630	2,280	*1,990	2,880	*1,960	7,850	*4,680	3,120	2,870
16	2,740	2,370	2,440	*1,680	1,950	*1,890	2,620	*2,060	6,490	*4,390	3,040	2,950
17	2,700	2,490	2,320	1,720	1,760	*2,120	2,610	*1,920	13,200	*4,100	3,180	2,890
18	2,710	2,530	2,220	1,560	1,670	2,040	2,580	*1,770	30,900	*3,860	2,980	2,880
19	2,780	2,520	2,240	1,570	1,790	*1,900	2,880	*1,840	21,100	*3,700	2,990	2,920
20	2,600	2,460	2,160	1,550	2,400	*1,800	2,550	*1,880	9,000	*3,660	2,930	2,840
21	2,640	2,450	2,130	1,590	2,360	*1,700	2,360	1,930	6,360	*3,570	3,080	2,860
22	2,650	2,310	2,210	1,570	1,940	*1,730	2,450	2,030	5,270	3,440	3,040	2,910
23	2,660	2,310	2,310	*1,980	1,860	*2,060	2,790	2,360	5,670	3,370	3,010	2,810
24	2,640	2,460	2,310	1,940	7,760	1,840	2,690	2,190	12,400	3,510	3,120	2,710
25	2,660	2,560	2,310	1,620	10,000	1,860	2,540	2,010	20,900	3,430	2,940	2,690
26	2,620	2,630	2,200	1,570	8,770	1,840	2,470	4,390	17,900	3,320	2,970	2,760
27	2,540	2,520	2,070	6,090	6,910	1,720	2,340	5,210	21,000	3,170	2,920	2,820
28	2,550	2,400	2,010	3,780	7,000	4,450	2,390	3,710	47,000	3,160	3,000	2,760
29	2,620	2,440	1,990	3,630	5,740	51,900	2,170	3,150	38,700	3,210	3,070	2,780
30	2,600		1,960	3,300	6,120	21,900	2,170	3,130	29,000	3,210	3,100	2,840
31	2,590		1,930		6,720		2,980	3,090		3,220		2,730

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	4.50	4.15	1	3,130	20	2,490	2,810	173,000	201,979
February	4.33	4.03	2	2,740	22	2,260	2,490	143,000	163,545
March	6.32	3.81	3	7,300	31	1,900	2,620	161,000	164,078
April	7.14	3.55	27	9,690	20	1,510	2,030	121,000	154,262
May	8.50	3.58	24	14,600	18	1,610	3,430	211,000	282,226
June	19.92	3.51	29	79,500	21	1,640	4,820	287,000	277,869
July	11.38	3.59	7	27,800	6	2,060	4,050	249,000	221,207
August	5.75	*3.35	26	6,890	18	*1,730	2,710	167,000	303,316
September	16.12	4.09	28	58,300	1	3,030	12,800	762,000	671,612
October	10.66	3.95	1	25,000	30	3,000	6,110	376,000	449,593
November	4.08	3.65	21	3,420	6	2,550	3,020	180,000	221,618
December	4.16	3.62	6	3,560	26	2,430	2,940	181,000	199,948
The Year	19.92	*3.35		79,500		1,510	4,150	3,011,000	3,311,253

* Partly 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 on the outskirts of Villa de Fuente, 5 miles above the confluence with the Rio Grande and 5.6 miles below the confluence of the Rio San Antonio.

RECORDS: Based upon 102 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: 1922 to 1936.

REMARKS: From 1922 to 1932 there were made daily 3 staff-gage readings 2,300 feet downstream from the present station by Agents of the Mexican Department of Agriculture at Monterrey, N.L. 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. The present station was constructed by the Mexican Section of this Commission and completed in September, 1932. The flow of this spring-fed stream is modified by irrigation diversions in the drainage basins of the San Antonio and the Escondido. The drainage area above this station is 1,170 square miles, entirely in Mexico.

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 feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	69.9	47.0	22.6	22.6	28.6	54.7	147	44.1	55.1	51.2	41.0	48.0
2	67.8	47.0	22.6	22.6	28.6	50.9	201	41.0	51.2	48.0	37.8	37.8
3	69.9	47.0	26.5	22.6	26.5	47.7	155	44.1	41.0	48.0	37.8	37.8
4	69.9	43.4	22.6	24.4	26.5	44.5	108	37.8	35.0	48.0	41.0	41.0
5	67.8	39.9	20.8	22.6	20.8	36.0	101	37.8	35.0	48.0	41.0	44.1
6	67.8	38.1	20.8	22.6	14.8	28.6	97.5	35.0	35.0	48.0	41.0	48.0
7	67.8	38.1	22.6	22.6	14.8	24.4	97.5	32.1	35.0	48.0	41.0	55.1
8	67.8	38.1	24.4	20.8	14.8	17.7	93.9	32.1	29.7	37.8	32.1	64.3
9	67.8	35.3	24.4	20.8	13.4	12.4	90.4	32.1	20.8	29.7	24.7	71.3
10	67.8	32.8	24.4	19.1	12.4	12.4	86.9	32.1	20.8	20.8	29.7	71.3
11	69.9	30.4	24.4	19.1	12.4	10.9	84.0	32.1	19.1	20.8	44.1	74.5
12	69.9	32.8	26.5	19.1	13.4	10.9	80.5	29.7	19.1	20.8	44.1	74.5
13	69.9	30.4	26.5	19.1	14.8	10.9	120	29.7	20.8	20.8	44.1	74.5
14	69.9	30.4	28.6	17.7	15.9	12.4	109	29.7	20.8	20.8	41.0	74.5
15	69.9	30.4	28.6	26.5	20.8	10.2	84.0	29.7	17.3	20.8	41.0	74.5
16	72.4	27.9	41.7	28.6	22.6	10.2	80.5	29.7	19.1	19.1	41.0	71.3
17	67.8	27.9	38.5	19.1	19.1	10.2	74.5	29.7	19.1	15.5	41.0	59.3
18	69.9	27.9	31.1	14.8	17.7	10.2	74.5	29.7	348.0	15.5	35.0	51.2
19	67.8	27.9	22.6	14.8	19.1	10.2	71.3	29.7	80.5	15.5	24.7	51.2
20	72.4	27.9	22.6	14.8	15.9	9.18	71.3	27.2	59.3	14.1	24.7	51.2
21	67.8	27.9	24.4	14.8	13.4	10.2	68.5	24.7	51.2	14.1	35.0	51.2
22	63.2	26.1	24.4	14.8	330	10.2	68.5	20.8	48.0	15.5	44.1	51.2
23	65.7	24.4	24.4	17.7	410	10.2	64.3	17.3	48.0	19.1	44.1	55.1
24	61.1	22.6	24.4	17.7	523	10.2	59.3	15.5	48.0	22.6	44.1	55.1
25	53.0	20.8	22.6	15.9	353	10.2	64.3	14.1	48.0	22.6	37.8	55.1
26	50.9	22.6	19.1	15.9	149	9.18	59.3	14.1	51.2	20.8	37.8	55.1
27	50.9	24.4	19.1	103	85.1	7.42	59.3	14.1	55.1	27.2	35.0	59.3
28	50.9	24.4	20.8	41.7	72.4	2,410	51.2	14.1	51.2	35.0	32.1	59.3
29	48.7	22.6	20.8	33.2	63.2	6,710	44.1	14.1	51.2	44.1	41.0	59.3
30	48.7		20.8	33.2	59.0	326	44.1	53.7	51.2	41.0	48.0	59.3
31	47.0		20.8		56.9		44.1	55.1		41.0		59.3

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1936
	High	Low	Dates		Dates				
January	2.46	2.07	16-20	72.4	31	47.0	64.2	3,950	5,477
February	2.10	1.77	3	48.7	25	20.8	31.6	1,820	3,411
March	2.10	1.71	16	44.5	25	17.7	24.7	1,520	2,474
April	4.76	1.64	27	604		14.8	24.0	1,430	3,336
May	7.02	1.51	24	1,700	20	10.2	80.2	4,930	7,756
June	19.13	1.41	29	24,000	27	7.42	331	19,700	7,490
July	4.23	1.87	2	441	31	41.0	85.7	5,270	3,828
August	2.69	1.44	30	132	26	12.7	29.8	1,830	1,754
September	7.28	1.54	18	1,870	15	17.3	49.6	2,950	5,870
October	2.00	1.44	1	55.1	19-20	12.7	29.4	1,810	10,199
November	1.97	1.64	30	51.2	9	22.6	38.1	2,270	6,493
December	2.17	1.80		74.5	2	35.0	57.9	3,560	6,150
The Year	19.13	1.41		24,000		7.42	70.3	51,040	64,238

RIO GRANDE AT LAREDO STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car. Cable and car located about 2-1/2 miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo. Zero of gage at the cable is elevation 353.13 feet. The water-stage recorder was first located near the cable using the above gage. The recorder was moved to its present location in October, 1925, and zero of gage was elevation 352.65 feet. On August 25, 1930, zero of gage at recorder was changed to elevation 351.50 feet. All gage elevations are on United States Coast and Geodetic Survey sea level datum.

RECORDS: Based on 159 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: May, 1900, to March, 1914; from October, 1922, to December, 1936.

REMARKS: The river flow at this station is modified by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated the drainage area above this station is 132,915 square miles, of which 91,516 are in the United States and 41,399 in Mexico.

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. In 1910 a minimum flow of 939 second feet was reached. Numerous records of extreme flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,370	2,840	2,580	2,000	4,240	*7,200	28,000	2,210	6,040	30,900	3,570	3,180
2	3,370	2,840	3,670	1,940	3,370	*6,040	7,910	3,180	3,990	23,000	3,440	3,180
3	3,370	2,840	5,090	1,870	2,580	*5,090	5,690	3,280	5,270	16,400	3,370	3,180
4	*3,370	2,920	3,570	1,810	2,210	*4,100	9,080	3,020	5,510	13,400	3,280	3,180
5	*3,370	2,840	5,510	1,810	2,000	*3,510	5,160	4,630	4,700	11,400	3,370	3,180
6	*3,370	2,840	4,870	1,760	1,870	*3,090	4,450	3,570	4,630	9,750	3,280	3,180
7	3,180	2,750	4,340	1,760	1,810	*2,840	3,570	3,280	6,110	8,690	3,180	3,370
8	3,180	2,750	3,990	1,690	1,870	*2,510	15,000	2,920	7,630	8,260	3,090	3,560
9	3,180	2,660	3,440	1,760	3,570	*2,370	17,300	2,660	9,460	7,630	3,280	3,440
10	3,090	2,580	3,440	1,690	2,660	*2,210	7,910	2,510	8,760	6,990	3,020	3,440
11	3,090	2,580	3,370	1,650	2,440	*2,510	6,320	2,370	7,270	6,460	3,090	3,020
12	3,090	2,580	3,280	1,650	2,070	*4,240	5,690	2,210	7,270	6,110	3,370	3,090
13	3,090	2,660	3,020	1,650	1,940	*4,520	7,060	1,940	8,120	5,860	3,280	3,180
14	3,020	2,750	2,920	1,650	*1,870	*2,840	6,640	2,000	41,700	5,510	3,180	3,280
15	3,090	2,580	2,840	1,540	2,510	*2,270	4,630	2,150	37,400	5,260	3,280	3,180
16	3,020	2,580	2,750	1,610	2,440	*2,210	*3,570	2,080	10,400	5,160	3,370	3,180
17	2,920	2,440	2,580	1,610	*2,660	*1,940	3,440	1,810	12,000	4,940	3,280	3,090
18	2,920	2,510	2,440	1,690	2,150	*1,760	3,280	1,810	15,900	4,700	3,180	3,180
19	2,840	2,580	2,440	1,690	1,810	*1,940	3,090	1,810	32,900	4,520	3,180	3,090
20	2,840	2,580	2,370	1,610	1,650	*1,940	2,750	1,680	22,900	4,340	3,090	3,090
21	2,920	2,580	2,370	1,650	*1,810	*1,870	3,090	1,810	10,500	3,990	3,020	3,090
22	2,750	2,580	2,270	1,690	2,270	*1,680	2,750	1,810	7,200	3,740	3,090	3,020
23	2,750	2,580	2,270	1,610	2,750	*1,650	2,580	1,760	6,430	4,450	3,180	3,090
24	2,840	2,440	2,370	1,610	3,020	*1,650	*2,840	1,870	8,690	4,340	3,090	3,090
25	2,920	2,440	2,440	1,870	5,790	*2,080	*2,840	2,000	11,600	3,990	3,090	3,090
26	2,920	2,580	2,440	2,080	13,350	1,810	2,510	2,000	20,600	3,920	3,090	3,020
27	2,840	2,750	2,440	1,760	9,390	*1,760	2,510	1,940	25,600	3,670	3,020	3,020
28	2,750	2,750	2,210	3,600	8,260	*1,680	2,440	5,260	25,000	3,440	3,090	3,090
29	2,750	2,580	2,150	6,820	7,630	9,110	2,270	4,630	49,800	3,440	3,020	3,090
30	2,840		2,150	3,670	6,320	73,500	2,370	5,010	42,400	3,440	3,280	3,090
31	2,840		2,000		*5,930		2,270	6,430		3,570		3,090

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Normal 1924 to 1936
January	5.41	5.15		3,370	29	2,660	3,030	186,000	192,715
February	5.28	5.05	4	3,020		2,440	2,650	153,000	156,463
March	6.79	4.86	3	7,270	31	2,000	3,020	186,000	156,835
April	7.18	4.59	29	8,550	15	1,540	2,030	121,000	160,802
May	8.89	4.66	26	15,800	20	1,650	3,690	227,000	299,612
June	20.96	*4.59	30	87,600	23	*1,540	5,400	*321,000	323,593
July	18.08	4.99	1	66,700		2,270	5,770	355,000	228,936
August	6.92	4.66	31	7,700	20	1,650	2,760	170,000	286,175
September	18.44		14	69,200					
September	17.32	5.35	29	61,800	3	3,180	15,500	924,000	729,143
October	12.60	5.41	1	34,300	31	3,370	7,460	459,000	501,751
November	5.51	5.22	2	3,670	22	2,840	3,210	191,000	226,982
December	5.51	5.22	8	3,670	26	2,840	3,160	194,000	197,624
The Year	20.96	4.59		87,600		1,540	4,800	3,487,000	3,460,631

* Partly estimated

DOLORES CREEK STATION NEAR SAN IGNACIO, TEXAS

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

RECORDS: Based upon previous rating curve. 1936 records poor. Records available: January 1, 1932, to May 31, 1936. Record estimated May 13 to May 31, 1936.

REMARKS: This creek is dry except during storms. The drainage area above this station is 606 square miles, all in the United States. Station abandoned May 13, 1936.

PREVIOUS EXTREME FLOWS: On September 4, 1932, Rio Grande backwater reached a gage height of 343.06 feet at this station. On September 6, 1933, a peak flow of 21,300 second feet was reached with a gage reading of 327.17 feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0							
2	0	0	0	0	0							
3	0	0	0	0	0							
4	0	0	0	0	0							
5	0	0	0	0	0							
6	0	0	0	0	0							
7	0	0	0	0	0							
8	0	0	0	0	0							
9	0	0	0	0	*7,680							
10	0	0	0	0	*948							
11	0	0	0	0	*240							
12	0	0	0	0	*109							
13	0	0	0	0	*10							
14	0	0	0	0	0							
15	0	0	0	0	0							
16	0	0	0	0	0							
17	0	0	0	0	0							
18	0	0	0	0	0							
19	0	0	0	0	0							
20	0	0	0	0	0							
21	0	0	0	*268	0							
22	0	0	0	*386	0							
23	0	0	0	442	0							
24	0	0	0	*116	0							
25	0	0	0	*25	0							
26	0	0	0	0	0							
27	0	0	0	0	0							
28	0	0	0	0	0							
29	0	0	0	*40.5	0							
30	0		0	0	0							
31	0		0		0							

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Average 1932 to 1935
January							0	0	8 265
February							0	0	8 16.4
March							0	0	8 326
April	319.19		21	520		0	*42.6	*2,530	8 *2,989
May	326.25		9	17,200		0	*290	*17,800	8 *6,289
									3,722
									1,724
									994
									13,065
									172
									0
									0
The Period	326.25			17,200			*67.4	*20,330	29,562.4

* Partly estimated
8 Normals for these months are for the period 1932 to 1936

RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located about 6.2 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southward of Ciudad Guerrero, Tamaulipas. Zero of gage is 265.74 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based on 177 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: 1901 to 1912; 1923 to 1936.

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

PREVIOUS EXTREME FLOWS: The greatest 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 has not been dry since irrigation commenced in System No. 4 in 1931. Numerous extremes may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	231	146	238	187	245	298	332	152	5,830	245	204	225
2	225	140	175	157	231	276	283	146	2,540	192	219	212
3	219	152	238	140	198	225	593	129	664	169	198	187
4	212	152	403	129	157	192	1,400	124	516	169	162	180
5	198	129	314	134	134	169	1,390	118	367	146	146	175
6	187	118	275	152	124	140	540	103	267	140	134	175
7	187	118	290	180	113	118	622	103	231	140	140	175
8	180	118	290	180	213	108	267	93.6	231	129	146	175
9	180	124	283	157	15,500	113	198	93.6	212	124	140	162
10	187	124	238	140	3,530	140	192	93.6	198	118	157	157
11	187	140	238	146	1,240	118	175	93.6	204	113	146	157
12	180	157	238	152	516	108	212	93.6	180	108	152	157
13	180	175	219	140	374	103	5,010	113	169	103	157	162
14	175	152	204	134	307	124	3,270	103	169	113	162	175
15	169	129	212	140	275	134	3,990	89.7	175	129	146	187
16	162	124	212	134	192	134	1,760	113	667	134	134	225
17	162	124	175	118	152	140	904	113	1,320	129	134	212
18	162	129	152	124	162	146	463	98.2	473	129	140	187
19	162	219	152	198	146	140	323	191	413	124	140	157
20	152	212	152	192	134	146	245	180	290	129	129	152
21	152	175	180	307	124	152	238	134	225	157	192	152
22	140	175	204	636	140	152	225	129	225	192	169	152
23	140	198	204	604	494	169	212	108	169	298	225	146
24	140	259	238	452	1,780	219	187	103	233	283	275	146
25	140	259	275	445	3,220	219	162	98.2	225	192	259	146
26	146	314	219	259	1,890	187	157	98.2	187	231	252	192
27	146	323	175	198	4,450	204	152	103	157	259	225	219
28	162	283	152	275	1,720	212	146	255	152	231	231	192
29	198	252	140	473	597	204	146	298	134	225	219	169
30	180		162	290	816	245	140	1,560	259	219	204	157
31	157		212		473		146	4,870		198		157

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	2.76	2.26	1	231		140	174	10,700	25,918
February	3.25	2.13	26	350		118	177	10,200	18,087
March	3.64	2.23	4	463	29	134	221	13,600	10,860
April	4.59	2.10	22	883	17	113	232	13,800	17,231
May	14.17	2.00	9	22,200	8	98.2	1,280	78,600	53,049
June	3.28	2.03	1	357	13	103	168	9,990	45,400
July	8.40	2.23	13	6,140	31	134	777	47,800	26,083
August	7.94	1.94	31	5,330	15	89.7	326	20,000	14,387
September	8.53	2.20	1	6,390	29	129	569	33,900	125,611
October	3.54	2.03	23	434	13	103	170	10,450	106,539
November	3.02	2.17	24	290	20	124	178	10,600	40,651
December	2.79	2.30	26	238		146	175	10,800	29,210
The Year	14.17	1.94		22,200		89.7	373	270,440	513,026

RIO GRANDE AT ZAPATA STATION

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

RECORDS: Based upon 42 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: January, 1932, to December, 1936.

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

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. The lowest flow recorded was on June 23, 1932, when the extreme gage height was 219.18 feet and the extreme flow 992 second feet.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*3,560	2,820	2,930	*2,190	3,480	7,810	54,400	2,380	16,600	34,900	*3,600	3,220
2	*3,540	2,860	3,000	*2,110	3,810	7,400	11,800	2,380	9,530	27,700	3,590	3,200
3	*3,520	2,900	4,610	*2,010	3,350	5,940	6,390	3,200	5,340	20,300	3,550	3,200
4	*3,500	2,950	4,480	*1,950	2,590	4,710	8,140	3,260	6,780	15,900	3,280	3,230
5	*3,500	2,970	3,720	*1,950	2,270	4,020	7,670	3,080	5,860	13,200	3,100	3,280
6	*3,450	2,950	5,870	*1,960	2,090	3,590	5,260	4,220	4,730	11,100	3,040	3,250
7	*3,440	2,930	4,530	*1,940	1,920	3,250	4,630	3,530	5,420	9,600	3,110	3,330
8	*3,330	2,940	4,130	*1,940	1,880	2,960	5,000	3,360	6,800	8,520	*3,040	3,470
9	*3,420	2,900	3,790	*1,880	38,000	2,730	19,500	2,990	9,040	8,280	3,030	3,620
10	*3,410	2,810	3,500	*1,840	13,000	2,570	13,100	2,750	10,500	7,930	3,190	3,500
11	*3,300	2,750	3,550	*1,800	4,890	*2,520	*6,270	2,570	8,700	7,110	3,100	3,560
12	*3,220	2,730	3,380	*1,780	3,210	2,760	*5,560	2,440	7,650	6,440	3,190	3,300
13	*3,180	2,740	3,360	*1,720	*2,740	3,620	8,770	2,390	7,920	6,030	3,360	3,390
14	*3,130	2,740	3,220	*1,720	*2,460	3,560	11,000	2,130	22,500	5,610	3,350	3,490
15	*3,060	2,700	3,100	*1,700	*2,870	3,040	7,490	2,070	54,800	5,060	3,330	3,590
16	*3,050	2,680	3,030	*1,660	*3,280	2,610	5,260	2,280	19,500	4,930	3,450	3,520
17	*3,030	2,680	2,880	*1,560	*2,850	2,490	4,320	2,230	16,900	4,850	3,460	3,550
18	*3,000	2,690	2,740	*1,600	*2,550	2,270	4,010	1,990	12,200	4,590	3,440	3,480
19	*2,940	2,710	2,700	*1,750	*2,040	2,080	*3,570	2,150	30,800	4,340	3,420	3,450
20	*2,890	2,760	2,610	*1,840	*1,840	2,180	3,310	2,150	30,200	4,100	3,380	3,380
21	2,930	2,790	2,510	*2,290	*1,860	2,260	3,230	2,160	17,200	3,980	3,330	3,350
22	2,970	2,790	2,540	3,180	*1,920	2,090	3,230	2,070	9,680	3,990	3,320	3,380
23	2,930	2,820	2,520	2,800	*2,590	1,910	3,020	2,000	7,170	5,800	3,380	3,310
24	2,900	2,800	2,520	2,270	*3,140	1,870	2,790	1,890	6,190	3,860	3,490	3,340
25	2,930	2,710	*2,540	2,190	*5,640	1,890	2,940	2,000	7,980	3,600	3,360	3,370
26	2,900	2,740	*2,560	2,070	17,000	1,910	*3,210	2,280	16,500	3,540	3,300	3,270
27	2,880	2,850	2,530	2,270	16,100	1,930	2,870	2,210	23,600	3,810	3,250	3,300
28	2,860	2,900	2,490	2,310	13,600	1,950	2,670	2,640	28,000	3,710	3,170	3,260
29	2,840	2,920	2,340	5,390	9,740	1,970	2,590	6,080	35,900	3,570	3,110	3,330
30	2,820		*2,220	5,500	*9,200	40,200	2,570	14,800	50,100	3,530	3,090	3,290
31	2,790		2,240		*8,400		2,450	17,300		3,560		3,270

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1936
	High	Low	Dates		Dates				
January	*221.29	220.95	1	*3,590	31	2,770	*3,140	*193,000	239,054
February	221.04	220.88	5	2,970	16	2,660	2,810	162,000	191,636
March	222.11	*220.62	3	6,860	31	*2,160	3,170	195,000	184,614
April	222.50	*220.32	30	8,930	18	*1,540	*2,240	*133,000	176,034
May	236.27	220.46	9	75,000	8	1,800	6,140	377,000	317,790
June	233.95	220.41	30	73,600	24	1,870	4,340	258,000	465,692
July	234.50	220.70	1	72,000	31	2,400	7,320	450,000	294,740
August	226.40	220.37	30	27,600	23	1,830	3,520	216,000	220,276
September	232.58		15	62,200					
September	231.36	221.22	30	55,100	7	4,110	16,500	980,000	1,343,034
October	228.56	221.10	1	38,900	26	3,500	8,180	503,000	834,748
November	221.14	220.88	2	3,670	9	2,950	3,290	196,000	312,508
December	221.05	220.90	9	3,770	1	3,090	3,370	207,000	267,632
The Year	236.27	*220.32		75,000		*1,540	5,330	3,870,000	4,847,758

* Partly estimated

EL TIGRE ARROYO STATION NEAR ZAPATA, TEXAS

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

RECORDS: Based upon previous rating curve and 2 meter measurements. 1936 records fair. Records available: January 1, 1932, to April 30, 1936.

REMARKS: This creek is dry most of the time and carries only storm flow. The drainage area above this station is 261 square miles, all in the United States. Station discontinued May 22, 1936.

PREVIOUS EXTREME FLOWS: On September 5, 1932, Rio Grande backwater reached a gage height of 27.64 feet at this station.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0								
2	0	0	0	0								
3	0	0	0	0								
4	0	0	0	0								
5	0	0	0	0								
6	0	0	0	0								
7	0	0	0	0								
8	0	0	0	0								
9	0	0	0	0								
10	0	0	0	0								
11	0	0	0	0								
12	0	0	0	0								
13	0	0	0	0								
14	0	0	0	0								
15	0	0	0	0								
16	0	0	0	28.7								
17	0	0	0	*64.1								
18	0	0	0	*15.1								
19	0	0	0	0								
20	0	0	0	0								
21	0	0	0	0								
22	0	0	0	*329								
23	0	0	0	*19.7								
24	0	0	0	*16.1								
25	0	0	0	*14.6								
26	0	0	0	*14.1								
27	0	0	0	*13.2								
28	0	0	0	"12.3								
29	0	0	0	"11.5								
30	0		0	"10.0								
31	0		0									

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Average 1932 to 1935
January							0	0	**37
February							0	0	**6
March							0	0	**61
April	2.73		22	*606			*18.3	*1,090	**364
									637
									305
									202
									148
									2,984
									59
									157
									199
The Period							*4.54	*1,090	5,159

" Estimated
* Partly estimated
** Normals for these months are for the period 1932 to 1936

RIO ALAMO STATION AT CD. MIER, TAMAULIPAS

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

RECORDS: Based upon 88 meter measurements. Computations by shifting channel methods. 1936 records good. Records available: July 5, 1923, to December 31, 1936.

REMARKS: The flow of this spring-fed stream is somewhat modified by irrigation diversions above the station. The drainage area above this station is 1,840 square miles, all in Mexico.

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 and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	25.8	23.0	15.2	6.00	1.41	7.13	0	9.89	1,430	20.1	13.1	20.1
2	25.8	23.0	15.2	6.00	1.41	3.96	*403	4.94	182	18.0	10.9	20.1
3	25.8	23.0	15.2	6.00	.71	2.97	*876	2.12	77.7	15.2	10.9	20.1
4	25.8	23.0	15.2	6.00	.71	2.05	99.9	1.41	36.4	15.2	9.89	20.1
5	23.0	23.0	18.0	6.00	.71	1.34	13.1	.71	25.8	15.2	8.12	20.1
6	23.0	18.0	15.2	6.00	.71	1.34	8.12	.71	20.1	13.1	8.12	20.1
7	23.0	18.0	10.9	6.00	.71	.74	6.00	.35	452	13.1	8.12	20.1
8	23.0	18.0	10.9	7.06	.71	.28	2.83	.35	141	10.9	8.12	20.1
9	23.0	18.0	10.9	9.89	*925.0	.28	2.83	.35	55.1	9.89	10.9	20.1
10	23.0	18.0	9.89	10.9	*879.0	0	2.83	.35	40.3	9.89	18.0	20.1
11	23.0	18.0	9.89	10.9	*145.0	0	2.83	.35	25.8	9.89	20.1	20.1
12	23.0	18.0	8.12	8.12	*32.1	0	2.83	.35	20.1	8.12	20.1	20.1
13	23.0	18.0	8.12	4.94	13.1	0	76.6	.35	20.1	8.12	20.1	23.0
14	23.0	18.0	8.12	2.83	13.1	0	682	.35	20.1	7.06	18.0	23.0
15	23.0	18.0	7.06	2.12	*194.0	0	1,917*	.35	20.1	7.06	18.0	23.0
16	23.0	18.0	7.06	1.41	*54.7	0	346	.35	137	7.06	20.1	23.0
17	23.0	18.0	7.06	*63.6	15.2	0	77.7	.35	4,130	7.06	20.1	20.1
18	20.1	15.2	7.06	10.9	10.9	0	32.5	.35	999	7.06	18.0	20.1
19	20.1	15.2	7.06	3.88	7.06	0	20.1	.35	258	7.06	18.0	20.1
20	20.1	15.2	6.00	*13.8	4.94	0	13.1	.35	182	7.06	113	20.1
21	20.1	15.2	6.00	3.88	4.94	0	9.89	.35	305	6.00	59.3	20.1
22	20.1	15.2	6.00	*17.7	*53.0	0	7.06	.35	71.0	6.00	36.4	20.1
23	23.0	15.2	6.00	2.12	1,014*	0	6.00	.35	49.4	3.88	25.8	20.1
24	23.0	15.2	6.00	.71	*367	0	4.94	3.88	75.9	3.88	25.8	20.1
25	23.0	15.2	6.00	.35	86.5	0	4.94	3.88	226	15.2	25.8	20.1
26	23.0	15.2	6.00	.71	200	0	3.88	2.83	40.3	15.2	23.0	20.1
27	23.0	15.2	6.00	1.41	71.0	0	3.88	3.88	29.0	10.9	15.2	20.1
28	23.0	15.2	6.00	1.41	20.1	0	2.83	2.12	25.8	10.9	15.2	20.1
29	23.0	15.2	6.00	1.41	9.89	0	1.41	1,293	18.0	13.1	15.2	20.1
30	23.0		6.00	1.41	35.0	0	167	6,710	18.0	13.1	18.0	20.1
31	23.0		6.00		10.9		32.8	2,570		13.1		23.0

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	1.05	.98		25.8		20.1	22.9	1,410	7,817
February	1.02	.92		23.0		15.2	17.7	1,020	5,888
March	.95	.72	5	18.0		6.0	8.98	552	4,172
April	*1.90	.49	17	165	25	.35	7.44	443	8,141
May	*4.99	.52	9	2,120		.70	135	*8,280	21,264
June	.79		1	8.4		0	.67	39.8	18,091
July	*6.69		15	3,740	1	0	156	*9,580	11,643
August	11.09	.49	30	10,000		.35	343	21,100	5,846
September	9.06	.92	17	6,780	30	15.2	304	18,100	34,275
October	1.05	.66	25	25.8	24	3.88	10.6	649	15,074
November	2.03	.79	20	193		8.12	21.7	1,290	6,194
December	1.02	.98		23.0		20.1	20.5	1,260	6,147
The Year	11.09			10,000		0	87.8	63,723.8	144,552

* Partly estimated

RIO GRANDE AT ROMA STATION

DESCRIPTION: Water-stage recorder at international bridge at Roma, Starr County, Texas. Zero of gage is 145.90 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 43 meter measurements during the year from bridge. Computations by shifting channel methods. 1936 records good. Records available: August, 1900, to March, 1914; November, 1922, to December, 1936.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated the drainage area above this station is 160,014 square miles; 93,645 being in the United States and 66,369 in Mexico. After March, 1929, the station was operated by the United States, and previously by Mexico. Datum 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. The lowest flow ever recorded was on May 29, 1925, when the extreme flow was 975 second feet. Records of other extreme flows may be found in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*4,070	2,890	2,860	2,270	4,000	*6,930	55,200	2,370	18,500	36,100	3,540	3,170
2	*3,750	2,890	2,780	2,200	3,250	*7,550	25,000	2,320	12,800	29,300	3,510	*3,330
3	*3,580	2,870	3,010	2,140	3,380	*6,830	11,400	2,370	6,460	23,000	3,550	*3,320
4	*3,480	2,880	4,820	*2,070	2,740	*5,500	6,730	3,030	5,100	18,600	3,370	*3,330
5	3,480	2,920	3,760	*2,110	2,280	*4,510	10,800	2,880	6,100	*15,500	3,220	*3,260
6	3,410	2,930	4,290	*2,080	2,070	3,790	6,210	3,790	5,020	13,000	3,190	*3,220
7	3,360	2,870	5,020	*2,040	1,910	3,280	*4,680	4,000	4,770	10,800	3,140	*3,220
8	3,300	2,850	4,010	*1,990	1,800	2,910	*3,970	3,370	6,310	9,190	3,160	*3,210
9	3,250	2,840	4,050	*1,970	26,600	2,610	*12,700	3,210	7,370	8,600	3,100	3,430
10	3,230	2,770	3,400	*1,920	32,100	2,490	*16,400	2,870	9,580	7,960	3,160	*3,480
11	3,200	2,720	3,430	*1,900	10,300	2,410	9,280	2,650	9,130	7,070	3,200	*3,470
12	3,140	2,710	3,250	*1,880	5,260	2,320	6,560	2,480	6,910	6,530	3,110	*3,350
13	3,080	2,700	3,290	*1,880	3,520	2,870	9,780	2,390	6,730	6,080	3,330	*3,370
14	3,060	2,680	3,180	*1,860	3,030	3,340	13,300	2,310	12,000	5,750	3,360	*3,390
15	3,020	2,670	3,050	1,820	3,840	3,390	12,600	2,140	42,900	5,400	3,290	*3,340
16	2,980	2,690	2,920	1,820	3,910	2,630	8,810	2,160	30,100	5,090	3,310	*3,340
17	2,960	*2,660	2,840	2,730	3,810	2,390	4,880	2,310	23,400	5,030	3,370	3,330
18	2,880	*2,640	2,740	1,900	3,220	2,320	4,160	2,180	16,500	4,770	3,360	*3,280
19	*2,820	*2,630	2,660	1,760	2,820	2,170	3,570	2,080	21,200	4,550	3,300	3,230
20	*2,810	*2,690	2,610	2,190	2,410	2,060	3,230	2,400	31,800	4,300	3,370	3,220
21	*2,810	*2,760	2,550	2,410	2,180	2,180	2,940	2,130	23,400	4,170	3,250	3,160
22	*2,810	*2,790	2,510	5,020	2,240	2,120	3,130	2,100	13,100	4,000	3,220	3,140
23	*2,810	*2,780	2,510	3,980	2,450	2,020	2,960	2,060	9,340	4,840	3,130	3,170
24	2,750	*2,770	2,460	2,820	7,580	1,920	2,720	2,010	7,810	4,360	3,210	3,100
25	2,760	*2,760	2,460	2,270	8,710	1,890	2,650	1,970	9,220	3,880	3,280	3,190
26	2,820	*2,630	2,540	2,070	15,000	1,970	3,060	2,030	13,200	3,710	3,200	3,170
27	2,850	*2,700	2,510	2,110	16,400	2,210	2,930	2,210	23,900	3,790	3,260	3,160
28	2,850	*2,800	2,470	2,700	13,600	2,000	2,680	2,120	27,800	3,790	3,130	3,140
29	2,870	*2,870	2,390	2,600	11,000	1,990	2,560	4,450	28,500	3,710	3,140	3,110
30	2,880		2,300	6,030	9,140	11,400	2,530	*16,500	44,000	3,600	3,150	3,180
31	2,860		2,260		*8,180		2,450	*19,800		3,530		3,120

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	*2.13	1.06	1	*4,270	24	2,740	3,090	190,000	239,560
February	1.20	*.87	6	2,940	26	*2,590	2,770	159,000	195,333
March	3.11	.55	4	5,600	31	2,240	3,060	188,000	185,898
April	4.07	.04	30	7,150	20	1,740	2,420	144,000	201,002
May	18.31	.28	9	68,400	9	1,770	7,060	434,000	376,538
June	*14.10	*.34	30	*44,600	24	*1,870	3,400	202,000	428,919
July	16.60	1.23	1	59,900	31	2,420	8,380	515,000	301,795
August	*10.28	.56	30	*28,200	25	1,950	3,570	220,000	288,678
September	14.98		15	51,100					
September	14.18	2.76	30	47,200	7	4,390	16,100	958,000	912,742
October	13.45	2.33	1	43,300	31	3,520	8,710	536,000	623,126
November	2.36	1.70	3	3,590	23	3,020	3,260	194,000	279,436
December	*2.10	1.60	10	*3,580	31	3,030	3,260	200,000	243,255
The Year	18.31	.04		68,400		1,740	5,430	3,940,000	4,276,282

* Partly estimated

RIO SAN JUAN STATION AT SANTA ROSALIA, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located about 27-1/2 miles above the confluence with the Rio Grande and 15 miles south of Ciudad Camargo, Tamaulipas, Mexico, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station. Zero of gage is 205.15 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 162 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: May 1, 1900, to 1913; 1923 to 1936.

