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WATER BULLETIN NUMBER 10

Flow of the Rio Grande and Tributary Contributions

From San Marcial, New Mexico to the Gulf of Mexico

1940

WITH MAXIMUMS, MINIMUMS AND NORMALS

STORAGE CAPACITIES AND WATER STORED IN LARGE RESERVOIRS
SOURCES OF RIVER FLOW
DIVERSIONS
SILT, CHEMICAL CONSTITUENTS, SALT BURDEN
BACTERIA AND DISSOLVED OXYGEN
FLOODS
MAGNITUDES AND FREQUENCIES, DROUGHTS AND PLENTITUDES OF RAINFALL IN LOWER RIO GRANDE VALLEY
RAINFALL RECORDS AND INDEX
EVAPORATION
DRAINAGE BASIN AND IRRIGATED AREAS
INDEX TO WATER BULLETINS

CONTENTS

Map of Rio Grande Basin 3
Foreword ..... 4 - 7

Quantity of Water

Stream Flow Records - 1940
Rio Grande at San Marcial Station 8
Below Elephant Butte Dam Station 9
Below Caballo Dam Station 10
El Paso Station 11
Below American Dam Station 12
tributary - Outfalls from Deep Wells near El Paso 13
at Ciudad Juarez Station 14
Island Station 15
County Line Station 16
Fort Quitman Station 17
La Nutria Station 18
Upper Presidio Station 19
tributary - Rio Conchos 20
at Lower Presidio Station 21
tributary - Alamito Creek Station 22
Terlingua Creek Station 23
at Johnson Ranch Station 24
Langtry Station 25
tributary - Pecos River Station 26
Goodenough Spring Station 27
Devils River Station 28
at Del Rio Station 29
tributary - Las Vacas Arroyo Station 30
San Felipe Creek Station 31
Pinto Creek Station 32
Rio San Diego Station 33
Rio San Rodrigo Station 34
at Eagle Pass Station 35
tributary - Rio Escondido Station 36
at Laredo Station 37
tributary - Rio Salado Station 38
at Zapata Station 39
tributary - Rio Alamo Station 40
at Roma Station 41
tributary - Rio San Juan Station 42
at Rio Grande City Station 43
at Hidalgo Station 44
Mercedes Bridge Station 45
Floodway - Ranch Viejo near Brownsville, Texas, and
North Floodway south of Sebastian, Texas 46
at Matamoros Station 47
Lower Brownsville Station 48
Rio Grande at Below Elephant Butte Dam Station 1915 and 1916 ..... 49 & 50
Stored Water in Large Reservoirs of Rio Grande Basin ..... 51 - 53

Sources of River Flow

General Statement - Maps and Graph, 1924-1940 ..... 53 - 55

Diversions from the Rio Grande

In El Paso-Juarez Valley, near Eagle Pass, Texas and in the Lower Valley of Texas, and Tamaulipas ..... 56 - 61
Municipal Uses 62

Quality of Water

Silt Sampling at three Rio Grande stations and two Mexican tributaries, 1940 ..... 63 - 67
Chemical Analyses, and Electrical Conductances, 1940; Rio Grande Salt Burden Graph, 1935-1940 ..... 68 - 74
Bacteria near El Paso and Nuevo Laredo and Dissolved Oxygen near El Paso, Texas, 1940 ..... 75 & 76

Floods

Occurrences of Flood Peaks on the Rio Grande at El Paso, Texas 77

Rainfall

Rainfall in the Lower Rio Grande Valley ..... 78 - 80
United States and Mexican station records ..... 81 - 96
Index to Rio Grande Basin precipitation records and Map showing location of stations ..... 97 - 99

Evaporation

United States and Mexican station records ..... 100 & 101

Drainage Basin and Irrigated Areas

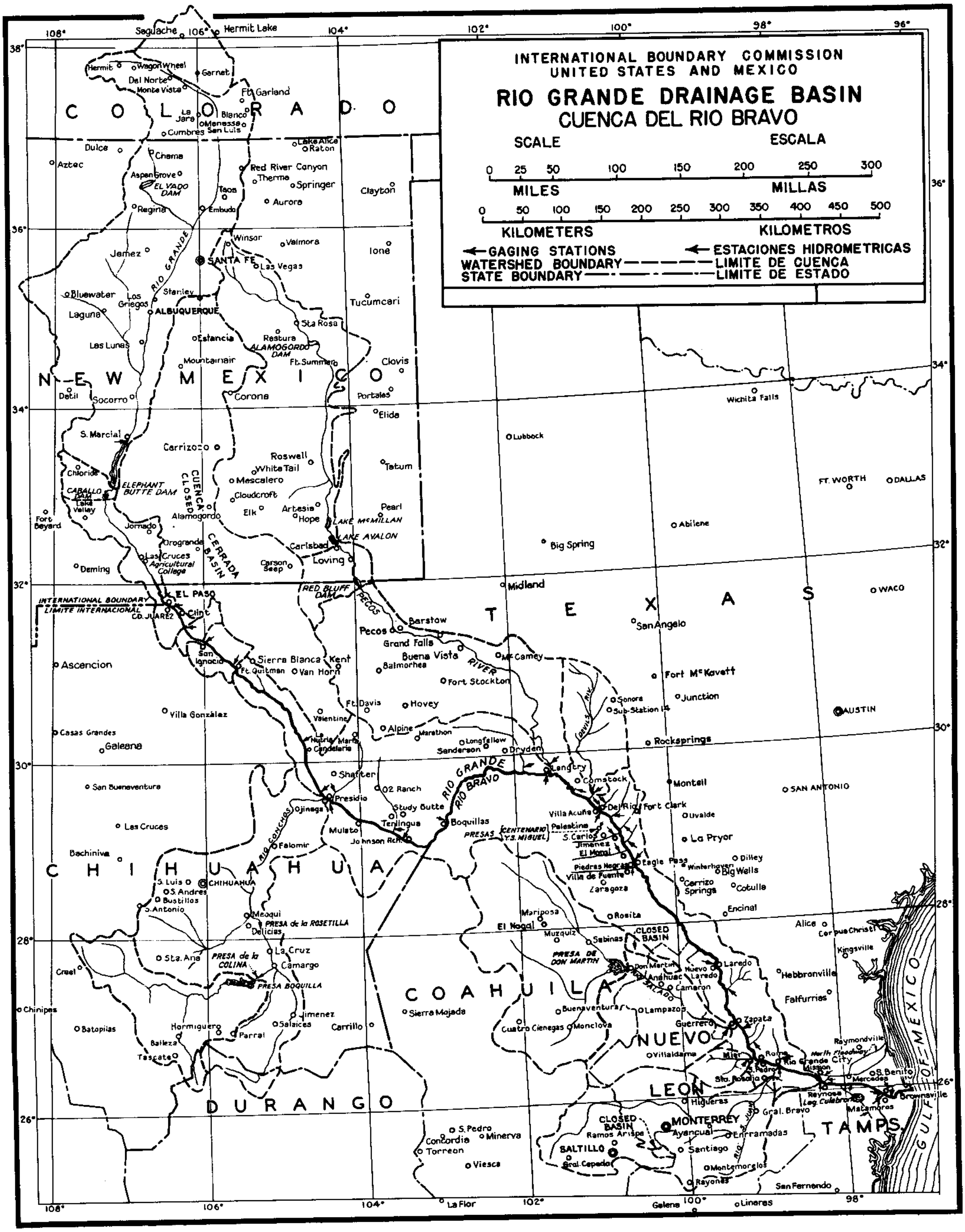
Drainage Basin area above each gaging station, areas irrigated along Rio Grande and tributaries, 1940 ..... 102 & 103

Authenticated Discharges

Publications in which may be found Authenticated Discharge Records ..... 104 & 105

Index

Index to all Water Bulletins ..... 106 - 112



RIO GRANDE DRAINAGE BASIN

CUENCA DEL RIO BRAVO

FOREWORD

This compilation of stream discharges and related data is the tenth unified publication relative to the cooperative determination of the flow of the International portion of the Rio Grande. The first such publication was Water Bulletin No. 1, covering the year 1931. These data are published jointly by the United States and Mexican Sections of the International Boundary Commission and represent the results of stream flow and related measurements made on the Rio Grande and on important tributaries near their confluence, from San Marcial, New Mexico, which is at the head of Elephant Butte reservoir, to the Gulf of Mexico, for the year 1940 as well as adjustments to and authentications of hydrographic records.

International stream gaging was begun in 1889, with the operation of the station at El Paso, Texas. A number of stations on the Lower Rio Grande and tributaries below El Paso were established in 1900 and operated until 1914. From 1914 to 1923, all such work was suspended except for a few months in 1919 and 1920. In 1923 the work was resumed and carried on independently by the two countries until 1931, when the present cooperative work began.