REMARKS: Daily gage readings began May 1, 1900, and meter measurements October 3, 1900, at La Quemada Ranch (now Ochoa settlement). The station was moved 2-1/2 miles upstream to its present location July 14, 1902. For more detailed history of gages, see previous Water Bulletins.

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

PREVIOUS EXTREME FLOWS: On September 29, 1932, there was recorded an extreme gage height of 41.01 feet with an estimated discharge of 187,000 second feet. On August 30, 1909, there occurred a flood which reached a height estimated at 49.21 feet on the present scale, according to records of the residents of the region. In Water Bulletin No. 1, the mean daily flow for this flood was given as 30,000 second feet which was copied from the records. New slope-area computations supported by measurements during recent floods, show the 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. In previous Water Bulletins may be seen numerous records of extreme flows.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,670	932	302	162	228	1,150	77	999	31,500	3,150	953	1,260
2	2,390	918	293	162	198	865	77	936	13,800	3,470	953	1,230
3	2,170	918	293	146	180	699	2,800	886	6,430	3,150	936	1,240
4	2,030	865	293	146	162	593	1,450	780	4,700	2,770	893	1,220
5	1,870	840	302	139	162	498	812	749	3,670	2,470	865	1,170
6	1,770	798	353	129	155	438	438	713	3,090	2,240	865	1,150
7	1,700	766	353	129	139	381	312	667	2,960	2,070	848	1,120
8	1,640	749	353	125	132	340	312	622	3,470	1,890	865	1,090
9	1,550	724	1,240	118	2,420	302	171	579	3,510	1,870	840	1,050
10	1,500	685	780	118	8,440	265	162	551	2,850	1,750	822	1,050
11	1,450	667	657	112	13,700	240	198	512	2,370	1,620	840	1,030
12	1,400	650	537	112	3,920	209	139	487	2,120	1,480	865	1,020
13	1,400	650	448	112	2,050	190	198	459	1,960	1,320	886	1,030
14	1,340	636	410	106	1,950	171	886	438	1,790	1,310	865	1,060
15	1,320	593	388	99.6	2,540	155	35,200	403	1,710	1,240	865	1,090
16	1,290	565	371	99.6	2,060	146	13,600	381	1,600	1,190	865	1,090
17	1,240	540	344	190	1,160	132	8,510	360	3,180	1,140	848	1,090
18	1,220	512	314	257	840	118	5,760	353	6,140	1,090	840	996
19	1,140	473	290	118	667	106	4,410	353	3,350	1,010	840	968
20	1,090	452	276	118	523	99.6	3,490	371	3,510	964	968	932
21	1,050	438	265	1,030	473	92.9	2,870	918	3,960	918	978	918
22	1,050	438	240	1,070	512	87.9	2,490	3,880	3,710	886	1,610	893
23	1,030	413	240	798	2,670	85.1	2,630	2,440	2,180	840	1,700	918
24	996	392	228	403	2,440	82.3	1,960	1,240	2,700	840	2,430	893
25	978	374	219	360	1,570	79.5	1,700	1,010	3,460	848	1,850	886
26	968	353	219	331	1,700	79.5	1,500	953	4,100	848	1,600	848
27	932	353	209	331	1,470	111	1,390	812	3,810	848	1,470	848
28	918	332	190	1,070	1,870	106	1,290	812	2,150	848	1,380	848
29	893	312	180	274	1,260	90.4	1,190	918	2,400	886	1,330	848
30	950		171	265	1,520	85.1	1,110	2,960	3,780	893	1,290	823
31	950		162		950		1,060	10,490		936		840

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	8.50	4.72	1	2,880	29	893	1,380	85,100	36,141
February	4.79	3.25	1	932	29	312	598	34,400	23,723
March	6.33	2.72	9	1,680	31	162	352	21,700	16,778
April	7.12	2.43	28	2,080		99.6	288	17,100	19,742
May	18.01	2.59	11	19,600	9	132	1,870	115,000	56,243
June	5.51	2.23	1	1,300		79.5	267	15,900	125,426
July	23.69	2.17	15	51,600	2	74.5	3,170	195,000	94,229
August	18.70	3.38	31	22,800	18-19	353	1,230	75,400	75,289
September	21.26	6.04	1	37,400	16	1,550	4,530	270,000	273,865
October	9.25	4.56	2	3,570	23	823	1,510	92,800	176,251
November	8.30	4.56	24	2,750	10	823	1,110	65,800	64,122
December	5.45	4.56	1	1,280	30	823	1,010	62,400	44,488
The Year	23.69	2.17		51,600		74.5	1,450	1,050,600	1,006,297

LOS OLMOS CREEK STATION NEAR RIO GRANDE CITY, TEXAS

DESCRIPTION: Water-stage recorder attached to pile of lower side of highway bridge about one mile north of Rio Grande City and 3-3/4 miles above confluence with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon the previous rating curve. 1936 records fair. Records available: January 1, 1932, to March 31, 1936.

REMARKS: The drainage area above this station is 535 square miles, all in the United States. Station discontinued March 23, 1936.

PREVIOUS EXTREME FLOWS: The greatest recorded flow was on December 12, 1936, when the extreme flow was 4,700 second feet with a gage height of 162.99 feet. The creek is dry except during storms.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*3.0	*.1	0									
2	*3.0	*.5	0									
3	*3.0	*.5	0									
4	*3.0	*.1	0									
5	*3.0	0	0									
6	*3.0	0	0									
7	*3.0	0	0									
8	*3.0	0	0									
9	*3.0	0	0									
10	*2.5	0	0									
11	*2.0	0	0									
12	*1.5	0	0									
13	*1.0	0	0									
14	*.5	0	0									
15	*.5	0	0									
16	*.5	0	0									
17	*.5	0	0									
18	*.5	0	0									
19	*.5	0	0									
20	0	0	0									
21	0	0	0									
22	0	0	0									
23	0	0	0									
24	0	0	0									
25	0	0	0									
26	0	0	0									
27	0	0	0									
28	*.1	0	0									
29	*.1	0	0									
30	*.1		0									
31	*.1		0									

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Average 1932 to 1935
	High	Low	Dates		Dates				
January	-			*3.0		0	*1.2	*74.2	8 *182
February	-			*.5		0	*.04	*2.4	8 *9.9
March							0	0	8 29.4
									435
									1,424
									953
									689
									905
									7,743
									2,355
									116
									1,383
The Period				*3.0		0	*.42	*76.6	16,224.3

* Partly estimated
8 Normals for these months are for the period 1932 to 1936

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, Starr County, Texas, and 7.3 miles below the confluence of the Rio San Juan with the Rio Grande. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 41 meter measurements during the year. Computations by shifting channel methods. 1936 records fair. Records available: January 1, 1932, to December 31, 1936.

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

When floods in the Rio San Juan exceed a gage height of about 38 feet or a flow of about 160,000 second feet at the Santa Rosalia station, water begins to overflow the right bank of that river at several places from El Asucar (20 miles below Santa Rosalia station) downstream. This overflow water cuts across country and reaches the Rio Grande about 9 river miles below Rio Grande City gaging station and is therefore not measured there. The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated, the drainage area above this station is 174,203 square miles; 94,323 being in the United States and 79,885 in 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.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*6,940	*3,920	*3,280	*2,530	*5,380	7,720	51,700	3,640	42,100	45,800	4,640	4,440
2	*6,680	*3,920	*3,220	*2,500	*3,950	*7,770	32,800	3,560	36,800	35,100	4,650	4,540
3	*6,160	*3,900	*3,290	*2,430	*3,610	*7,870	13,800	3,610	17,100	27,400	4,600	4,590
4	*5,800	*3,890	*4,310	*2,350	*3,340	*6,550	10,500	3,640	10,800	21,200	4,560	4,640
5	*5,610	*3,860	5,010	*2,340	*2,770	5,370	10,600	3,680	9,760	17,500	4,340	4,680
6	*5,420	*3,860	4,060	*2,330	*2,440	4,510	8,820	3,820	8,660	15,000	4,230	4,580
7	*5,260	*3,800	5,670	*2,290	*2,240	3,920	6,550	4,830	7,610	13,200	4,160	4,590
8	*5,130	*3,730	5,160	*2,240	*2,090	3,520	5,570	4,290	8,800	11,700	4,120	4,570
9	*5,020	*3,690	*4,480	*2,200	*11,300	3,240	8,500	3,940	*9,950	12,300	4,060	4,610
10	*4,890	*3,630	*5,060	*2,170	*57,400	3,000	17,100	3,640	11,700	10,300	3,900	4,750
11	*4,820	*3,530	*4,300	*2,140	*28,200	*2,890	11,300	3,330	*12,400	9,480	4,040	4,680
12	*4,720	*3,480	*4,100	*2,100	*17,300	2,820	8,330	3,170	*10,500	8,840	3,950	4,660
13	*4,610	*3,460	*3,910	*2,090	*8,440	2,870	9,560	2,980	*9,180	8,160	3,940	4,500
14	*4,570	*3,440	*3,780	*2,080	*5,340	3,840	14,900	2,870	*10,300	7,580	4,170	4,530
15	*4,480	*3,410	*3,620	*2,050	*6,420	3,880	39,000	2,680	*37,900	6,880	4,200	4,530
16	*4,420	*3,370	*3,470	*2,020	*6,610	3,570	31,500	2,520	*40,100	6,390	4,160	4,580
17	*4,360	*3,340	*3,350	*2,480	*6,010	2,850	15,100	2,600	22,500	6,230	4,300	4,520
18	*4,260	*3,290	*3,230	*2,600	*4,710	2,650	10,900	2,620	24,600	6,090	4,270	4,520
19	*4,170	*3,250	*3,110	*2,190	*4,030	2,500	8,710	2,450	20,100	5,850	4,200	4,390
20	*4,060	*3,220	*3,020	*2,190	*3,440	2,320	7,080	2,580	34,500	5,630	4,130	4,360
21	*4,000	*3,280	*2,960	*2,520	3,010	2,220	6,330	2,710	27,300	5,360	4,300	4,280
22	*3,960	*3,310	*2,900	*4,840	2,900	2,340	5,850	3,690	18,200	*5,200	4,380	4,250
23	*3,960	*3,320	*2,850	*5,670	3,930	*2,210	6,070	5,170	12,800	5,190	4,780	4,250
24	*3,910	*3,290	*2,820	*4,300	10,700	*2,100	5,400	3,980	10,900	6,110	5,330	4,210
25	*3,850	*3,260	*2,790	*3,050	11,600	*2,020	4,720	3,180	10,500	4,950	5,660	4,170
26	*3,870	*3,170	*2,820	*2,630	15,100	*2,000	4,540	2,970	15,200	4,680	5,130	4,200
27	*3,900	*3,120	*2,840	*2,520	17,600	*2,160	4,880	2,950	24,000	4,640	4,880	4,120
28	*3,880	*3,200	*2,800	*2,840	15,400	*2,240	4,330	3,000	29,500	4,780	4,740	4,080
29	*3,880	*3,270	*2,720	*3,820	12,800	*2,080	4,050	*3,770	30,200	4,740	4,540	4,070
30	*3,870		*2,620	*4,690	10,500	*3,590	3,890	*12,400	47,600	4,630	4,530	4,050
31	*3,920		*2,550		9,620		3,800	*28,000		4,590		4,100

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal ** 1924 to 1936
	High	Low	Dates		Dates				
January	130.39	128.44	1	*7,080	30	*3,870	*4,660	*286,000	281,543
February	128.44	127.64	3	*3,920	26	*3,090	*3,490	*201,000	225,384
March	129.82	127.08	7	5,970	31	*2,520	*3,550	*218,000	208,213
April	130.22	126.49	30	*6,880	16	*1,980	*2,740	*163,000	222,364
May	145.40		10	71,200	9	*2,020	*9,620	*591,000	440,467
June	*134.90	126.95	30	*20,100	26	1,980	3,550	211,000	556,885
July	142.58	129.02	1	64,000	31	3,660	12,100	746,000	407,038
August	136.72	127.78	31	*30,400	19	2,400	4,460	274,000	358,467
September	141.30		15	*55,700					
September	140.76	131.11	30	55,400	7	7,240	20,400	1,213,000	1,130,175
October	140.70	129.34	1	54,300	31	4,550	10,800	665,000	826,168
November	129.84	128.76	24	5,790	10	3,860	4,430	264,000	352,040
December	129.02	128.44	10	4,790	30	4,050	4,420	272,000	293,850
The Year	145.40	126.49		71,200		1,980	7,030	5,104,000	5,302,594

* Partly estimated

** For the years 1924 to 1931, inclusive, the synthetic record for this station was used as published in W.B. No. 5 and recapitulated in this bulletin.

RIO GRANDE AT HIDALGO STATION

DESCRIPTION: Staff gage at international bridge at Hidalgo, Hidalgo County, Texas. Zero of gage is 79.28 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 6 meter measurements during the period from bridge. Records available: July, 1928, to December, 1931; also September and October, 1932, and September, 1933; peak flows in 1934, January to July and September, 1935. Peak flows May 11, 1936, July and September, and October 1-3, 1936. 1936 records considered fair.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. With all closed basins eliminated, the drainage area above this station is 175,110 square miles; 94,663 being in the United States and 80,447 in Mexico. Since 1931 this station has been operated only during flood periods. Water begins to flow into the Hackney Lake and Mission inlets of the American floodways above Hidalgo when the river at this station reaches a stage of about 22 feet, but the river may begin to overflow its banks at Granjeno and Jardin de Flores when the stages at Hidalgo are as much as 4 feet lower. In 1935 this gage height of 22 feet corresponded to a flow of about 60,000 second feet. The bottom of the river at this station is subject to considerable erosion during floods.

PREVIOUS EXTREME FLOWS: See previous Water Bulletins and Special Flood Report-1932 by the American Section of this Commission.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							*4,720		*28,400	*45,100		
2							*41,800		*41,500	*41,300		
3							*23,700		*27,000			
4							*10,500		*13,400			
5							*9,470		*10,300			
6							*9,410		*9,700			
7							*7,810		*8,980			
8							*6,600		*8,460			
9							*6,480		*9,240			
10							*10,700		*10,100			
11					*36,100		*15,300		*11,500			
12							*9,630		*11,800			
13							*7,790		*9,880			
14							*9,210		*9,460			
15							*18,000		*16,700			
16							*42,100		*39,700			
17							*23,900		*23,800			
18							*13,000		*23,100			
19							*9,610		*21,600			
20							*8,320		*28,500			
21							*7,460		*32,400			
22							*6,970		*23,500			
23							*6,660		*15,200			
24							*6,850		*11,000			
25							*6,260		* 9,790			
26							*5,840		*10,500			
27							*5,670		*15,500			
28							*5,210		*23,700			
29							*5,330		*28,000			
30							*4,920		*29,900			
31							*4,680					

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Per Sq. Mile
	High	Low	Dates		Dates				
May **	17.50		11	*42,800			*36,100	*71,600	
June									
July	18.20		2	*47,400					
July	17.00	4.60	16	*44,900	31	4,600	*11,300	*692,000	
August									
September	17.20		2	*42,500					
September	17.85	7.70	16	*46,100	8	*8,350	*18,800	*1,116,000	
October ***	18.15		1	*47,400			*43,200	*171,000	
November									
December									
The Period							*16,200	*2,050,600	

* Partly estimated
** One day in May
*** Two days in October

RIO GRANDE AT MERCEDES BRIDGE STATION

DESCRIPTION: Staff gage located at Mercedes pumping plant, about 500 feet upstream from Mercedes-Rio Rico bridge. The meter measurements made from the bridge. Zero of gage is 50.53 feet above mean sea level, United States Coast and Geodetic Survey datum. A staff gage of the United States Weather Bureau located at the bridge has its datum 3.47 feet below mean sea level.

RECORDS: Based upon daily gage readings and six current meter measurements during the period, as well as the previous rating curve. 1936 records considered fair. Records available: Records of discharge are available for September and October, 1932; April 28 to October 3, 1935; July 1 to 31, and September 1 to October 3, 1936. Unpublished records of daily river stage are available for each year from 1910 to 1936, except for 1913.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods only a portion of the water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries.

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

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							*2,820		*25,600	*35,700		
2							*31,500		*36,100	*36,300		
3							*32,000		*34,400	*34,300		
4							*16,900		*21,300			
5							*12,400		*11,900			
6							*10,600		*10,800			
7							*9,650		*10,000			
8							*7,100		*8,980			
9							*5,740		*8,950			
10							*7,500		*10,600			
11							*14,000		*11,500			
12							*10,800		*12,200			
13							*7,780		*11,000			
14							*6,660		*10,000			
15							*12,100		*12,500			
16							*30,800		*30,800			
17							*29,100		*34,100			
18							*15,700		*24,100			
19							*11,100		*23,100			
20							*9,000		*21,900			
21							*7,690		*30,800			
22							*6,620		*28,300			
23							*5,890		*21,900			
24							*5,630		*13,200			
25							*5,290		*11,500			
26							*4,750		*11,100			
27							*4,230		*13,900			
28							*3,820		*21,700			
29							*3,830		*25,400			
30							*3,770		*27,300			
31							*3,380					

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Per Sq. Mile
July	74.80		3	*37,600					
July	74.65	58.00	16	*35,700	1	*1,100	*10,900	*671,000	
September	74.70		2	*39,200					
September	74.80	64.60	17	*35,600	9	*8,730	*19,200	*1,140,000	
October **	75.30		2	*36,800			*35,400	*211,000	
The Period	75.30			*39,200		*1,100	*15,900	*2,022,000	

** October 1 to 3 inclusive
* Partly estimated

RANCHO VIEJO FLOODWAY STATION NEAR BROWNSVILLE, TEXAS

DESCRIPTION: Staff gage at the Military Highway bridge over the Rancho Viejo Floodway, about nine miles northwest of Brownsville, Texas. Meter measurements made from bridge. The highway bridge is located about 1.2 mile from the river. Zero of gage is mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based on several gage readings per day and 5 meter measurements during the period and previous rating curve. 1936 records considered fair. Records available: Whenever there was flow during 1935 and 1936.

REMARKS: Through a gate-controlled inlet upstream from this gaging station this floodway diverts only excess flood water from the Rio Grande. When the water reaches a stage of 16.4 feet, or 5 meters, at the Matamoros gaging station, water will begin to flow at this gaging station if the control gates are open.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									112	2,330		
2							145		1,590	2,700		
3							1,500		2,290	2,340		
4							482		799	2,040		
5										474		
6												
7												
8												
9												
10												
11					473							
12					1,370							
13					353							
14												
15												
16							735		751			
17							2,070		2,100			
18							552		1,740			
19									1,010			
20												
21									1,250			
22									1,940			
23									390			
24												
25												
26												
27												
28												
29									563			
30									1,290			
31												

Month		Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
				High		Low				
		High	Low	Dates		Dates			Total	Per Sq. Mile
May	11-13	44.32		12	1,500			70.8	4,360	
July	2- 4									
	16-18	45.30		17	2,290			177	10,900	
September	1- 4									
	16-19									
	21-23	45.50		3	2,480			528	31,400	
	29-30									
October	1- 5	45.70		2	2,800			319	19,600	
The Period								1,240	66,260	

RIO GRANDE AT MATAMOROS STATION

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

RECORDS: Based upon 152 meter measurements during the year. Computations by shifting channel methods. 1936 records good. Records available: 1901 to 1913; 1923 to December, 1936.

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

PREVIOUS EXTREME FLOWS: The greatest previous flow recorded here was on July 20, 1906, when a mean daily flow of 38,300 second feet occurred with a gage height of 13.39 feet. The highest gage reading was on June 18, 1935, when a reading of 22.28 feet present gage datum was reached. In 1930 the river at this station was dry for a few days in March and April. Numerous records of extreme flows may be seen in previous Water Bulletins.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6,670	3,710	2,320	992	2,780	9,570	989	3,530	16,200	26,900	4,520	4,480
2	6,570	3,740	2,370	964	2,920	8,690	11,120	3,390	25,700	29,500	4,410	4,030
3	6,390	3,810	2,600	784	3,450	7,590	26,700	3,480	28,400	29,500	4,170	3,810
4	6,140	3,740	2,600	770	4,200	7,240	23,520	3,320	23,500	29,000	4,130	3,810
5	6,040	3,390	2,420	901	3,850	6,920	14,130	3,040	13,700	23,000	4,240	3,960
6	5,900	3,300	2,220	932	3,030	6,360	9,960	2,790	9,960	18,400	4,200	4,170
7	5,650	3,410	2,800	883	2,460	5,470	9,040	2,810	9,390	15,100	4,100	4,240
8	5,440	3,450	3,430	692	1,960	4,660	7,200	2,880	8,830	13,100	4,060	4,060
9	5,160	3,410	3,780	639	1,480	3,960	5,050	3,120	8,230	11,600	4,030	3,780
10	4,940	3,450	4,170	639	1,700	3,180	4,310	3,480	8,620	10,500	3,880	3,530
11	4,560	3,510	3,920	802	17,500	2,490	11,120	3,250	9,390	10,000	3,740	3,570
12	4,520	3,570	3,640	830	25,800	2,150	14,020	2,710	12,000	9,430	3,670	3,710
13	4,770	3,430	3,710	1,020	22,200	1,870	9,180	2,270	11,100	8,480	3,600	4,170
14	4,660	3,170	3,710	932	12,200	1,820	7,170	2,040	10,000	7,700	3,600	4,520
15	4,520	3,130	3,600	731	8,330	1,820	9,780	1,930	9,530	7,130	3,640	4,660
16	4,310	3,120	3,450	569	6,780	1,700	21,720	2,060	22,400	6,990	3,710	4,520
17	4,100	3,120	2,920	533	6,920	1,820	28,100	2,170	28,500	6,780	3,710	4,310
18	3,850	3,040	2,320	667	7,240	1,920	22,000	2,060	27,000	6,570	3,670	4,240
19	3,960	2,780	2,140	978	6,780	1,830	13,100	1,740	22,600	6,140	3,640	4,240
20	4,100	2,620	1,840	1,530	5,790	1,680	9,320	1,610	20,100	5,580	3,600	4,310
21	3,880	2,660	1,670	1,640	4,870	1,640	7,560	1,620	23,500	5,010	3,600	4,310
22	3,640	2,690	1,780	1,690	4,060	1,730	6,780	1,640	27,300	4,870	3,960	4,100
23	3,440	2,780	2,000	1,590	3,410	1,450	6,140	1,700	22,600	4,770	4,130	4,060
24	3,320	2,830	1,960	2,250	2,870	1,080	5,860	1,810	15,600	4,660	4,030	3,920
25	3,170	2,480	1,450	3,810	3,350	869	5,790	2,060	11,800	4,660	3,880	3,810
26	3,250	2,310	1,210	4,520	7,730	749	5,580	2,740	10,400	4,840	4,030	3,880
27	3,570	2,280	1,180	4,240	10,800	706	5,160	2,490	11,000	4,730	4,560	3,920
28	3,670	2,460	1,080	3,390	15,900	678	4,480	1,970	20,200	4,590	4,870	3,960
29	3,780	2,480	1,070	2,660	17,100	773	4,060	1,830	21,500	4,520	4,840	3,810
30	3,810		1,280	2,320	14,700	749	4,030	2,140	23,500	4,480	4,800	3,640
31	3,810		1,190		11,400		3,960	3,020		4,520		3,490

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January	11.81	7.87	1	6,710	25	3,100	4,570	281,000	245,225
February	8.79	6.66	2	3,810	26	2,250	3,100	178,000	172,150
March	9.28	4.59	10	4,240	28	992	2,450	150,000	127,577
April	9.68	3.44	26	4,590	17	523	1,500	89,100	136,282
May	21.00	5.22	12	26,100	9	1,500	7,860	483,000	311,275
June	13.81	4.99	1	10,200	27	614	3,110	185,000	425,102
July	21.72		3	27,700					
July	22.18	5.38	17	28,700	1	897	10,200	629,000	336,166
August	12.01	6.82	31	6,710	20	1,590	2,470	152,000	305,361
September	22.21		3	28,800					
September	22.41		18	29,100					
September	22.24	13.35	22	27,900	9	8,090	17,100	1,017,000	654,853
October	22.57	10.50	2	29,600	30	4,480	10,700	661,000	612,675
November	10.60	8.66	1	4,560	13	3,570	4,030	240,000	328,897
December	9.78	8.33	1	4,700	10	3,440	4,030	248,000	255,832
The Year	22.57	3.44		29,600		523	5,940	4,313,100	3,911,395

RIO GRANDE AT LOWER BROWNSVILLE STATION

DESCRIPTION: Water-stage recorder and cable with sit down cable car, located about 1,000 feet below the El Jardin pumping plant and about 8.5 river miles below Brownsville, Texas. Zero of gage is United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon 34 current meter measurements made during the year. Computations by shifting channel methods. First two months estimated from Matamoros Station. 1936 records fair for first two months, good for last ten months. Records available: January, 1934, to December, 1936.

REMARKS: The river flow is greatly modified at this station by many irrigation diversions and by large reservoirs in the United States and Mexico. Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods only a portion of the water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries. With all closed basins eliminated, the drainage area above this station is 175,138 square miles; 94,677 being in the United States and 80,461 in Mexico.

PREVIOUS EXTREME FLOWS: 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.

Mean Daily Discharge in Second Feet and Annual Summary, 1936

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	"6,640	"3,680	"2,290	931	2,760	9,870	758	3,350	*13,500	*20,200	4,650	4,410
2	"6,490	"3,710	"2,340	886	2,990	8,900	6,180	3,180	*21,700	*21,100	4,540	3,850
3	"6,340	"3,780	"2,570	764	3,340	7,830	22,000	3,380	24,500	*20,800	4,200	3,510
4	"6,110	"3,680	"2,540	714	4,120	7,330	21,000	3,270	23,800	*20,600	4,080	3,510
5	"6,010	"3,320	*2,350	789	3,910	7,140	14,800	2,950	15,100	*19,400	4,220	3,710
6	"5,870	"3,260	2,190	846	3,110	6,440	10,100	3,640	10,500	17,200	4,220	3,910
7	"5,620	"3,370	2,600	825	2,500	5,520	9,140	2,650	9,890	14,800	4,090	4,060
8	"5,380	"3,420	3,280	634	2,030	4,690	7,620	2,830	9,190	13,000	4,030	3,910
9	"5,100	"3,380	3,630	556	1,620	3,830	5,910	3,140	8,510	11,600	4,010	3,590
10	"4,910	"3,420	4,000	543	1,510	3,050	5,060	3,700	8,710	10,700	3,820	3,250
11	"4,530	"3,480	3,890	680	12,800	2,390	9,220	3,570	9,740	10,200	3,590	3,260
12	"4,490	"3,500	3,530	732	22,300	1,970	12,200	2,980	11,300	9,610	3,440	3,420
13	"4,740	"3,380	3,590	844	21,000	1,720	9,340	2,400	*11,700	8,630	3,320	3,950
14	"4,600	"3,140	3,620	823	12,800	1,550	7,520	2,110	*10,800	7,660	3,350	4,450
15	"4,450	"3,100	3,490	643	8,140	1,550	8,730	2,000	*10,000	7,100	3,390	4,630
16	"4,240	"3,090	3,360	457	6,500	1,420	*17,700	2,070	*14,900	6,870	3,560	4,560
17	"4,030	"3,090	2,890	419	6,390	1,510	*24,000	2,220	*20,300	6,670	3,590	4,340
18	"3,820	"2,980	2,290	523	6,620	1,670	22,200	2,190	*20,400	6,450	3,530	4,160
19	"3,930	"2,710	1,980	744	6,210	1,600	14,500	1,890	*19,500	6,110	3,480	4,120
20	"4,070	"2,560	1,770	1,250	5,460	1,470	10,000	1,650	*17,900	5,560	3,410	4,210
21	"3,850	"2,600	1,570	1,430	*4,780	1,380	7,890	1,650	*19,200	4,990	3,390	4,240
22	"3,590	"2,630	1,660	1,560	*4,220	1,450	6,720	1,710	*20,500	4,690	3,520	4,030
23	"3,360	"2,750	1,840	1,440	3,660	1,230	6,050	1,790	19,300	4,640	3,700	3,940
24	"3,240	"2,800	1,810	2,060	3,250	913	5,580	1,900	14,500	4,500	3,680	3,830
25	"3,140	"2,450	1,450	3,690	3,380	734	5,510	2,080	10,900	4,510	3,520	3,750
26	"3,220	"2,250	1,160	4,570	7,200	665	5,460	2,970	*9,260	4,880	3,600	3,840
27	"3,540	"2,250	1,110	4,380	10,100	635	5,090	2,990	9,380	4,880	4,090	3,880
28	"3,640	"2,430	1,030	3,670	14,000	639	4,480	2,370	13,800	4,680	4,540	3,900
29	"3,750	"2,450	986	2,960	14,900	669	3,850	2,100	17,400	4,540	4,640	3,830
30	"3,780		1,160	2,480	13,400	654	3,750	2,370	19,100	4,520	4,670	3,630
31	"3,780		1,110		11,500		3,730	2,830		4,590		*3,520

Month	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low				
	High	Low	Dates		Dates			Total	Average 1934 to 1936
January				"6,680		"3,060	"4,520	"278,000	227,667
February				"3,780		"2,190	"3,060	"176,000	163,667
March	19.37	14.39	10	4,100	29	949	2,360	145,000	119,233
April	19.78	13.18	26	4,670	17	403	1,430	85,000	148,000
May	31.15	15.26	12	23,300	10	1,420	7,310	449,000	405,000
June	24.55	15.15	1	10,500	27	610	3,010	179,000	511,000
July	31.20		3	23,500					
July	31.73	15.35	17	24,500	1	684	9,550	587,000	407,333
August	20.04	16.89	31	4,360	20	1,630	2,580	159,000	199,667
September	32.11		3	25,600					
September	32.27	*20.00	17	*21,000	1	*4,240	14,800	883,000	682,666
October	32.27	20.90	2	21,200	25	4,410	9,540	586,000	471,667
November	21.06	19.25	1	4,670	13	3,280	3,860	230,000	227,667
December	20.46	18.86	15	4,660	10	3,150	3,910	240,000	213,933
The Year	32.27	13.18		25,600		403	5,510	3,997,000	3,777,500

" Estimated

* Partly estimated

RIO CONCHOS NEAR OJINAGA, CHIHUAHUA

DESCRIPTION: The Rio Conchos enters the Rio Grande about 4 miles above the international highway bridge at Presidio, Texas, and 1-1/2 miles above the Lower Presidio gaging station on the Rio Grande, and 8 miles below the Upper Presidio gaging station on the Rio Grande. No gaging station was maintained on the Rio Conchos, but the discharge records were calculated as mentioned below.

RECORDS: Based on discharge records of the Rio Grande at Upper Presidio and Lower Presidio stations; and irrigation diversions and arroyo inflow between these two stations. Due to a small error the figures below modify slightly the monthly and annual totals and averages published on p. 71, W. B. No. 5. The extremes of discharge shown there are not changed. Records fair. Records available: 1924 to 1936.

REMARKS: The Boquilla Dam, as well as many irrigation diversions above the confluence of the Rio Conchos and the Rio Grande greatly modify the river flow. The drainage area of the Rio Conchos above its confluence with the Rio Grande is 22,600 square miles, entirely in Mexico.

PREVIOUS EXTREME FLOWS: The greatest previous recorded flow occurred September 11, 1904, when the estimated peak was about 170,000 second feet.

Month 1936	Extreme Gage Height—Feet		Extreme Second Feet				Average Second Feet	Acre Feet	
			High		Low			Total	Normal 1924 to 1936
	High	Low	Dates		Dates				
January			25	672	13	251	392	24,100	68,238
February			25	979	2	354	553	31,800	57,561
March			3	946	31	148	394	24,200	52,985
April			18	725	11	101	195	11,600	44,569
May			22	1,820	2	76.9	184	11,300	42,850
June			18	836	30	41.1	147	8,720	53,957
July			30	5,780	10	33.8	361	22,200	76,231
August			28	4,120	11	180	644	39,600	132,323
September			26	24,400	1	1,160	5,530	329,000	219,900
October			1	6,450	24	523	1,620	99,800	166,415
November			30	1,460	13	575	876	52,100	67,408
December			1	1,310	31	740	977	60,100	65,546
The Year				24,400		33.8	984	714,520	1,047,983

ARROYO LAS VACAS NEAR VILLA ACUNA, COAHUILA

Arroyo Las Vacas enters the Rio Grande immediately below Del Rio. No gaging station was maintained on this creek. The discharges shown below are approximate only. They represent estimates of a skilled hydrographer made merely by inspection of the stream on the occasions of visits to the Del Rio gaging station gage well.

The drainage area of Arroyo Las Vacas above its confluence with the Rio Grande is 154 square miles, entirely in Mexico.

Date	Estimated Discharge in Sec. Ft.	Date	Estimated Discharge in Sec. Ft.	Date	Estimated Discharge in Sec. Ft.	Date	Estimated Discharge in Sec. Ft.
1935		1936		May 12	5	Sept. 23	5
June 6	10	Jan. 4	10	May 23	6	Oct. 6	5
June 13	2,000	Jan. 16	10	May 26	30	Oct. 8	5
June 17	30	Feb. 3	8	June 9	10	Nov. 2	4
June 22	20	Mar. 5	8	June 10	10	Nov. 19	4
Sept. 5	20	Mar. 20	7	June 16	4	Nov. 27	4
Sept. 8	Flood	Apr. 1	6	July 8	10	Dec. 3	4
Sept. 10	30	Apr. 18	5	Aug. 6	7	Dec. 9	4
Oct. 12	15	Apr. 23	6	Aug. 21	5	Dec. 17	4
Nov. 26	15	Apr. 28	6	Sept. 8	5		
Dec. 8	12						

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

From the records of the Middle Rio Grande Conservancy District the following data are taken for El Vado reservoir on the Rio Chama. From the United States Reclamation Bureau the following data are taken for the Elephant Butte reservoir on the Rio Grande and for the McMillan and Avalon reservoirs on the Pecos River, all in New Mexico. The Red Bluff Water Power Control District furnished the data for Red Bluff reservoir on the Pecos River about 8 miles below the Texas-New Mexico line. The data for Boquilla reservoir on the Rio Conchos in Chihuahua are taken from the records of the Compania Agricola y de Fuerza del Rio Conchos, S. A. The data for San Miguel and Centenario reservoirs on the San Carlos project in Coahuila and that for Don Martin reservoir on the Rio Salado are taken from the records of the National Irrigation Commission of Mexico.

The monthly figures represent the number of acre feet of water in storage on the last day of each month. Storage began in Red Bluff on September 28, 1936. For previous years' records, see Water Bulletins Numbers 2, 3, 4 and 5.

Month	El Vado		Elephant Butte		Boquilla		McMillan and Avalon	
	Acre Feet		Thousands of Acre Feet		Thousands of Acre Feet		Acre Feet	
	1936	Average 1935 to 1936	1936	Normal 1924 to 1936	1936	Normal 1924 to 1936	1936	Normal 1924 to 1936
Jan.	121,976	62,126	712	1,159	1,180	1,279	36,700	38,904
Feb.	125,000	65,525	731	1,167	1,133	1,252	36,700	38,019
Mar.	133,764	75,556	728	1,142	1,086	1,197	32,200	33,288
Apr.	160,200	111,181	773	1,135	1,031	1,133	17,000	21,092
May	166,450	161,705	880	1,238	960	1,060	18,900	26,723
June	136,579	149,740	775	1,235	893	1,002	19,900	22,465
July	99,400	132,238	662	1,144	875	1,024	13,200	19,100
Aug.	72,042	110,847	569	1,064	1,057	1,170	900	19,422
Sept.	56,466	96,844	553	1,040	1,722	1,349	15,000	28,146
Oct.	51,210	90,540	596	1,051	1,729	1,347	20,700	34,098
Nov.	53,030	85,080	632	1,058	1,684	1,297	21,550	34,354
Dec.	58,113	88,754	669	1,078	1,651	1,276	25,000	36,185
Total	-61,282	.....	-3	.....	+ 429	.....	-9,800	.....

Month	Red Bluff		Centenario and San Miguel		Don Martin	
	Acre Feet		Acre Feet		Thousands of Acre Feet	
	1936		1936		1936	Average 1930 to 1936
Jan.			*9,485		459	650
Feb.			*8,675		409	636
Mar.			14,917		354	610
Apr.			10,904		312	596
May			13,417		296	574
June			12,323		234	581
July			15,849		203	572
Aug.			12,890		172	557
Sept.			16,782		202	648
Oct.	18,360		19,886		201	666
Nov.	24,750		19,461		242	689
Dec.	30,240		17,654		272	693
Total					-190	...

* Centenario only.

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive

For all regular gaging stations on the Rio Grande or on tributaries near their confluence with the Rio Grande below El Paso, Texas, there is shown below the monthly, average monthly, annual and average annual discharge in acre feet for such time as records are available within the period 1924 to 1935 inclusive. These tables are supplemented by the regular station records which add the available 1936 data and carry forward the monthly and annual averages. Where averages cover 10 years or more they are called normals.