The duties and functions of the United States Section of the International Water Commission were transferred to the United States Section of the International Boundary Commission by Act of June 30, 1932. On January 1, 1932, the Mexican Section of the International Boundary Commission similarly took over the duties of the Mexican Section of the International Water Commission. On January 1, 1935, an International Water Commissioner for Mexico was again appointed and since then, though separated, the two Commissions function as one.

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

Of stream gaging stations on the Rio Grande, those at Juarez, Eagle Pass, Laredo, Roma and Matamoros were operated in 1940 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 drainage basin and irrigated areas, chemical and bacteriological analyses, silt, stored water, evaporation and rainfall have been furnished by the following agencies within the two countries: United States Department of Agriculture, United States Bureau of Reclamation, United States Army, Agriculture and Mechanical College of Texas,Middle Rio Grande Conservancy District, Pecos Joint Investigation, El Paso City-County Health Unit,the Department of Water and Sewage of the City of El Paso, Federal Board of Public Improvements of Nuevo Laredo, Tamaulipas, National Irrigation Commission of Mexico, Cia. Agricola y de Fuerza Electrica Del Rio Conchos, S. A., the Mexican Department of Agriculture and Development, National Bank of Agricultural Credit of Mexico, The Meteorological Service of Mexico, National Irrigation Commission, and private individuals and corporations. Specific acknowledgment is made where the data appear.

FOREWORD — continued

General Hydrologic Conditions for 1940

Along and Adjacent to The International Portion of the Rio Grande

For 1940 the yearly flow of the Rio Grande and most of its tributaries was below normal. At points above Laredo it was very similar to 1939. Below Laredo it was higher than 1939. The flow at Rio Grande City was 80% of the 1924-1940 normal flow. The lowest flow of the year at this point was 946 second feet on May 9. This was the lowest flow recorded at this station since January 1932. The monthly flow for March was the highest recorded since 1924 for that month from the Rio Salado and at stations on the Rio Grande from Zapata to Rio Grande City. Minimum flows for December since 1924, were established at Goodenough Spring, Del Rio and Eagle Pass.

The United States measured tributaries below Fort Quitman flowed about 60.1% of their annual average flow, while the Mexican measured tributaries flowed about 68.7% of their annual average.

During 1940 four flood peaks of note occurred at Rio Grande City. The first was on March 25 with a peak flow of 62,400 second feet. It came principally from the Rio Grande below Laredo and from the Rio Salado, with some contributions from the Rio Alamo and Rio San Juan. The second flood occurred on June 26 with a peak flow of 58,000 second feet. It came principally from the Rio San Juan with some from the Rio Grande below Zapata and the Rio Alamo. The third flood was on September 9 when the peak flow reached 45,800 second feet. It came principally from the Rio San Juan with only a small contribution from the main Rio Grande. The fourth flood occurred on October 26 when the peak flow reached 54,300 second feet. Very little of this flood came from the Rio San Juan, the Rio Alamo, or the Rio Salado. It came principally from the Rio Grande above Roma and below Eagle Pass.

The monthly average amount of water in storage was below normal, especially in reservoirs in the upper Rio Grande basin above El Paso, the outstanding exception being the Boquilla reservoir on the Rio Conchos in Mexico. Stored water in this reservoir was above normal throughout the year. The monthly average in all reservoirs combined was about 77% of normal.

The amount of water consumed in irrigation in the El Paso-Juarez valley was about 95% of the 1924-1940 normal and a little below the 1939 consumption. On the Rio Conchos and in the Presidio valley consumption increased a small amount over 1939. Near Eagle Pass there was about a 50% increase over the previous year in the acreage reported as irrigated, but the increase in water diverted was not so great. Though small there was a large percentage increase in consumption on the Mexican side of the Lower Rio Grande Valley. On the United States side of the Lower Rio Grande Valley the amount of water diverted for irrigation was the greatest on record, the amount being 138% of the normal for the period 1922 to 1940. Elsewhere there was not much change from 1939 in the amount of water consumed in the Rio Grande basin below El Paso and below Sheffield on the Pecos river.

Precipitation was in general a little above normal on both sides of the basin below the El Paso-Juarez valley.

At San Marcial, New Mexico 2,870 acre feet of suspended silt passed down the Rio Grande. This was 26% of normal. At Eagle Pass 4,960 acre feet, or 59% of the normal suspended silt passed that point. At Roma 101% of the normal silt, or 12,190 acre feet passed that station. More than twice the average silt load was contributed by the Rio Alamo and 150% of the average amount came down the Rio San Juan.

The tonnage of salts for the year carried by the Rio Grande at various gaging stations and the tributary contributions of salts was in general below the average. There was in general an increase in salt concentration in the water. This increase was most pronounced at stations from San Marcial to Fort Quitman, the Rio Conchos, the Pecos River and Eagle Pass. The Rio Salado and Rio San Juan were fresher than average as was the flow at Rio Grande City.

At El Paso and at the Ysleta-Zaragoza bridge the Rio Grande water contained less total bacteria than average, but at Nuevo Laredo the total bacteria was slightly above average. There was less than average B. Coli in the water at El Paso and more than average at the Ysleta-Zaragoza bridge and at Nuevo Laredo.

FOREWORD —continued

Quantity of Water

There are here shown for the year 1940: Descriptions of gaging stations and their equipment with pertinent notes concerning elevations of gages, station records, high and low flows in previous years, and factors modifying the stream discharges; also the mean daily discharges at points along the Rio Grande and the mean daily inflows from measured tributaries.

Extreme monthly high and low gage heights and peak discharges; also average monthly rates of discharge for each regular station together with the monthly and annual maximum, minimum and normal discharges in acre feet for the period 1924 to 1940, inclusive, for each gaging station.

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

The discharge of the Rio Grande below Elephant Butte Dam for 1915 and 1916.

The amount of water in storage at the end of each month of 1940 in all large reservoirs of the Rio Grande basin, as well as monthly and annual averages, maximums and minimums, including some records for past years for some of the reservoirs.

Sources of River Flow

Two maps are presented for the period 1924 to 1940. For sub-divisions of the watershed they show in average annual acre feet per square mile: (a) the unused stream flow, and (b) the total watershed yield.

By graph there is shown progressively from station to station downstream, the normal flow for the two periods 1900 to 1913 and 1924 to 1940, and also the maximum and minimum flows. On this graph there is also shown normal unused run-off per square mile for various sub-divisions of the Rio Grande basin below Fort Quitman.

DIVERSIONS

By numerous tabulations there is shown for the year 1940 the amount of water diverted for irrigation at all of the large diversions along the Rio Grande from El Paso, Texas to the Gulf of Mexico.

For 1940 and many previous years there is also shown the amount of water pumped into all large municipal distribution systems along the Rio Grande below the El Paso-Juarez Valley.

Quality of Water

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

Showing the suitability of the water of the Rio Grande and tributaries for irrigation use, there is reported detailed chemical analyses of water samples from a number of important points on the Rio Grande and from tributaries in 1940, and also a graphical representation of the Rio Grande salt burden in tons, its sources and its concentration in the stream flow for 1904 and averages for the period 1935 to 1940.

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

FOREWORD—continued

Floods

Floods in the Rio Grande at El Paso, their magnitude and average frequency are shown for the 23 years 1915 to 1937, during all of which years Elephant Butte Reservoir was in operation. With the data formerly published in Water Bulletin No. 6, this completes the data on floods at El Paso for the 109-year period 1828 to 1937.

Rainfall and Evaporation

For its pertinent relation to normal stream flow, floods, and irrigation, there are shown here rainfall records for both sides of the Rio Grande basin not published elsewhere. An index to all pertinent rainfall records is also given in this bulletin.

Evaporation records for both sides of the basin are also shown.

Drainage Basin and Irrigated Areas

From the most reliable sources available there has been tabulated the drainage basin area above each gaging station as well as the areas irrigated below San Marcial, New Mexico, and below Girvin on the Pecos River.

Authenticated Discharges

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

Index

There is presented an index to all Water Bulletins and the data therein as well as an index to all known rainfall records on both sides of the basin south of the New Mexico-Texas state line.

RIO GRANDE AT SAN MARCIAL STATION

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

RECORDS: Based upon 198 meter measurements, by wading, and from cable about 1,000 feet above railroad bridge (122 measurements by I.B.C. and 76 by U.S.G.S.). Computations by shifting channel methods. 1940 records good. Records available: January 1895 to December 1940.

REMARKS: For gage history 1895 to 1938 see Water Bulletins Nos. 4, 7 and 8. During 1940 the river continued to flow through the Val Verde area. See Water Bulletin No. 7.