Rio Grande at San Marcial Station — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	56,000	17,400	45,200	38,700	49,600	26,500	44,800
Feb.	77,100	37,800	37,100	32,900	47,000	29,600	52,900
Mar.	76,900	41,400	59,000	35,400	49,700	43,000	65,200
Apr.	407,000	98,200	118,000	134,000	40,200	78,600	186,000
May	608,000	53,900	440,000	317,000	251,000	276,000	124,000
June	134,000	3,550	272,000	168,000	106,000	132,000	62,500
July	50,000	1,310	27,200	154,000	595	38,100	79,300
Aug.	7,190	21,300	1,620	65,800	9,350	275,000	53,100
Sept.	2,920	27,000	3,900	189,000	5,040	308,000	4,780
Oct.	0	32,000	3,160	105,000	0	123,000	4,320
Nov.	3,840	40,300	8,930	61,300	4,340	76,200	18,000
Dec.	15,100	44,600	31,400	47,900	27,800	58,400	36,100
Total	1,438,050	418,760	1,047,510	1,349,000	590,625	1,464,400	731,000

	1931	1932	1933	1934	1935	Normal
Jan.	39,200	43,710	45,140	48,900	44,900	41,671
Feb.	45,800	64,050	38,580	46,300	39,100	45,686
Mar.	49,600	99,450	47,460	26,700	23,400	51,434
Apr.	53,100	232,780	16,850	29,500	21,500	117,977
May	92,800	430,920	94,470	4,450	182,000	239,545
June	5,090	212,060	253,490	228	368,000	143,076
July	8,010	157,140	55,240	0	36,000	50,575
Aug.	6,940	60,700	37,880	31,700	108,000	56,548
Sept.	58,950	12,200	42,330	*25,500	64,600	62,018
Oct.	55,600	16,770	15,900	861	37,200	32,818
Nov.	26,800	31,650	23,020	2,550	51,200	29,011
Dec.	47,900	37,270	46,200	27,800	53,600	39,506
Total	489,790	1,398,700	716,560	244,489	1,029,500	909,865

Rio Grande at El Paso Station — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	17,500	11,600	12,200	13,900	12,700	13,200	8,180
Feb.	48,500	29,200	15,400	24,600	26,600	18,000	16,300
Mar.	56,800	56,700	41,300	38,100	43,500	37,100	42,900
Apr.	91,000	75,100	65,400	59,000	**80,100	62,500	62,500
May	122,000	73,200	69,400	71,700	**68,600	70,700	58,800
June	98,200	68,400	75,200	73,800	**72,900	56,200	67,800
July	111,000	79,800	88,900	86,800	**86,300	83,000	82,400
Aug.	107,000	96,900	63,100	90,700	**97,500	107,000	83,000
Sept.	77,400	87,400	65,000	80,600	**67,300	51,500	51,900
Oct.	32,000	25,300	21,100	30,300	31,700	25,900	25,800
Nov.	21,100	15,300	21,000	29,500	22,300	14,300	16,700
Dec.	27,700	14,900	18,800	20,600	14,300	12,700	16,100
Total	810,200	633,800	556,800	619,600	623,800	552,100	532,380

	1931	1932	1933	1934	1935	Normal
Jan.	9,100	9,130	11,820	11,200	8,510	11,587
Feb.	13,900	16,880	24,870	33,100	8,800	23,012
Mar.	40,500	34,530	39,650	43,500	18,400	41,082
Apr.	56,800	57,240	66,470	56,700	44,900	64,809
May	53,700	62,460	63,490	60,700	47,600	68,529
June	63,100	73,630	79,110	62,000	56,700	70,587
July	76,440	78,460	82,600	73,800	69,900	83,283
Aug.	88,640	85,750	95,640	80,200	95,900	90,944
Sept.	52,480	67,440	66,680	48,000	65,800	65,125
Oct.	26,740	34,860	33,630	18,300	20,200	27,152
Nov.	22,250	24,370	20,460	11,400	11,500	19,182
Dec.	14,130	22,490	24,760	9,590	11,700	17,314
Total	517,780	567,240	609,180	508,490	459,910	582,606

* Partly estimated

** These totals agree with published mean dailies but do not agree with totals published in W.S.P. 668

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS
Period 1924 to 1935 Inclusive—continued

Rio Grande at Tornillo Bridge Station —1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	11,700	11,800	11,800	12,900	8,240	8,180	8,610
Feb.	36,000	7,730	3,310	13,700	10,400	3,540	4,420
Mar.	31,600	7,370	8,710	13,900	8,120	4,670	9,160
Apr.	35,100	10,000	15,600	14,500	28,000	10,200	10,100
May	57,600	11,300	23,000	20,000	26,700	25,500	9,780
June	36,000	13,600	25,800	24,900	13,600	5,090	19,800
July	61,900	10,900	40,500	31,300	22,100	21,300	24,500
Aug.	39,200	54,500	9,980	51,900	59,200	59,600	27,500
Sept.	40,600	43,700	26,700	46,700	27,600	10,300	10,600
Oct.	14,700	13,600	17,700	12,200	13,900	12,700	10,300
Nov.	11,000	7,000	7,150	17,900	16,800	9,640	7,680
Dec.	18,800	6,330	11,600	16,100	10,700	7,380	11,100
Total	394,200	197,830	201,850	276,000	245,360	178,100	153,550

	1931	1932	1933	1934	1935	Normal	
Jan.	8,300	7,100	10,590	10,100	6,810	9,677	
Feb.	6,830	10,470	12,250	20,400	2,060	10,926	
Mar.	8,920	7,100	5,520	13,600	457	9,927	
Apr.	20,100	6,960	15,520	3,470	640	14,183	
May	12,200	12,530	11,800	6,060	609	18,090	
June	8,690	14,490	31,010	2,570	1,520	16,423	
July	20,330	17,640	24,490	9,180	1,620	23,813	
Aug.	40,840	27,070	28,110	7,040	21,700	35,553	
Sept.	17,770	23,300	22,640	8,040	44,100	26,838	
Oct.	10,350	33,360	17,430	6,680	7,000	14,160	
Nov.	12,440	12,950	9,250	3,150	5,200	10,013	
Dec.	9,460	15,510	14,300	4,040	8,020	11,112	
Total	176,230	188,480	202,910	94,330	99,736	200,715	

Rio Grande at Fort Quitman Station —1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	19,200	13,800	13,900	13,500	12,500	10,600	11,500
Feb.	30,400	15,800	8,650	14,100	13,100	8,660	9,330
Mar.	28,500	18,300	11,300	7,720	7,440	9,220	10,800
Apr.	31,600	13,500	22,800	11,300	21,000	7,560	11,500
May	50,700	14,700	31,100	13,500	25,400	22,000	11,600
June	31,000	18,700	27,300	19,500	9,640	7,140	25,500
July	61,500	8,880	48,300	14,000	12,300	14,400	22,000
Aug.	29,200	58,100	19,700	45,300	66,400	62,100	25,500
Sept.	41,900	59,500	26,400	42,200	36,700	15,600	10,000
Oct.	17,600	20,800	30,000	21,200	24,000	24,400	22,900
Nov.	12,900	13,200	17,400	20,200	20,900	17,100	12,300
Dec.	19,000	12,600	19,400	18,400	14,400	13,000	15,100
Total	373,500	267,880	276,250	240,920	263,780	211,780	188,030

	1931	1932	1933	1934	1935	Normal	
Jan.	9,410	8,130	12,810	12,500	5,370	11,935	
Feb.	10,200	12,140	15,620	20,500	3,510	13,501	
Mar.	10,100	11,560	12,200	16,600	1,090	12,069	
Apr.	34,700	7,130	12,630	7,770	1,200	15,224	
May	21,700	9,180	10,760	7,340	*880	18,238	
June	8,750	9,410	29,010	4,480	3,630	16,172	
July	17,220	13,940	20,530	4,600	4,300	20,164	
Aug.	36,600	24,910	19,090	4,430	24,300	34,638	
Sept.	17,640	27,410	28,910	9,050	57,200	31,042	
Oct.	14,300	45,720	21,950	4,520	20,700	22,341	
Nov.	16,480	20,620	13,030	4,990	10,500	14,968	
Dec.	14,550	20,970	17,250	5,640	12,700	15,251	
Total	211,650	211,120	213,790	102,420	145,380	225,542	

* Partly estimated.

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Grande at La Nutria Station—1935

	1935	
Jan.	‡3,000	
Feb.	‡2,500	
Mar.	‡500	
Apr.	‡0	
May	‡0	
June	*5,290	Operation of this station began June 15, 1935.
July	2,780	
Aug.	40,300	
Sept.	62,700	
Oct.	24,400	
Nov.	11,100	
Dec.	13,500	
Total	*166,070	

Rio Grande at Upper Presidio Station—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	27,300	22,500	22,300	10,500	11,600	10,480	12,190
Feb.	29,400	17,500	13,800	10,100	12,000	8,820	10,030
Mar.	41,500	20,000	17,000	6,120	5,270	8,660	6,690
Apr.	36,000	10,200	39,900	4,930	*13,200	4,070	6,300
May	52,600	28,000	55,300	6,400	26,500	14,990	5,770
June	36,400	27,500	62,100	12,100	3,240	5,610	28,610
July	58,000	22,500	68,800	3,230	2,640	9,600	12,290
Aug.	27,500	74,100	81,700	38,300	75,200	62,580	41,340
Sept.	51,500	82,500	46,500	45,400	29,800	19,050	6,650
Oct.	22,700	46,600	78,000	32,100	21,400	39,460	43,900
Nov.	14,000	21,700	24,200	26,800	25,900	23,930	13,310
Dec.	21,300	14,300	21,700	19,000	18,600	13,170	13,620
Total	418,200	387,400	531,300	214,980	245,350	220,420	200,700

	1931	1932	1933	1934	1935	Normal	
Jan.	10,090	8,860	14,300	11,700	644	13,539	
Feb.	10,170	10,040	13,940	15,600	1,420	12,735	
Mar.	7,740	10,160	11,890	14,500	285	12,485	
Apr.	26,830	1,520	3,850	4,090	0	12,574	
May	23,440	2,170	4,340	1,800	0	18,442	
June	3,430	830	14,590	*928	9,780	17,093	
July	17,380	7,230	20,000	13.3	3,420	18,759	
Aug.	31,450	42,260	11,810	2,170	13,600	41,834	
Sept.	17,780	39,400	32,670	3,140	68,500	36,907	
Oct.	14,900	61,480	22,870	0	22,800	33,851	
Nov.	10,240	22,220	17,290	0	6,920	17,209	
Dec.	10,280	21,330	14,790	374	9,310	14,814	
Total	183,730	227,500	182,340	54,315	136,679	250,243	

Rio Conchos near Ojinaga, Chihuahua—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	161,000	46,100	96,700	87,500	89,300	85,300	66,100
Feb.	72,500	59,600	83,000	76,500	87,700	81,300	40,600
Mar.	54,000	64,200	71,600	80,000	74,700	80,800	24,300
Apr.	39,200	59,700	49,600	79,700	62,100	77,900	16,500
May	43,800	62,100	52,700	67,900	64,300	82,400	17,400
June	33,300	89,700	51,900	74,100	73,000	77,800	23,300
July	52,700	219,000	90,000	87,200	106,000	87,500	51,100
Aug.	40,700	449,000	242,000	107,000	177,000	106,000	155,000
Sept.	100,000	424,000	288,000	107,000	86,400	132,000	10,400
Oct.	102,000	241,000	182,000	86,900	95,500	88,000	47,200
Nov.	63,400	102,000	104,000	71,900	100,000	72,400	29,000
Dec.	58,600	99,700	101,000	88,000	97,700	67,700	28,700
Total	821,200	1,916,100	1,412,500	1,013,700	1,113,700	1,039,100	509,600

‡ Estimated
* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Conchos near Ojinaga, Chihuahua—continued—1924 to 1935

	1931	1932	1933	1934	1935	Normal
Jan.	20,300	50,900	50,700	64,500	44,600	71,916
Feb.	29,100	52,100	39,300	62,300	32,500	59,708
Mar.	46,500	44,700	43,700	59,200	20,900	55,383
Apr.	50,700	29,300	48,600	49,500	5,000	47,317
May	49,100	18,200	35,700	48,200	3,950	45,479
June	57,100	9,720	91,900	58,100	52,800	57,727
July	82,100	27,800	61,100	61,600	42,700	80,733
Aug.	86,800	128,000	85,200	43,500	60,400	140,049
Sept.	59,200	502,000	533,000	38,700	249,000	210,807
Oct.	66,000	798,000	200,000	41,000	116,000	171,966
Nov.	55,200	62,600	73,200	45,500	45,000	68,683
Dec.	59,600	50,900	69,400	44,100	26,600	66,000
Total	661,700	1,774,220	1,331,800	616,200	699,450	1,075,768

Rio Grande at Lower Presidio Station—1924 to 1935

	1924**	1925**	1926**	1927**	1928**	1929**	1930**
Jan.	188,000	68,600	119,000	98,000	101,000	95,800	78,300
Feb.	102,000	77,100	96,800	86,600	99,700	90,100	50,600
Mar.	95,400	84,100	88,500	86,100	79,900	89,400	30,900
Apr.	74,700	69,400	89,000	84,100	74,800	81,400	22,300
May	96,100	89,900	108,000	74,000	90,500	97,100	22,800
June	69,400	117,000	114,000	85,900	75,900	83,100	51,600
July	110,000	241,000	158,000	89,600	108,000	96,300	62,600
Aug.	67,700	523,000	323,000	145,000	252,000	168,000	196,000
Sept.	151,000	506,000	335,000	152,000	116,000	151,000	17,000
Oct.	125,000	288,000	260,000	119,000	117,000	128,000	91,200
Nov.	77,400	124,000	128,000	98,700	126,000	96,300	42,300
Dec.	79,900	114,000	123,000	107,000	116,000	80,900	42,300
Total	1,236,600	2,302,100	1,942,300	1,226,000	1,356,800	1,257,400	707,900

	1931**	1932	1933	1934	1935	Normal
Jan.	30,400	**59,800	65,000	*76,200	45,200	85,441
Feb.	39,300	**62,100	53,200	*77,900	33,900	72,441
Mar.	54,200	**54,900	55,400	73,600	21,200	67,800
Apr.	77,000	**30,700	51,500	53,000	4,460	59,363
May	72,200	**19,900	39,800	49,700	3,660	63,638
June	60,200	*10,100	106,000	58,700	62,300	74,516
July	98,700	34,400	*80,100	*60,800	45,300	98,733
Aug.	118,000	170,000	*96,400	45,200	*73,500	181,483
Sept.	77,000	*542,000	*566,000	41,800	*318,000	247,732
Oct.	80,900	859,000	223,000	41,000	*139,000	205,924
Nov.	65,400	84,800	90,500	45,500	51,900	85,900
Dec.	69,900	72,200	*84,200	44,500	35,900	80,816
Total	843,200	*1,999,900	*1,511,100	*667,900	*834,320	132,379

Alamito Creek Station near Presidio, Texas—1932 to 1935

		1932	1933	1934	1935	Average
Jan		154	159	184	*123	155
Feb.		173	167	167	*111	154
Mar.		185	*183	184	*123	169
Apr.		179	*168	191	*119	164
May		*200	*189	612	*613	404
June		*5,220	477	206	*6,360	3,066
July		*3,750	249	*359	6,650	2,752
Aug.		*16,330	1,380	*4,000	4,310	6,505
Sept.		*5,310	3,340	*179	*10,400	4,807
Oct.		157	518	165	*2,900	935
Nov.		166	319	119	*226	208
Dec.		207	240	131	*234	203
Total		*32,031	7,389	6,497	*32,169	19,522

* Partly estimated.

** Prior to June 14, 1932, the gaging station was located 6 miles downstream from the present station, but these figures are estimated as for the present location.

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Terlingua Creek Station near Terlingua, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	‡185	‡184	157	82.7	152	
Feb.	‡144	‡167	111	91.0	128	
Mar.	‡154	‡184	88.7	74.4	125	
Apr.	‡149	*216	66.8	55.1	122	
May	*2,220	215	117	3,970	1,630	
June	*988	431	2,300	21,000	6,180	Record began January, 1932
July	1,070	621	1,580	10,900	3,543	
Aug.	*26,680	1,720	254	6,740	8,849	
Sept.	*18,040	‡3,890	1,590	24,600	12,030	
Oct.	*1,390	*7,970	50.8	8,100	4,378	
Nov.	‡160	260	64.9	233	179	
Dec.	‡160	214	90.0	115	145	
Total	*51,340	*16,072	6,470.2	75,961.2	37,461	

Rio Grande at Boquillas Station—1924 to 1935

	1924**	1925**	1926**	1927**	1928	1929	1930
Jan.	224,000	66,300	109,000	111,000	**102,000	97,200	68,900
Feb.	98,200	55,300	84,700	96,300	**96,900	87,200	46,200
Mar.	91,300	64,400	79,900	99,300	**87,100	83,600	29,700
Apr.	69,500	75,200	75,900	86,500	**64,800	73,200	17,800
May	80,500	193,000	105,000	75,700	**95,900	90,400	17,000
June	83,500	92,300	109,000	98,300	**75,300	87,500	50,600
July	102,000	220,000	130,000	102,000	116,000	96,500	49,600
Aug.	61,200	642,000	373,000	135,000	249,000	156,000	200,000
Sept.	152,000	649,000	366,000	175,000	136,000	145,000	16,900
Oct.	152,000	289,000	308,000	125,000	112,000	113,000	106,000
Nov.	72,000	113,000	124,000	90,400	121,000	88,700	37,200
Dec.	73,800	94,100	112,000	109,000	109,000	78,700	35,400
Total	1,260,000	2,553,600	1,976,500	1,303,500	*1,365,000	1,197,000	675,300

	1931	1932	1933	1934	1935	Normal	
Jan.	30,600	57,680	‡66,610	81,800	44,900	88,332	
Feb.	32,600	60,560	‡53,790	81,000	34,900	68,971	
Mar.	43,700	52,360	‡56,510	78,900	27,300	66,172	
Apr.	73,200	29,850	‡51,580	55,200	9,980	56,892	
May	79,250	27,620	*40,260	66,900	30,500	75,169	
June	62,500	21,280	97,400	73,700	*98,500	79,157	
July	100,610	*47,950	*95,550	74,500	66,200	100,076	
Aug.	112,060	204,980	98,330	63,300	82,600	198,122	
Sept.	57,510	*725,800	*572,200	43,600	362,000	283,418	
Oct.	75,180	*774,060	*291,380	38,900	176,000	213,377	
Nov.	69,110	‡87,410	*101,020	43,900	72,400	85,012	
Dec.	72,950	‡73,930	83,430	41,500	40,800	77,051	
Total	809,270	*2,163,480	*1,608,060	743,200	1,046,080	1,391,749	

Lozier Creek Station near Langtry, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	0	0	0	0	0	
Feb.	0	0	0	0	0	
Mar.	0	0	0	0	0	
Apr.	0	1,390	485	*446	580	
May	1,040	0	0	29,100	7,535	Record began January, 1932
June	0	0	123	6,190	1,578	
July	4,540	0	0	0	1,135	
Aug.	2,670	2,220	0	*4,840	2,432	
Sept.	69,360	2	0	*147,000	54,091	
Oct.	805	350	0	0	289	
Nov.	0	0	0	0	0	
Dec.	0	0	0	0	0	
Total	78,415	3,962	608	*187,576	67,640	

‡ Estimated
* Partly estimated
** Estimated. See p. 75, W.B. No. 5.

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Grande at Langtry Station—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	*245,000	92,200	131,000	130,000	121,000	119,000	88,500
Feb.	*117,000	80,000	106,000	115,000	116,000	105,000	62,800
Mar.	*110,000	90,100	101,000	118,000	106,000	106,000	48,800
Apr.	*87,800	102,000	96,800	105,000	83,300	89,800	36,400
May	99,000	233,000	127,000	94,100	115,000	103,000	32,300
June	102,000	*121,000	131,000	117,000	94,000	114,000	72,000
July	121,000	263,000	153,000	121,000	133,000	106,000	56,100
Aug.	79,400	*730,000	*407,000	154,000	334,000	169,000	220,000
Sept.	172,000	*738,000	*399,000	195,000	184,000	160,000	35,700
Oct.	172,000	339,000	339,000	144,000	138,000	127,000	120,000
Nov.	90,400	144,000	147,000	109,000	134,000	108,000	56,600
Dec.	*92,200	123,000	134,000	128,000	131,000	97,200	49,800
Total	1,487,800	3,055,300	2,271,800	1,530,100	1,689,300	1,404,000	879,000
	1931	**1932**	**1933**	**1934**	**1935**	**Normal**	
Jan.	52,300	71,150	92,430	99,700	64,800	108,923	
Feb.	48,900	71,070	78,490	94,000	54,400	87,388	
Mar.	60,100	69,800	80,110	95,000	48,100	86,084	
Apr.	94,600	47,820	74,580	72,900	30,100	76,758	
May	122,000	72,680	60,580	86,700	113,000	104,863	
June	83,900	37,310	92,960	101,000	*146,000	101,014	
July	121,790	80,700	123,040	91,600	*114,000	123,686	
Aug.	132,680	199,380	112,040	78,100	110,000	227,133	
Sept.	68,840	1,100,130	628,000	64,400	543,000	357,339	
Oct.	90,780	856,120	319,720	55,200	204,000	242,068	
Nov.	82,300	131,070	114,010	62,100	95,000	106,123	
Dec.	90,860	103,240	97,750	59,100	61,900	97,338	
Total	1,049,050	2,840,470	1,873,710	959,800	1,584,300	1,718,719	

Pecos River Station near Comstock, Texas—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	32,200	13,700	19,700	33,800	13,000	23,700	17,500
Feb.	19,600	10,900	17,500	27,100	12,100	15,100	12,400
Mar.	21,500	11,100	17,900	15,500	12,200	17,700	12,400
Apr.	18,100	11,200	17,800	18,900	9,520	14,500	12,600
May	17,800	156,000	16,500	10,800	76,200	14,500	11,600
June	16,100	32,800	58,900	16,200	21,200	13,300	17,400
July	9,590	17,100	23,600	13,000	30,400	11,600	7,620
Aug.	8,660	46,500	15,700	9,510	50,400	9,410	7,620
Sept.	28,800	26,300	12,700	19,200	34,200	12,700	6,190
Oct.	20,300	29,400	37,400	14,600	23,100	21,300	92,200
Nov.	14,000	21,100	28,400	11,200	38,000	14,000	22,300
Dec.	14,100	22,300	29,500	13,000	36,900	17,400	20,000
Total	220,750	398,400	295,600	202,810	357,220	185,210	239,830
	1931	**1932**	**1933**	**1934**	**1935**	**Normal**	
Jan.	22,100	22,970	55,880	19,900	12,900	23,946	
Feb.	20,000	23,250	39,060	16,600	11,600	18,768	
Mar.	20,400	24,040	32,870	15,900	11,400	17,742	
Apr.	25,400	14,890	23,900	17,500	14,300	16,551	
May	66,400	29,040	21,830	13,300	126,000	46,664	
June	26,800	33,780	17,860	30,600	135,000	34,995	
July	15,950	18,540	16,730	12,800	34,700	17,636	
Aug.	16,250	20,820	17,590	9,270	19,300	19,252	
Sept.	11,540	324,420	21,180	8,890	202,000	59,010	
Oct.	12,480	192,240	24,430	9,520	29,800	42,231	
Nov.	14,280	73,260	16,950	10,300	21,100	23,741	
Dec.	15,770	54,260	19,610	12,200	23,300	23,195	
Total	267,370	831,510	307,890	176,780	641,400	343,731	

* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Goodenough Spring Station near Comstock, Texas — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.						8,980	6,580
Feb.						8,230	5,890
Mar.						8,550	6,210
Apr.		1924 to 1928 annuals estimated. Monthly				7,560	5,850
May		distribution for normals prorated same as				7,810	6,950
June		1929 to 1935				8,030	8,270
July						8,480	8,360
Aug.						8,420	7,440
Sept.						8,090	6,550
Oct.						8,360	7,560
Nov.						7,500	7,970
Dec.						7,130	8,790
Total	99,000	120,000	98,000	97,000	103,000	97,140	86,420

	1931	1932	1933	1934	1935	Normal
Jan.	8,920	8,180	19,620	12,500	8,890	9,687
Feb.	8,890	7,570	17,030	10,400	7,760	8,639
Mar.	9,410	7,570	17,770	10,700	8,460	9,028
Apr.	8,270	6,680	16,580	10,000	8,230	8,298
May	9,040	8,830	16,840	10,100	8,750	8,981
June	9,220	8,130	16,040	9,600	11,500	9,310
July	10,570	8,290	16,460	9,750	10,700	9,546
Aug.	10,000	7,580	15,840	10,700	10,300	9,240
Sept.	9,760	‖41,490	*14,580	10,100	*10,200	13,242
Oct.	9,630	*25,870	14,810	9,960	9,920	11,323
Nov.	9,020	21,850	13,840	9,330	9,050	10,322
Dec.	8,630	20,470	13,430	9,120	9,150	10,087
Total	111,360	172,510	192,840	122,260	112,910	117,703

Devils River Station near Del Rio, Texas — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	29,100	24,500	26,300	25,100	24,500	15,100	17,800
Feb.	26,900	21,500	22,600	24,700	21,100	17,900	15,100
Mar.	28,700	22,400	27,700	23,400	20,500	19,900	18,600
Apr.	27,200	20,900	42,600	39,500	18,300	11,100	21,800
May	34,300	301,000	28,800	24,700	33,300	26,700	10,500
June	31,200	45,600	26,300	27,700	51,900	37,600	33,100
July	25,000	33,200	24,700	23,200	23,600	47,200	20,200
Aug.	23,600	32,400	23,300	20,100	21,600	21,500	15,500
Sept.	27,900	29,800	22,200	48,300	32,800	15,900	13,900
Oct.	27,900	30,400	26,400	89,800	28,700	18,800	349,000
Nov.	24,400	27,600	24,000	27,000	22,000	17,600	37,000
Dec.	25,100	27,100	33,100	26,500	20,800	18,100	32,100
Total	331,300	616,400	328,000	400,000	319,100	267,400	584,600

	1931	1932	1933	1934	1935	Normal
Jan.	32,800	26,400	*45,250	21,000	14,500	25,196
Feb.	34,400	*22,220	*36,880	18,100	13,300	22,892
Mar.	32,500	21,520	39,420	20,600	14,000	24,103
Apr.	67,800	19,230	33,570	20,000	15,400	28,117
May	62,100	23,770	34,870	18,800	66,800	55,470
June	39,300	18,010	35,490	29,100	285,000	55,025
July	36,110	26,760	30,630	20,700	34,300	28,800
Aug.	31,740	*51,000	29,800	17,900	29,000	26,453
Sept.	28,750	895,990	26,480	19,900	405,000	130,577
Oct.	29,680	73,310	27,170	*19,500	45,400	63,838
Nov.	30,150	56,350	23,950	15,900	34,400	28,362
Dec.	26,650	49,520	23,300	15,900	34,800	27,748
Total	451,980	1,284,080	386,810	237,400	991,900	516,581

‖ Estimated
* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Cienegas Creek Station near Del Rio, Texas —1931 to 1935

	1931	1932	1933	1934	1935	Average
Jan.		468	747	527	149	473
Feb.	Record began	282	669	322	184	364
Mar.		263	521	328	*2,810	980
Apr.		85	376	262	"219	236
May		663	374	554	*440	508
June		189	342	167	*6,360	176
July		"61.5	247	158		155
Aug.		222	246	166		211
Sept.	312	"861	516	*1,280		742
Oct.	394	861	570	757		646
Nov.	426	780	507	*171	Record ended.	471
Dec.	489	738	536	163		482
Total	1,621	5,473.5	5,651	4,855	*10,162	5,444

Rio Grande at Del Rio Station — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	344,000	153,000	188,000	201,000	178,000	175,000	135,000
Feb.	192,000	131,000	157,000	184,000	160,000	152,000	102,000
Mar.	194,000	145,000	166,000	168,000	149,000	160,000	94,700
Apr.	163,000	150,000	196,000	166,000	131,000	133,000	83,300
May	172,000	*700,000	174,000	142,000	269,000	167,000	68,200
June	176,000	282,000	245,000	176,000	184,000	183,000	145,000
July	160,000	388,000	197,000	174,000	185,000	175,000	97,800
Aug.	136,000	865,000	489,000	205,000	409,000	210,000	249,000
Sept.	254,000	844,000	485,000	271,000	273,000	204,000	72,600
Oct.	252,000	413,000	449,000	262,000	215,000	181,000	574,000
Nov.	144,000	215,000	227,000	166,000	213,000	158,000	148,000
Dec.	153,000	187,000	218,000	181,000	215,000	148,000	132,000
Total	2,340,000	4,473,000	3,191,000	2,296,000	2,581,000	2,046,000	1,901,600

	1931	1932	1933	1934	1935	Normal
Jan.	133,000	145,610	281,160	162,000	111,000	183,898
Feb.	127,000	138,310	229,970	148,000	96,200	151,457
Mar.	134,000	138,190	224,670	156,000	102,000	152,630
Apr.	192,000	99,850	185,990	135,000	85,200	143,362
May	278,000	169,390	166,460	153,000	345,000	233,671
June	177,000	110,200	178,830	180,000	704,000	228,419
July	199,760	150,510	223,340	138,000	223,000	192,618
Aug.	200,790	254,720	203,860	124,000	185,000	294,281
Sept.	129,800	2,754,590	733,080	117,000	1,274,000	617,672
Oct.	157,450	1,409,020	422,490	110,000	*320,000	397,080
Nov.	142,490	376,150	189,070	108,000	177,000	188,642
Dec.	160,330	295,180	164,630	108,000	144,000	175,512
Total	2,031,620	6,041,720	3,203,550	1,639,000	3,766,400	2,959,241

San Felipe Creek Station near Del Rio, Texas — 1931 to 1935

	1931	1932	1933	1934	1935	Average
Jan.		3,730	7,070	3,400	934	3,784
Feb.	Record began	3,820	5,490	2,270	487	3,017
Mar.		3,750	3,910	*1,560	1,560	2,695
Apr.		2,660	3,870	1,500	566	2,149
May		6,700	4,010	2,740	2,920	4,092
June		2,490	3,680	1,510	*47,900	13,895
July		2,910	4,290	1,550	*5,350	3,525
Aug.		5,590	3,940	1,280	3,930	3,685
Sept.	3,860	9,790	3,310	3,060	19,100	7,824
Oct.	3,510	6,320	3,820	2,310	5,410	4,274
Nov.	3,310	5,560	3,370	526	4,850	3,523
Dec.	3,550	5,820	3,100	496	5,130	3,619
Total	14,230	59,140	49,860	22,202	98,137	56,082

" Estimated
* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Sycamore Creek Station near Del Rio, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	252	1,010	*219	0	370	
Feb.	262	855	*196	0	328	
Mar.	272	829	*169	220	372	
Apr.	118	628	*95.8	223	266	
May	124	514	*123	*5,020	1,445	Record began January, 1932.
June	127	346	*33.9		169	
July	2,480	161	0		880	
Aug.	24,500	81.5	0		8,186	Record ended May, 1935.
Sept.	43,400	2.8	234		14,531	
Oct.	1,900	0	119		673	
Nov.	983	*101	4.2		362	
Dec.	985	*136	0		373	
Total	75,403	4,664.3	*1,193.9	*5,463	27,955	

Pinto Creek Station near Del Rio, Texas—1928 to 1935

	1928	1929	1930	1931	1932	1933	1934	1935	Average
Jan.		94	12	799	523	2,110	273	0	544
Feb.		61	8.3	750	444	1,860	194	13.9	476
Mar.	Record	52	4.3	775	383	1,600	156	2,500	781
Apr.	began	43	750	1,290	227	1,020	148	3,600	1,011
May		4,650	28	1,830	290	992	*856	20,500	4,164
June		43	405	1,170	*12.3	1,130	0	30,000	4,680
July		4,490	0	1,020	1,840	2,050	0	2,060	1,637
Aug.		15	0	744	48,700	457	0	983	7,271
Sept.		481	0	582	17,300	197	1,880	9,980	4,346
Oct.		0	4,000	380	2,210	266	3,040	1,920	1,688
Nov.		0	421	456	2,150	190	6.9	1,500	675
Dec.	98	465	615	732	2,180	180	0	1,690	745
Total	98	10,394	6,243.6	10,528	76,259.3	12,052	6,553.9	74,746.9	28,018

Rio San Diego Station at Jimenez, Coahuila—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.		36,430	7,160	3,340	15,643	
Feb.		25,760	3,530	2,540	10,610	
Mar.		21,500	2,690	2,540	8,910	
Apr.		15,420	2,880	16,800	11,700	
May.		11,710	6,280	120,000	45,997	
June		9,140	2,000	62,200	24,447	Present station record began October, 1932.
July		6,630	7,230	21,500	11,787	
Aug.		6,050	20,000	18,200	14,750	
Sept.		8,220	17,500	64,500	30,073	
Oct.	146,640	8,670	5,040	28,900	47,312	
Nov.	68,290	7,050	3,530	23,000	25,468	
Dec.	45,160	5,820	3,360	17,800	18,035	
Total	260,090	162,400	81,200	381,320	264,732	

Las Moras Creek Station near Eagle Pass, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	688	118	106	*30.7	236	
Feb.	700	95.4	161	*27.8	246	
Mar.	730	122	204	*50.6	277	
Apr.	335	126	100	1,380	485	
May	638	151	655	9,290	2,684	
June	0	213	147	13,200	3,390	Record began January, 1932.
July	6,710	0	49.6	2,850	2,402	
Aug.	9,490	4.03	*34.9	1,480	2,752	
Sept.	20,260	0	1,110	3,970	6,335	
Oct.	943	0	405	2,030	844	
Nov.	131	0	370	2,000	625	
Dec.	141	0	690	1,760	648	
Total	40,766	829.43	4,032.5	38,069.1	20,924	

* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio San Rodrigo Station near El Moral, Coahuila—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	4,160	14,850	2,990	1,310	5,828	
Feb.	2,300	11,580	2,020	1,070	4,242	
Mar.	4,710	9,900	1,670	914	4,298	
Apr.	3,710	6,870	2,590	493	3,416	
May	4,830	4,730	1,780	42,300	13,410	
June	4,020	3,110	526	37,600	11,314	Station reconstructed in 1932. Previous record not available.
July	6,580	2,160	1,890	8,560	4,798	
Aug.	5,170	2,180	2,030	6,770	4,038	
Sept.	*253,960	2,970	3,310	20,200	70,110	
Oct.	81,360	5,620	2,050	10,800	24,958	
Nov.	24,450	4,130	1,690	8,700	9,742	
Dec.	19,060	3,030	1,710	7,350	7,788	
Total	414,310	71,130	24,256	146,067	163,942	

Rio Grande at Eagle Pass Station — 1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	365,000	*170,000	205,000	210,000	194,000	197,000	146,000
Feb.	200,000	*135,000	166,000	194,000	171,000	162,000	106,000
Mar.	*196,000	*167,000	175,000	172,000	149,000	167,000	95,900
Apr.	170,000	*180,000	219,000	170,000	131,000	136,000	98,200
May	227,000	*869,000	237,000	144,000	286,000	196,000	77,500
June	194,000	*367,000	280,000	182,000	188,000	169,000	220,000
July	181,000	*475,000	204,000	191,000	180,000	218,000	127,000
Aug.	150,000	*969,000	444,000	198,000	448,000	227,000	250,000
Sept.	389,000	*909,000	478,000	272,000	433,000	243,000	80,900
Oct.	*332,000	*494,000	*503,000	319,000	256,000	190,000	652,000
Nov.	*189,000	*249,000	*248,000	179,000	240,000	169,000	249,000
Dec.	*178,000	*209,000	*234,000	196,000	231,000	174,000	187,000
Total	2,771,000	*5,193,000	3,393,000	2,427,000	2,907,000	2,248,000	2,289,500

	1931	1932	1933	1934	1935	Normal	
Jan.	186,000	160,480	322,240	181,000	116,000	204,393	
Feb.	187,000	*151,640	254,250	157,000	99,200	165,258	
Mar.	182,260	150,410	247,440	162,000	108,000	164,334	
Apr.	219,000	105,030	194,180	144,000	118,000	157,034	
May	353,000	184,760	185,680	*175,000	523,000	288,162	
June	231,000	113,340	186,960	189,000	1,005,000	277,108	
July	245,500	165,700	229,490	143,000	267,000	218,891	
Aug.	247,360	320,060	176,690	139,000	207,000	314,676	
Sept.	145,130	2,857,410	710,510	166,000	1,285,000	664,079	
Oct.	173,280	1,603,480	440,950	121,000	384,000	455,726	
Nov.	155,760	486,390	196,880	109,000	230,000	225,086	
Dec.	172,250	369,760	175,320	112,000	180,000	201,528	
Total	2,497,540	6,668,460	3,320,590	1,798,000	4,522,200	3,336,274	