El Vado and smaller reservoirs and many irrigation diversions and drainage returns above this station in Colorado and New Mexico modify the river flow.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., Oct. 11, 1904, 50,000 sec. ft. with water surface level of 4,459.5 ft. on U.S.C. & G.S. datum about .25 mile above the present station gage. This is the greatest flood peak flow in at least the past 112 years, or since 1828. Min., sometimes dry. See Water Bulletin No. 6, page 79, for all large peak flows since 1828 and their average frequency. Daily: Max., Oct. 11, 1904, 33,000 sec. ft. average. Min., 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 and 1906, 2,750 sec. ft. average. Min., 1899 and 1900, 487 sec. ft. average. Three Successive Years: Max., 1905 to 1907, 2,830 sec. ft. average. Min., 1900 to 1902, 609 sec. ft. average. Four Successive Years: Max., 1905 to 1908, 2,390 sec. ft. average. Min., 1899 to 1902, 539 sec. ft. average. Five Successive Years: Max., 1905 to 1909, 2,260 sec. ft. average Min., 1898 to 1902, 697 sec. ft. average. Ten Successive Years: Max., 1903 to 1912, 1,980 sec. ft. average. Min., 1925 to 1934, 1,170 sec. ft. average. Forty-Six Year Average: 1,510 sec. ft.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	550	640	563	404	569	513	249	703	140	702	*562	748
2	499	899	590	403	325	423	399	288	135	836	*466	675
3	470	1,010	572	526	240	364	509	201	108	599	329	813
4	515	966	800	481	186	270	374	332	92.4	475	274	763
5	662	892	941	466	146	333	251	367	73.0	536	234	*709
6	683	740	1,000	406	113	174	476	380	103	513	348	662
7	656	760	845	387	71.1	157	187	639	174	451	360	559
8	710	716	854	412	55.9	117	207	649	211	347	*315	*622
9	704	671	767	350	60.9	84.4	120	839	195	315	*218	738
10	679	642	690	343	134	73.2	108	379	131	316	172	727
11	642	620	756	264	145	77.2	107	265	315	251	159	*656
12	580	646	740	153	310	55.6	61.7	201	562	251	161	*686
13	566	559	832	118	423	50.1	55.2	177	1,040	274	189	700
14	542	566	752	92.2	334	47.7	50.0	138	892	280	348	749
15	586	548	749	76.4	361	45.4	65.9	137	971	248	249	944
16	621	637	721	70.8	296	52.9	73.9	160	761	281	187	872
17	663	603	638	71.8	225	128	69.1	223	834	301	175	816
18	571	560	569	104	216	122	146	245	645	237	157	818
19	244	567	522	495	240	128	419	238	420	211	178	718
20	312	567	604	619	385	107	615	280	279	178	172	590
21	413	558	448	317	1,090	64.0	581	268	610	167	281	709
22	642	559	404	239	1,290	69.1	411	289	1,070	159	825	824
23	588	552	448	171	1,880	57.0	336	1,150	1,730	205	1,160	741
24	657	559	478	250	*2,700	79.6	266	1,450	1,860	204	1,030	718
25	598	590	463	296	*2,100	162	144	2,320	933	374	917	673
26	571	583	351	354	1,400	250	82.3	2,490	697	415	1,080	690
27	611	652	426	369	1,320	162	75.5	2,170	714	376	891	779
28	672	599	501	315	1,300	98.8	127	1,400	572	378	841	881
29	776	538	494	264	934	115	551	568	567	365	771	850
30	793		510	276	762	146	1,700	295	526	508	800	817
31	649		583		656		1,180	202		667		764
Sum	18,425	18,999	19,611	9,093.2	20,267.9	4,526.0	9,996.6	19,443	17,360.4	11,420	13,849	23,011

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1924-1940 Normal	Acre Feet Period 1924-1940 Maximum	Acre Feet Period 1924-1940 Minimum
Jan.	.72	-.84	29	875	19	107	594	36,500	42,268	56,000	17,400
Feb.	1.02	-.03	2	1,100	19	455	655	37,700	46,437	77,100	29,600
Mar.	.94	-.56	5	1,060	26	258	633	38,900	58,412	119,000	23,400
Apr.	.27	-1.40	20	695	17	68.7	303	18,000	123,308	407,000	16,850
May	3.33	‡-1.67	24	2,910	8	49.7	654	40,200	238,396	608,000	4,450
June	.30	-1.58	1	650	14	40.5	151	8,980	130,580	368,000	228
July	1.89	-1.62	30	2,010	14	50.0	322	19,800	50,664	157,140	0
Aug.	2.87	-1.06	26	2,820	15	114	627	38,600	48,569	275,000	1,620
Sept.	2.49	-1.28	24	2,200	5	68.7	579	34,400	57,754	308,000	2,920
Oct.	1.01	-.77	2	987	22	145	368	22,700	33,630	123,000	0
Nov.	1.71	-.69	23	1,240	18	126	462	27,500	28,825	76,200	2,550
Dec.	1.76	.79	15	1,050	7	525	742	45,600	40,834	58,400	15,100
Yearly	3.33	-1.67		2,910		40.5	508	368,880	899,677	1,557,800	244,489

‡ And other days. * Partly Estimated

RIO GRANDE AT BELOW ELEPHANT BUTTE DAM STATION

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

RECORDS: Based upon 75 meter measurements during the year and a stable rating curve. Records available 1915 to 1940. 1940 records good. Records furnished by the El Paso Office of the United States Bureau of Reclamation.

REMARKS: The station described here is operated by the Reclamation Bureau. It has been the official station since 1931. Prior to 1931 it was located at other points a little farther downstream. See United States Geological Survey Water Supply Papers. The river flow at this station is completely modified by irrigation diversions, drainage returns and reservoirs. Elephant Butte Dam is 42.4 river miles downstream from the San Marcial gaging station at the upper end of Elephant Butte Reservoir.

EXTREME FLOWS: The greatest mean daily flow to pass Elephant Butte Dam (since storage began on January 6, 1915) occurred June 4, 1915 when the flow was 7,500 second feet. Since this time the maximum daily flow was from July 29 to August 3, 1917 when 3,200 second feet passed. The minimum flow sometimes reaches zero.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.3	18.5	17.5	2,190	1,510	2,180	1,780	1,440	1,690	69.8	82.6	101
2	14.4	18.7	17.7	2,180	1,510	2,170	1,780	1,620	1,680	67.3	77.3	101
3	14.7	16.8	17.5	2,190	1,510	2,160	1,150	2,010	1,640	72.4	75.1	101
4	14.7	14.3	17.0	2,210	1,510	2,150	870	2,010	1,580	79.4	74.7	104
5	14.7	15.2	16.8	2,210	1,350	2,130	1,270	1,860	1,580	80.7	74.2	118
6	15.1	18.0	18.2	2,210	1,900	2,140	2,100	941	1,570	76.2	89.3	116
7	14.4	18.2	17.3	2,200	1,910	2,140	2,160	1,730	1,560	77.3	99.4	97.6
8	14.7	17.9	18.3	2,170	1,910	2,130	2,200	1,730	1,490	74.7	81.8	94.8
9	15.1	17.4	18.9	2,140	1,920	2,110	2,310	1,860	1,230	74.7	77.7	104
10	15.1	18.2	18.9	2,150	1,910	2,100	2,370	2,070	1,320	72.8	81.0	97.7
11	15.4	17.6	17.0	2,150	1,910	1,940	2,440	2,080	1,060	70.9	78.9	88.6
12	15.7	17.2	17.0	2,140	1,910	2,100	2,620	2,110	1,020	76.5	85.5	87.4
13	17.5	17.9	16.7	2,160	1,900	2,100	2,840	2,110	1,000	69.0	86.2	100
14	16.1	18.1	17.2	2,160	1,760	2,090	2,640	2,100	1,110	70.9	82.3	564
15	17.2	18.2	17.5	2,170	1,600	2,060	2,920	1,930	1,460	72.8	75.2	613
16	18.2	16.6	17.7	2,160	1,600	2,060	2,760	2,080	852	74.7	81.1	733
17	18.2	16.3	16.0	2,160	1,610	2,060	2,580	2,080	997	72.8	77.5	682
18	16.7	16.8	17.7	1,780	1,610	2,050	2,550	2,070	1,070	74.1	77.7	654
19	16.8	18.1	18.7	1,980	1,610	2,050	2,560	2,070	930	92.8	77.9	686
20	16.2	18.8	18.1	2,120	1,610	2,040	2,390	2,020	822	90.1	85.7	768
21	16.2	19.1	18.2	2,110	1,620	2,050	2,280	1,910	830	84.2	89.7	704
22	16.2	18.3	18.2	1,880	1,660	2,140	1,930	1,860	1,090	74.2	85.4	540
23	17.2	18.7	18.8	1,810	1,390	2,130	2,110	1,860	422	72.3	86.1	611
24	18.0	19.4	18.5	1,650	1,070	2,130	2,020	1,860	453	72.3	91.6	852
25	17.8	19.6	209	1,420	1,070	2,130	1,600	1,860	256	72.3	98.3	563
26	18.3	18.7	1,400	1,440	1,070	2,130	1,770	1,850	79.3	72.3	117	852
27	18.9	17.9	1,710	1,450	1,070	2,130	1,680	1,780	75.5	72.1	117	811
28	17.5	19.4	1,940	1,460	1,070	2,120	1,940	1,700	75.5	71.8	111	893
29	18.7	19.1	1,940	1,460	1,120	1,260	1,560	1,700	71.7	94.4	110	748
30	19.7		1,950	1,460	1,870	1,780	1,800	1,710	69.8	91.0	106	963
31	19.3		2,000		1,960		1,620	1,690		80.0		1,070
Sum	512.0	519.0	11,574.4	58,970	49,030	61,960	64,600	57,701	29,083.8	2,366.8	2,633.2	14,618.1

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	⊕ Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1924-1940 Normal	Maximum	Minimum
Jan.			30	19.7	1	13.3	16.5	1,020	4,699	40,100	184
Feb.			25	19.6	4	14.3	17.9	1,030	25,952	57,500	969
Mar.			31	2,000	17	16.0	373	23,000	60,213	88,500	1,520
Apr.			‡ 5	2,210	25	1,420	1,970	117,000	114,371	136,000	84,400
May			31	1,960	‡ 24	1,070	1,580	97,300	105,488	155,000	78,500
June			1	2,180	29	1,260	2,070	123,000	121,353	146,000	101,000
July			15	2,920	4	870	2,080	128,000	124,576	137,000	97,800
Aug.			‡12	2,110	6	941	1,860	114,000	122,800	162,000	78,700
Sept.			1	1,690	30	69.8	969	57,700	73,618	129,000	24,900
Oct.			29	94.4	2	67.3	76.3	4,690	17,660	50,200	506
Nov.			‡26	117	5	74.2	87.8	5,220	12,680	39,300	884
Dec.			31	1,070	12	87.4	472	29,000	14,119	68,700	916
Yearly				2,920		13.3	966	700,960	797,529	1,003,484	637,534

⊕ Mean Daily. ‡ And other days.

RIO GRANDE AT BELOW CABALLO DAM STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and winch located .75 river mile below Caballo Dam and 26.7 river miles downstream from Elephant Butte Dam. Elevation of zero of the gage was 4,147.03 feet from February 26 to October 7, 1938 when it was changed to 4,146.03 feet. On October 13, 1938 it was again changed to 4,145.03 feet. All elevations are on United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 151 meter measurements during the year. Records available: February 26, 1938 to December 31, 1940. 1940 records good. Records furnished by the El Paso Office of the United States Bureau of Reclamation.

REMARKS: This gaging station was installed by the Bureau of Reclamation on the Rio Grande on February 26, 1938 to measure the flow from the Caballo reservoir. The river flow here is completely modified by reservoirs and irrigation diversions and drainage returns above this station. This station is about 1.5 miles upstream from Percha Dam (a low diversion dam) at which point records have been kept in past years. Small accretions to the river take place between this station and Percha Dam. 2,299 acre feet of water, not accounted for in the tables below, were diverted from Caballo reservoir into a small irrigation canal (Bonito Lateral) just below the dam.

EXTREME FLOWS: The greatest mean daily flow to pass Caballo Dam (since storage began February 8, 1938) occurred July 14, 1940 when the discharge was 2,550 second feet.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	2.3	1,060	2,110	1,520	2,100	1,670	1,500	1,800	433	1.9	1.6
2	3.4	2.6	1,070	2,120	1,550	2,140	1,560	1,440	1,750	40.0	1.9	1.4
3	3.2	2.4	1,070	2,190	1,660	2,090	1,930	1,660	1,630	35.0	1.9	1.4
4	2.8	2.4	1,010	2,130	1,650	2,060	1,770	1,750	1,540	29.2	1.9	1.4
5	2.7	2.0	1,030	2,080	1,660	2,020	1,860	1,750	1,540	16.2	1.9	1.4
6	2.7	2.0	853	2,180	1,730	2,000	2,000	1,690	1,540	2.3	1.9	1.4
7	2.7	2.0	853	2,180	1,650	2,050	2,040	1,780	1,490	2.3	1.9	1.4
8	2.7	2.0	967	2,180	1,530	2,070	1,990	1,820	1,460	2.3	1.9	1.4
9	2.7	163	1,150	2,100	1,450	2,140	2,260	1,900	1,460	2.2	1.8	1.4
10	2.3	334	1,030	2,010	1,390	2,090	2,380	2,130	1,420	2.2	1.8	1.4
11	2.3	399	771	2,020	1,430	2,040	2,440	2,140	1,320	2.1	1.7	1.4
12	2.3	281	844	2,030	1,450	1,920	2,430	1,920	1,240	2.0	1.7	1.3
13	2.1	273	1,110	2,030	1,460	1,860	2,360	1,850	1,240	2.0	1.6	1.3
14	2.1	735	1,110	2,030	1,410	1,800	2,550	1,790	1,300	1.7	1.6	1.3
15	2.0	888	1,180	2,000	1,490	1,900	2,460	1,770	1,300	1.7	1.5	1.3
16	2.1	888	1,400	1,890	1,510	1,900	2,450	1,840	1,290	1.7	1.4	1.3
17	2.1	821	1,400	1,810	1,450	1,910	2,400	1,970	1,180	1.7	1.4	1.3
18	2.1	798	1,390	1,750	1,450	1,930	2,410	2,240	1,050	1.7	1.3	1.3
19	2.1	446	1,440	1,760	1,450	2,020	2,380	2,160	958	1.7	1.3	1.3
20	2.1	3.9	1,520	1,770	1,410	2,050	2,280	2,050	865	1.7	1.3	1.3
21	2.1	3.9	1,520	1,770	1,360	2,140	2,200	1,900	663	1.7	1.3	1.3
22	2.2	3.9	1,570	1,770	1,270	2,120	2,050	1,830	620	1.7	376	1.3
23	2.2	3.9	1,830	1,620	925	1,890	1,950	1,850	620	1.7	636	1.3
24	2.2	3.2	1,820	1,480	1,010	1,510	1,910	1,980	650	1.7	498	1.3
25	2.2	3.2	1,830	1,430	1,220	1,500	1,910	1,990	699	269	158	1.3
26	2.2	3.2	1,840	1,430	1,370	1,710	1,920	1,980	677	377	5.2	1.3
27	2.1	33.1	1,900	1,430	1,460	1,710	1,940	1,860	731	186	2.0	1.3
28	2.1	60.0	1,840	1,430	1,630	1,720	1,950	1,700	890	2.3	1.7	1.4
29	2.1	253	1,840	1,440	1,690	1,640	1,970	1,710	890	2.1	1.6	1.4
30	2.1		2,120	1,480	1,890	1,600	1,960	1,860	873	2.0	1.6	1.4
31	2.1		2,120		2,020		1,730	1,800		1.9		1.4
Sum	73.6	6,415.0	42,488	55,650	46,145	57,630	65,110	57,610	34,686	1,429.8	1,715.0	42.0

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	⊕ Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1938-1940 Average	Maximum	Minimum
Jan.			1	3.5	15	2.0	2.4	146	1,143	3,080	146
Feb.			‡15	888	‡ 5	2.0	221	12,700	18,300	22,200	12,700
Mar.			‡30	2,120	11	771	1,370	84,300	78,033	84,300	73,800
Apr.			3	2,190	‡25	1,430	1,860	110,400	110,800	116,000	106,000
May			31	2,020	23	925	1,490	91,500	103,167	113,000	91,500
June			‡ 2	2,140	25	1,500	1,920	114,300	118,767	121,000	114,300
July			14	2,550	2	1,560	2,100	129,100	122,033	129,100	109,000
Aug.			18	2,240	2	1,440	1,860	114,300	121,100	131,000	114,300
Sept.			1	1,800	‡22	620	1,160	68,800	63,133	76,800	43,800
Oct.			1	433	‡14	1.7	46.1	2,840	16,080	26,100	2,840
Nov.			23	636	‡18	1.3	57.2	3,400	8,533	12,100	3,400
Dec.			1	1.6	‡12	1.3	1.4	83.3	6,021	9,320	83.3
Yearly				2,550		1.3	1,010	731,869.3	767,110	789,064	631,869.3

⊕ Mean Daily ‡ And other days

RIO GRANDE AT EL PASO STATION

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

RECORDS: At high flows the record was based upon meter measurements made here during the year and computations by shifting channel methods. At flows below about 1,500 second feet, the record is based upon the record of flows into the American Canal at the American Dam and flows passing the American Dam in the Rio Grande. 1940 records good. Records available: 1889 to 1940, inclusive.