Rio Escondido Station at Villa Fuente, Coahuila—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	3,430	15,990	3,440	577	5,859	
Feb.	2,670	9,990	2,000	576	3,809	
Mar.	2,510	6,910	1,210	219	3,812	
Apr.	4,210	4,940	5,360	739	3,912	
May	4,270	2,580	3,200	23,800	8,462	
June	2,590	1,500	2,760	10,900	4,437	
July	1,530	789	9,290	2,260	3,467	Present station record began January, 1932.
Aug.	4,440	719	771	1,010	1,735	
Sept.	14,340	1,520	2,170	8,370	6,600	
Oct.	39,790	3,740	514	5,140	12,296	
Nov.	25,590	1,360	174	3,070	7,548	
Dec.	20,720	1,960	932	3,580	6,798	
Total	126,090	51,998	31,821	60,241	67,537	

* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Grande at Laredo Station —1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	352,000	158,000	196,000	192,000	*178,000	183,870	135,000
Feb.	*185,000	125,000	156,000	197,000	*164,000	142,020	109,410
Mar.	176,000	154,000	163,000	174,000	*144,000	150,550	95,680
Apr.	156,000	152,000	401,000	163,000	*125,000	118,910	118,710
May	214,000	906,000	304,000	144,000	276,000	185,160	114,700
June	221,000	514,000	262,000	211,000	201,000	135,270	280,310
July	*169,000	413,000	225,000	*231,000	169,000	172,170	128,770
Aug.	141,000	888,000	457,000	*174,000	426,000	223,140	253,830
Sept.	418,000	962,000	505,000	*218,000	561,000	304,170	87,260
Oct.	327,000	445,000	518,000	*364,000	271,000	215,510	628,170
Nov.	179,000	246,000	243,000	"168,000	239,000	162,490	260,690
Dec.	169,000	202,000	234,000	"174,000	230,000	181,990	191,270
Total	2,707,000	5,165,000	3,664,000	2,410,000	2,984,000	2,175,250	2,403,800

	1931	1932	1933	1934	1935	Normal
Jan.	177,570	153,300	301,550	178,000	114,000	193,274
Feb.	182,880	129,930	237,380	153,000	99,400	156,752
Mar.	173,260	125,350	223,020	159,000	115,000	154,405
Apr.	169,450	95,640	188,720	159,000	122,000	164,119
May	394,290	199,950	164,850	174,000	591,000	305,662
June	236,090	89,190	157,850	221,000	1,357,000	323,809
July	247,810	166,270	217,150	159,000	323,000	218,431
Aug.	236,240	238,940	175,120	134,000	203,000	295,856
Sept.	134,330	3,116,670	741,430	181,000	1,326,000	712,905
Oct.	167,260	2,071,590	498,240	126,000	432,000	505,314
Nov.	135,710	570,800	188,070	122,000	245,000	229,980
Dec.	159,820	352,680	164,350	107,000	209,000	197,926
Total	2,414,710	7,310,310	3,257,730	1,873,000	5,136,400	3,458,433

Dolores Creek Station near San Ignacio, Texas —1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	0	0	1,300	"25.8	332	
Feb.	0	32.5	0	"49.6	20	
Mar.	0	0	0	*1,630	408	
Apr.	1,570	4.8	1,420	*9,420	3,104	
May	7,726	247	602	*5,070	3,411	
June	3,374	370	46.2	*11,100	3,722	Record began January, 1932.
July	897	3,710	2,290	0	1,724	
Aug.	2.8	3,780	192	0	994	
Sept.	"20,000	23,110	3,910	5,240	13,065	
Oct.	0	510	9.9	*170	172	
Nov.	0	0	0	0	0	
Dec.	0	0	0	0	0	
Total	*33,570	31,764	9,770	*32,705	26,952	

Rio Salado Station at Cd. Guerrero, Tamaulipas —1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	63,000	44,600	27,800	4,760	3,180	3,300	335
Feb.	42,700	26,000	16,500	2,300	1,980	1,500	2,400
Mar.	27,000	31,400	12,000	1,190	930	954	52
Apr.	16,000	16,800	22,200	5,000	56.4	6,730	49,000
May	15,700	25,200	45,700	7,740	*253,000	5,120	167,240
June	17,600	30,200	16,800	192,000	5,220	9,940	131,740
July	7,850	3,460	36,800	100,000	2,360	2,420	9,570
Aug.	224	53,000	10,700	15,800	6,920	710	81
Sept.	600,000	171,000	7,610	3,710	105,000	31,820	3,310
Oct.	202,000	183,000	24,500	32,500	34,900	33,840	41,060
Nov.	107,000	49,800	5,190	852	8,610	4,710	38,740
Dec.	63,100	37,500	4,860	65.3	4,070	752	8,850
Total	1,162,174	671,960	230,660	365,917	*426,226	101,796	452,378

" Estimated
* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Salado Station at Cd. Guerrero, Tamaulipas—continued—1924 to 1935

	1931	1932	1933	1934	1935	Normal
Jan.	5,420	2,700	144,110	22,800	4,230	27,186
Feb.	8,090	2,880	98,520	15,400	6,660	18,744
Mar.	4,740	3,490	18,720	15,200	11,900	10,631
Apr.	2,100	11,700	16,750	54,500	9,370	17,517
May	16,190	7,650	9,800	17,300	40,400	50,920
June	7,700	12,540	10,970	11,500	134,000	48,351
July	45,310	3,160	13,550	16,200	50,600	24,273
Aug.	7,690	5,150	48,480	6,680	11,600	13,920
Sept.	6,200	181,170	313,260	8,960	167,000	133,253
Oct.	4,100	673,070	108,490	21,100	16,000	114,546
Nov.	1,430	248,590	39,110	3,990	9,840	43,155
Dec.	3,400	198,160	26,200	4,870	17,100	30,744
Total	112,370	1,350,260	847,960	198,500	478,700	533,242

Rio Grande at Zapata Station—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	180,820	*484,450	218,000	119,000	250,568	
Feb.	149,830	*361,350	174,000	111,000	199,045	
Mar.	161,990	252,080	176,000	138,000	182,018	
Apr.	138,770	216,400	226,000	166,000	186,792	
May	234,650	187,300	206,000	584,000	302,988	
June	122,580	180,880	250,000	1,517,000	517,615	Record began January, 1932.
July	177,320	252,380	197,000	397,000	255,925	
Aug.	*240,940	233,440	164,000	247,000	221,345	
Sept.	2,895,330	1,103,840	203,000	*1,533,000	1,433,792	
Oct.	2,396,440	647,300	165,000	*462,000	917,685	
Nov.	748,020	235,520	133,000	250,000	341,635	
Dec.	591,380	201,780	119,000	219,000	282,790	
Total	8,038,070	4,356,720	2,231,000	5,743,000	5,092,198	

El Tigre Arroyo Station near Zapata, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	0	0	185	0	46	
Feb.	0	0	29.8	0	8	
Mar.	0	0	0	307	77	
Apr.	0	*488	109	132	182	
May	0	2,390	36	123	637	
June	0	605	0	614	305	Record began January, 1932.
July	13.9	534	0	261	202	
Aug.	0	591	0	0	148	
Sept.	‖9,000	1,590	37.3	1,310	2,984	
Oct.	*0	107	97	*32.3	59	
Nov.	0	0	0	*627	157	
Dec.	0	0	0	*795	199	
Total	‖9,014	6,305	494	4,201.3	5,004	

Rio Alamo Station at Cd. Mier, Tamaulipas—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	34,900	13,500	15,100	14,000	10,900	73.6	0
Feb.	25,500	9,110	10,700	8,120	8,660	67.2	87
Mar.	19,800	6,350	11,800	1,680	2,390	119	63
Apr.	8,100	8,050	17,400	11,400	7,120	599	3,460
May	*26,700	8,740	21,600	7,700	*137,000	209	28,410
June	*37,000	11,300	23,000	49,400	4,790	0	83,230
July	*14,400	4,730	*32,000	17,100	4,320	1,180	2,080
Aug.	0	19,700	*6,900	1,340	1,160	5,400	123
Sept.	*3,500	54,100	*135	7,410	53,500	3,020	494
Oct.	0	38,600	*14,000	20,900	10,600	1,100	13,840
Nov.	0	11,200	*14,500	2,560	10,900	6.9	6,110
Dec.	*13,800	13,100	*15,000	4,190	7,980	124	968
Total	*183,700	198,480	182,135	145,800	259,320	11,900	138,865

‖ Estimated
* Partly estimated

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Alamo Station at Cd. Mier, Tamaulipas—continued—1924 to 1935

	1931	1932	1933	1934	1935	Normal
Jan.	1,980	725	1,390	6,410	1,230	8,351
Feb.	3,770	221	2,380	6,150	757	6,293
Mar.	3,450	277	2,120	3,940	1,690	4,473
Apr.	2,580	18,030	1,340	26,700	616	8,783
May	13,880	2,050	4,590	9,720	7,550	22,346
June	5,360	1,920	913	1,930	16,300	19,595
July	37,590	256	16,320	1,100	10,700	11,815
Aug.	2,530	2,770	11,810	395	2,770	4,575
Sept.	1,030	98,750	190,520	4,120	10,900	35,623
Oct.	71	36,190	51,620	4,070	4,320	16,276
Nov.	611	7,480	21,940	1,100	2,830	6,603
Dec.	2,780	4,370	11,860	1,110	3,370	6,554
Total	75,632	173,039	316,803	66,745	63,033	151,288

Rio Grande at Roma Station—1924 to 1935

	1924 *	1925 *	1926 *	1927 *	1928 *	1929	1930
Jan.	466,000	237,000	254,000	225,000	209,000	*207,000	146,000
Feb.	275,000	184,000	208,000	226,000	180,000	*163,000	138,000
Mar.	246,000	201,000	201,000	198,000	181,000	*186,000	99,000
Apr.	197,000	180,000	400,000	194,000	150,000	185,000	223,000
May	254,000	524,000	398,000	179,000	683,000	326,000	406,000
June	277,000	837,000	318,000	511,000	232,000	184,000	595,000
July	185,000	424,000	307,000	379,000	150,000	240,000	131,000
Aug.	158,000	600,000	480,000	212,000	400,000	276,000	246,000
Sept.	1,020,000	1,702,000	520,000	240,000	809,000	338,000	117,000
Oct.	540,000	800,000	570,000	451,000	359,000	252,000	732,000
Nov.	308,000	351,000	280,000	189,000	283,000	171,000	336,000
Dec.	274,000	281,000	262,000	191,000	259,000	192,000	213,000
Total	4,200,000	6,301,000	4,198,000	3,195,000	3,895,000	2,720,000	3,382,000

	1931	1932	1933	1934	1935	Normal
Jan.	208,000	166,910	467,370	219,000	119,000	243,690
Feb.	220,000	152,330	349,000	177,000	108,000	198,361
Mar.	201,000	155,070	260,610	174,000	126,000	185,723
Apr.	180,000	133,470	223,560	239,000	164,000	205,752
May	473,000	233,460	195,530	219,000	570,000	371,749
June	290,000	112,700	178,240	253,000	1,586,000	447,828
July	542,530	195,410	265,390	189,000	400,000	284,028
Aug.	285,110	228,080	242,620	157,000	* 248,000	294,401
Sept.	152,750	3,047,630	1,266,270	196,000	*1,499,000	908,971
Oct.	180,820	2,371,870	673,950	163,000	471,000	630,387
Nov.	151,820	735,960	253,890	127,000	*252,000	286,556
Dec.	192,580	565,140	207,590	114,000	231,000	246,859
Total	3,077,610	8,098,030	4,584,020	2,227,000	5,774,000	4,304,305

Rio San Juan Station at Santa Rosalia, Tamaulipas—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	49,800	9,450	49,500	12,400	17,600	13,880	9,230
Feb.	34,000	3,740	15,500	7,430	10,100	8,110	3,880
Mar.	27,600	15,400	17,300	3,420	5,790	7,200	1,810
Apr.	17,700	11,700	32,600	6,880	2,510	8,540	11,110
May	32,800	22,600	74,400	3,500	28,900	21,260	136,360
June	143,000	54,700	96,900	586,000	8,570	5,160	439,460
July	25,300	2,840	280,000	174,000	4,010	37,870	52,130
Aug.	2,120	47,900	59,400	42,400	3,080	27,120	10,130
Sept.	34,700	311,000	36,300	37,800	196,000	123,520	22,790
Oct.	36,200	121,000	102,000	34,400	41,900	40,140	457,310
Nov.	15,400	26,800	60,400	12,900	31,400	15,260	171,610
Dec.	12,000	27,700	18,800	14,800	22,400	23,830	74,130
Total	430,620	654,830	843,100	935,930	372,260	331,890	1,389,950

* Partly estimated.

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio San Juan Station at Santa Rosalia, Tamaulipas—continued — 1924 to 1935

	1931	1932	1933	1934	1935	Normal	
Jan.	77,300	9,750	25,420	93,500	16,900	32,061	
Feb.	92,810	5,190	14,540	64,000	14,700	22,833	
Mar.	56,570	2,000	10,170	40,100	9,060	16,368	
Apr.	26,810	1,670	10,820	98,500	10,700	19,962	
May	92,310	3,690	43,940	98,400	58,000	51,347	
June	55,030	5,430	34,590	20,800	165,000	134,553	
July	121,940	12,490	188,700	74,500	56,200	85,832	
Aug.	116,320	33,140	519,050	27,300	15,400	75,280	
Sept.	34,340	761,520	1,411,080	59,200	262,000	274,187	
Oct.	18,970	385,100	772,040	83,400	106,000	183,205	
Nov.	16,860	85,910	221,640	24,800	84,800	63,982	
Dec.	19,720	38,770	135,490	21,300	107,000	42,995	
Total	728,980	1,344,660	3,387,480	705,800	905,760	1,002,605	

Los Olmos Creek Station near Rio Grande City, Texas—1932 to 1935

	1932	1933	1934	1935	Average	
Jan.	‖0	0	834	0	208	
Feb.	‖0	0	47	0	12	
Mar.	97	0	50	0	37	
Apr.	*113	*170	820	638	435	
May	2,412	738	486	2,060	1,424	
June	69	567	7	3,170	953	Record began January, 1932.
July	0	805	0	1,950	689	
Aug.	2,350	1,160	28	82	905	
Sept.	25,460	2,740	823	*1,950	7,743	
Oct.	8,610	169	315	327	2,355	
Nov.	0	21	0	444	116	
Dec.	0	0	0	5,530	1,383	
Total	39,111	6,370	3,410	16,151	16,260	

Rio Grande at Rio Grande City Station — 1924 to 1935

	1924 **	1925 **	1926 **	1927 **	1928 **	1929 **	1930 **
Jan.	521,000	254,000	309,000	244,000	234,000	232,000	162,000
Feb.	317,000	196,000	235,000	241,000	180,000	181,000	149,000
Mar.	284,000	221,000	224,000	209,000	214,000	180,000	108,000
Apr.	222,000	194,000	395,000	208,000	159,000	204,000	241,000
May	279,000	565,000	524,000	191,000	719,000	290,000	549,000
June	389,000	887,000	420,000	1,104,000	250,000	230,000	1,041,000
July	217,000	428,000	550,000	581,000	160,000	306,000	190,000
Aug.	167,000	602,000	500,000	266,000	430,000	290,000	263,000
Sept.	1,060,000	2,000,000	556,000	266,000	974,000	435,000	147,000
Oct.	584,000	1,000,000	680,000	520,000	387,000	336,000	1,196,000
Nov.	332,000	397,000	340,000	210,000	330,000	203,000	515,000
Dec.	295,000	291,000	282,000	208,000	289,000	225,000	294,000
Total	4,667,000	7,035,000	5,015,000	4,248,000	4,326,000	3,112,000	4,855,000

	1931 **	1932	1933	1934	1935	Normal	
Jan.	260,000	188,670	*508,390	321,000	140,000	281,172	
Feb.	343,000	151,300	*368,690	242,000	125,000	227,416	
Mar.	260,000	155,430	279,340	221,000	133,000	207,397	
Apr.	206,000	*133,170	236,560	340,000	190,000	227,311	
May	572,000	253,810	259,260	330,000	603,000	427,922	
June	352,000	118,850	223,660	276,000	1,737,000	585,709	
July	671,000	222,050	456,440	274,000	490,000	378,791	
Aug.	408,000	283,770	714,300	192,000	*270,000	365,506	
Sept.	201,000	3,312,800	2,505,480	263,000	*1,759,000	1,123,273	
Oct.	204,000	2,852,270	1,450,910	252,000	*613,000	839,598	
Nov.	174,000	829,260	473,260	156,000	353,000	359,377	
Dec.	217,000	*625,260	347,790	143,000	331,000	295,671	
Total	3,868,000	9,126,640	7,823,080	3,010,000	6,744,000	5,319,143	

‖ Estimated

* Partly estimated

** The discharge record for this station for the years 1924 to 1931, inclusive, was obtained synthetically (see W.B. No. 5)

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS
Period 1924 to 1935 Inclusive—continued

Rio Grande at Hidalgo Station—1928 to 1931

	1928	1929	1930	1931	Average	
Jan.		205,000	148,000	255,000	202,667	Since 1931 the station has been operated only periodically, mostly for flood measurements.
Feb.		141,000	132,000	329,000	200,667	
Mar.		164,000	91,600	250,000	168,533	
Apr.		183,000	193,000	202,000	578,000	
May		282,000	462,000	542,000	428,667	
June		183,000	1,010,000	335,000	509,333	
July 8		252,000	188,000	558,930	332,977	
Aug.	397,000	267,000	227,000	400,270	322,818	
Sept.	946,000	422,000	142,000	209,830	429,958	
Oct.	363,000	283,000	1,060,000	195,180	475,295	
Nov.	313,000	188,000	536,000	166,750	300,938	
Dec.	270,000	208,000	275,000	211,120	241,030	
Total	2,289,000	2,778,000	4,464,600	3,655,080	3,805,250	

Rio Grande at Mercedes Bridge Station

This station has been operated only periodically for flood measurements.

Rio Grande at Matamoros Station—1924 to 1935

	1924	1925	1926	1927	1928	1929	1930
Jan.	491,000	214,000	295,000	181,000	177,000	181,730	127,780
Feb.	268,000	76,400	193,000	172,000	123,000	71,350	95,960
Mar.	207,000	77,200	174,000	78,700	71,500	90,950	27,860
Apr.	101,000	102,000	318,000	101,000	57,700	162,610	90,760
May	217,000	133,000	461,000	99,400	476,000	191,810	400,770
June	349,000	589,000	369,000	611,000	196,000	179,310	1,180,380
July	126,000	297,000	519,000	557,000	54,400	226,020	247,540
Aug.	73,200	834,000	383,000	175,000	295,000	201,420	248,290
Sept.	607,000	1,120,000	513,000	211,000	720,000	379,440	124,060
Oct.	615,000	820,000	508,000	461,000	341,000	278,840	911,480
Nov.	261,000	367,000	384,000	147,000	255,000	185,890	563,910
Dec.	258,000	268,000	232,000	163,000	230,000	200,370	244,660
Total	3,573,200	4,897,600	4,349,000	2,957,100	2,996,600	2,349,740	4,263,450

	1931	1932	1933	1934	1935	Normal
Jan.	223,150	147,290	463,980	299,000	106,000	242,244
Feb.	328,330	90,770	323,540	236,000	81,600	171,663
Mar.	219,290	105,530	240,770	183,000	32,700	125,708
Apr.	159,230	75,810	150,460	242,000	122,000	140,214
May	478,410	225,010	149,180	270,000	462,000	296,965
June	277,810	34,590	216,230	177,000	1,162,000	445,110
July	542,960	156,920	383,320	183,000	448,000	311,763
Aug.	347,230	187,270	644,280	171,000	258,000	318,141
Sept.	153,380	1,253,590	1,259,620	204,000	951,000	624,674
Oct.	124,280	1,287,410	1,129,760	195,000	632,000	608,648
Nov.	114,640	827,490	478,130	99,600	352,000	336,305
Dec.	177,970	594,220	305,890	98,700	305,000	256,484
Total	3,146,680	4,985,900	5,745,160	2,358,300	4,912,300	3,877,919

8 Records began July 23

RECAPITULATED MONTHLY AND ANNUAL DISCHARGES WITH NORMALS

Period 1924 to 1935 Inclusive—continued

Rio Grande at Lower Brownsville Station— 1934 to 1935

	1934	1935	Average
Jan.	299,000	106,000	202,500
Feb	237,000	78,000	157,500
Mar	183,000	29,700	106,350
Apr	242,000	117,000	179,500
May	307,000	*459,000	383,000
June	193,000	*1,161,000	677,000
July	193,000	*442,000	317,500
Aug.	183,000	*257,000	220,000
Sept.	217,000	*948,000	582,500
Oct.	200,000	‖629,000	414,500
Nov.	104,000	‖349,000	226,500
Dec.	99,800	‖302,000	200,900
Total	2,457,800	*4,877,700	3,667,750

‖ Estimated
* Partly estimated

AUTHENTICATED DISCHARGE RECORDS 1924-1936

The tabulation below shows where authenticated discharge records may be found for the years 1924 to 1936, inclusive, for the following gaging stations on the Rio Grande and its tributaries below San Marcial, New Mexico:

Name of Gaging Station	Records for the years (inclusive)	Considered Correct as Published in the following:
San Marcial	1924 - 1930	W. S. P. 628, 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
El Paso	1924 - 1930	W. S. P. 588, 608, 628, 648, 668, 688, 703, 718 [e]
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Tornillo Bridge	1924 - 1927	W. B. 5
	Oct. 1927 - 1930	W. S. P. 668, 688 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Fort Quitman	1924 - 1930	W. S. P. 588, 608 628, 648, 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
La Nutria	June 1935 - 1936	W. B. 5, 6
Upper Presidio	1924 - 1925	W. S. P. 588, 608, 628
	*1926	W. B. 4
	1927 - 1928	W. B. 4
	1929 - 1930	W. B. 3
	1931 - 1932	W. B. 1, 2
	**1933	W. B. 3, 4
	1934 - 1936	W. B. 4, 5, 6
Rio Conchos	** 1924 - 1936	W. B. 5, 6
Lower Presidio	* 1924 - 1926	W. B. 4
	1927 - 1928	W. B. 4
	1929 - 1930	W. B. 3
	* 1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Alamito Creek	1932 - 1936	W. B. 2,3,4,5,6
Terlingua Creek	1932 - 1936	W. B. 2, 3, 4, 5, 6
Johnson Ranch	Apr. to Dec. 1936	W. B. 6
Boquillas	1924 - 1928	W. B. 5
	June 1928 - 1930	W. S. P. 668, 688, 703, 718
	April 1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Lozier Creek	1932 - 1935	W. B. 2, 3, 4, 5
Langtry	* 1924 - 1927	W. B. 4
	1928 - 1930	W. S. P. 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Pecos River	1924 - 1930	W. S. P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Goodenough Spring	1924 - 1929	W. B. 5
	Feb. 1929 - 1930	W. S. P. 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6

[e] The monthly totals for the year 1928 are slightly revised on page 46, W. B. No. 6

AUTHENTICATED DISCHARGE RECORDS 1924-1936—continued

Name of Gaging Station	Records for the years (inclusive)	Considered Correct as Published in the following:
Devils River	1924 - 1930	W. S. P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - **1932	W. B. 1, 2, 6
	1933 - 1936	W. B. 3, 4, 5, 6
Cienegas Creek	Sept. June 1931 - 1935	W. B. 1, 2, 3, 4, 5
Del Rio	** 1924	W. S. P. 588, 608 W. B. 4
	1925 - 1930	W. S. P. 608, 628, 648, 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
San Felipe Creek	Sept. 1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Sycamore Creek	May 1932 - 1935	W. B. 2, 3, 4, 5
Pinto Creek	Nov. 1928 - 1930	W. S. P. 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Rio San Diego	Sept. 1924 - 1932	Not Published
	Sept. 1932 - 1936	W. B. 2, 3, 4, 5, 6
Las Moras Creek	1932 **1934	W. B. 2, 3, 4, 5
	1935	W. B. 5
Rio San Rodrigo	1924 - 1931	Not Published
	1932 - 1936	W. B. 2, 3, 4, 5, 6
Eagle Pass	*1924 - 1926	W. B. 4
	1927 - 1930	W. S. P. 648, 668, 688, 703, 718
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Rio Escondido	1924 - 1931	Not Published
	1932 - 1936	W. B. 2, 3, 4, 5, 6
Laredo	*1924 - 1925	W. B. 4
	** 1926	W. B. 4, 5
	1927 - 1928	W. B. 4
	1929 - 1930	W. B. 3
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Dolores Creek	May 1932 - 1936	W. B. 2, 3, 4, 5, 6
Rio Salado	1924 - 1928	W. B. 5
	1929 - 1930	W. B. 3
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Zapata	1932 - 1936	W. B. 2, 3, 4, 5, 6
El Tigre Creek	April 1932 - 1936	W. B. 2, 3, 4, 5, 6
Rio Alamo	1924 - 1928	W. B. 5
	1929 - 1930	W. B. 3
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Roma	1924 - 1929	W. B. 5
	Mar. 1929 - 1930	W. S. P. 688, 703, 718
	1931	W. B. 1
	**1932	W. B. 2, 3
	1933 - 1936	W. B. 3, 4, 5, 6
Rio San Juan	1924 - 1928	W. B. 5
	1929 - 1930	W. B. 3
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Los Olmos Creek	Mar. 1932 - 1936	W. B. 2, 3, 4, 5, 6
Rio Grande City	1924 - 1931	W. B. 5
	1932 - 1936	W. B. 2, 3, 4, 5, 6
Hidalgo	July 1928 - 1930	W. S. P. 668, 688, 703, 718
	1931	W. B. 1
	Partial Records 1932 - 1936	W.B. 2, 3, 4, 5, 6
Mercedes Bridge	Sept. Oct. 1932 - 1932	W. B. 2
	Partial Records 1935 - 1936	W. B 5, 6
Matamoros	Sept. 1924 - 1926	W. S. P. 588, 608, 628
	Oct. 1926 - 1928	W. B. 5
	1929 - 1930	W. B. 3
	1931 - 1936	W. B. 1, 2, 3, 4, 5, 6
Lower Brownsville	1934 - 1936	W. B. 4, 5, 6

W. S. P. - Water Supply Papers of the U. S. Geological Survey
W. B. - Water Bulletins of this Commission
* Previously published but revised in above reference
+ Station moved June, 1932
** Partial revision in the last named Water Bulletin

SOURCES OF RIVER FLOW
1924-1935

Subdivisions of the Rio Grande basin below Fort Quitman on the main river and below Angeles on the Pecos River are shown on the following five maps. For each of these subdivisions each map shows certain figures which are based upon average annual stream flow and rainfall as shown by records for the 12-year period 1924 to 1935, inclusive.

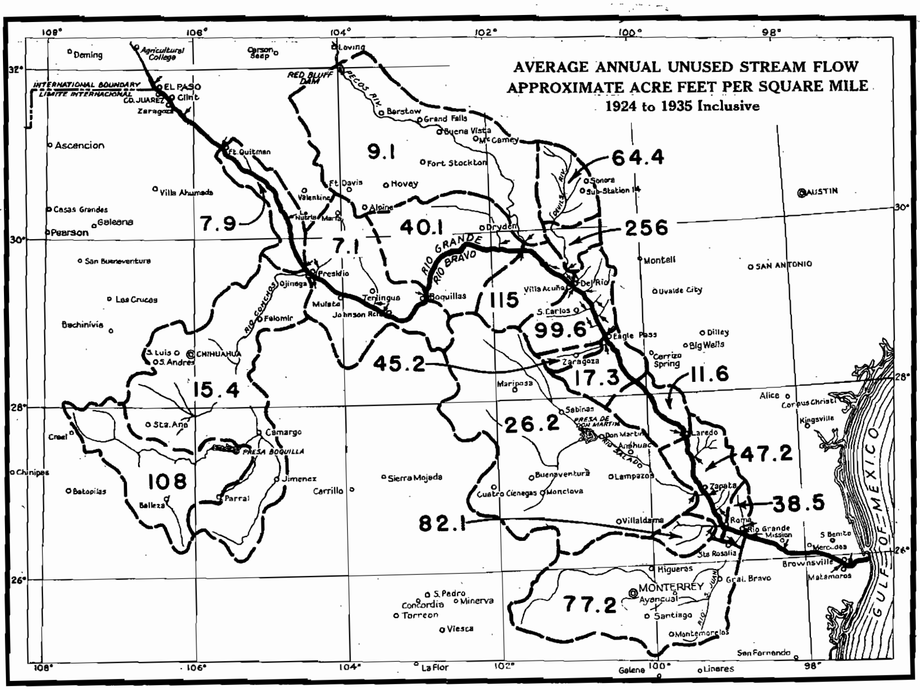
The large figures on the first map show the approximate amount of river flow which originated on and which passed unused from each water-shed subdivision.

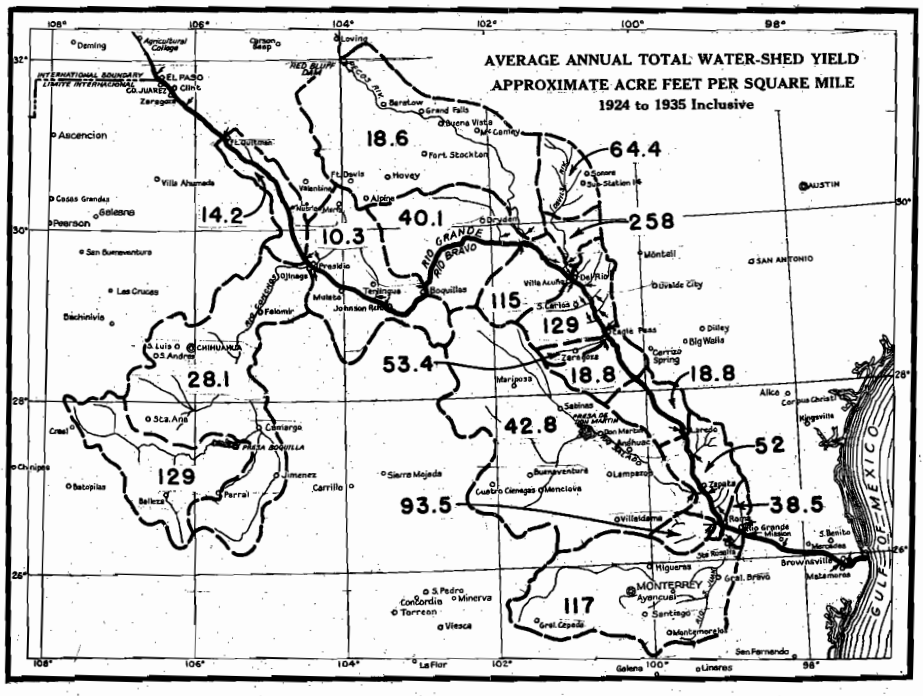
On the second map there is shown, for each subdivision, the total water-shed yield, sometimes called the virgin yield, that is, the sum of the unused water as shown on the first map and the water estimated to have been consumed by irrigation and reservoir evaporation within each subdivision.

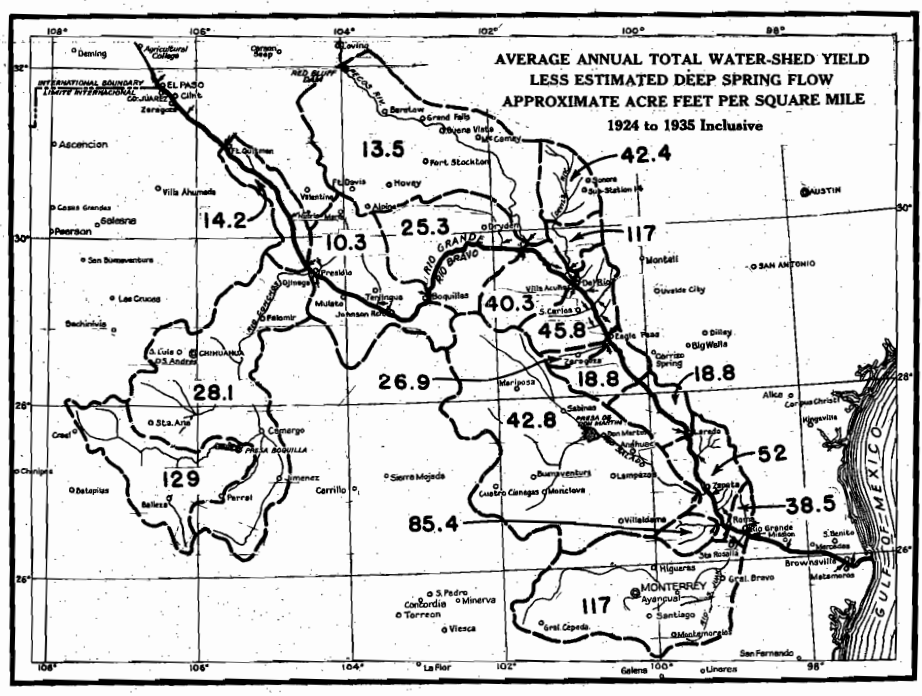
From the total water-shed yield figures shown on the second map there was deducted the estimated average annual flow from deep springs within each subdivision and the resulting figures appear on the third map. This deduction is based upon the assumption that the deep spring flow came from elsewhere than the rainfall on the water-shed.

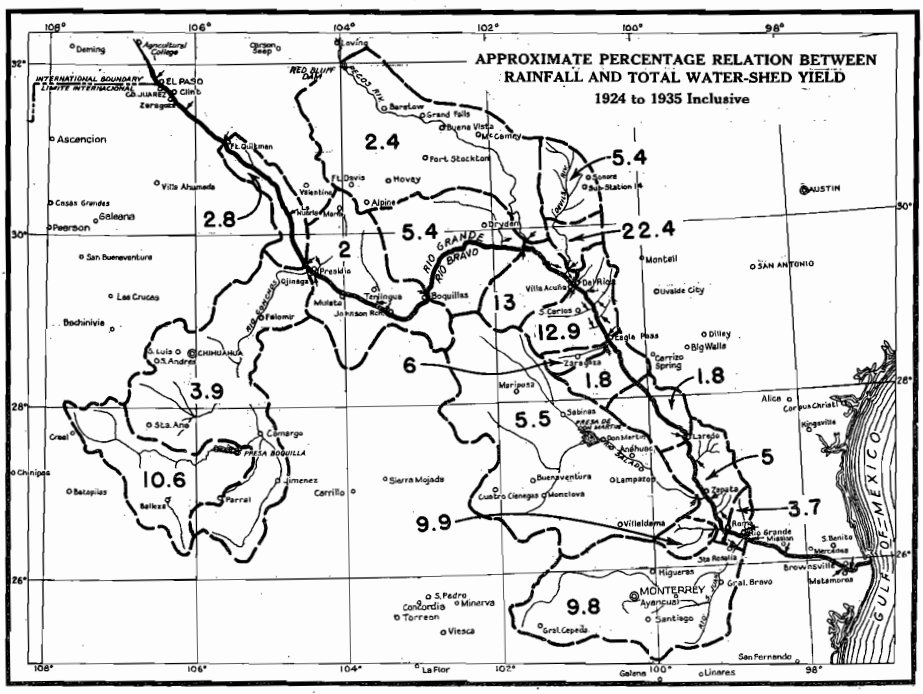
The fourth map shows the approximate percentage relationship between the average annual rainfall that occurred on each subdivision and the total water-shed yield for the same area as shown on the second map.

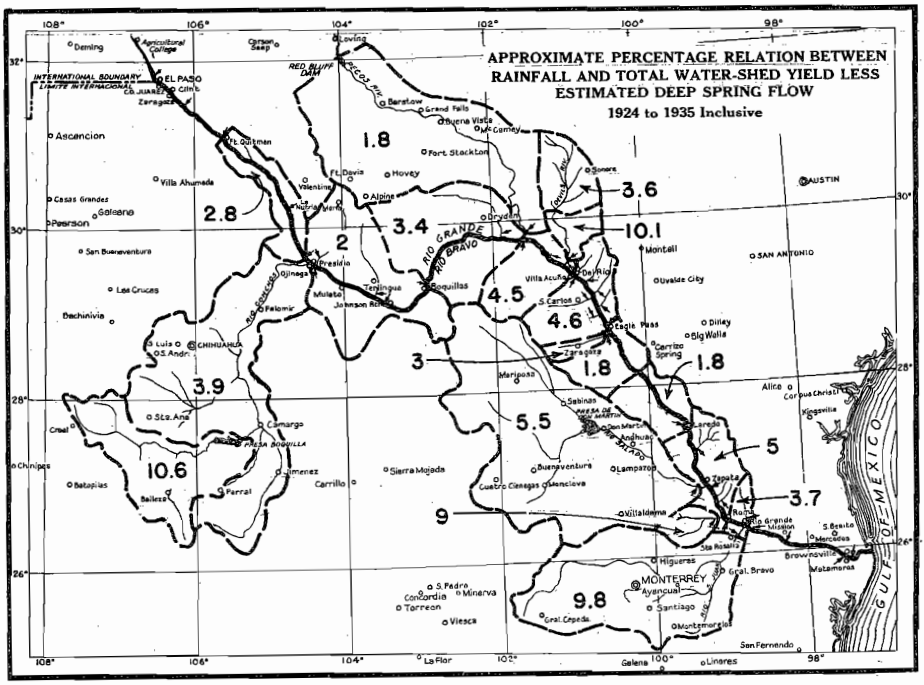
The fifth map shows the approximate percentage relationship between the average annual rainfall that occurred on each subdivision and the total water-shed yield less deep spring flow as shown on the third map.