REMARKS: Reservoirs on the Rio Grande and its tributaries, also many irrigation diversions and drainage returns, completely modify the river flow.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., June 12, 1905, 24,000 sec. ft., with 6.0 ft. stage (lower gage). This is the greatest peak flow in the past 112 years or since 1828, or possibly longer. Min., sometimes dry. Daily: Max., June 12, 1905, 23,680 sec. ft. average. Min., sometimes dry. Monthly: Max., June 1905, 14,300 sec. ft. average. Min., sometimes dry. Yearly: Max., 1905, 2,780 sec. ft. average. Min., 1902, 70.1 sec. ft. average. Two Successive Years: Max., 1905 and 1906, 2,160 sec. ft. average. Min., 1899 and 1900, 168 sec. ft. average. Three Successive Years: Max., 1905 to 1907, 2,280 sec. ft. average. Min., 1900 to 1902, 269 sec. ft. average. Four Successive Years: Max., 1904 to 1907, 1,880 sec. ft. average. Min., 1899 to 1902, 227 sec. ft. average. Five Successive Years: Max., 1903 to 1907, 1,790 sec. ft. average. Min., 1898 to 1902, 669 sec. ft. average. Ten Successive Years: Max., 1903 to 1912, 1,560 sec. ft. average. Min., 1931 to 1940, 577 sec. ft. average. Fifty-Two Years: Average 991 sec. ft. See Water Bulletin No. 6, page 79, for all large peak flows since 1828 and their average frequency. Since Elephant Butte Dam was closed in 1915 the largest peak flow to pass this station was 13,550 sec. ft. on September 3, 1925. Elsewhere in this bulletin see peak flood flows, 1915 to 1937.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	217	143	* 151	1,100	784	829	1,060	1,600	924	456	233	183
2	213	141	* 140	1,030	761	1,040	830	1,160	1,040	485	237	186
3	205	147	* 139	1,010	808	1,100	924	1,060	984	635	223	189
4	194	144	313	1,020	729	1,080	949	996	904	558	223	179
5	192	142	440	998	878	1,020	1,840	1,110	817	379	220	175
6	202	148	426	1,060	911	973	1,310	1,120	761	347	223	177
7	182	139	421	998	827	966	977	1,130	758	320	223	177
8	183	147	518	1,040	860	969	1,030	1,050	888	298	220	178
9	171	146	472	994	945	1,110	941	920	780	282	208	181
10	173	137	485	986	855	1,230	964	853	757	262	196	185
11	171	137	724	970	908	1,140	1,160	875	753	271	186	194
12	173	131	691	916	825	1,150	1,130	1,290	732	316	186	186
13	158	136	588	1,000	853	1,090	1,070	1,150	675	408	184	188
14	156	166	516	993	894	1,110	1,040	1,000	635	338	185	189
15	166	313	664	1,040	883	1,040	1,010	938	687	314	181	189
16	160	300	752	1,060	811	1,030	1,210	881	757	296	186	182
17	158	384	684	1,060	765	1,070	1,100	820	667	290	186	194
18	184	385	848	971	904	997	1,080	789	613	281	186	191
19	169	410	814	898	864	914	1,130	826	648	277	192	188
20	179	464	* 753	867	934	925	1,170	1,010	605	268	180	185
21	180	457	* 740	924	963	1,010	1,260	1,050	692	256	186	186
22	186	386	* 763	960	921	1,000	1,250	934	895	244	186	188
23	171	245	* 642	937	897	2,200	1,140	836	802	215	190	191
24	174	202	765	1,020	943	1,680	1,070	769	599	213	193	178
25	176	186	1,090	960	826	1,880	1,020	834	488	209	179	159
26	175	183	839	840	729	1,280	977	1,060	461	207	184	154
27	166	178	830	867	791	1,130	946	1,090	431	208	192	157
28	160	167	894	886	737	1,210	958	990	408	206	238	149
29	143	157	888	887	729	1,100	1,100	936	423	240	196	159
30	140		753	830	823	1,140	1,630	847	429	266	192	162
31	142		748		941		1,440	836		253		167
Sum	5,419	6,421	19,491	29,122	26,299	34,413	34,716	30,760	21,013	9,597	5,994	5,546

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	3.59	3.38	1	226	31	138	175	10,700	11,064	17,500	8,180
Feb.	4.44	3.20	20	544	12	117	221	12,700	20,132	48,500	8,800
Mar.	5.24	3.18	25	1,160	3	* 160	629	38,700	39,287	56,800	18,400
Apr.	5.17	4.69	1	1,150	25	752	971	57,800	62,883	91,000	44,900
May	5.23	4.65	20	1,010	27	690	848	52,200	66,897	122,000	47,600
June	6.45	4.76	23	3,250	1	788	1,150	68,300	70,238	98,200	56,200
July	6.28	‡ 4.70	5	2,990	2	663	1,120	68,900	80,741	111,000	68,900
Aug.	5.85	4.91	1	2,010	‡18	755	992	61,000	85,990	107,000	61,000
Sept.	5.28	‡ 3.93	2	1,060	28	382	700	41,700	62,594	87,400	41,700
Oct.	4.78	3.49	3	708	28	200	310	19,000	25,719	34,860	17,800
Nov.	3.66	3.40	2	243	26	170	200	11,900	18,028	29,500	11,400
Dec.	3.42	3.30	11	204	26	146	179	11,000	16,528	27,700	9,590
Yearly	6.45	3.18		3,250		* 117	625	453,900	560,101	810,200	453,900

‡ And other days. * Partly Estimated.

RIO GRANDE AT BELOW AMERICAN DAM STATION

DESCRIPTION: Water-stage recorder at the lower side of the American Dam 2.1 miles above the International Dam, near El Paso, Texas. Zero of the recorder gage is 3,712.30 feet. Prior to January 1, 1939, zero of gage was 3,722.30 feet. Also a staff gage 3,200 feet below the American Dam the zero of which is 3,716.28 feet. This has been the official gage since May 1, 1939. The above elevations are on U.S.C. & G.S. sea level datum. The American Dam is about 1,210 river miles above the Gulf of Mexico.

RECORDS: Based upon 87 meter measurements at normal and low stages during the year, 55 by the United States and 32 by the Mexican Section and since May 1, 1939, staff gage read several times daily and more frequently during floods. Computations by shifting channel methods. High flows determined by subtracting the American Canal diversion from the Rio Grande flow at El Paso Station. 1940 records good. Records available: June 1, 1938 to December 31, 1940.

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

EXTREME FLOWS: The largest peak flow to pass this station since 1828, or possibly before, was 24,000 second feet on June 12, 1905. Since Elephant Butte Reservoir was closed in January 1915, the largest peak flow was 13,550 second feet on September 3, 1925. See Water Bulletin No. 6, page 79, for the average frequency of floods since 1828. Elsewhere in this bulletin will be found data on peak flows from 1915 to 1937.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	ó 215	ó141	* 6.4	203	213	212	115	ó 590	61.1	2.4	10.7	7.1
2	ó 211	ó140	* 4.9	193	215	225	135	159	70.7	2.3	8.1	6.0
3	ó 203	ó145	* 6.4	203	212	208	158	79.0	59.7	2.3	148	6.0
4	ó 192	ó143	54.3	204	193	199	154	71.7	55.5	2.3	220	5.9
5	ó 191	ó140	91.8	212	187	202	ó 857	76.6	60.0	2.0	217	5.8
6	ó 200	ó146	108	216	165	205	ó 530	78.0	63.3	2.1	220	6.7
7	ó 181	ó137	130	212	178	200	197	80.7	60.4	2.0	220	5.5
8	ó 181	ó145	138	208	211	198	192	79.9	57.6	1.6	151	6.5
9	ó 169	ó145	115	185	225	209	170	80.9	64.8	1.7	4.2	5.3
10	ó 171	ó135	93.5	197	225	199	143	78.9	63.6	1.6	4.7	5.2
11	ó 169	ó 75.0	104	199	224	202	145	76.8	58.1	1.6	2.9	5.2
12	ó 172	ó 34.7	96.9	204	208	207	140	76.6	58.0	‖ 92.9	6.2	5.2
13	ó 156	ó 38.5	90.7	208	209	213	142	74.7	61.3	‖ 407	14.2	6.3
14	ó 155	ó 36.9	92.2	198	207	219	148	78.9	61.0	‖ 336	10.5	5.2
15	ó 164	ó 65.9	93.6	208	199	203	150	87.2	59.1	‖ 312	11.0	6.3
16	ó 158	ó 37.0	96.9	198	194	207	143	85.8	58.8	‖ 294	9.3	5.2
17	ó 156	ó 61.9	96.4	190	189	214	134	82.7	55.0	‖ 288	10.0	5.2
18	ó 182	ó 19.0	99.7	194	206	199	137	79.9	55.4	‖ 280	90.8	5.2
19	ó 168	22.9	98.7	192	204	202	123	82.6	54.1	‖ 275	189	5.2
20	ó 177	21.5	104	183	214	207	129	77.8	51.0	‖ 267	177	6.3
21	ó 179	21.5	107	178	209	208	143	76.9	50.6	‖ 254	183	5.2
22	ó 184	18.9	108	174	209	202	141	74.2	50.3	‖ 64.0	184	6.3
23	ó 169	17.4	106	214	202	ó 980	134	69.8	64.5	3.9	187	5.2
24	ó 172	9.7	118	225	200	515	123	71.3	49.6	3.0	191	50.7
25	ó 174	7.1	119	206	201	ó 810	115	71.0	53.8	2.7	176	157
26	ó 174	4.2	96.0	199	203	ó 401	120	70.6	56.3	2.7	181	151
27	ó 164	3.7	101	204	192	223	134	72.6	62.3	2.3	189	155
28	ó 159	3.9	102	210	189	216	140	111	65.6	2.3	101	146
29	ó 141	3.9	98.8	211	198	217	133	126	69.2	3.9	10.1	157
30	ó 138		97.7	205	209	224	ó 470	61.1	68.8	8.6	8.1	159
31	ó 140		102		218		ó 280	62.0		7.0		164
Sum	ó 1,920.6			6,033		8,126		3,044.2		2,928.2		1,271.7
	ó 5,365		2,876.9		6,308		5,975		1,779.5		3,134.8	

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1938-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	3.04	2.84	1	224	31	133	173	10,600	10,450	10,600	10,300
Feb.	* 2.82	1.50	9	176	27	* 3.4	66.2	3,810	2,855	3,810	1,900
Mar.	2.85	1.51	31	174	1	* 5.0	92.8	5,710	3,885	5,710	2,060
Apr.	3.12	* 2.75	24	231	9	* 166	201	12,000	9,180	12,000	6,360
May	* 3.20	2.86	11	240	6	160	203	12,500	13,000	13,500	12,500
June	4.85	2.70	23	* 1,610	30	122	271	16,100	16,757	24,400	9,770
July	4.62	2.47	5	1,500	1	107	193	11,900	14,367	18,300	11,900
Aug.	3.80	2.26	1	ó 840	30	57.6	98.2	6,040	9,107	13,300	6,040
Sept.	2.76	2.31	23	162	24	46.1	59.3	3,530	12,177	17,500	3,530
Oct.	3.02	1.70	13	* 450	10	1.3	94.5	5,810	2,303	5,810	197
Nov.	2.72	1.31	3	224	12	3.1	104	6,220	5,287	6,220	4,460
Dec.	2.49	1.24	31	167	10	2.3	41.0	2,520	4,063	7,760	1,910
Yearly	4.85	1.24		* 1,610		1.3	133	96,740	103,431	98,727	96,740

* Partly Estimated. ó Deduced. ‖ Estimated.

OUTFALLS FROM DEEP WELLS

Near El Paso, Texas, and Cd. Juarez, Chihuahua.

Between the Below American Dam Station and the Cd. Juarez Station several outfall ditches or pipe lines discharge water into the Rio Grande, the source of which is from deep wells in the vicinity of El Paso and Cd. Juarez. During 1940 such outfalls contributed a total of 8,144 acre feet of water to the Rio Grande flow, which is equivalent to an average steady flow of 11.2 second feet during the year. Of this total flow 10.2 second feet or 7,420 acre feet came from the United States side while 1.0 second feet or 724 acre feet came from the Mexican side. On the remainder of this page will be found details concerning these outfalls.

El Paso Electric Company Santa Fe Street Plant Cooling Water Waste

This outfall enters the river 3.3 miles below the American Dam. From the company's pumping records it is calculated that 566 acre feet flowed into the river in 1940. This corresponds to an average flow of 0.8 second foot.

Cd. Juarez Sewage Outfall

This outfall enters the river 4.7 miles below the American Dam. From several inspections this outfall is estimated at 724 acre feet for 1940, which corresponds to an average flow of 1.0 second foot.

Peyton Packing Company Waste

This outfall enters the river 5.7 miles below the American Dam. From several inspections an average flow of 0.5 second foot or 362 acre feet is estimated to have entered the river from this source.

El Paso Sewage Outfall

This outfall enters the river 6.6 miles downstream from the American Dam. The flow of sewage is measured by Venturi meter at the treatment plant which began operating in 1936. During the later months of 1940 there were parts of days when the maximum flow exceeded the plant capacity. During such times the excess flow passed to the river unmeasured. The amounts of such excess are unknown and are not included in the following tabulation. The record below was furnished by the Department of Water and Sewage of the City of El Paso.

Month	1940		Period 1936-1940
	Mean Second Feet	Acre Feet	Average Acre Feet
January	9.2	565	496
February	9.0	515	491
March	8.7	534	484
April	8.6	515	525
May	8.5	525	535
June	9.2	547	564
July	9.2	567	569
August	9.1	558	554
September	9.0	537	527
October	9.1	560	527
November	8.8	524	510
December	8.9	545	519
Yearly	8.9	6,492	6,301

RIO GRANDE AT CD. JUAREZ STATION

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

RECORDS: Based upon 187 meter measurements during the year, 157 by the Mexican and 30 by the United States Section. Computations by shifting channel methods. 1940 records good. Records available: April 1, 1938 to December 31, 1940.

REMARKS: The operation of this station began April 1, 1938. Reservoirs, irrigation diversions and drainage returns above this station completely modify the river flow.

EXTREME FLOWS: The greatest flow since April 1, 1938 occurred September 2, 1938 with a gage height of 9.74 feet and a flow of 5,010 second feet. The lowest flow since April 1, 1938 occurred February 25, 1940 with a gage height of 3.48 feet and a flow of 16.2 second feet.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	217	154	163	738	301	320	784	1,050	597	287	237	48.7
2	228	163	139	593	292	523	463	777	657	268	248	58.6
3	210	177	55.1	607	316	625	551	706	650	519	224	56.9
4	208	170	114	607	298	572	579	667	526	337	218	47.0
5	206	173	202	551	413	558	1,080	780	473	140	212	79.5
6	203	154	157	607	501	494	667	791	403	125	224	167
7	201	170	112	544	378	477	572	773	417	83.0	245	169
8	200	167	190	614	357	480	597	766	501	59.0	249	154
9	195	176	200	572	420	583	505	540	427	60.7	177	141
10	201	184	258	558	353	784	480	463	378	39.2	70.6	196
11	203	180	424	512	381	689	636	562	399	38.8	51.9	193
12	194	178	417	378	339	657	724	826	385	135	44.1	160
13	170	112	323	487	353	614	657	773	388	427	48.7	144
14	214	91.8	234	523	392	678	639	636	339	374	56.5	163
15	214	64.3	300	576	396	547	569	583	360	333	59.7	182
16	200	78.8	427	632	342	611	766	544	399	318	72.0	228
17	198	117	399	650	275	565	724	441	348	309	91.1	147
18	204	195	523	526	360	530	706	406	296	279	218	45.9
19	211	206	484	413	417	399	756	410	287	284	210	44.5
20	199	314	441	388	406	410	788	586	295	289	200	38.1
21	223	274	420	463	466	494	886	745	345	272	195	39.2
22	208	219	434	526	463	494	837	632	547	210	189	40.6
23	207	99.6	367	477	480	1,550	780	530	512	68.2	214	41.7
24	187	45.9	406	537	526	1,390	738	466	364	51.9	171	80.5
25	204	59.7	763	554	463	1,200	667	523	225	55.8	145	87.2
26	200	168	494	374	360	865	614	650	173	62.2	152	159
27	194	159	480	396	374	696	562	727	154	57.6	210	191
28	176	168	537	403	357	837	544	636	117	57.9	173	169
29	170	165	576	424	279	756	643	554	121	44.8	66.0	170
30	161		448	367	317	802	1,060	470	151	73.5	47.0	171
31	163		424		413		975	480		204		176
Sum	6,169	4,583.1	10,911.1	15,597	11,788	20,200	21,549	19,493	11,234	5,862.6	4,718.6	3,788.4

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1938-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	4.49	4.00	17	319	31	108	199	12,200	11,150	12,200	10,100
Feb.	4.46	3.48	20	342	25	16.2	158	9,090	8,610	9,090	8,130
Mar.	5.28	3.64	25	840	4	22.2	352	21,600	21,800	22,000	21,600
Apr.	5.31	4.23	16	901	26	336	519	30,900	33,133	35,100	30,900
May	5.12	4.04	5	780	29	246	381	23,400	26,900	29,300	23,400
June	7.25	4.20	23	2,710	1	304	675	40,100	40,167	44,300	36,100
July	6.69	4.13	5	2,270	10	392	696	42,700	44,833	49,400	42,400
Aug.	5.64	3.87	1	1,340	19	374	629	38,700	40,933	44,100	38,700
Sept.	4.92	3.54	22	869	29	97.1	374	22,300	33,367	42,500	22,300
Oct.	4.27	3.12	3	660	11	31.8	189	11,600	14,200	17,900	11,600
Nov.	4.07	3.18	23	424	30	42.0	157	9,360	11,553	13,200	9,360
Dec.	3.97	3.22	29	245	20	33.5	122	7,510	9,247	10,300	7,510
Yearly	7.25	3.12		2,710		16.2	371	269,460	295,893	303,930	269,460

RIO GRANDE AT ISLAND STATION

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

RECORDS: Based upon 101 meter measurements during the year. 54 by the United States and 47 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available August 17, 1938 to December 31, 1940.