AVERAGE ANNUAL TOTAL WATER-SHED YIELD
APPROXIMATE ACRE FEET PER SQUARE MILE
1924 to 1935 Inclusive
18.6
64.4
14.2
40.1
258
10.3
115
129
53.4
18.8
18.8
28.1
42.8
52
129
93.5
38.5
117
RIO GRANDE
RIO BRAVO
GULF OF MEXICO


AVERAGE ANNUAL TOTAL WATER-SHED YIELD
LESS ESTIMATED DEEP SPRING FLOW
APPROXIMATE ACRE FEET PER SQUARE MILE
1924 to 1935 Inclusive
13.5
42.4
14.2
25.3
117
10.3
40.3
45.8
26.9
18.8
18.8
28.1
42.8
52
129
85.4
38.5
117
RIO GRANDE
RIO BRAVO
GULF OF MEXICO


APPROXIMATE PERCENTAGE RELATION BETWEEN
RAINFALL AND TOTAL WATER-SHED YIELD
1924 to 1935 Inclusive
INTERNATIONAL BOUNDARY
LIMITE INTERNACIONAL
EL PASO
CD. JUAREZ
RED BLUFF DAM
PECOS RIV.
RIO GRANDE
RIO BRAVO
GULF OF MEXICO
2.4
5.4
2.8
5.4
22.4
2
13
12.9
6
1.8
1.8
3.9
5.5
5
10.6
9.9
3.7
9.8
AUSTIN
SAN ANTONIO
MONTERREY


APPROXIMATE PERCENTAGE RELATION BETWEEN
RAINFALL AND TOTAL WATER-SHED YIELD LESS
ESTIMATED DEEP SPRING FLOW
1924 to 1935 Inclusive
INTERNATIONAL BOUNDARY
LIMITE INTERNACIONAL
EL PASO
CD. JUAREZ
RED BLUFF DAM
PECOS RIV.
RIO GRANDE
RIO BRAVO
GULF OF MEXICO
1.8
3.6
2.8
3.4
10.1
2
4.5
4.6
3
1.8
1.8
3.9
5.5
5
10.6
9
3.7
9.8
AUSTIN
SAN ANTONIO
MONTERREY

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1936

Gravimetric Percentages of Dried Silt in the Rio Grande at San Marcial, New Mexico as Determined from Water Samples During 1936

The gravimetric percentages of dry silt reported here were determined by the United States Department of Agriculture at Riverside, California, 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.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely 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.

Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt
Jan. 13	.558	Apr. 6	.196	June 5	.162	Aug. 10	5.301	Oct. 1	2.122
Jan. 19	.427	Apr. 15	.761	June 11	.048	Aug. 17	.903	Oct. 2	1.329
Jan. 28	.386	Apr. 18	1.226	June 17	.178	Aug. 23	5.213	Oct. 7	.653
Feb. 2	.307	Apr. 21	1.135	June 26	.114	Aug. 28	.452	Oct. 13	.418
Feb. 12	.565	Apr. 24	.892	July 2	.005	Sept. 1	3.377	Oct. 20	.418
Feb. 18	1.483	Apr. 27	.709	July 5	tr.	Sept. 4	2.775	Oct. 28	.631
Feb. 24	.504	Apr. 30	.855	July 12	1.642	Sept. 10	.448	Nov. 3	1.496
Mar. 4	.631	May 6	.615	July 17	tr.	Sept. 14	4.934	Nov. 9	.569
Mar. 10	1.325	May 12	.479	July 23	.100	Sept. 16	1.307	Nov. 15	.300
Mar. 16	.810	May 18	.138	Aug. 4	3.677	Sept. 22	2.063	Nov. 21	.539
Mar. 25	.827	May 24	.117	Aug. 5	6.182	Sept. 27	8.150	Nov. 27	.263
Mar. 31	.580	May 30	.086	Aug. 5	11.233	Sept. 28	8.737	Dec. 3	.693
				Aug. 5	11.997	Sept. 29	3.598	Dec. 9	.469
								Dec. 15	.455
								Dec. 21	.520
								Dec. 27	.475

Tons of Suspended Silt Passing San Marcial in the Rio Grande During 1936

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Acre Foot
January	73,140,000	342,800	.4687	236.1
February	71,500,000	575,700	.8052	396.5
March	90,850,000	796,300	.8765	548.5
April	276,490,000	2,464,800	.8915	1,698
May	290,110,000	1,275,500	.4397	878.4
June	27,920,000	35,500	.1271	24.4
July	31,050,000	312,400	1.0061	215.1
August	53,660,000	3,218,800	5.9985	2,217
September	80,090,000	3,696,000	4.6148	2,545
October	57,880,000	440,800	.7616	303.6
November	61,020,000	437,400	.7168	301.2
December	66,330,000	340,600	.5135	234.6
The Year	1,180,040,000	13,936,600	1.1810	9,598.4

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1936—continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Eagle Pass, Texas as Determined from Water Samples During 1936

The gravimetric percentage of dry silt reported here were determined by the United States Department of Agriculture at Austin, Texas, from samples of Rio Grande water taken approximately every second day 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.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely 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.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.0008	.0006	.0022	.0039	.0540	.9762	.0568	.7279	.8902	.4689	.0707	.0052
2	.0000	.0013	.0022	.0052	.0957	.9702	.0395	.7279	.8834	.3642	.0522	.0041
3	.0000	.0020	.0113	.0048	.0914	.6304	.0223	.6003	.8767	.2596	.0338	.0030
4	.0000	.0026	.0121	.0044	.0871	.2907	.0165	.4727	.9620	.2501	.0154	.0041
5	.0000	.0032	.0129	.0040	.0828	.2862	.0107	.3860	1.0472	.2406	.0128	.0052
6	.0000	.0039	.0180	.0036	.0828	.2816	.0085	.2992	.9172	.1766	.0102	.0140
7	.0000	.0046	.0231	.0044	.0223	.2020	*.1521	.3200	.7873	.1125	.0097	.0228
8	.0000	.0052	.0176	.0052	.0278	.1224	.1521	.3408	.9673	.0848	.0093	.0204
9	.0000	.0041	.0121	.0066	.0333	.1332	*.3127	.3616	1.1474	.0572	.0088	.0179
10	.0000	.0030	.0121	.0080	.0388	.1441	.3127	.2862	1.3274	.0544	.0055	.0126
11	.0000	.0028	.0104	.0073	.0099	.1662	.3136	.2109	1.0091	.0517	.0022	.0074
12	.0000	.0026	.0088	.0066	.0288	.1884	.3146	.1900	.6908	.0763	.0026	.0079
13	.0000	.0022	.0081	.0055	.0476	.1592	.2248	.1691	.5942	.1009	.0030	.0083
14	.0000	.0022	.0074	.0044	.0891	.1301	.1350	.2984	.4975	.1106	.0022	.0088
15	.0000	.0022	.0074	.0052	.0590	.1116	.1455	.4276	.6564	.1202	.0014	.0066
16	.0000	.0022	.0075	.0052	.0289	.0932	.0638	.2400	.8154	.0842	.0033	.0033
17	.0000	.0022	.0076	.0052	.0294	.2530	.0638	.0525	.8566	.0481	.0052	.0000
18	.0000	.0022	.0076	.0052	.0300	.4128	.1428	.0616	.3165	.0468	.0041	.0015
19	.0000	.0029	.0076	.0102	.0363	.2366	.2219	.0707	.3136	.0454	.0030	.0030
20	.0000	.0036	.0077	.0151	.0426	.0605	.1247	.0715	.3106	.0413	.0162	.0042
21	.0000	.0025	.0072	.0102	.0352	.0598	.0275	.0723	.3077	.0371	.0294	.0055
22	.0000	.0014	.0066	.0052	.0278	.0591	.0227	.0757	.5119	.0330	.0205	.0032
23	.0000	.0022	.0066	.0059	.0278	.0500	.0179	.0791	.7161	.0257	.0116	.0008
24	.0000	.0030	.0066	.0066	.0530	.0410	.0212	.0825	1.1734	.0184	.0065	.0008
25	.0000	.0026	.0073	.0044	.0781	.0320	.0245	.0825	1.6313	.0200	.0014	.0008
26	.0000	.0022	.0080	.0022	*.0781	.0231	.0238	.2687	1.4626	.0217	.0014	.0102
27	.0000	.0026	.0066	.2709	.6394	.0231	.0231	.4363	1.2939	.0323	.0014	.0195
28	.0000	.0030	.0044	*.0096	.5274	.0231	.0244	.6039	1.0116	.0429	.0025	.0196
29	.0000	.0026	.0022	.0096	.4155	*.0740	.0256	.7260	.7293	.0583	.0036	.0198
30	.0000		.0014	.0124	.6989	.0740	*.0256	.8481	.5991	.0737	.0044	.0099
31	.0000		.0027		.9823		*.7279	.8692		.0891		.0000

Tons of Suspended Silt Passing Eagle Pass in the Rio Grande During 1936

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Acre Foot
January	235,630,000	100	T	.1
February	194,770,000	5,200	.0027	3.6
March	219,280,000	20,200	.0092	13.9
April	164,800,000	54,600	.0331	37.6
May	287,380,000	688,400	.2395	474.1
June	390,890,000	687,600	.1759	473.6
July	339,140,000	499,400	.1473	343.9
August	227,450,000	870,300	.3826	599.4
September	1,037,840,000	8,853,700	.8531	6,098
October	512,110,000	882,500	.1723	607.8
November	245,160,000	28,800	.0117	19.8
December	246,520,000	20,200	.0082	13.9
The Year	4,100,970,000	12,611,000	.3075	8,685.7

* Partly estimated.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1936—continued

Gravimetric Percentages of Dried Silt in the Rio Alamo at Mier, Tamaulipas, and in the Rio San Juan at Santa Rosalia, Tamaulipas, Mexico, as Determined from Water Samples During 1936

The gravimetric percentages of dry silt reported here for two Mexican tributaries to the Rio Grande were determined by the Mexican Section of the International Boundary Commission from samples taken by that section. 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 computations below made in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for 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.

Silt in Rio Alamo—1936

Date	% Silt	Date	% Silt	Date	% Silt
May 9	0.4950	July 15	0.0099	August 31	0.6908
July 3	0.6658	August 29	0.9328	September 17	0.8217
		August 30	1.6698		

Tons of Suspended Silt Passing Cd. Mier in the Rio Alamo—1936

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Acre Foot
January	1,910,000	0	0	
February	1,380,000	0	0	
March	750,000	0	0	
April	603,000	920	.1526	.6
May	11,260,000	55,700	.4947	38.4
June	54,000	0	0	0
July	13,030,000	107,100	.8219	73.8
August	28,630,000	285,500	.9972	196.6
September	24,630,000	115,700	.4698	79.7
October	880,000	0	0	0
November	1,760,00	2,820	.1602	1.9
December	1,720,000	0	0	0
The Year	86,607,000	567,740	.6555	391.0

Silt in Rio San Juan—1936

Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt	Date	% Silt
Mar. 9	.0678	May 1	Trace	July 3	.3759	Sept. 1	1.0978	Nov. 2	.1169
Mar. 21	.0151	May 11	.8533	July 15	1.7707	Sept. 1	1.3703	Nov. 16	.1037
Apr. 1	Trace	May 11	1.1910	July 15	1.4523	Sept. 16	Trace	Dec. 2	.1218
Apr. 22	.0348	May 18	.2929	Aug. 3	Trace	Oct. 2	.0796	Dec. 14	.0223
		June 1	.3699	Aug. 17	Trace	Oct. 14	.0106		

Tons of Suspended Silt Passing Santa Rosalia in the Rio San Juan—1936

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Acre Foot
January	115,730,000	39,000	.0337	26.9
February	46,760,000	0	.0000	0
March	29,450,000	3,900	.0132	2.7
April	23,310,000	6,210	.0266	4.3
May	156,590,000	712,100	.4548	490.4
June	21,590,000	37,300	.1728	25.7
July	264,720,000	1,245,600	.4705	857.8
August	102,570,000	95,900	.0935	66.0
September	366,580,000	1,102,300	.3007	759.2
October	126,130,000	63,100	.0500	43.5
November	89,450,000	97,700	.1092	67.3
December	84,870,000	50,900	.0600	35.0
The Year	1,427,750,000	3,454,010	.2419	2,378.8

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1936—continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas as Determined from Water Samples During 1936

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 by the United States 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.

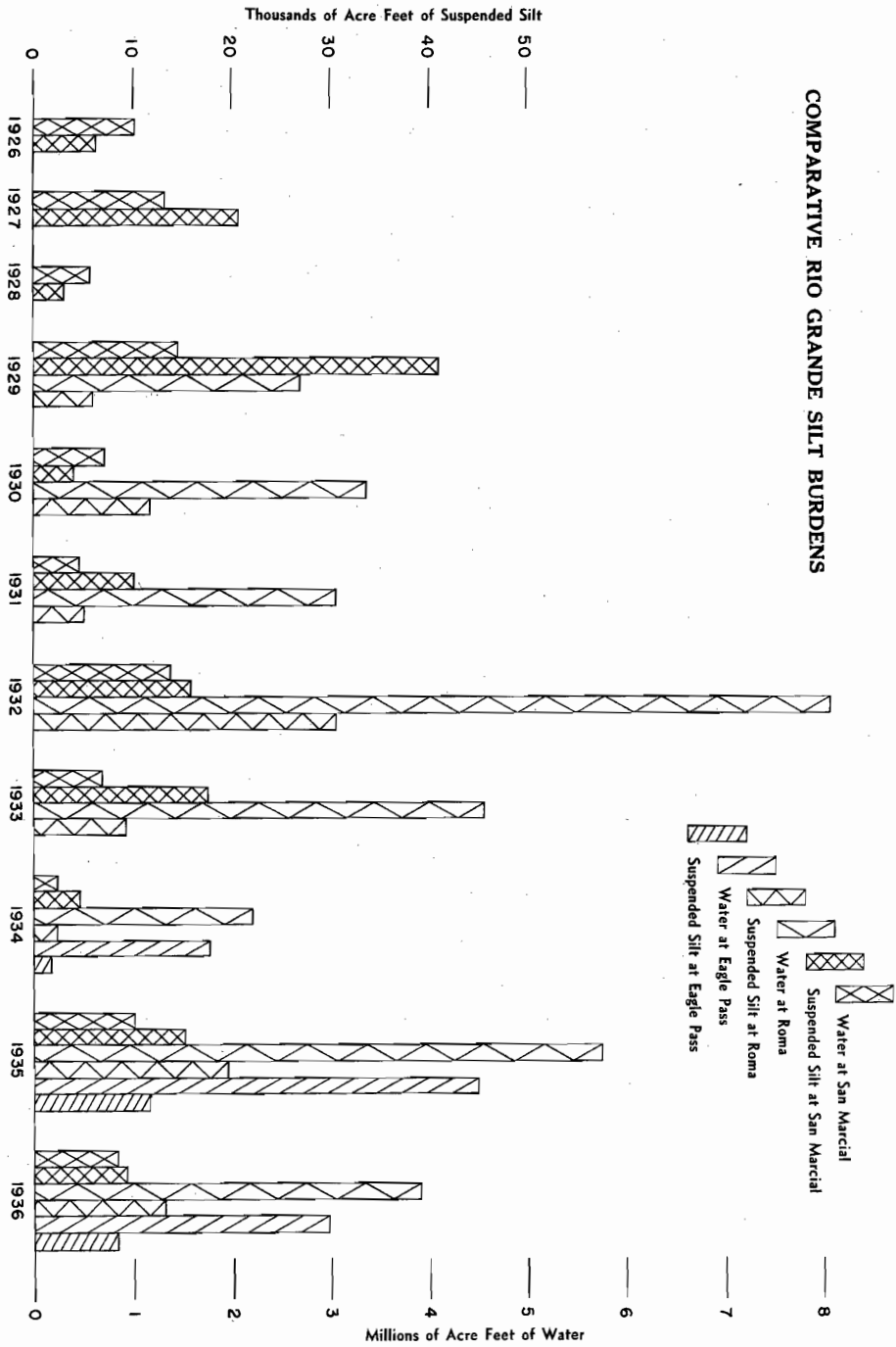
The daily figures below were computed in accordance with the foregoing.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely 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.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.0011	.0000	.0008	.0011	.0756	.4048	.5701	.0077	.5274	.7593	.0151	.0011
2	.0014	.0000	.0014	.0038	.0267	.5019	.2266	.0055	.4708	.9881	.0135	.0014
3	.0000	.0000	.0022	.0044	.0162	.4411	.2013	.0030	.4623	.9955	.0190	.0008
4	.0008	.0000	.0052	.0036	.0280	.2208	.1026	.0030	.2288	.6190	.0165	.0036
5	.0000	.0008	.0407	.0022	.0234	.3484	.1463	.0022	.5662	.4496	.0154	.0008
6	.0014	.0000	.0528	.0036	.0275	.2233	.2156	.0113	.6600	.3957	.0132	.0022
7	.0000	.0014	.0506	.0030	.0256	.2769	.1053	.0121	.6135	.3404	.0077	.0000
8	.0000	.0014	.0129	.0044	.0267	.2038	.0671	.0036	.5445	.2307	.0099	.0000
9	.0008	.0014	.0151	.0069	1.4688	.1122	.1947	.0107	.6630	.2365	.0030	.0000
10	.0000	.0000	.0036	.0052	.6314	.0861	.2951	.0179	1.0475	.1713	.0052	.0000
11	.0022	.0014	.0085	.0044	.3754	.0866	.2808	.0272	.7213	.1444	.0099	.0000
12	.0030	.0014	.0297	.0044	.1125	.0528	.1936	.0451	.8558	.1353	.0074	.0000
13	.0022	.0008	.0223	.0030	.0443	.0883	.3622	.0916	1.2023	.1125	.0044	.0008
14	.0008	.0008	.0074	.0014	.0195	.1078	.7722	.0586	1.4746	.0880	.0022	.0000
15	.0008	.0008	.0058	.0044	.1301	.0891	.3028	.0300	1.1355	.0635	.0022	.0000
16	.0022	.0014	.0096	.0036	.0660	.0627	.4246	.0300	.3443	.0498	.0008	.0000
17	.0022	.0022	.0074	.0129	.0421	.0396	.1279	.0319	.6047	.0476	.0008	.0000
18	.0066	.0036	.0052	.0569	.0319	.0322	.0693	.0297	.4601	.0399	.0036	.0000
19	.0030	.0014	.0080	.0121	.0226	.0308	.0608	.0228	.5588	.0338	.0022	.0000
20	.0044	.0080	.0085	.0077	.0088	.0360	.0734	.0624	.9699	.0363	.0132	.0000
21	.0014	.0000	.0135	.0132	.0066	.0311	.0729	.0187	.3476	.0319	.0008	.0000
22	.0011	.0008	.0102	.4774	.0462	.0239	.1023	.0187	.2580	.0272	.0022	.0000
23	.0000	.0030	.0099	.1422	.0113	.0198	.0586	.0176	.1650	.0561	.0000	.0011
24	.0022	.0030	.0072	.1067	.3564	.0099	.0432	.0118	.1845	.2255	.0030	.0014
25	.0014	.0022	.0044	.0220	.2456	.0157	.0223	.0044	.2008	.0418	.0008	.0008
26	.0000	.0022	.0030	.0151	.4001	.0063	.0220	.0091	.2461	.0250	.0008	.0000
27	.0000	.0036	.0063	.0195	.2978	.0022	.0201	.0058	.4755	.0173	.0000	.0000
28	.0000	.0022	.0044	.0113	.3011	.0044	.0184	.0080	1.2991	.0151	.0000	.0008
29	.0014	.0036	.0022	.1276	.1474	.0058	.0110	.2068	.7898	.0165	.0000	.0000
30	.0008		.0030	.1590	.1045	1.0142	.0143	.8445	1.6401	.0135	.0030	.0014
31	.0008		.0008		.1367		.0099	.5849		.0165		.0014

Tons of Suspended Silt Passing Roma in the Rio Grande During 1936

Months	Tons of Water	SUSPENDED SILT		
		Tons	Average Percent By Weight	Acre Feet at 1,452 Tons Per Acre Foot
January	258,780,000	3,400	.0013	2.3
February	216,560,000	3,500	.0016	2.4
March	256,060,000	35,200	.0137	24.2
April	196,130,000	136,000	.0693	93.7
May	591,110,000	2,416,700	.4088	1,664
June	275,120,000	777,000	.2824	535.1
July	701,430,000	2,129,500	.3036	1,467
August	299,640,000	752,700	.2512	518.4
September	1,304,800,000	10,031,300	.7688	6,909
October	730,030,000	3,200,900	.4385	2,204
November	264,230,000	15,800	.0060	10.9
December	272,400,000	1,500	.0006	1.0
The Year	5,366,290,000	19,503,500	.3634	13,432.0


COMPARATIVE RIO GRANDE SILT BURDENS
Thousands of Acre Feet of Suspended Silt
0
10
20
30
40
50
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
Years
Water at San Marcial
Suspended Silt at San Marcial
Water at Roma
Suspended Silt at Roma
Water at Eagle Pass
Suspended Silt at Eagle Pass
0
1
2
3
4
5
6
7
8
Millions of Acre Feet of Water

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1936

The chemical analyses reported here were made by the United States Department of Agriculture at Riverside, California, from water samples taken by the United States Section of the International Boundary Commission.

For the entire year at San Marcial each water sample was analyzed. The monthly figures in the table represent the arithmetical mean for each month. For the entire year at El Paso, Fort Quitman, Rio Grande City and Lower Brownsville a composite sample was made up for each month at each station. These composite samples were composed by using from each sample an amount proportional to the river flow at the time the sample was taken.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: HCO_3, 61; Cl, 35.5; SO_4, 48; Ca, 20; Mg, 12.15; Na, 23; NO_3, 62.

Conductance, reported in the tables as ($K \times 10^5$ 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 and is quite as valid and is probably more precise and more significant than is the statement of concentration in terms of total dissolved solids as parts per million.

Month	No. of Samples	Tons of Salts		Mean $K \times 10^5$ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Per Acre Foot	Per Month						Ca	Mg	Na	HCO_3	SO_4	Cl	NO_3
Water Samples from Rio Grande at San Marcial, New Mexico															
Jan.	3	.86	46,230	93.9	.16	7.8	47	23	3.77	1.36	4.53	3.29ϕ	4.13	2.27	.02
Feb.	4	.87	45,730	93.2	.21	7.8	49	22	3.71	1.22	4.76	3.16ϕ	4.47	2.15	.01
Mar.	5	.77	51,400	84.7	.16	7.9	46	20	3.43	1.28	3.99	2.86ϕ	4.19	1.74	.02
Apr.	5	.62	125,900	65.2	.15	7.8	36	17	3.24	1.08	2.67	2.79ϕ	2.95	1.20	.01
May	5	.46	98,040	51.5	.14	7.9	35	18	2.68	.90	1.98	2.52ϕ	2.07	1.01	.01
June	4	.74	15,280	80.3	.18	7.8	46	24	3.10	1.22	3.82	2.43	3.70	1.96	tr
July	5	1.10	25,120	118	.19	7.9	47	23	5.14	1.67	5.86	3.46ϕ	6.27	2.88	0
Aug.	8	1.47	58,110	152	.15	7.7	43	14	7.74	2.51	7.42	4.32ϕ	11.17	2.31	tr
Sept.	9	1.25	73,670	126	.15	7.3	41	14	6.41	2.09	5.82	3.68	8.63	1.99	tr
Oct.	6	.91	38,900	95.7	.18	7.6	43	18	4.43	1.49	4.40	3.03	5.42	1.78	.01
Nov.	5	.78	35,220	85.2	.16	7.5	42	19	3.88	1.30	3.83	3.21	4.08	1.67	.02
Dec.	5	.81	39,730	89.7	.16	8.1	46	21	3.63	1.29	4.22	2.97	4.14	1.86	.01
Total ⊛ & Mean	64	.75	653,330	80.6	.16	7.8	42	18	3.76	1.27	3.62	2.96	4.11	1.58	.01
									** 43	** 15	** 42	*** 34	*** 48	*** 18	
Water Samples from Rio Grande at El Paso, Texas															
Jan.	4	1.92	16,510	214	.36	8.3	59	39	6.49	2.58	13.18	4.93ϕ	8.71	8.65	tr
Feb.	4	1.68	17,980	184	-	8.1	55	36	6.60	2.14	10.55	4.43ϕ	7.96	6.85	.07
Mar.	5	1.33	39,100	136	.19	7.7	52	30	5.01	1.66	7.09	3.58	6.18	4.09	.05
Apr.	4	1.16	58,930	130	.19	7.6	50	27	4.93	1.73	6.70	3.38	6.51	3.52	.05
May	4	1.16	72,500	127	.21	8.0	49	28	4.85	1.62	6.19	3.33ϕ	6.03	3.56	.07
June	5	1.03	64,680	123	.26	7.9	48	25	4.71	1.73	6.06	3.31	5.85	3.05	.07
July	4	1.11	84,920	120	.17	7.6	50	27	4.67	1.47	6.05	3.41	5.63	3.24	.05
Aug.	4	.92	73,560	110	.18	7.9	49	27	4.46	1.54	5.74	3.26	5.42	3.15	.07
Sept.	4	1.11	56,060	128	.14	8.1	51	33	4.82	1.62	6.69	3.66ϕ	5.13	4.28	.02
Oct.	4	1.52	27,060	183	-	7.6	57	36	6.24	2.00	10.69	4.50	7.66	6.82	.03
Nov.	5	1.79	22,380	200	.27	7.9	57	37	6.31	2.39	11.67	4.73ϕ	8.33	7.74	.02
Dec.	4	1.72	26,640	187	-	7.8	55	36	6.35	2.60	11.05	4.70	8.26	7.22	.05
Total ⊛ & Mean	51	1.18	560,320	129.9		7.8	51	30	4.95	1.70	6.98	3.55	6.07	3.98	.05
									** 37	** 12	** 51	*** 26	*** 44	*** 30	

⊛ Weighted Mean
ϕ Carbonate (CO_3) present
** Percent of total cations
*** Percent of total anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1936—continued

Month	No. of Samples	Tons of Salts: Per Acre Foot	Tons of Salts: Per Month	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	HCO_3	SO_4	Cl	NO_3
Water Samples from Rio Grande at Fort Quitman, Texas															
Jan.	5	3.19	36,370	360	.36	8.0	60	57	10.50	4.05	22.16	4.63ϕ	11.09	20.90	.05
Feb.	4	3.16	25,250	362	.27	8.2	59	58	10.79	4.45	22.27	4.53ϕ	11.19	21.60	.11
Mar.	4	3.13	18,000	366	.33	7.6	60	60	10.08	4.25	21.84	3.93	10.65	21.81	.05
Apr.	4	3.77	17,530	427	.41	8.1	60	62	11.99	5.35	26.45	4.18ϕ	12.48	27.01	.02
May	5	3.38	26,060	390	.34	7.6	60	61	10.85	4.56	23.58	3.58	11.56	23.81	.05
June	4	3.13	24,910	365	.37	7.8	62	61	9.93	4.06	22.44	3.02	11.20	22.07	.11
July	5	3.21	21,280	372	-	7.4	61	62	10.29	4.15	22.70	3.41	10.72	23.14	tr
Aug.	4	2.51	27,610	286	-	8.1	60	60	8.24	3.11	17.09	3.21ϕ	8.32	17.04	.05
Sept.	4	2.10	78,540	249	.20	8.0	57	52	7.66	2.87	14.17	3.81ϕ	8.10	13.05	.05
Oct.	5	2.97	59,990	334	--	7.8	60	57	9.77	3.84	20.48	4.16	10.68	19.42	.11
Nov.	4	3.26	44,660	371	.31	7.7	61	58	10.60	4.26	22.84	4.38	11.34	21.96	.04
Dec	5	2.98	45,300	341	.27	7.9	60	55	10.37	3.78	21.32	4.75	11.28	19.27	.05
Total ϑ & Mean	53	2.84	425,500	332		7.9	60	57	9.54	3.75	19.78	4.01	10.17	18.96	.06
									** 29	** 11	** 60	*** 12	*** 31	*** 57	
Water Samples from Rio Grande at Rio Grande City, Texas															
Jan.	5	1.15	328,900	132	.13	8.3	43	40	4.83	2.68	5.69	2.94ϕ	5.06	5.28	.11
Feb.	4	1.20	241,200	134	.17	8.0	44	38	4.99	2.78	6.03	3.16	5.55	5.13	.14
Mar.	5	1.17	255,060	132	.19	8.0	45	38	4.92	2.60	6.15	3.22	5.25	5.03	.18
Apr.	8	1.08	176,040	134	-	8.3	51	43	3.26	2.44	6.03	1.60	5.23	5.11	.01
May	4	.97	573,270	113	-	8.5	55	45	2.40	1.72	5.04	.73ϕ	4.35	4.13	tr
June	4	.70	147,700	81.2	.15	8.4	45	36	2.49	1.42	3.21	1.70ϕ	2.87	2.49	.03
July	6	.48	558,080	53.0	-	8.4	38	26	1.88	.96	1.77	1.92ϕ	1.51	1.20	tr
Aug.	4	.75	205,300	92.4	.20	8.3	42	32	3.09	1.87	3.60	1.98ϕ	3.92	2.79	.01
Sept.	6	.46	557,980	50.6	.12	8.4	35	23	1.96	.98	1.59	1.88ϕ	1.52	1.00	.03
Oct.	5	.68	452,200	79.7	-	8.3	46	35	2.90	1.55	3.74	1.70ϕ	3.50	2.79	tr
Nov.	3	.97	256,080	122	.20	8.2	49	39	3.53	2.23	5.62	1.75ϕ	5.15	4.38	.01
Dec.	5	1.12	304,640	131	.19	8.2	40	39	4.87	2.92	5.11	2.43ϕ	5.55	4.98	.04
Total ϑ & Mean	51	.76	3,856,650	87.6		8.3	44	35	2.89	1.66	3.61	1.91	3.33	2.88	.03
									** 35	** 21	** 44	*** 24	*** 41	*** 35	
Water Samples from Rio Grande at Lower Brownsville Station															
Jan.	6	1.0	278,000	126	.18	8.3	52	39	4.45	1.36	6.35	2.60ϕ	4.79	4.68	.07
Feb.	5	1.17	205,920	132	.18	7.5	44	38	4.93	2.48	5.82	3.09	5.19	4.96	.11
Mar.	5	1.22	176,900	136	.22	7.9	45	38	5.00	2.42	6.08	2.89ϕ	5.45	5.11	.11
Apr.	4	1.08	91,800	134	-	8.3	51	43	3.26	2.44	6.03	1.60ϕ	5.23	5.11	.01
May	5	.79	354,710	92.6	-	7.7	45	37	3.63	1.08	3.92	2.50	3.26	3.24	.11
June	5	.74	132,460	85.2	-	7.8	38	27	3.98	1.29	3.17	2.94	3.18	2.18	.11
July	5	.57	334,590	65.1	-	8.6	46	31	1.57	1.02	2.17	1.25ϕ	2.08	1.48	.01
Aug.	6	.69	109,710	85.1	.13	8.4	43	32	3.10	1.29	3.25	1.80ϕ	3.42	2.38	.03
Sept.	6	.71	626,930	81.3	.10	7.9	40	25	3.66	1.08	3.15	2.84ϕ	2.95	1.92	.06
Oct.	7	.60	351,600	69.4	.12	8.6	46	30	2.02	.88	2.44	1.35ϕ	2.37	1.62	.01
Nov.	6	1.03	236,900	121	.13	8.1	47	39	3.84	2.11	5.38	1.90ϕ	5.15	4.50	.03
Dec.	6	1.05	252,000	130	.16	8.5	53	43	2.92	2.37	5.89	.85ϕ	5.49	4.73	.02
Total ϑ & Mean	66	.79	3,151,520	92.4		8.2	45	34	3.22	1.35	3.79	2.11	3.45	2.82	.05
									** 39	** 16	** 45	*** 25	*** 41	*** 34	

ϑ Weighted Mean
ϕ Carbonate (CO_3) present
** Percent of total cations
*** Percent of total anions
ϑ No samples taken in April at Rio Grande City- figures given here estimated from Brownsville April samples

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1936—continued

Date	Second Feet Flow	Mean Kx10⁵ @25°C	Total Salts p.p.m.	Boron p.p.m.	pH	Percent * Na	Percent ** Cl	Mean Milligram Equivalents per Liter Ca	Mg	Na	HCO_3	SO_4	Cl	NO_3
Water Samples from the Rio Grande at La Nutria Station														
Jan. 16	177	355	2,310	.42	8.0	61	59	9.43	4.78	22.36	3.54ϕ	11.43	21.23	.03
Feb. 4	184	350	2,266	.35	7.7	63	59	9.02	3.85	22.38	3.63	11.05	20.90	tr
Feb. 16	102	370	2,366	.36	7.8	63	60	9.39	4.56	23.50	3.29	11.85	22.35	tr
Mar. 9	95.1	410	2,631	.38	8.0	62	63	10.98	4.84	25.58	2.84ϕ	12.36	25.90	.14
Apr. 10	82.3	391	2,430	.55	7.9	62	61	9.70	4.71	23.51	3.08ϕ	11.79	23.14	.05
Apr. 29	19.6	476	3,086	.42	7.6	63	64	12.39	5.21	30.33	2.64	14.62	30.35	.03
May 15	86.2	372	2,378	.09	7.9	63	60	9.30	4.12	23.32	2.54ϕ	12.24	22.34	.04
May 31	107	388	2,482	.40	7.8	62	62	9.82	4.72	24.11	2.64	11.96	23.94	.05
June 15	45.0	424	2,739	.34	7.4	61	63	11.60	5.07	26.21	2.57	13.13	27.10	.18
June 30	33.5	383	2,450	.43	7.6	63	61	9.60	4.28	23.54	2.57	12.14	23.09	.05
July 15	36.0	216	1,300	.30	7.5	62	58	5.71	2.17	13.13	1.98	7.01	12.25	.03
Aug. 3	39.5	118	738	.14	7.3	46	43	6.14	1.12	6.08	2.27	5.21	5.61	.07
Aug. 13	6.0	463	3,065	.47	7.5	61	65	13.07	5.12	28.33	2.47	13.96	29.67	.21
Aug. 31	276	67.7	465	.14	7.4	45	35	3.30	.72	3.26	2.72	2.12	2.57	.07
Oct. 13	292	331	2,116	.35	7.5	61	58	9.19	3.63	20.28	3.17	10.68	19.12	.21
Nov. 8	190	410	2,711	.37	7.7	63	62	10.88	4.65	26.90	3.32	12.62	25.80	.36
Nov. 26	227	362	2,351	.38	7.7	61	60	9.96	4.05	22.35	3.52	11.29	21.81	.04
Dec. 13	202	363	2,281	.28	7.8	62	58	9.47	4.06	22.20	3.87	11.37	20.85	.06
Water Samples from Rio Grande at Upper Presidio Station														
Feb. 1	127	375	2,335	.34	8.1	62	59	9.92	4.53	23.20	3.49ϕ	11.83	22.39	tr
Feb. 15	112	379	2,455	.44	7.9	60	59	10.43	4.60	22.30	3.49ϕ	12.36	22.65	tr
Mar. 14	78.6	431	2,875	.46	7.8	59	61	12.80	5.18	26.39	3.34	13.73	27.09	.05
Apr. 18	2.5	484	3,194	.37	7.8	52	61	17.45	6.43	25.90	3.48	15.71	30.57	.03
May 5	18.2	235	1,580	.24	7.3	49	47	10.00	2.23	11.57	2.29	10.41	11.26	tr
May 22	113	201	1,283	.16	7.2	69	45	4.69	2.15	15.04	2.73	9.24	9.97	tr
May 29	180	370	2,376	.41	7.4	61	61	10.28	4.24	22.47	2.73	11.84	22.56	0
June 13	16.9	404	2,638	.43	8.4	63	62	10.54	4.70	25.43	2.52ϕ	13.04	25.26	.07
July 19	93.8	249	1,571	.35	7.3	60	57	7.61	2.28	15.05	2.47	8.47	14.23	.10
July 28	117	114	695	.15	7.5	56	48	3.71	1.12	6.16	2.42	3.30	5.32	.02
Aug. 21	180	135	888	.15	7.5	54	48	5.08	1.34	7.56	3.41	3.91	6.78	.01
Sept. 12	369	236	1,511	.18	7.8	58	50	7.72	2.17	13.65	3.61	8.39	11.95	tr
Dec. 13	196	355	2,303	.37	7.7	61	58	9.86	4.11	22.00	3.57	11.44	21.00	.03
Water Samples from Rio Conchos near Ojinaga, Chihuahua														
Feb. 15	388	90.3	624	.19	7.8	39	15	4.25	1.44	3.60	2.94	5.06	1.36	tr
Mar. 14	492	87.6	664	.19	7.7	40	18	4.28	1.02	3.51	2.94	4.39	1.58	tr
Apr. 18	698	120	760	.20	7.8	46	20	4.52	1.71	5.30	2.84	6.50	2.27	.11
May 16	124	121	860	.31	7.8	42	21	5.58	1.53	5.17	2.64ϕ	6.97	2.63	tr
June 13	72	107	778	.21	7.9	47	20	4.50	1.40	5.15	2.52	6.18	2.18	.01
July 18	1,035	93.6	658	.20	7.4	40	18	4.84	1.07	3.98	2.42	5.83	1.79	.02
Aug 15	370	78.5	562	.15	8.0	37	15	4.03	1.18	3.12	2.82	4.35	1.21	.04
Dec. 13	1,167	74.9	501	.11	7.8	37	12	3.75	.94	2.74	3.12	3.66	.86	.04
Water Samples from Alamito Creek Station														
Jan. 4	3.8	61.7	431	.15	8.3	71	9	1.70	.23	4.62	5.08ϕ	.92	.57	.04