REMARKS: Reservoirs, diversions and drainage returns above this station completely modify the river flow.

EXTREME FLOWS: The greatest flow since August 17, 1938 occurred September 3, 1938 with a gage height of 15.50 feet and a flow of 4,570 second feet. The lowest flow is sometimes zero.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	191	102	17.9	41.8	2.4	12.3	309	556	50.8	.1	0	0
2	172	109	21.9	42.8	2.5	1.7	104	378	98.6	6.0	0	0
3	176	135	20.6	7.6	2.1	134	8.5	143	122	4.8	1.0	0
4	153	127	19.2	21.4	2.2	93.5	7.2	136	97.2	140	1.0	0
5	156	116	14.4	5.1	1.9	23.6	196	40.6	4.4	49.4	1.4	0
6	178	113	3.3	7.1	28.2	8.2	316	178	3.1	.8	1.2	0
7	142	112	2.6	9.2	16.2	2.5	23.9	50.6	3.8	21.2	1.0	0
8	150	112	2.8	20.0	1.6	2.0	16.5	176	2.9	1.4	.2	0
9	139	122	3.2	8.3	.7	1.7	7.7	65.6	2.4	1.7	0	0
10	130	135	3.2	5.6	‼ 1.0	75.1	4.6	8.2	1.8	0	0	0
11	114	125	3.8	4.6	‼ 3.8	138	5.8	6.0	1.7	0	0	0
12	105	97.0	6.0	3.9	‼ 10.1	98.1	66.4	‼ 31.8	1.6	.1	0	0
13	89.8	82.2	5.6	8.4	* 5.4	92.0	12.0	‼ 411	1.6	115	0	0
14	132	82.7	* 4.9	40.2	* 2.0	96.0	6.7	205	1.6	138	0	0
15	181	69.5	* 3.9	6.6	‼ 5.5	55.2	6.7	56.6	2.2	48.3	0	0
16	173	54.7	* 10.1	4.2	‼ 10.0	74.1	6.1	6.0	2.6	69.3	0	0
17	150	31.3	10.4	90.9	‼ 6.6	115	32.0	2.5	13.6	98.1	0	0
18	142	27.4	12.1	77.7	* 7.6	73.3	33.4	.8	7.5	123	0	0
19	146	28.7	35.1	35.3	100	36.0	26.4	3.3	6.1	121	0	0
20	138	29.7	10.1	3.1	93.4	9.7	110	4.2	5.0	82.0	0	0
21	180	28.5	8.3	3.3	85.2	4.5	172	41.8	3.5	85.7	0	0
22	199	27.8	8.4	12.8	‼ 90.0	12.7	418	15.3	120	110	0	0
23	147	26.2	11.2	29.9	‼ 90.0	633	189	4.8	240	84.8	0	0
24	126	24.6	7.6	7.2	‼ 60.0	1,120	76.7	1.9	82.7	41.0	0	0
25	134	33.2	86.9	60.9	‼ 60.0	682	36.5	2.1	4.2	2.0	0	48.4
26	152	29.3	80.2	26.0	‼ 40.0	606	18.9	25.3	1.8	0	0	27.7
27	134	27.0	16.5	3.8	‼ 40.0	157	6.5	48.0	1.2	0	0	27.5
28	126	26.1	15.4	2.9	‼ 17.1	403	3.1	131	1.1	0	0	44.8
29	114	19.8	21.6	3.7	3.2	237	6.2	31.7	.7	0	0	136
30	108		8.5	3.7	1.6	288	335	5.9	.4	0	0	127
31	109		5.3		3.2		364	6.8		.2		118
Sum	4,485.8	2,053.7	481.0	598.0	* 793.5	5,285.2	2,924.8	2,773.8	886.1	1,342.9	5.8	529.4

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
								Total 1940	Period 1938-1940 ⊕		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	12.46	11.69	21	645	13	16.5	145	8,900	8,850	8,900	8,800
Feb.	12.13	11.10	9	372	29	9.3	70.8	4,070	3,500	4,070	2,930
Mar.	12.07	10.90	25	241	7	2.4	15.5	954	915	954	876
Apr.	11.90	11.12	17	131	21	* .1	19.9	1,190	1,675	2,160	1,190
May	12.37	10.90	18	513	9	.7	* 25.6	* 1,570	1,310	1,570	1,050
June	13.68	10.88	23	1,640	2	1.0	176	10,500	5,905	10,500	1,310
July	13.11	10.76	6	1,070	29	‼ 0	94.3	5,800	5,320	5,800	4,840
Aug.	12.83	10.99	2	826	24	‼ 0	89.5	5,500	7,900	10,300	5,500
Sept.	12.29	10.66	23	453	30	0	29.5	1,760	14,387	29,400	1,760
Oct.	12.12	10.71	4	332	‡ 1	0	43.3	2,660	2,020	2,660	1,620
Nov.	11.32		5	2.9	‡ 1	0	.2	11.5	843	2,220	11.5
Dec.	12.21		29	219	‡ 1	0	17.1	1,050	2,277	3,300	1,050
Yearly	13.68	10.66		1,640		0	60.6	43,965.5	54,902	49,642	43,965.5

⊕ The average, maximum and minimum discharges for January through August are for the period 1939-1940.
‼ Estimated. * Partly estimated. ‡ And other days.

RIO GRANDE AT COUNTY LINE STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located 0.8 mile downstream from the El Paso-Hudspeth county line. This gaging station is on the rectified channel of the Rio Grande, 47.3 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,547.59 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 103 meter measurements during the year, 53 by the United States and 50 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: January 1, 1938 to December 31, 1940.

REMARKS: Reservoirs, diversions and drainage returns above this station completely modify the river flow.

EXTREME FLOWS: The greatest flow since January 1, 1938, occurred September 3, 1938 with a gage height of 6.39 feet and a flow of 4,050 second feet. The lowest flow since January 1, 1938 occurred March 5, 1939 with a gage height of 2.23 feet and a flow of 44.3 second feet.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	252	231	67.5	114	75.8	79.5	467	613	" 189	88.8	193	160
2	282	235	61.7	263	74.8	76.3	285	663	" 196	91.8	148	149
3	265	245	70.5	169	90.9	94.8	147	377	* 199	110	146	144
4	233	211	65.8	109	81.8	123	160	360	187	239	118	133
5	212	186	92.9	115	89.3	120	190	245	109	300	145	117
6	210	169	125	98.2	160	95.4	568	305	105	94.0	159	113
7	224	175	69.0	114	125	90.1	242	264	98.9	124	156	138
8	222	160	60.6	148	77.4	81.2	213	250	112	132	145	94.0
9	231	173	74.5	123	76.6	86.8	137	208	249	167	135	162
10	247	139	63.7	102	96.3	177	117	147	186	139	126	163
11	250	144	111	79.6	104	254	115	288	100	112	116	163
12	266	156	181	84.3	179	205	116	378	102	150	122	185
13	282	148	172	75.7	148	176	112	533	95.3	246	120	193
14	258	147	150	95.0	102	181	93.9	393	88.4	287	100	179
15	226	145	65.8	174	94.8	217	99.8	293	81.8	263	97.3	183
16	189	129	122	122	86.9	247	85.6	244	135	264	76.4	194
17	210	109	207	173	90.2	410	108	135	145	284	84.6	184
18	235	69.3	242	210	75.5	171	185	105	102	256	131	163
19	256	120	239	173	112	93.8	216	113	91.5	244	150	105
20	265	141	211	119	217	79.0	279	105	108	189	153	110
21	249	199	96.5	108	118	92.7	340	133	171	238	130	103
22	309	203	111	122	138	126	496	213	213	233	126	69.8
23	258	181	99.0	121	157	443	316	130	313	214	125	88.0
24	258	117	83.3	118	180	1,350	233	98.4	222	171	167	86.0
25	257	96.5	178	128	210	793	250	116	132	137	173	131
26	252	121	309	178	120	940	196	212	84.1	139	159	174
27	248	127	160	102	87.8	380	167	186	80.3	131	144	86.0
28	236	83.1	106	126	99.6	448	196	283	90.8	137	188	110
29	240	79.0	135	193	84.4	432	185	164	88.9	140	174	213
30	241		113	111	81.6	508	262	133	103	139	140	166
31	234		109		84.1		534	142		192		162
Sum	7,597	4,438.9	3,951.8	3,967.8	3,518.0	8,570.6	7,111.3	7,829.4	4,178.0	5,651.6	4,147.3	4,420.8