ϕ Carbonate (CO_3) present
* Percent of total cations
** Percent of total anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1936—continued

Date	Second Feet Flow	Mean Kx10⁵ @25°C	Total Salts p.p.m.	Boron p.p.m.	pH	Percent * Na	Percent ** Cl	Mean Milligram Equivalents per Liter Ca	Mg	Na	HCO_3	SO_4	Cl	NO_3
Water Samples from Pecos River Station														
Jan. 10	333	423	2,902	.26	7.8	55	56	11.71	8.14	24.45	3.14ϕ	16.27	24.85	.07
Feb. 7	254	349	2,315	.21	8.2	55	55	9.61	6.63	19.79	3.39ϕ	12.68	19.97	.02
Mar. 13	300	360	2,351	.19	8.1	57	60	9.22	6.70	20.78	3.19ϕ	11.26	21.86	.18
Apr. 9	237	373	2,569	.28	8.0	58	60	8.67	7.36	22.17	3.03ϕ	12.48	22.96	.01
Apr. 28	2,110	177	1,086	.09	7.4	56	53	4.89	2.81	9.91	2.19	6.32	9.61	.01
May 5	253	432	2,701	.14	7.7	62	60	9.80	6.70	27.03	3.08	14.47	26.08	.01
June 14	219	359	2,350	.23	7.5	59	61	7.88	6.91	21.01	2.52	11.69	21.78	.20
June 15	2,060	392	2,477	.23	8.5	59	61	8.85	7.36	23.69	2.72ϕ	12.77	24.49	.13
July 6	19,300	194	1,236	.14	7.2	53	58	5.78	3.43	10.57	2.82	5.59	10.65	.75
July 14	382	231	1,428	.15	7.5	54	57	6.22	4.32	12.49	2.72	7.18	12.87	.07
Aug. 11	207	321	2,029	.20	7.6	60	59	7.55	5.54	18.76	2.62	10.52	18.59	.05
Sept. 14	193	307	1,934	.24	7.8	58	58	7.10	5.63	17.75	2.77	9.90	17.63	.11
Sept. 27	31,100	94.0	617	.04	7.4	44	40	4.17	1.14	4.11	2.28	3.40	3.63	.18
Oct. 8	447	380	2,705	.15	7.3	58	60	9.46	6.80	22.67	3.02	12.68	23.26	.14
Nov. 12	304	427	2,836	.27	7.8	59	61	10.13	7.93	26.08	3.22	14.29	26.64	.18
Dec. 14	284	548	3,668	.32	7.7	61	63	12.06	10.11	34.79	3.12	17.76	35.98	.06
Water Samples from Devils River Station														
Jan. 2	560	38.9	263	.06	8.1	13	14	2.88	.84	.56	3.64ϕ	.11	.38	.21
Water Samples from Rio San Diego Station														
Jan. 14	257.4	48.5	295	.11	7.7	18	17	3.76	.68	.96	3.39	.92	.79	.07
Water Samples from Rio San Rodrigo Station														
Jan. 13	85.5	36.0	207	.08	8.2	9	7	3.01	.47	.35	3.29ϕ	.17	.22	.04
Water Samples from Rio Salado Station														
Jan. 31	157	265	1,906	.92	7.6	44	34	10.73	5.91	12.92	2.79	16.66	9.92	.18
Feb. 15	129	339	2,592	1.18	7.0	43	32	13.92	7.90	16.37	3.04	22.83	12.07	.36
Mar. 28	152	314	2,306	1.23	7.7	46	35	12.39	6.45	15.92	2.79	20.04	11.68	.36
Apr. 28	275	318	2,397	1.10	7.5	45	32	12.74	6.51	16.02	2.34	21.84	11.21	.21
May 23	494	256	1,933	.87	7.6	44	31	10.44	5.38	12.23	2.13	17.37	8.47	.19
June 16	134	134	925	.49	7.9	42	31	5.55	2.70	5.92	1.73	7.89	4.36	.09
July 23	212	75.5	513	.21	7.7	37	27	3.68	1.10	2.76	1.83	3.77	2.03	.01
Aug. 21	134	360	2,997	1.35	7.7	46	28	14.48	8.90	19.60	1.83	29.22	12.10	.02
Sept. 24	233	253	1,841	.78	8.1	43	30	10.05	5.62	11.95	2.23	16.93	8.17	.07
Oct. 20	129	336	2,655	1.27	7.3	45	27	13.27	8.06	17.51	1.83	26.39	10.26	.43
Nov. 16	134	320	2,541	1.13	7.5	42	28	13.80	7.49	15.16	2.21	23.74	9.92	.36
Dec. 21	152	250	1,902	.81	7.5	42	29	10.47	5.88	11.73	2.76	17.05	7.79	.16
Water Samples from Rio San Juan Station														
Jan. 23	1,030	99.2	898	.18	7.8	33	25	4.60	2.49	3.48	2.79	5.25	2.29	.36
Feb. 29	312	104	746	.19	7.7	39	27	4.76	1.82	4.28	2.54	5.32	2.55	.43
Mar. 3	293	102	704	.16	7.8	35	25	4.69	2.34	3.72	2.69	5.44	2.55	.18
Apr. 1	162	106	776	.16	7.4	35	26	5.31	2.23	4.12	2.69	5.53	2.76	.14
May 28	1,870	67.5	436	.09	7.5	29	17	3.81	1.25	2.10	2.29	3.63	1.20	.02
June 17	132	89.3	608	.25	7.2	36	26	4.06	2.07	3.39	2.27	4.74	2.47	.05
July 27	1,390	52.5	365	.07	7.9	25	16	3.43	.98	1.45	2.47	2.39	.77	.14
Aug. 24	1,240	102	694	.21	7.5	45	33	3.99	1.79	4.66	1.88	5.16	3.34	.05
Sept. 16	1,600	62.5	459	.09	7.6	26	16	3.61	1.24	1.69	2.67	2.95	.97	.14
Oct. 20	964	70.8	492	.06	7.6	33	20	3.64	1.30	2.47	2.52	3.44	1.40	.11
Nov. 17	848	110	775	.02	7.4	37	23	4.80	2.45	4.19	2.62	6.08	2.53	.11
Dec. 16	1,090	110	748	.19	7.6	34	23	4.86	2.62	3.91	2.67	6.01	2.58	.05

ϕ Carbonate (CO_3) present
* Percent of total cations
** Percent of total anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1936—continued

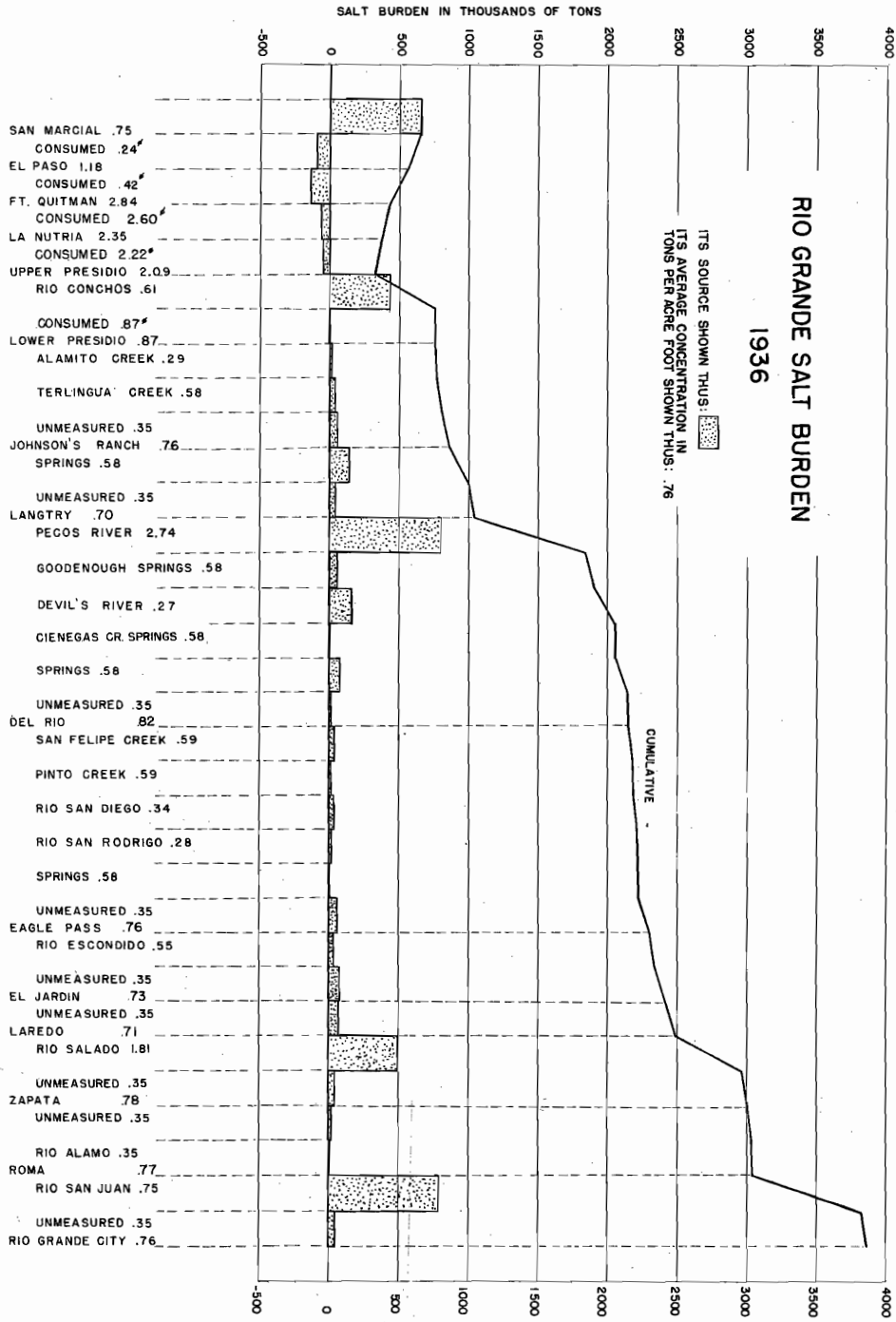
Water Samples from Springs and Wells in the Vicinity of El Jardin Dam Site, 61 River Miles Below Eagle Pass

Month 1935	Mean Kx10⁵ @25°C.	Total Salts p.p.m.	Boron p.p.m.	pH	Percent * Na	Percent ** Cl	Mean Milligram Equivalents per Liter Ca	Mg	Na	AB	HCO_3	SO_4	Cl	NO_3
JUAN REYES SPRING														
On Chupadero Ranch, Webb Co., Tex., 3 miles downstream from Sullivan Spring, 200 yds. from Rio Grande. (Long. 100° 03' W., Lat. 28° 06' N.) Ground elev. 540 ft. Disch. 0.02 c.f.s. Temp. 17° C. No odor, gas, or color. Stock use.														
Jan. 25	97.5	676	.34	7.4	31	16	5.88	1.50	3.36	3.44	5.36	3.76	1.69	.02
SULLIVAN SPRING														
On Chupadero Ranch, 4.0 miles south of Ford Ranch, Webb Co., Tex. 200 yds. from Rio Grande. (Long. 100° 05' W., Lat. 28° 8' N.) Ground elev. 520 ft. Disch. 15 g.p.h. Temp. 23° C. No odor, gas, or color. Stock use.														
Feb. 1	90.1	-	.35	7.3	38	31	4.71	1.14	3.56	3.35	4.13	2.18	2.78	.11
CHUPADERO SPRING														
On Chupadero Creek 1 mile NE of Ford Ranch, Webb Co., Texas. (Long. 100° 03' W., Lat. 28° 12' N.) Ground elev. 640 ft. Disch. est. 20 g.p.m. (below surface of pool). Temp. 14° C. No odor, gas, or color. Stock use.														
Feb. 18	128.0	-	.41	7.3	39	38	6.06	1.85	5.07	4.83	4.13	3.79	4.77	.05
CHUPADERO RANCH WINDMILL														
At Ford Ranch, Webb Co., Tex., (Long. 100° 04' W., Lat. 28° 11' N.) Ground elev. 640 ft. Static level 18 ft. Casing 6 in. Temp. 23° C. No odor, gas, or color. Domestic and stock use.														
Feb. 18	52.3	-	.18	7.3	34	34	2.75	.67	1.77	1.64	3.05	.28	1.19	.54
GUERRERO SPRING														
At Guerrero, Coahuila, Mex., (Long. 100° 30' W., Lat. 28° 20' N.) 300 meters NE of town at foot of large boulder. Disch. 4.4 c.f.s., no odor, gas, or color. (There are 2 or 3 other springs near this town, one said to contain sulphur).														
Feb. 16	127.0	-	.20	7.2	17	18	7.99	3.85	2.39	2.66	6.24	5.71	2.44	.11
ELLIS PERRY RANCH SPRING														
Coahuila, Mex. (Long. 100° 04' W., Lat. 28° 08' N.) About 1.5 miles west of Rio Grande. No flow.														
Feb. 16	390.0	-	.44	6.7	53	85	12.27	4.91	19.43	19.84	.98	4.67	31.36	.01
RINCON WINDMILL														
Chupadero Ranch, Webb Co., Tex. (Long. 100° 08' W., Lat. 28° 11' N.) 2.5 miles NW of Alamito Crossing Station, 1.25 miles north of Rio Grande. Ground elev. 600 ft. Static level 60 ft. Casing 6 in. Temp. 29° C. Stock use.														
Mar. 27	1,050.0	7,388	3.07	8.4	94	78	3.25	3.47	102.03	101.56	6.69ϕ	17.82	83.74	.03
JARDIN WINDMILL														
On Chupadero Ranch, 2.4 miles south of Ford Ranch, Webb Co., Tex. (Long. 100° 04' W., Lat. 28° 9' N.) Ground elev. 640 ft. Static level 50 ft. 4 in. casing. Temp. 23° C. No odor, gas or color. Stock use.														
Mar. 28	82.9	529	.30	6.7	29	32	4.44	1.44	2.34	2.46	2.95	2.71	2.68	tr
HOLLOWAY WINDMILL														
Fitzsimmons Ranch, Dimmit Co., Tex. (Long. 100° 01' W., Lat. 28° 20' N.) At cattle pens 12.5 miles north of Ford Ranch. Depth 250 ft. Static level 190 ft. 6 in. casing. Ground elev. 800 ft. Temp. 23° C. Used for stock.														
Mar. 29	85.7	573	.35	7.8	30	41	4.69	1.75	2.72	2.75	4.28	1.14	3.48	.29
SPRING AT EL JARDIN DAMSITE														
On west side of Rio Grande at El Jardin dam site. (Long. 100° 03' W., Lat. 28° 09' N.) Above gaging station. Elev. 500 ft. Disch. 20 g.p.h. Temp. 20° C. No odor, gas or color. Stock use.														
Mar. 31	16.6	116	.05	7.0	23	16	1.19	.18	.40	.40	1.43	.06	.25	.03
CHUPADERO RANCH SPRING														
Webb Co., Tex., 0.1 mile east of San Ambrosia Creek. (Long. 100° 05' W., Lat. 28° 10' N.) Ground elev. 570 ft. Disch. 10 g.p.h. Temp. 22° C. No odor, gas or color. Used for stock.														
Apr. 1	80.5	505	.11	7.6	21	18	5.95	1.17	1.84	1.86	6.09	1.24	1.64	.01
CARRIZO CREEK SPRING														
5 miles south of Carrizo Springs, Tex. (Long. 99° 55' W., Lat., 28° 29' N.) Temp. 29° C. Undersurface flow in large pond, used for stock. Cloudy from recent rain.														
Apr. 2	39.7	253	.14	6.8	28	21	2.48	.50	1.14	1.15	2.41	.84	.84	.04

ϕ Includes 2.46 CO_3

* Percent of total cations.

** Percent of total anions.



Note: "UNMEASURED" *means unmeasured inflow to Rio Grande*

* *These figures represent average concentration of water consumed*

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

The following bacteriological analyses of Rio Grande water samples taken near El Paso in 1935 were furnished by the City-County Health Unit, El Paso, Texas. No such data are available for 1936.

From Water Samples in February, 1935

Specific Location		Total Bacteria per Sq. Cm. in Agar-Agar at 37.5° C.	Bacilus Coli Per 100 c. c.
At School	3.03 Miles above El Paso Gaging Station	1,780	100
At Pump	1.1 " below " " " "	2,920	100
	1.95 " " " " " "	2,040	100
At Headgate	2.6 " " " " " "	1,530	1,000
Above Schneider's	5.81 " " " " " "	4,550	10,000
Below Peyton's	6.14 " " " " " "	3,700	10,000
	*6.82 " " " " " "	500	
	*7.16 " " " " " "	1,840	
	7.6 " " " " " "	17,000	
	8.1 " " " " " "	36,000	10,000
	8.6 " " " " " "	107,000	10,000
	9.1 " " " " " "	130,000	10,000
	9.6 " " " " " "	92,000	100,000
	10.1 " " " " " "	153,000	100,000
	10.6 " " " " " "	107,000	100,000

From Water Samples in April, 1935

At School	3.03 Miles above El Paso Gaging Station	64	100
At Pump	1.1 " below " " " "	570	1,000
	2.4 " " " " " "	1,220	1,000
	6.1 " " " " " "	1,530	10,000
	6.31 " " " " " "	1,650	10,000

* Outfall into river from El Paso City Sewage disposal plant is 7.1 river miles below El Paso Gaging Station.

DISSOLVED OXYGEN IN RIO GRANDE WATER NEAR EL PASO

In Parts Per Million

The following determinations of dissolved oxygen in Rio Grande water near El Paso, Texas, made in 1936, were also furnished by the City-County Health Unit, El Paso, Texas. The outfall into river from El Paso City Sewage disposal plant is 7.1 river miles below El Paso Gaging Station.

1936	Immediately above Outfall	Miles Below El Paso Sewage Outfall		
		2 to 2.5	4 to 6	9.5 to 10
June 10	4.70	3.90	4.20	
June 13	4.80		4.40	4.20
June 22	5.60	3.90		
June 25	5.50	5.60	5.10	
June 30	5.60			6.0
July 10	5.35		5.20	
July 16	6.15	6.0	5.9	
July 31	4.65		3.75	5.80
August 11	5.36	5.16	5.60	
August 19	6.35	5.45	6.20	
August 24	5.50			
August 28	5.30	5.00	5.40	
November 16	8.00	5.90	7.00	
December 17	8.70	7.50	8.10	

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.

	Chemical Analysis — Parts per Million					Bacteriological Analysis	
Month 1936	Turbidity	Total Alkalinity	Phenolphthalein Alkalinity	Hardness	Magnesia	Total Bacteria per Sq. Cm. in Agar-Agar at 37.5° C.	Bacilus Coli Per 100 c. c.
Average							
January	29	175	4.0	379	53.0	74	31
February	25	150	2.0	323	47.0	39	29
March	221	143	6.0	302	36.0	555	546
April	111	132	6.0	288	40.0	435	81
May	1,161	121	3.0	240	34.0	2,143	477
June	2,802	118	3.0	237	29.0	2,459	1,060
July	997	114	4.0	195	26.0	4,781	1,376
August	1,326	129	4.6	242	30.0	1,473	331
September	7,139	115	7.0	208	14.9	2,348	460
October	1,576	134	8.0	253	24.0	1,694	441
November	79	144	7.5	305	39.0	345	43
December	35	148	6.0	334	42.0	135	33
Total	15,501	1,625	61.1	3,306	414.9	16,481	4,908
Average	1,292	135	5.1	275	34.6	1,373	409
Minimum	25	114	2.0	195	14.9	39	29
Maximum	7,139	175	8.0	379	53.0	4,781	1,376
Minimum							
January	25	155	0.0	325	32.0	10	0
February	25	130	0.0	290	32.0	16	5
March	25	95	0.0	185	24.0	30	10
April	36	115	0.0	235	32.0	105	10
May	82	90	0.0	130	12.0	90	100
June	168	60	0.0	135	12.0	100	100
July	97	60	0.0	80	12.0	50	50
August	95	105	0.0	200	12.0	95	50
September	1,456	80	5.0	140	4.0	700	100
October	167	95	5.0	155	8.0	120	10
November	35	130	5.0	245	28.0	50	5
December	28	135	3.0	305	32.0	30	10
Maximum							
January	80	230	8.0	530	68.0	180	100
February	25	185	5.0	410	68.0	70	100
March	1,587	157	10.0	400	52.0	4,000	10,100
April	697	145	8.0	355	52.0	2,590	100
May	14,550	142	5.0	342	60.0	19,400	1,000
June	9,677	155	5.0	350	52.0	19,680	10,000
July	3,200	145	5.0	245	44.0	27,100	10,000
August	10,900	145	8.0	295	56.0	20,500	1,000
September	15,046	140	8.0	280	46.0	7,000	1,000
October	8,980	165	10.0	310	48.0	10,350	1,000
November	152	155	10.0	347	52.0	730	100
December	47	165	8.0	385	56.0	355	100

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE AT SAN MARCIAL, NEW MEXICO, AND EL PASO, TEXAS

By tables and graphs there is shown on this and the two following pages the results of exhaustive research as to the peak discharge of Rio Grande floods at San Marcial, New Mexico, and at El Paso, Texas, covering the 108 year period from 1828 to 1936. There were examined all known reports on the subject including Mission records at Tome, New Mexico, "Historical Documents" of Ciudad Juarez, Chihuahua, and newspaper files from Santa Fe, to El Paso. In May and June, 1828, a great flood occurred at San Marcial and at El Paso; its peak discharge at these points cannot as yet be definitely established. This uncertainty limits the present record to the period since 1828 or to 108 years. The calculated peak discharges for floods at El Paso since 1915, when Elephant Butte Dam was built, are based upon the assumption that no such dam had been constructed. For each of the stations, San Marcial and El Paso, the graphs and the tabulation of floods, presented below, correspond to each other.

Each of the graphs on the following page shows the chronological sequence of the floods given in the corresponding tabulation. Each heavy vertical line represents a flood. The shaded areas in these graphs show for what years and for what peak discharges the information is not complete. Above the shaded areas the information is complete for all floods. The base line in these graphs shows the limit of flood peak discharge below which floods were not considered. Above this base line all available information concerning flood peak discharge was considered.

The average number of years between floods having a peak discharge equaling or exceeding any given magnitude is shown in the graphs on page 81, for all floods given in the corresponding tabulation and graph on page 80.

In contradistinction to the rather smooth generalization represented by the line throughout the points of the graphs on page 81, the very erratic nature of flood occurrence at these two points on the Rio Grande should be noted.

At San Marcial for the 76 year period 1829 to 1904, inclusive, there was only one flood which equaled or exceeded 47,000 second feet. That is to say during this period floods of 47,000 second feet or greater occurred, on the average, once every 76 years. On the other hand, during the 26 year period 1904 to 1929, inclusive, 2 such floods occurred or during this shorter period such floods occurred, on the average, once every 13 years. Comparing these two periods with respect to such floods it may be said that in the 26 year period, floods equalling or exceeding 47,000 second feet occurred, on the average, nearly 6 times as frequently as in the 76 year period.

At El Paso for the 62 year period 1829 to 1890, inclusive, there was only one flood which equaled or exceeded 16,000 second feet. In other words, floods of 16,000 second feet or greater occurred, on the average, once every 62 years. On the other hand, during the fifteen year period 1891 to 1905, inclusive, 6 floods occurred having peak discharges greater than 16,000 second feet, or it is seen that floods of 16,000 second feet or greater occurred on the average of once every 2-1/2 years. Comparing these two periods with respect to floods equaling or exceeding 16,000 second feet, it may be said that in the 15 year period such floods occurred on the average of 25 times as frequently as in the 62 year period.

For these points on the Rio Grande, therefore, forecasts of flood peak discharge occurrence should not be based upon records covering less than about 100 years.

Flood Peaks at San Marcial—1828 to 1936

There is shown below for San Marcial all floods in the past 108 years having a peak discharge of 47,000 second feet or greater and all floods in the past 42 years having a peak discharge of 15,100 second feet or greater.

No.	Date	Peak Discharge in Second Feet ϕ	Order of * Magnitude	Period ** of Years	Average No. *** of Years
1	Oct. 11, 1904	50,000	1	108	108
2	Sept. 24, 1929	47,000	2	108	54
3	May 24, 1905	29,500	3	42	14
4	Aug. 13, 1929	24,000	4	42	10.5
5	Oct. 2, 1904	23,000	5	42	8.4
6	May 27-June 4, 1920	22,500	6	42	7.0
7	May 21-22, 1897	21,800	7	42	6.0
8	June 22, 1933	20,640	8	42	5.2
9	June 20, 1921	19,400	9	42	4.7
10	June 24, 1903	19,400	10	42	4.2
11	Oct. 10, 1897	19,400	11	42	3.8
12	July 17, 1898	19,000	12	42	3.5
13	April 25, 1905	16,000	13	42	3.2
14	May 31, 1912	15,300	14	42	3.0
15	May 14, 1916	15,100	15	42	2.8

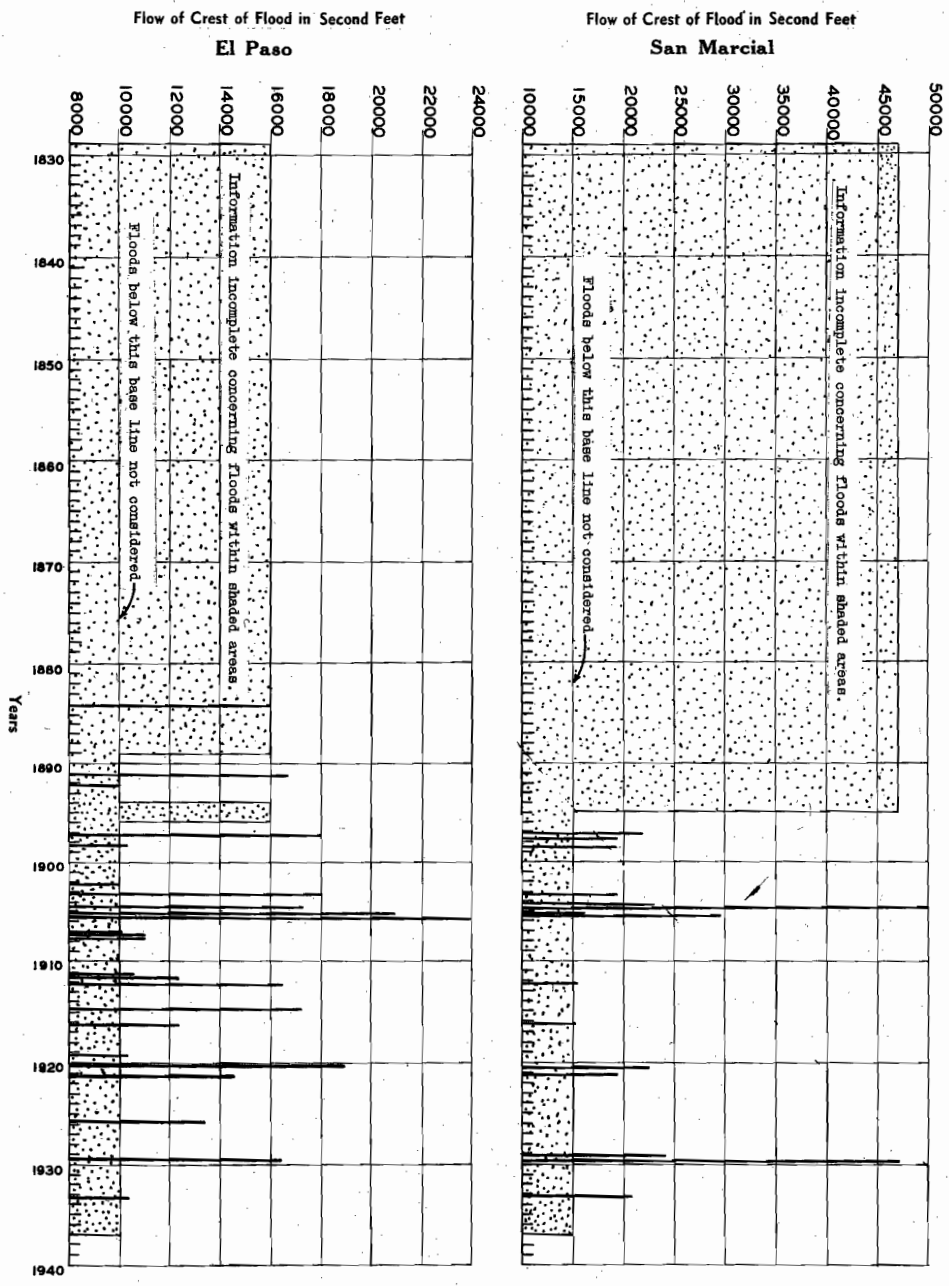
* "Order of Magnitude" with reference to all other floods within the same period.

** Period of years during which all floods are shown which had peak discharges equaling or exceeding the lowest flood in the period.

*** Average number of years (period of years divided by order number) between floods having a peak discharge equaling or exceeding any given magnitude.

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

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE AT SAN MARCIAL, NEW MEXICO, AND EL PASO, TEXAS
continued



OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE AT SAN MARCIAL, NEW MEXICO, AND EL PASO, TEXAS

continued

Assuming that Elephant Butte Dam had not been built there is shown below all floods which occurred or would have occurred at El Paso in the last 108 years having a peak discharge of 16,000 second feet or greater and all floods of 10,000 second feet or greater which occurred or would have occurred at El Paso in the 46 year period 1889 to 1893, inclusive, and 1896 to 1936, inclusive.

Flood Peaks at El Paso—1828 to 1936

No.	Date	Peak Discharge in Second Feet ∅	Order of * Magnitude	** Period	Average No. *** of Years
1	June 12, 1905	24,000	1	108	108
2	June 2, 1905	21,000	2	108	54
3	June , 1920	19,000	3	108	36
4	May 27, 1897	18,200	4	108	27
5	June 21, 1903	18,100	5	108	22
6	October 15, 1904	17,300	6	108	18
7	May 17, 1891	16,600	7	108	15
8	September, 1929	16,500	8	108	14
9	June 3, 1912	16,500	9	108	12
10	May, June, 1884	16,000	10	108	11
11	June, 1921	14,600	10	46	4.6
12	September 5, 1925	13,550	11	46	4.2
13	May 19, 1916	12,400	12	46	3.8
14	October 12, 1911	12,300	13	46	3.5
15	June 24, 1907	11,000	14	46	3.3
16	September 3, 1907	11,000	15	46	3.1
17	July 25, 1911	10,600	16	46	2.9
18	April, 1919	10,400	17	46	2.7
19	June, 1933	10,400	18	46	2.6
20	July 20, 1898	10,200	19	46	2.4
21	May 8, 1892	10,000	20	46	2.3
22	June 1, 1907	10,000	21	46	2.2

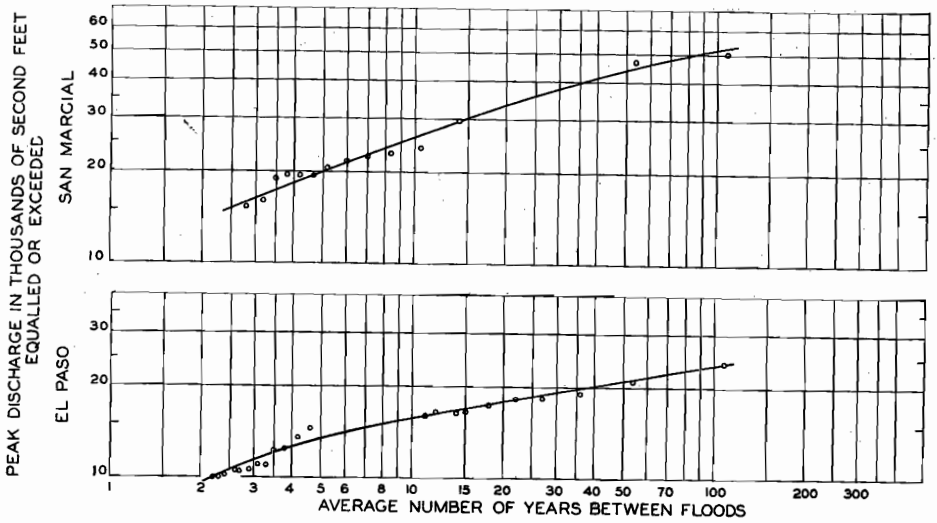
* "Order of Magnitude" with reference to all other floods within the same period.

** Period of years during which all floods are shown which had peak discharges equaling or exceeding the lowest flood in the period.

*** Average number of years (period of years divided by order number) between floods having a peak discharge equaling or exceeding any given magnitude.

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

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE AT SAN MARCIAL, NEW MEXICO, AND EL PASO, TEXAS



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS

The graphs that follow give the approximate hours required for flood crests of various magnitudes to travel down the several stretches of the Rio Grande from gaging station to gaging station from Fort Quitman to Hidalgo and down the Rio San Juan from Aldamas to Rio Grande City.

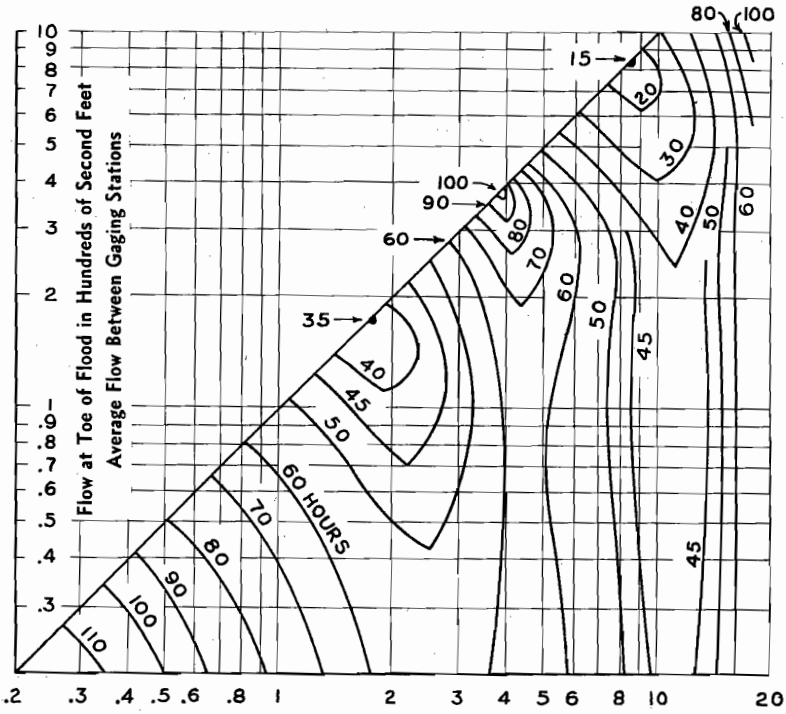
The records of past floods from which the graphs are made show that the approximate hours required for a flood peak to travel down any particular stretch of river can be determined from two figures representing average discharges within the stretch: (a) the discharge just ahead of the flood (the flow at the toe of the flood) and (b) the discharge at the crest of the flood. But the records of past floods show that the travel time of floods cannot be determined exactly from these two factors only. The graphs are least reliable in the regions where they show sudden changes in hours of travel and in the higher regions where records of past floods are very few.

In using the graphs to estimate the time of travel of a concurrent flood it will be necessary to know approximately the two figures mentioned above. Usually these figures are estimated from known discharges at the upper gaging station of the stretch by making allowance for inflow within the stretch, if any inflow is expected, and by making allowance for flattening of the flood peak discharge in the stretch. The graph described on bottom of page 93 will be of assistance in estimating the flattening of the flood peak.

Because flood information from Aldamas is usually received in terms of gage heights in meters the graph on page 91 is cast on coordinate axes showing gage heights at Aldamas, rather than average discharges within the stretch.

The mileage shown on each graph is that by river from station to station at low flow. At flood stages the average distance traversed by the water may be quite different from that shown.

FORT QUITMAN TO LA NUTRIA—120.6 Miles

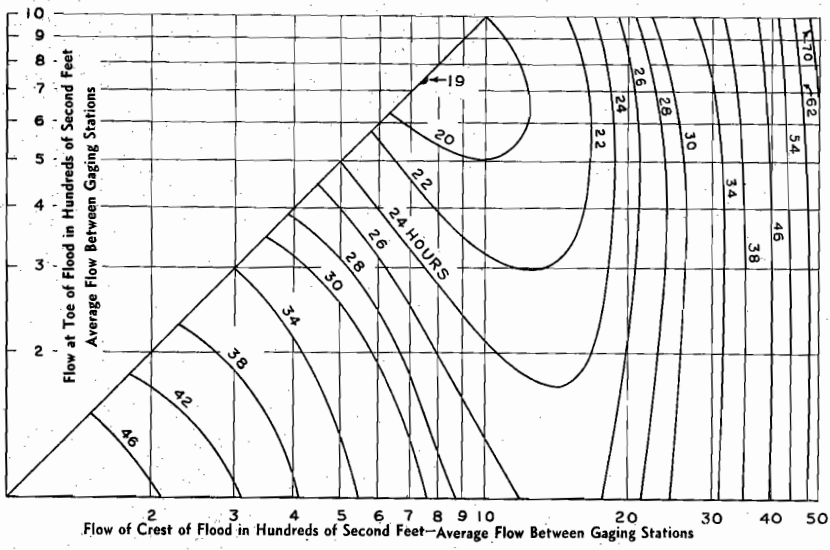


Flow of Crest of Flood in Hundreds of Second Feet
Average Flow Between Gaging Stations

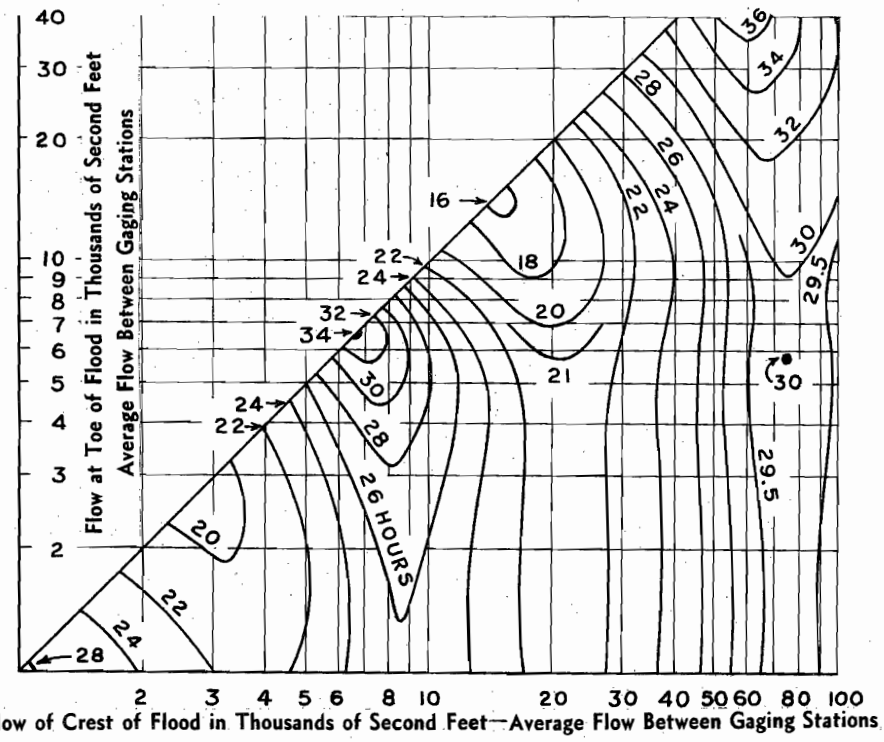
APPROXIMATE TRAVEL TIME OF FLOOD CRESTS

continued

LA NUTRIA TO UPPER PRESIDIO—72 Miles

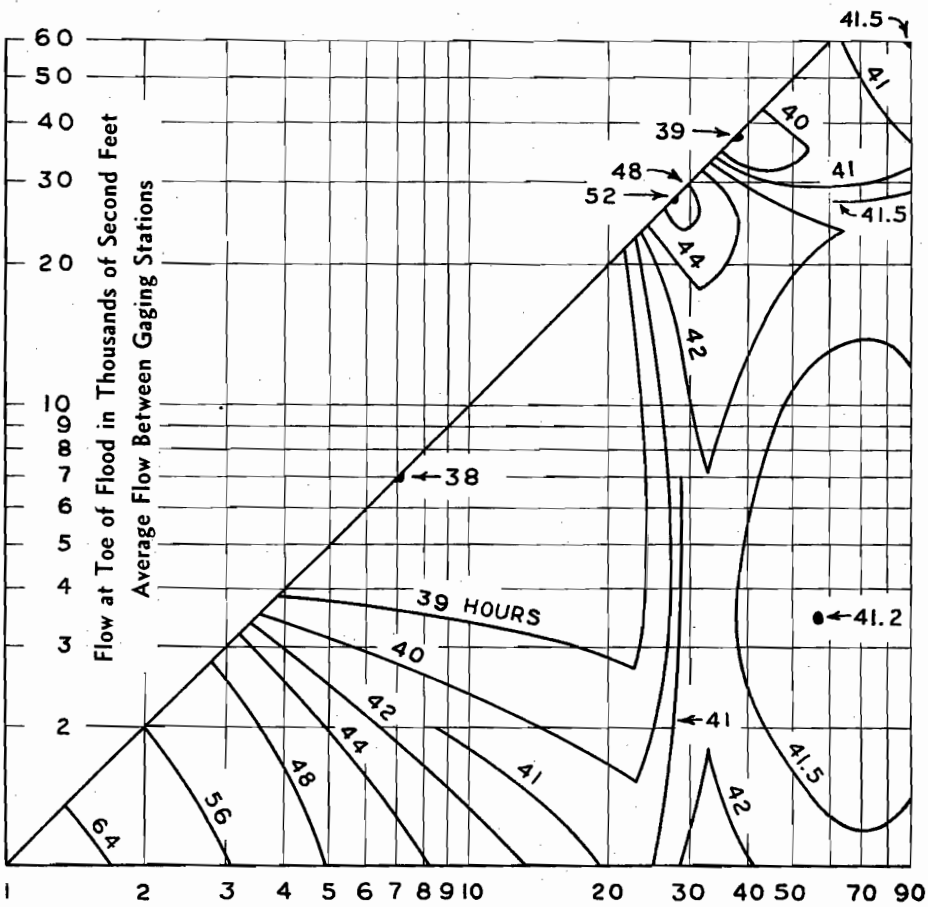


LOWER PRESIDIO TO JOHNSON RANCH—105.2 Miles



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

JOHNSON RANCH TO LANGTRY—210 Miles

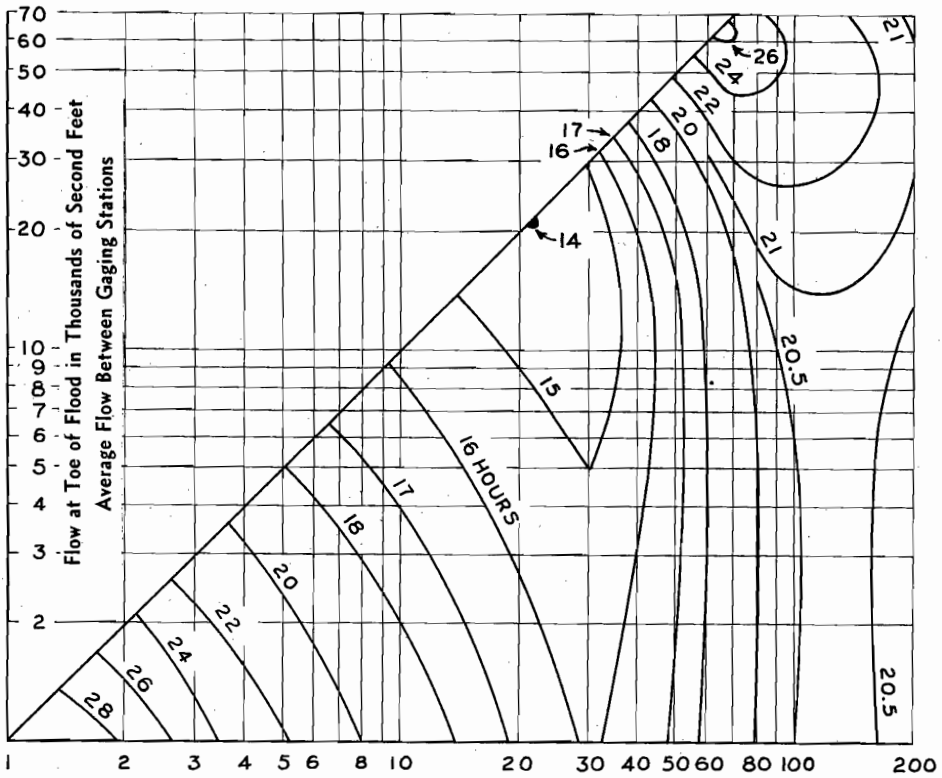


Flow of Crest of Flood in Thousands of Second Feet

Average Flow Between Gaging Stations

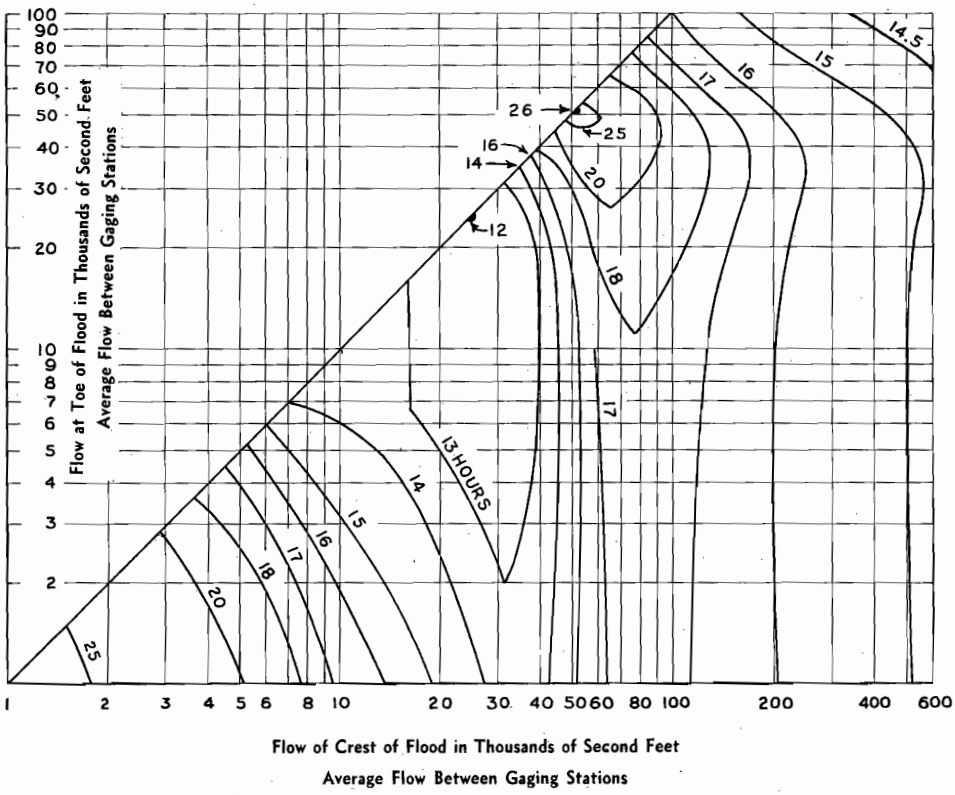
APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

LANGTRY TO DEL RIO—72.3 Miles



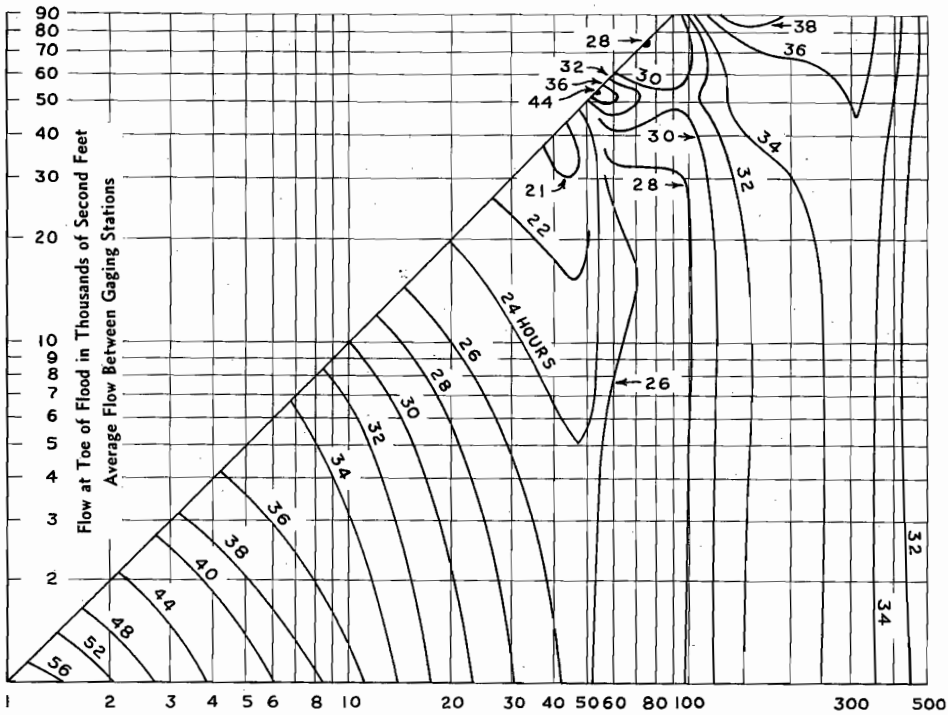
APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

DEL RIO TO EAGLE PASS—57.9 Miles



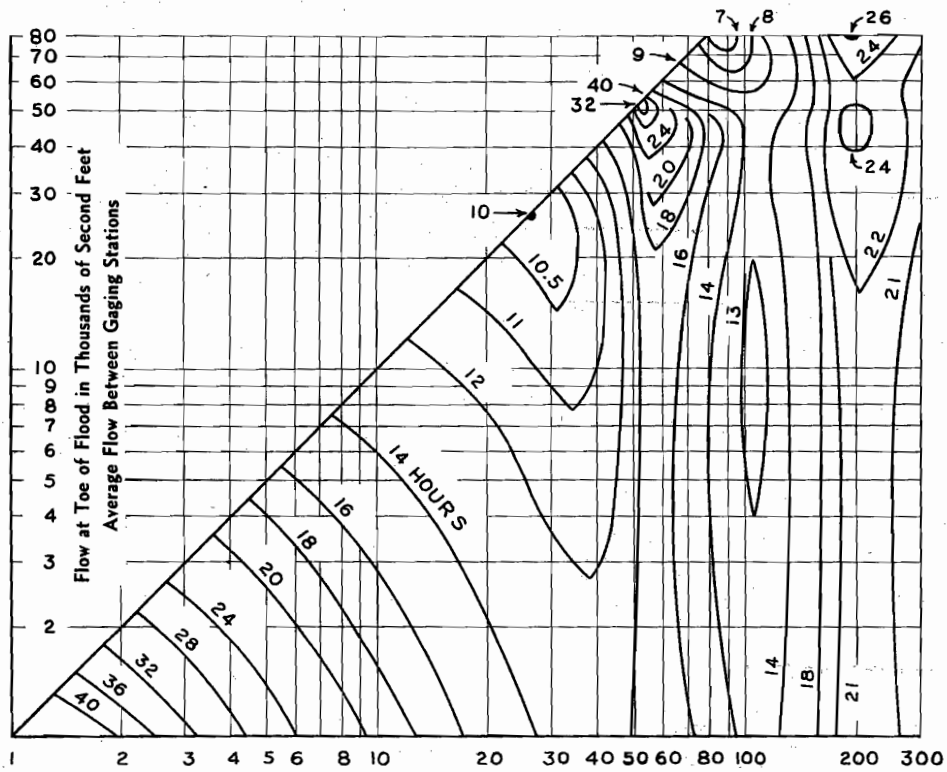
APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

EAGLE PASS TO LAREDO—130.5 Miles



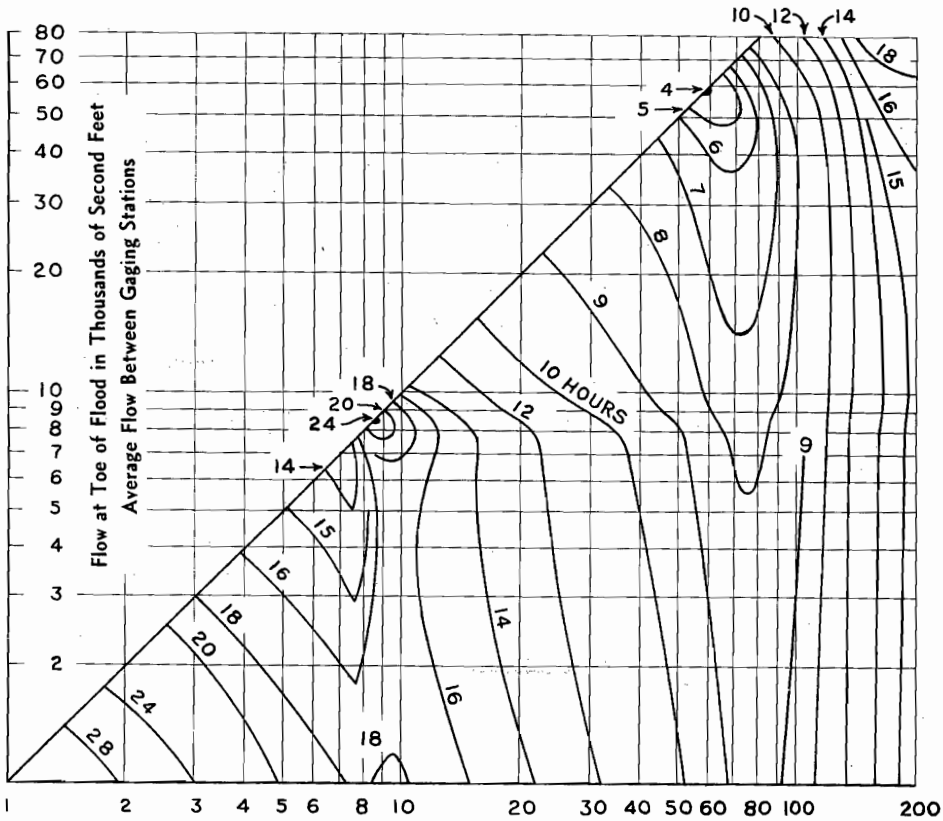
APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

LAREDO TO ZAPATA—63.6 Miles



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

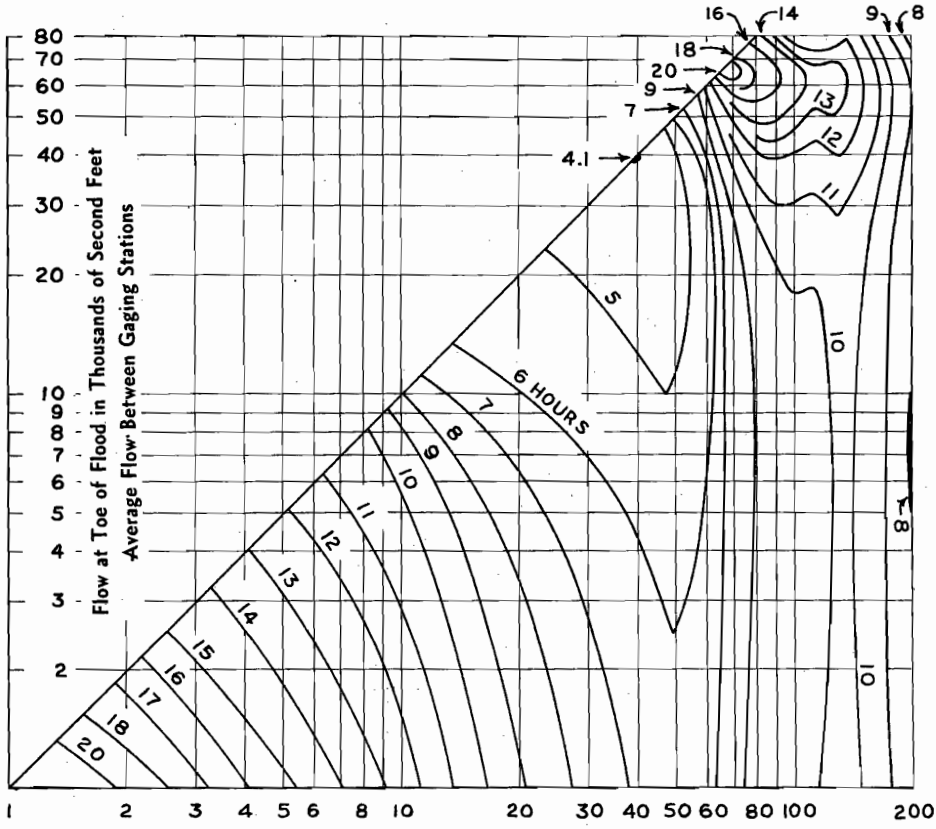
ZAPATA TO ROMA—44.4 Miles



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS

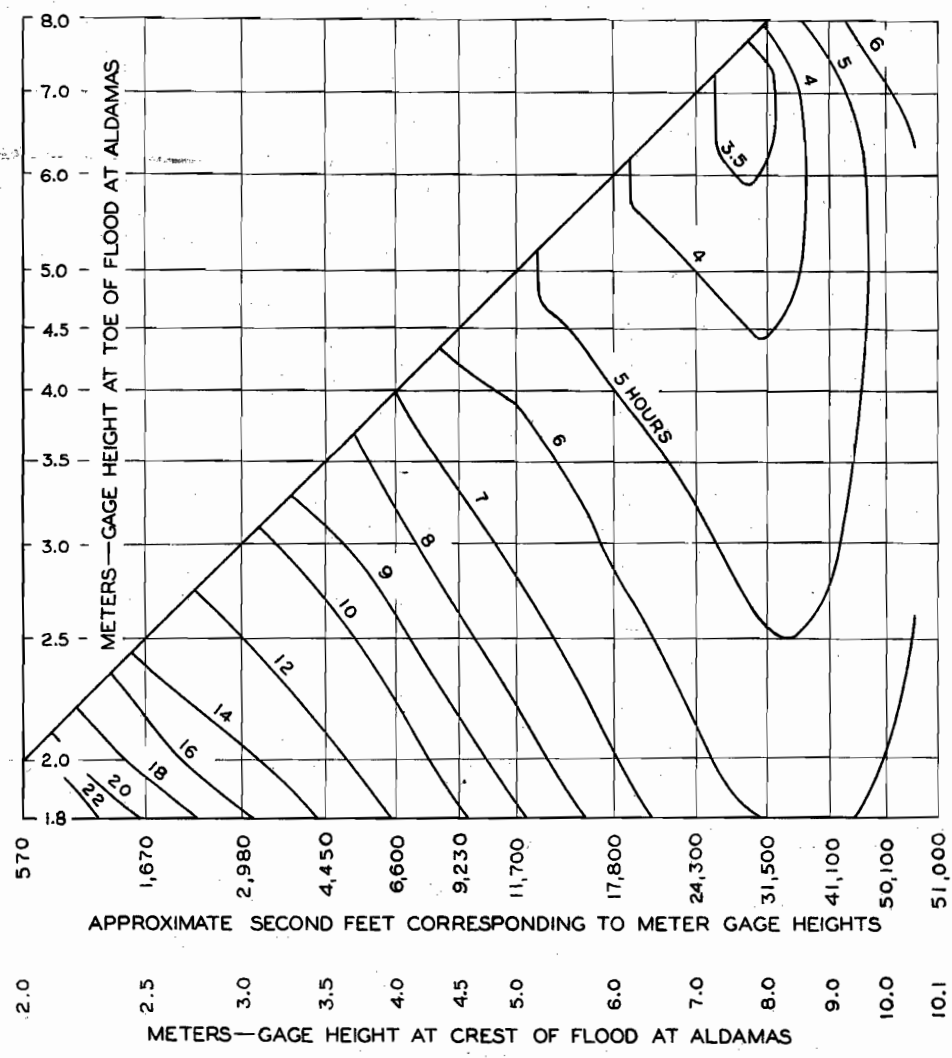
continued

ROMA TO RIO GRANDE CITY—22.6 Miles



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

ALDAMAS TO SANTA ROSALIA—22.6 Miles
Rio San Juan



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS

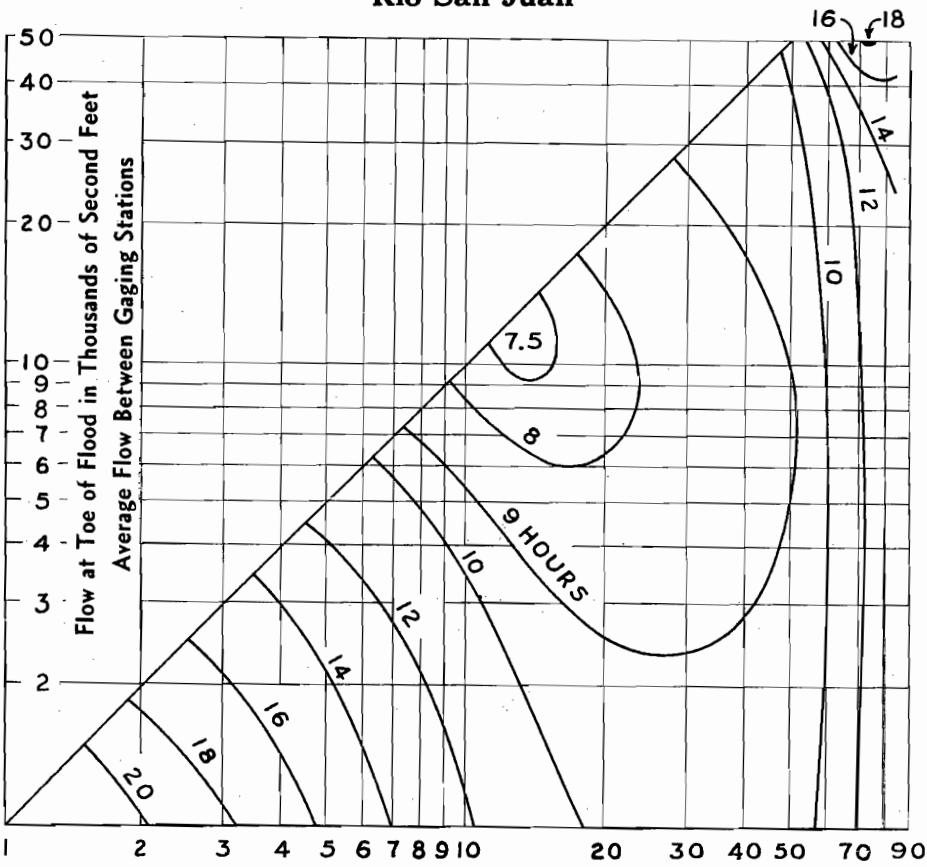
continued

Santa Rosalia is about 27.5 river miles up the Rio San Juan from the junction with the Rio Grande. Roma is 15.3 river miles up the Rio Grande from this junction and Rio Grande City is 7.3 river miles below the junction.

In using this graph the average flow between gaging stations at the toe of the flood is to be estimated by adding together eight tenths of the flow at Santa Rosalia and two tenths of the flow at Rio Grande City. To estimate the average flow between gaging stations at the flood crest add together the crest flow at Santa Rosalia and the crest flow expected at Rio Grande City and subtract from this sum 95% of the flow at Roma at about the time the crest passed Santa Rosalia. Then take four tenths of this balance and add to it two tenths of the expected Rio Grande City crest flow.

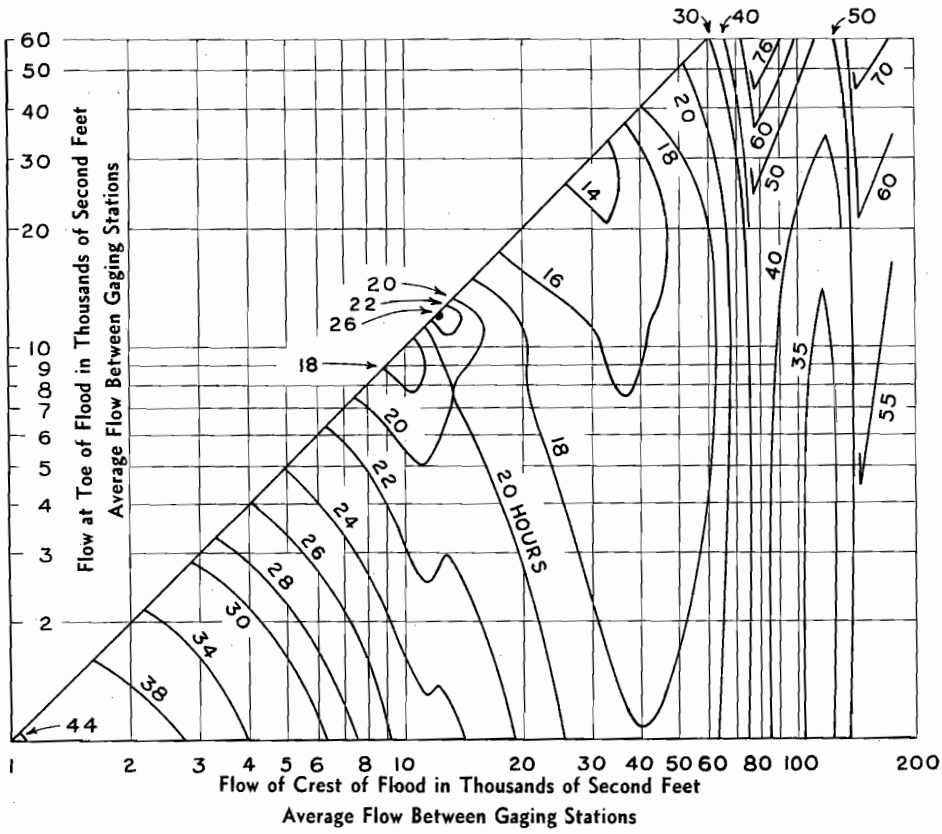
SANTA ROSALIA TO RIO GRANDE CITY—34.8 Miles

Rio San Juan



APPROXIMATE TRAVEL TIME OF FLOOD CRESTS
continued

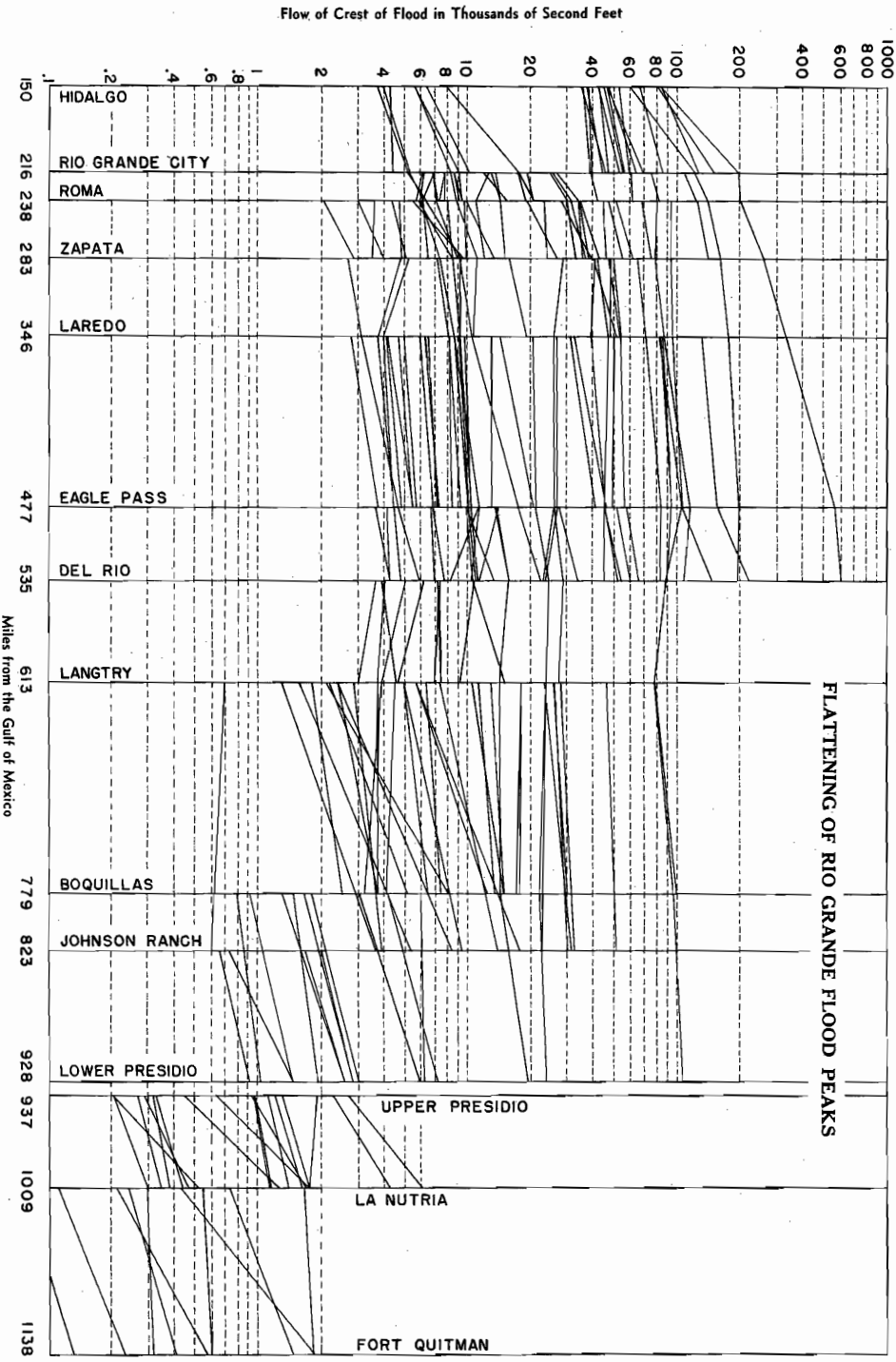
RIO GRANDE CITY TO HIDALGO—65.9 Miles



FLATTENING EFFECT OF RIO GRANDE FLOOD PEAKS

The graph on the opposite page shows how the peak discharge of various floods flattened or decreased in second footage as they passed down the different stretches of Rio Grande channel from Fort Quitman to Hidalgo. In some cases the second footage did not decrease as the flood passed down stream, but this was due to tributary inflow within the stretch.

In using the graph for estimating the flattening of peak discharge of a concurrent flood in any given stretch of river, due allowance must be made for inflow within the stretch if any inflow is expected.


Flow of Crest of Flood in Thousands of Second Feet
.1
.2
.4
.6
.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
150 HIDALGO
216 RIO GRANDE CITY
238 ROMA
283 ZAPATA
346 LAREDO
477 EAGLE PASS
535 DEL RIO
613 LANGTRY
779 BOQUILLAS
823 JOHNSON RANCH
928 LOWER PRESIDIO
937 UPPER PRESIDIO
1009 LA NUTRIA
1138 FORT QUITMAN
Miles from the Gulf of Mexico
FLATTENING OF RIO GRANDE FLOOD PEAKS

EVAPORATION FROM FREE WATER SURFACES IN THE RIO GRANDE BASIN

Four types of pans are used for determining evaporation from free water surfaces in the Rio Grande basin. 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, Mesilla Park, Dilly 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 1-1/2 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 33 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.

The United States Weather Bureau furnished the records for Elephant Butte, Mesilla Park and Dilly. The State Engineer of New Mexico furnished the record for Jornada. From Texas A. & M. College comes records for Balmorhea, Winterhaven and Weslaco. Records for all Mexican stations are from the Meteorological Service of Mexico.

Month	Elephant Butte Dam, N. M.			Mesilla Park, N. M.			Balmorhea, Texas		
	1935	1936	Normal 1924 to 1936	1935	1936	Normal 1924 to 1936	1935	1936	Normal 1926 to 1936
Jan.	3.22	2.99	2.64	3.45	3.59	2.95	2.86	2.53	2.66
Feb.	4.18	5.65	4.21	3.93	5.26	4.41	2.65	3.66	3.63
Mar.	9.20	9.11	7.49	8.41	9.07	7.59	5.36	5.02	5.43
Apr.	12.30	12.10	9.79	11.61	10.85	9.49	6.17	5.72	6.44
May	12.58	14.07	12.02	11.66	13.31	11.27	6.12	5.99	7.51
June	16.80	17.41	14.05	15.13	15.33	12.45	6.78	8.35	8.18
July	15.97	14.50	12.24	15.37	12.60	11.43	7.69	6.70	7.87
Aug.	10.85	14.22	10.50	12.02	10.43	9.79	6.70	6.16	7.04
Sept.	8.05	9.66	8.61	7.43	7.29	7.96	4.10	3.61	5.42
Oct.	8.50	8.01	6.68	7.18	5.63	5.95	3.67	3.76	4.29
Nov.	4.86	4.64	4.04	4.41	3.65	3.79	2.54	2.09	3.01
Dec.	2.40	3.60	2.51	2.62	2.56	2.57	1.63	2.15	2.13
Total	108.91	115.96	94.78	103.24	99.57	89.65	56.26	55.74	63.61

Month	Winterhaven, Texas			Palestina, Coah.			Dilley, Texas		
	1935	1936	Average 1931 to 1936	1935	1936	Average 1935 to 1936	1935	1936	Average 1928 to 1936
Jan.	1.94	2.21	1.89	6.74	4.33	5.54	2.64	2.90	2.78
Feb.	3.12	2.99	2.62	5.67	4.73	5.20	3.97	3.54	3.52
Mar.	5.56	4.97	4.99	9.37	7.87	8.62	7.68	5.87	6.20
Apr.	5.75	6.46	5.58	9.82	9.16	9.49	6.35	7.89	7.18
May	6.33	5.79	6.39	12.38	8.99	10.68	7.40	6.72	7.90
June	5.45	7.90	7.92	11.35	11.27	11.31	6.77	9.15	9.52
July	7.74	7.50	8.26	11.80	10.50	11.15	9.54	7.55	10.37
Aug.	8.98	8.57	8.27	13.11	11.39	12.25	11.21	9.28	10.34
Sept.	4.81	5.42	5.91	8.28	8.14	8.21	6.14	5.28	7.20
Oct.	4.42	3.58	4.64	7.54	7.29	7.42	3.99	4.88	5.66
Nov.	2.25	2.08	3.04	5.77	6.70	6.24	2.61	2.73	3.37
Dec.	1.42	1.76	1.84	5.76	5.23	5.50	1.73	2.28	2.51
Total	57.77	59.23	61.35	107.59	95.60	101.61	70.03	68.07	76.55

Month	El Nogal, Coah.			Don Martin, Coah.			Monterrey, N. L.		Saltillo, Coah.		
	1935	1936	Average 1935 to 1936	1935	1936	Normal 1927 to 1936	1935	Normal 1924 to 1935	1935	1936	Average 1929 to 1936
Jan.	3.5	4.38	3.94	3.87	3.99	3.63	3.91	3.62	5.53	5.98	5.44
Feb.	5.28	5.60	5.44	4.71	5.15	4.66	4.17	4.27	4.95	6.34	5.29
Mar.	9.27	8.94	9.10	8.87	8.51	8.39	6.03	5.74	7.42	8.53	7.81
Apr.	11.02	10.06	10.54	10.45	10.25	9.83	7.46	6.29	8.67	8.70	8.99
May	11.45	8.98	10.22	11.01	9.87	11.29	8.21	7.25	8.00	7.87	9.29
June	8.67	12.29	10.48	10.50	12.96	13.27	-	8.27	-	12.25	10.54
July	8.64	9.05	8.84	12.57	12.51	13.44	-	8.82	-	8.79	8.86
Aug.	12.32	11.70	12.01	14.04	13.00	13.50	-	7.83	9.04	8.57	9.42
Sept.	6.97	8.78	7.88	7.88	8.30	9.30	-	4.64	-	6.48	7.50
Oct.	5.55	6.61	6.08	6.77	6.23	6.95	-	4.08	6.28	6.07	6.61
Nov.	3.05	3.50	3.28	3.72	3.94	4.57	-	3.59	4.93	4.01	5.35
Dec.	2.03	3.36	2.70	2.43	3.29	3.27	-	3.08	5.20	5.17	5.80
Total	87.75	93.25	90.51	96.82	98.00	102.10		67.48		88.76	90.90

EVAPORATION DATA—continued

Month	Linares, N. L.			Weslaco, Texas			Jornada, N. M.			
	1935	1936	Average 1935 to 1936	1935	1936	Average 1932 to 1936	1929	1930	1931	1932
Jan.	3.56	2.59	3.08	3.00	2.41	2.62	-	3.31	2.04	2.60
Feb.	4.09	3.23	3.66	3.10	2.27	3.00	-	4.98	2.67	4.28
Mar.	6.54	5.08	5.81	5.28	4.09	4.76	-	7.05	7.81	6.77
Apr.	6.07	5.38	5.72	5.48	5.63	5.44	-	9.55	8.19	9.28
May	6.94	5.15	6.04	6.32	4.83	5.93	-	13.22	11.44	12.50
June	6.15	7.77	6.96	5.45	7.16	6.82	14.70	13.22	12.79	12.08
July	6.39	6.91	6.65	6.88	5.11	6.26	11.25	11.04	11.03	11.03
Aug.	7.67	5.96	6.82	7.11	5.99	6.73	8.53	9.21	9.54	9.49
Sept.	5.47	4.44	4.96	4.36	4.20	4.06	7.83	9.18	9.52	8.27
Oct.	4.54	3.99	4.26	4.79	3.99	4.60	5.88	7.13	7.52	*6.00
Nov.	3.08	2.42	2.75	2.74	2.69	3.29	2.97	4.11	4.23	*4.00
Dec.	1.76	2.41	2.08	1.93	2.20	2.38	2.93	1.93	2.14	*2.00
Total	62.26	55.33	58.79	56.44	50.57	55.89	-	93.93	88.92	89.13

Month	Jornada, N. M. — continued					San Buenaventura, Chih.				
	1933	1934	1935	1936	Average 1929 to 1936	1928	1929	1930	1931	1932
Jan.	2.43	4.10	3.16	2.68	2.90	3.78	4.56	4.74	2.87	4.13
Feb.	3.67	5.49	3.91	4.47	4.21	5.08	5.59	4.99	3.20	4.85
Mar.	8.41	8.15	7.97	7.48	7.66	7.24	8.10	6.59	7.38	7.02
Apr.	9.98	10.52	11.09	9.07	9.67	10.08	11.34	8.13	8.01	9.70
May	12.36	13.14	11.47	11.73	12.26	9.80	11.20	11.66	10.02	11.25
June	11.35	13.69	13.41	-	13.03	12.63	13.37	10.10	10.30	12.36
July	12.10	13.06	13.94	10.19	11.70	9.75	8.85	8.07	9.07	8.61
Aug.	10.32	11.89	9.70	10.13	9.85	8.13	6.56	8.13	6.90	7.11
Sept.	9.04	10.11	7.18	6.64	8.47	7.31	7.29	8.68	6.15	6.45
Oct.	6.21	7.32	7.00	5.60	6.58	6.29	5.70	6.47	6.45	5.91
Nov.	4.38	4.56	3.86	3.40	3.94	4.70	3.80	3.08	4.50	4.42
Dec.	3.46	2.63	1.89	2.26	2.39	3.74	3.55	2.07	2.90	3.28
Total	92.88	104.56	94.58	-	92.66	88.53	89.91	82.71	77.75	85.09

Month	San Buenaventura, Chih. — continued					Cd. Anahuac, N. L.				
	1933	1934	1935	1936	Average 1928 to 1936	1933	1934	1935	1936	Average 1933 to 1936
Jan.	3.63	3.87	3.74	3.16	3.83	-	2.49	2.86	2.40	2.58
Feb.	5.01	5.13	4.21	5.37	4.82	-	3.78	3.66	3.23	3.56
Mar.	8.35	6.71	7.61	6.83	7.31	-	7.09	6.85	6.08	6.67
Apr.	9.34	7.93	9.65	7.82	9.11	-	6.58	8.11	8.10	7.60
May	12.21	9.58	10.92	9.70	10.70	-	8.94	8.47	7.10	8.17
June	10.54	9.89	10.19	10.77	11.13	11.90	11.77	8.11	10.16	10.48
July	9.04	8.81	9.13	8.66	8.89	11.10	10.45	10.27	9.89	10.43
Aug.	7.92	6.83	6.29	7.35	7.25	9.39	10.89	11.36	9.80	10.36
Sept.	6.54	9.64	5.70	5.22	7.00	6.77	7.88	5.40	6.38	6.61
Oct.	5.22	6.44	5.82	5.36	5.96	4.83	5.82	4.38	4.56	4.90
Nov.	4.37	4.72	4.16	2.89	4.07	3.69	4.76	2.56	2.78	3.45
Dec.	4.43	3.02	2.60	2.97	3.17	3.55	2.41	1.27	2.30	2.38
Total	86.60	82.57	80.02	76.10	83.24	-	82.86	73.30	72.78	77.19

* Partly estimated

EVAPORATION DATA—continued

Month	Santa Rosalia, Tamps.						
	1924	1925	1926	1927	1928	1929	1930
Jan.	1.98	3.26	2.67	4.46	3.93	4.50	2.87
Feb.	4.35	5.97	4.70	5.13	3.91	4.33	5.54
Mar.	6.28	8.20	-	8.25	7.66	8.24	6.26
Apr.	8.73	9.43	4.61	10.81	10.04	10.11	9.51
May	8.39	11.73	-	13.50	10.23	12.39	8.39
June	11.38	11.56	10.67	9.75	14.30	13.35	9.54
July	13.57	15.48	9.96	10.61	14.83	12.76	12.96
Aug.	15.34	12.29	12.76	13.40	14.25	12.65	13.82
Sept.	8.69	7.01	10.10	9.96	7.11	9.33	10.19
Oct.	6.19	-	9.26	7.53	8.33	7.00	5.90
Nov.	5.96	-	4.21	7.44	4.17	3.72	3.28
Dec.	3.47	2.60	3.26	-	2.80	3.27	2.67
Total	94.33	-	-	-	101.56	101.65	90.93

Month	Santa Rosalia, Tamps. — continued						
	1931	1932	1933	1934	1935	1936	Normal 1924 to 1936
Jan.	2.58	3.96	4.18	3.21	-	3.33	3.41
Feb.	2.93	5.65	4.16	3.81	4.94	4.31	4.59
Mar.	6.18	7.79	7.59	-	13.72	7.64	7.98
Apr.	6.18	8.97	8.75	-	9.90	9.54	8.88
May	8.17	10.52	12.46	-	10.46	9.40	10.50
June	10.59	12.98	11.38	-	9.91	13.35	11.56
July	9.73	13.31	11.09	-	12.41	11.15	12.32
Aug.	10.30	12.64	7.75	-	12.91	10.75	12.40
Sept.	8.40	7.24	-	-	7.65	7.71	8.49
Oct.	8.15	5.63	5.61	-	6.57	6.40	6.96
Nov.	5.87	4.86	3.82	-	3.50	4.31	4.65
Dec.	3.23	2.73	3.96	-	2.49	4.75	3.20
Total	82.31	96.28	-	-	-	92.64	94.94

RAINFALL

The rainfall records hereinafter shown have not been published elsewhere, except part of the Johnson Ranch record. The records for Fort Bliss near El Paso, Marfa and Dryden are from the United States Army, those for Candelaria, Johnson Ranch and Zapata are from the records of the American Section of this Commission.

RAINFALL

Rainfall at Ft. Bliss, Texas

Record began January 15, 1924.

1924

Mo.	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
Jan.															.08								.22									
Feb.														.01										.12								.13
Mar.																		.30										.03				.33
Apr.					.04	.25			T																							.29
May																									T					T		T
June																																0
July	.01	.01		T				.38		.61	.58				.02	.04	.11	.16		.52	T		.22		.08		T	.19				2.93
Aug.			.07	.31	.33																				.08	.08	.70					1.57
Sep.																															No record.	
Oct.						.25	T																									.25
Nov.	.12																.32															.44
Dec.									.06	.08	T		T		T	T													T			.14

1925

Mo.	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
Jan.																	.25															.25
Feb.																				T	T											T
Mar.								T														T						T				T
Apr.																													T			T
May					.19	.02	.16	T	T																		T	.16	.06			.59
June															T		T	T	.15				T	T					T			.15
July				T	.20		.01															T	.04	T	T	T	T	.06	.16	T	.96	1.43
Aug.	.01			.35	.38	.05		.27									.02			.20										.03		1.31
Sep.			.69										T				T				.32	T	T									1.01
Oct.										.19	.02	T	.02	T	.19	.01	T							.15	.01	.14						.73
Nov.																								T	T							T
Dec.			T																								T	.02	T	.12	.11	.25
																															Yearly Total	5.72

1926

Mo.	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
Jan.	T	.13	T	.07													.02			.16	T		.04	.01								.43
Feb.	.20																										T					.20
Mar.	T	.05			.14	T									T	.01								.26	.36	.14	.18	.02	.06			1.22
Apr.						.08				.10		.02		.45													.10	.04	T			.79
May																															No record	
June									T	T							.01						.01	T	.01	.09						.12
July					T	.15						1.43										T	.01		.01		2.04			T		3.64
Aug.										T	.09	.01	.08	.12	T								.04									.34
Sep.	.01						.01		.15				T			T									.01	.66	1.08	.62				2.54
Oct.		.22				T		.19					.15						.17			T							.24	.05	.17	1.19
Nov.	.24																															.24
Dec.					.54	T	.10													.16			T	.18								.98
																															Period Total	11.69

1927

Mo.	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
Jan.																						.08										.08
Feb.			.09									.05					.11															.25
Mar.							.22			T	T																		.07	.06		.35
Apr.													T																			T
May																																0
June										T	T				.03														.02			.05
July	T					.12				T	.33					T								1.45	.04	.06	.08	.02	.40	.01		2.55
Aug.			.04	.05		.09			.07					.02	1.17		.02	.03	.72	.29			.04								T	2.50
Sep.			T			T	.02	.02			.23	.16			T	T		.02								T						.45
Oct.								T																				T				T
Nov.																																0
Dec.						T				T	.21	.02							T	.07				T		.01	.58					.89
																															Yearly Total	7.18

1928

Mo.	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
Jan.																					T											T
Feb.					T					.05	.18	.07				.09																.39
Mar.																.01						.09										.10
Apr.									.05				T	.17																		.22
May		.48	.13					T						.17									T	.14				T	.05		.36	1.33
June	T																									T						T
July			T											T	.02	T	.05	.74	.09		.07				T						T	.97
Aug.		1.47					T	*	1.47					.51	.48		.22					.04	*	1.35			.08	.35		.05	.02	6.04
Sep.																						T	T									T
Oct.											.08	.08	.18																.26	.77		1.37
Nov.				T	.01								T												.16							.17
Dec.					.02	.08		.03	T	T	.03																					.16
																															Yearly Total	10.75

1929

Mo.	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
Jan.										T						T																T
Feb.	T						T	.12	.07																							.19
Mar.																	T										.34					.34
Apr.																T	T															T
May															.02	T	.02		.03	.65	.02	.40	.10	.11						.14	.15	1.64
June																													.54			.54
July					T					1.26	.77	T								.40	T				T	.11	.03		.64			3.21
Aug.			T	.45					.27	.12	.10	.62			.62					T	T	.09	T		T	T			.31			2.58
Sep.			T		T					T					.02	T	T						.02									.04
Oct.									T		T	.05			.33	.75	.04	.02						.16	.06		T		.42			1.83
Nov.					T	.22		T	.09															T								.31
Dec.																				.25											.02	.27
																															Yearly Total	10.95

1930

Mo.	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
Jan.	T						T	.04	T							.01	.02			.01								.06				.14
Feb.				.18																	.05			T								.23
Mar.						T										T	T	.04			T							.01				.05
Apr.										T												T	T	T	.01							.01
May						.17																			.48	.12		T	.05		.13	.95
June								.08	.12	T	.38	T			.10				T													.68
July	.06			T	T					T	.14						T	T		T	.13	.07	.11		T	.02		.01		T		.54
Aug.				T	.01	.18	.14		.13																T	.04						.50
Sep.			T	T			.03																			T			.02			.05
Oct.		.01				.30				T			.21					.14				T	T			.13						.79
Nov.										T	.21	.01	.01		.38			T	.12		T							.05	.47			1.25
Dec.				.09					.66	.13																				T		.88
																															Yearly Total	6.07

*Rainfall included in the following day.

RAINFALL

Rainfall at Ft. Bliss, Texas

1931

Mo.	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
Jan.			.10	.24					T	.05																.48	.43			T		1.30
Feb.				T	.22				T	.06		.13	.15	.11	.28											.15		T				1.10
Mar.															.28											.15						.43
Apr.							.03	.05							.03	.04	.69					.32	.31			.01	.43	.83				2.74
May	.02																															.02
June			.50	.07				T																						.04		.61
July		.23			.03									.02			.10			.04										.10	.08	.60
Aug.	.04	.70	.54			T			.54	.76						T							.02						.03			2.65
Sep.													.08	.05		.12	.15	.83	.28				T						.02			1.53
Oct.																				.10		.08										.18
Nov.								.14								.02									.01	.02				.73		.92
Dec.	.09	.02					.06	.01		.10																				T		.28
Yearly Total																																12.34

1932

Mo.	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
Jan.				.26	.07				T					T																			.33
Feb.										.07					.01			.08	.25	.04	.02								T			.47
Mar.		T		T						T	T	T																		.01		.01
Apr.																						T										T
May											.64																					.64
June																						.08	T	T				.04		T		.12
July	.10				T		.02	.09			.20	T		.11	T				T	T	T					T		1.03	T	T		1.55
Aug.			.02		.52	T	.11	.22	.15	.03			.24				.08											T	.02			1.39
Sep.																		.02				T		.25	.02			.83	.95	.46		2.53
Oct.	.06								.09	.01	T	.57	T						.01	.01	.11	.02										.68
Nov.																																0
Dec.									.25				.10	.20	.12							T							T			.67
Yearly Total																																8.39

1933

Mo.	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
Jan.					.04	T					T					.03	.07			T								T				.14
Feb.						T	.09																	T	.12	.01						.22
Mar.																																0
Apr.																T									.08							.08
May																									.03				T	.01	T	.04
June												.30	.37		T	.12			.01	.04	.16	.02	.15	.07								1.24
July	.02		T		T								T			T	.02	.01			.27	T		.08		.07						.47
Aug.			1.17								.21						.02					.65	.07		.15		T	.08				2.35
Sep.								.02	.26		T							.05									.35					.68
Oct.			T	.02	.21	.06	.01		.37		.03														.10							.80
Nov.	.01	.12																										T	.02			.15
Dec.																																0
Yearly Total																																6.17

1934

Mo.	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
Jan.					.02																											.02
Feb.																								.03								.16
Mar.	.12																							.12				.13				.24
Apr.																T									.02					.01		.03
May											.28												T		T	.02	1.62			T		1.92
June	T	T	.28											T							T							T		.01		.29
July	.01	T	.04											T				T	T	T	T	.13		.06			.09	.02				.35
Aug.						T								.11							T			.05	.06				.55		.03	.80
Sep.							.01	.17	.24				T									T										.42
Oct.										.15	.69																					.84
Nov.		T											T						T	.08	.26											.34
Dec.							.06						.10																.03			.19
Yearly Total																																5.60

1935

Mo.	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
Jan.						.29														T												.29
Feb.								T		.30					T										1.10							1.40
Mar.				.06							.03																					.09
Apr.								T										.01						T								.01
May				.03													.04	T								T	.12				T	.19
June					.01		T			T	.05		T									T		T	T		T	.09				.15
July	T			T		T		.04					T							.02		T	T	.01							T	.07
Aug.		.10	1.27	.01	.01	.08							.02			.01		.69		.41		.02					T			1.27	T	3.89
Sep.		T		T				.10															.88				.22					1.20
Oct.																T		.03	.01					T	T							.04
Nov.									T															T	.50	.31						.81
Dec.		T			.02															.26	.07	.01					T			T		.36
Yearly Total																																8.50

1936

Mo.	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
Jan.					T		T	T																				T	.07	.66		.73
Feb.	T															.18	T		T	.01												.19
Mar.		T																T														T
Apr.																		T	.21	.11						T	T					.32
May				.14									T											.08			T				.05	.27
June											.03					T						.01	.01	.13								.18
July		.02					T	T	.03	.48	.48					T						T						T	T	T	T	2.04
Aug.	T							T			T		T	.01	.20		T	.24	.02	.15	.12	T	.45				T	2.01	.16	T	3.36
Sep.		.48				T				.07						T			.25	.47				1.10	.62	T	.77					3.76
Oct.						T													T			.03		.17	.13							.33
Nov.								.01											T		.07	T	.19					.14	.06	.81		1.28
Dec.	.20				.05																				.06					.07		.38
Yearly Total																																12.84

Rainfall at Candelaria, Texas

1935

Mo.	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
Nov.		*																							.17							.17
Dec.					T														.23	.35										.05		.63
Period Total																																.80

* Rain gage established at Candelaria November 2, 1935.

RAINFALL

Rainfall at Candelaria, Texas

1936

Mo.	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
Jan.																											T	T	.17			.17
Feb.																		T	T													0
Mar.		.34	1.36			.02																										1.72
Apr.																			.06		T											.06
May						T														.55	T	T	.04		.39							.98
June								.05														T										.05
July							T							T				.04								1.16				.50		1.50
Aug.	.17																	.45										1.38				2.00
Sep.		.39			.84															1.20	1.05	.40	.45	.50	.65							5.88
Oct.																										T	T					0
Nov.																				T							.24		.36			.60
Dec.	.36		.28		0																					.04						.68
																															Yearly Total	13.04

Rainfall at Marfa, Texas

Records started March, 1928. Data for August not available.

1928

Mo.	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
Mar.																T						T										T
Apr.									T																							T
May	.11	.59										.32	.17	.12		T								T			T	.02			.07	1.20
June	.02																								.01							.03
July								.14								.14		.53		.05	.38		.33	1.13	.26	.10	.07		.05			3.18
Sep.	.03																				.61	.54	.01	.10	.28							1.57
Oct.	.06									.05	.01																				.58	.68
Nov.					.01																				.19	.60				.13		.93
Dec.							.45		.01	.04		T																				.50
																															Period Total	8.09

1929

Mo.	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
Jan.										T							T															T
Feb.																				.23							.17					.40
Mar.																	.01			.05							T					.06
Apr.				.02		T		.20																								.22
May											.21						.07			.03	.15	.01	.31	.03	.03					.23		1.07
June	.36				.03			.50	.06		.03																T			.05		1.03
July	.32	.17			.09	.22	.01																		.40		.06		.29	.01		1.57
Aug.							.81	.03	.04	.09	.04	.01	.01	.22	.15				.04	.01	.06								.17	.01		1.69
Sep.				.02	.01					1.45			.06		.02	.03									.07	.03						1.69
Oct.												.09	.64	.16			.25	.07						.52	.23		.41	.02		.16		2.55
Nov.						.04																			.13							.17
Dec.												T									.04											.04
																															Yearly Total	10.49

1930

Mo.	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
Jan.	.02								.07								.02															.11
Feb.			T																													T
Mar.													T														.09					.09
Apr.		T										.45										T	.03	.01	.18		.90	.29				1.86
May																										.57	.34	.55	T			1.46
June	.44				.02				.18	T	.02	.08		.02	.15				.01					.04								.96
July			.22				.09		.29	.10					.02			.18				.13	.03	.01				.14				1.21
Aug.						.13	.56					.27	.03	.04	.11			.04														1.18
Sep.		.03				.02					.18																.32	.02				.57
Oct.	.60	.05	.04		.62					.15			.03					.02				.16				.08	.04	.02				1.81
Nov.								.43	.01	.20	.01		.06	T					.23				.10					.32				1.36
Dec.				T					.19																					.42		.61
																															Yearly Total	11.22

1931

Mo.	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
Jan.									.48	.08						.38										.34	.09		.16	.11	.02	1.66
Feb.					.31	.10	.36					.11			.32											.18	.59	.10				2.07
Mar.															.36																	.36
Apr.							.07								.02	.31	1.26					.70	.28				T	.72				3.56
May	.10	.10	T	.09															.05									T				.34
June								.47	.23						.04					.03							.02	T	T			.79
July	T								.08	.04									.13		.02			T					T			.27
Aug.		.10				1.19	.06		.01											T		.02						.61	.12	.49	.10	2.70
Sep.		.08																	T		1.39		.01									1.48
Oct.											T	.18			T	T			.02			T										.20
Nov.													.21			.08	.04								.03			.02		.10		.48
Dec.	.05	T		T		.15	.13										T	T														.33
																															Yearly Total	14.04

1932

Mo.	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
Jan.																											Daily record missing.				.71
Feb.										.01				.04	.18		.10	T	.75	.83	.29								T			2.20
Mar.		.01		.11							.23	.02																				.37
Apr.																																0
May										T		.22	.20	T					T				.13									.55
June																						.53			.13				.60			1.26
July		.12		.10			T	.15	.01												.36	.18				.31	1.01	.10				2.34
Aug.	T						.69	.09		1.96		T				.07	T	.18	T							T			.82	2.11		5.92
Sep.		.03	.01		T	.27	.43			T		.02										.17	.48	.18		T		1.51	.69	.19		3.98
Oct.	T	T										T								.30	.07											.37
Nov.																																0
Dec.									.02	.03				.13	T							.04	.34							.01		.57
																															Yearly Total	18.27

1933

Mo.	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
Jan.			T			T	T																					.01				.01
Feb.					T	.06	.01																	.02								.09
Mar.																			.01													.01
Apr.																		T							.10							.10
May																				.34					.02						.30	.66
June	.01							.08				.01	.02	T	T		.01					T	.23	.20	.01	.01	T	.20				.78
July	.10	.35	.03		.01								.01					.18	.20									.01	.01		.61	1.52
Aug.	.10	.04										.12	.01			.15						.04	.19	.31	.08	.49	.87		.01	.02		2.43
Sep.	.08	.06	.07							.03		.04	.54			T			.35					T								1.17
Oct.		T						T		.71		.01	.23																			.95
Nov.		T								.12																		.03				.15
Dec.																																0
																															Yearly Total	7.87

RAINFALL

Rainfall at Marfa, Texas

1934

Mo.	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
Jan.					T					T																		T		.15		.15
Feb.											T					T			T													0
Mar.	.07																							T	.15							.22
Apr.							.03	T				.20			.01		.02						T			.12				.40		.78
May	.04																			T	T	.32	.01	.08		.10	.03		.01	.08		.67
June	.01		3.29				T								T						T		T			T			T	.06	.02	3.38
July		.01			.07	.02										.01	T				.01	.12	.97			.10		.03				1.34
Aug.			.12	T	.02								.03											.44	.42					.02	.30	1.35
Sep.							T	.23	.11			.04	.53										.06									.97
Oct.																						.01										.01
Nov.		T														.37				.33	.01											.71
Dec.						.18							T														T		T			.18
																															Yearly Total	9.76

1935

Mo.	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
Jan.						.01											T	.35	.08													.44
Feb.	.03					.11	.32	.01			.20	.44	.30																			1.41
Mar.																				T									.31			.31
Apr.																				T		.04				.03						.07
May						T				T								.06		.20				.43		T		.08			.01	.78
June				.16	T	.03	.02		1.26	2.39	.29		.06												T	T	.01	.07	.04			4.33
July	.01	.02	T	T									.12		.02	.42	.03	.06	.32	.03	.03		1.05	.13	.02				.32			2.58
Aug.	.07	.44	4.32	2.14								.34				.03	.44						.20				.02			.25		8.25
Sep.		T	.60	1.03		T	.13	T													.03	.04	.32	.28	.03							2.46
Oct.										.06			T				T	1.04						.01	.04				.41			1.56
Nov.																T									.01	.42						.43
Dec.				T			.02												T	.24	.40									.05		.71
																															Yearly Total	23.33

1936

Mo.	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
Jan.																											.02	.04	.02	.11	.01	.20
Feb.																																0
Mar.		.34			.02	.02																										.38
Apr.																			.39								.33					.72
May		.04											T					T		1.15	.52	.02	.07	.11	.18	.09	.14					2.32
June														T		.02														.14		.16
July	.57								.85		T				.06								T		.01		.01		.74	.05		2.29
Aug.																	T	.35	.35	T					T	.05			.04	T		1.38
Sep.		.94	1.26	.22		T						T		.51			T	.10	2.00	2.08	.07	.52			.30		T	T				8.35
Oct.																					.61	.15	T	.18				.02	T	T		.05
Nov.								T	T	T									T		T	.01	.02	T			.38	T	.06			.48
Dec.	.04	.07		.02																			.04			T						.13
																															Yearly Total	16.46

Rainfall at Johnson Ranch, Texas

Record of rainfall began July 1, 1933.

1933

Mo.	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
July		.37															T	T	.40						.10						T	.87
Aug.		.50				.41																										.71
Sep.									.20				.22																			.42
Oct.			.21							.44	.04		.45	.15																		1.29
Nov.																																0
Dec.																																0
																															Period Total	3.29

1934

Mo.	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
Jan.																																0
Feb.																																0
Mar.																																0
Apr.																														.20		.20
May																										.40					.20	.60
June																																0
July																					.23					.46						.69
Aug.																							.25									.25
Sep.																													.30			.30
Oct.																			.40													.40
Nov.																																0
Dec.																																0
																															Yearly Total	2.44

1935

Mo.	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
Jan.	.50																								.10							.40
Feb.											.50																					.50
Mar.																																0
Apr.												.31																	.19			.50
May																																0
June						.40					.23	.12		.16								.18			.05	.03			.18	.30		1.65
July		.23															.08			.09			.49		.51							1.20
Aug.		.25		.13												.02	.13															.53
Sep.	1.88	.05	.15						.73												.07		.11					.50				3.49
Oct.																	.24	.02					.25									.51
Nov.																										.02						.02
Dec.										.06								.02	.36	.19	.01											.64
																															Yearly Total	9.44

1936

Mo.	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
Jan.																											.01		.12			.13
Feb.																																0
Mar.	.18	.25			.05																											.48
Apr.																			.05							.06						.11
May		.01	.53										.12										.10	.30	.46	.02	T					1.54
June																						.14							T			.14
July	.16					.46																1.20			.01				T	.49		2.28
Aug.	.02			.04						T					T			.25			.02				T	T				T		.33
Sep.	T		.06	.10					.30			T				T		.20						.04	2.50				.10			3.10
Oct.																																0
Nov.																																0
Dec.																																0
																															Yearly Total	8.11

RAINFALL

Rainfall at Dryden, Texas

1931

Mo.	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
Jan.				.02					.27	.18					.04	.49										.84			.32			2.16
Feb.						.30		.06				.14		.59	.30												.03	.01				1.43
Mar.														.12	.86											.01						.99
Apr.								.01							.15	.03	.55	.12		.05						.04	.10	.82	.77			2.81
May	1.20	.28		.40													.25	T			.26	.01					.10	1.20	.86	.02		4.58
June									.94																		.24	.23	.17			1.58
July									.15									.02														.17
Aug.									.02	1.03	.10											.11	.26								.81	2.33
Sep.																																0
Oct.																				.01												.01
Nov.																.62									.25		.02	.01		.31		1.21
Dec.						.30	.75									.01	.03	.23	.14													1.46
																															Yearly Total	18.71

1932

Mo.	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
Jan.			.04	.11											.03																	.18
Feb.														.04			.08	.01	.27	.20	.12	.04										.76
Mar.	.02	.04		.04							.03	T																				.13
Apr.															T		.14					.20					.01					.35
May								.41	.01	.20	.97	.01			.94								.03	.29	.02	.17		.04				3.09
June		.01	.01	.20		.01		.05																			.02					.30
July		.29	1.48			.01																										1.78
Aug.								1.62	.01	.97									.36	.24						.08	.02			1.41	.13	4.84
Sep.	.51	.17	.14	.48	.14	.61	1.25	.50											.01		.02	1.58	1.28	.19			.79	1.49	1.68			10.82
Oct.	.10	.13																		.21												.43
Nov.				.01																												.01
Dec.									.11	.03		.01	.07	.02	.12							.01	.58						.06			1.01
																															Yearly Total	23.70

1933

Mo.	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
Jan.																											.04					.04
Feb.																										.04						.04
Mar.			.02																								.03	.40				.45
Apr.																						.32		.93								1.25
May																			.01	.01					.14			.17				.33
June													.16	.35																		.51
July																	T	T	.84					1.39								2.23
Aug.											.06	.07																.26	.64	.99	.02	2.04
Sep.																																0
Oct.	.44							.02		.01		.24	1.80	.12																		2.63
Nov.		.10			.03																											.13
Dec.																																0
																															Yearly Total	9.65

1934

Mo.	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
Jan.																	.10									.01		.10		.18		.39
Feb.										.01	.02																	.04				.07
Mar.																								.22								.22
Apr.					.02	.06	.09							.23				.20														.68
May	1.03									.04												.03										1.10
June	.18	.08	.40	.08																												.74
July																										.33						.33
Aug.										.12																						.12
Sep.			.20											T						.32												.52
Oct.																																0
Nov.		T													T	.03			.01	.04												.08
Dec.						.02										.04	.05									.28						.39
																															Yearly Total	4.58

1935

Mo.	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
Jan.																	.04														.07	.11
Feb.						.09			.04	.03		.52																				.68
Mar.																						.01								.03		.04
Apr.				.02																		.64										.66
May														.04		.05	.61						.36		.01		.44		.39			2.90
June	.03			.28						.05	.07		T	T		.78						.22							.04			1.47
July													.05				T		.07	T	T	.30	.02	.09	.01				T			.54
Aug.			.15																								.02			1.47		1.64
Sep.		.16	1.66	2.24	.20																		.25	.07	.07							4.65
Oct.									.17										T			.24	.15	.06	.05							.67
Nov.	.01				.01	.02									.03		.05	.02						.03		.10						.27
Dec.				.13						.03									.07	.06	.19			.03	.05	.01	.02					.59
																															Yearly Total	14.22

1936

Mo.	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
Jan.																											.05		.04			.09
Feb.																																0
Mar.	.02	.74					T																									.76
Apr.								.05												.02						.29	.40					.76
May			T										.24										.33	1.10	1.25	.20		T				3.12
June																										.26				.01		.27
July		.33				.26		.55					.05			.52						.02								2.01		3.74
Aug.																									.63	.05		.06			.02	.76
Sep.				1.42														.84						.42	.65		.19					3.52
Oct.							T															.03	.03	.07				.61	.42	T		1.16
Nov.									.04	.07									.20				.06				.08	.04		.28		.77
Dec.		.14																								.04						.18
																															Yearly Total	15.13

Rainfall at Zapata, Texas

Record began April 22, 1932.

1932

Mo.	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
Apr.																											.34	.03	.18	.01		.56
May									.01		.41	.08	.14		.06																	.70
June					.01																		.01	.63						1.64		2.29
July		.07			.03						.15																					.25
Aug.																		.05			.54							.05	.05			.69
Sep.	.83		.71		.04									.30							.85	1.85	.83	.28			.12	2.49	1.75	.25		10.30
Oct.	.04			.66																												.70
Nov.																																0
Dec.									.02			.06		.06	.07					.05												.26
																															Period Total	15.75

RAINFALL

Rainfall at Zapata, Texas

1933

Mo.	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
Jan.								.14																					.13		.06	.33
Feb.					.35	.04									.64												.15					1.18
Mar.											.20																		.09			.29
Apr.					.37																		.04									.41
May																									.69				.10			.79
June												.26																				.26
July									.06	.65													.07		.95	.03						1.76
Aug.				.38	.24						.95	.79																		.51	.44	3.31
Sep.				1.18	.89	.65									.18	2.01				.90				.34	.03	.35	.20					6.73
Oct.	.10	.21							1.50										.09													1.90
Nov.						.43			.52																							.95
Dec.																																0
																															Yearly Total	17.91

1934

Mo.	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
Jan.						.22				.40							.51	.12					.31	.29							.95	2.80
Feb.																	.50															.50
Mar.																								.30								.30
Apr.							.48						.29														2.47					3.24
May											1.20			.50									.25									1.95
June	.15																															.15
July																						.24			.45							.69
Aug.																															.30	.30
Sep.														.81																.95		1.76
Oct.																	.65															.65
Nov.																																0
Dec.								.42										.10								.70						1.22
																															Yearly Total	13.56

1935

Mo.	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
Jan.																															.10	.10
Feb.										.30	1.20																					1.50
Mar.																											.55		.28			.83
Apr.																						.12				.06						.18
May			2.20	.35					.68												.05	.92	.42									4.62
June			1.19				.12			.77	.40	.93		.33														.10				3.84
July													.21					.05					.07	.94								1.27
Aug.																																0
Sep.	.18			3.10	.68																	.24	.90		.14							5.24
Oct.																	.20	.30						.11	.05							.66
Nov.	.70				.05										.26		.15															1.16
Dec.				.15						.70									.05	.15					.29	.21				.08		1.63
																															Yearly Total	21.03

1936

Mo.	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
Jan.																										.08					.08	.16
Feb.																											.06		.22			.28
Mar.		.68										.20																				.88
Apr.																.08				.04	.34							1.60				2.06
May									3.77	.15					.06							.89	1.40									6.27
June	.06																															.06
July								.43				.78	.14	.21																		1.56
Aug.																				.34								.93	.52	.42	.18	2.39
Sep.													.60			.30		.27											.21			1.38
Oct.							.02																.04			.10		.21	.08			.45
Nov.			.18							.12																						.30
Dec.				.16							.08	.28	.24														.04					.80
																															Yearly Total	16.59