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1938-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	3.53	2.63	19	712	16	112	245	15,100	15,367	16,500	14,500
Feb.	3.26	2.41	22	425	18	52.7	153	8,800	11,757	17,200	8,800
Mar.	3.16	2.29	26	403	2	50.9	127	7,840	9,803	15,200	6,370
Apr.	3.10	2.31	18	338	12	66.3	132	7,870	11,080	15,800	7,870
May	3.29	2.20	25	333	8	64.8	113	6,980	9,447	13,900	6,980
June	4.66	2.18	24	1,550	2	73.4	286	17,000	17,123	27,500	6,870
July	3.88	2.39	6	1,020	16	80.8	229	14,100	22,633	42,400	11,400
Aug.	3.84	2.25	2	946	21	93.3	253	15,500	16,767	19,000	15,500
Sept.	3.29	2.17	23	430	15	73.9	139	8,290	26,263	46,600	8,290
Oct.	3.36	2.23	4	470	1	83.4	182	11,200	13,333	15,500	11,200
Nov.	2.82	2.23	1	228	16	69.4	138	8,230	11,510	13,500	8,230
Dec.	3.06	2.28	29	290	22	50.4	143	8,770	11,857	13,900	8,770
Yearly	4.66	2.17		1,550		50.4	179	129,680	176,940	250,900	129,680

" Estimated. * Partly estimated.

RIO GRANDE AT FORT QUITMAN STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located on the rectified Rio Grande channel 1.5 miles below Old Fort Quitman, and 81.1 river miles below the American Dam at El Paso. The zero of the new gage is 3,450.57 feet, U.S.C. and G.S. datum. See Water Bulletin No. 7 for a gage history of this station.

RECORDS: Based upon 108 meter measurements during the year, 58 by the United States and 50 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: January 1923 to December 1940.

REMARKS: Reservoirs, diversions and drainage returns completely modify the river flow.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., about June 20, 1905, 17,000 sec. ft.⊕. This is the greatest flow in the last 112 years. Max. since Jan. 1923, 6,620 sec. ft., Aug. 26, 1940. Min., frequently dry prior to Jan. 1915**. Since Jan. 1923, dry only once, March 30, 1935. Daily: Max., about 17,000 sec. ft. June 20, 1905⊕. Since Jan. 1923, 2,600 sec. ft. average on Sept. 11, 1925. Min., frequently dry prior to Jan. 1915. Since Jan. 1923, 0.9 sec. ft. average May 31 to June 4, 1935. Monthly: Max., since Jan. 1923, 1,080 sec. ft. average in August 1928. Min., frequently dry prior to Jan. 1915. Since Jan. 1923, 14.3 sec. ft. average in May 1935. Yearly: Max., since Jan. 1923, 514 sec. ft. average in 1924. Min., since Jan. 1923, 141 sec. ft. average in 1934. Two Successive Years: Max., since Jan. 1923, 487 sec. ft. average 1923 and 1924. Min., 171 sec. ft. average 1934 and 1935. Three Successive Years: Max., since Jan. 1923, 448 sec. ft. average 1923 to 1925. Min., since Jan. 1923, 183 sec. ft. average 1934 to 1936. Four Successive Years: Max., since 1923, 431 sec. ft. average 1923 to 1926. Min., since Jan. 1923, 199 sec. ft. average 1934 to 1937. Five Successive Years: Max., since Jan. 1923, 412 sec. ft. average 1923 to 1927. Min., since 1923, 218 sec. ft. average 1933 to 1937. Eighteen Years: Average 301 sec. ft. See pages 71 and 72 of Water Bulletin No. 8 for the magnitude and average frequency of floods in the period 1828 to 1938.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	244	188	140	39.3	101	18.4	422	1,030	371	53.5	159	168
2	237	194	130	24.6	49.8	20.5	299	864	382	53.4	173	171
3	252	198	122	38.8	45.3	19.7	140	430	‖ 300	54.9	168	177
4	266	198	121	26.9	57.7	21.1	94.3	352	‖ 217	90.3	169	178
5	287	196	115	25.0	48.9	20.0	71.5	461	‖ 168	242	165	172
6	331	173	136	27.3	82.4	20.6	259	337	‖ 118	177	172	177
7	320	182	152	28.8	113	21.6	154	307	‖ 68.3	124	191	178
8	304	185	97.6	38.5	91.4	23.6	103	335	‖ 66.0	115	199	187
9	296	163	62.8	39.9	56.1	26.7	56.9	259	63.7	136	196	189
10	301	* 155	57.5	42.4	55.5	52.3	27.5	121	‖ 61.4	160	186	176
11	313	* 165	66.7	32.4	93.4	49.3	21.4	141	‖ 59.1	108	171	165
12	* 334	* 168	118	29.8	112	71.1	21.3	300	‖ 49.6	204	152	169
13	* 319	* 134	148	24.3	148	77.7	19.5	527	‖ 40.0	233	160	170
14	249	142	156	26.2	95.0	90.5	21.0	450	‖ 30.4	291	147	172
15	214	136	143	32.5	80.2	103	19.6	270	33.2	265	128	164
16	201	126	70.2	37.1	84.6	142	15.8	* 172	55.0	254	112	151
17	197	121	108	43.2	68.6	166	16.8	* 113	61.4	251	128	173
18	* 186	213	209	48.7	61.6	188	125	116	54.5	253	141	159
19	* 193	254	159	63.3	55.6	120	103	65.0	35.7	159	175	150
20	200	293	177	67.1	100	93.8	93.4	42.8	38.6	219	193	154
21	172	294	109	78.9	108	56.4	173	37.1	36.0	218	190	147
22	163	261	61.5	88.3	75.0	73.6	* 191	43.8	128	221	174	142
23	214	219	60.5	102	168	165	* 225	52.7	230	227	169	134
24	236	186	77.5	85.7	142	1,060	269	175	252	188	176	139
25	239	153	60.1	83.0	161	1,030	186	156	201	142	192	146
26	270	154	107	74.9	171	943	106	2,290	160	147	189	143
27	287	162	136	75.4	153	642	94.4	* 340	93.8	164	191	154
28	262	155	58.3	65.2	97.0	296	298	* 278	46.8	156	182	127
29	221	* 153	37.1	105	75.0	850	290	* 216	44.7	130	187	154
30	191		34.3	122	47.9	389	355	* 154	53.9	135	168	171
31	194		52.4		23.0		1,240	* 192		102		146
Sum	7,693	5,321	3,282.5	1,616.5	2,821.0	6,850.0	5,511.4	10,627.4	3,519.1	5,273.1	5,103	5,003

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1924-1940 Normal	Acre Feet Period 1924-1940 Maximum	Acre Feet Period 1924-1940 Minimum
Jan.	4.21	3.10	19	484	22	105	248	15,300	12,151	19,200	5,370
Feb.	3.90	3.13	20	438	15	112	183	10,600	12,579	30,400	3,510
Mar.	3.73	2.42	18	286	29	32.7	106	6,510	10,911	28,500	1,090
Apr.	3.20	2.30	30	124	13	19.4	53.9	3,210	12,795	34,700	1,200
May	3.63	2.23	23	245	31	17.0	91.0	5,600	15,687	50,700	880
June	7.23	2.19	29	3,790	5	17.0	228	13,600	15,453	31,000	3,630
July	5.97	2.02	31	2,390	17	15.3	178	10,900	19,959	61,500	4,300
Aug.	8.85	2.37	26	6,620	22	23.0	343	21,100	28,910	66,400	4,430
Sept.	3.70	1.85	1	602	14	27.8	117	6,980	31,252	59,500	6,980
Oct.	3.41	1.96	20	320	2	49.1	170	10,500	21,088	45,720	4,520
Nov.	3.72	2.75	25	432	16	111	170	10,100	14,954	20,900	4,990
Dec.	3.66	2.98	8	271	28	117	161	9,920	15,266	20,970	5,640
Yearly	8.85	1.85		6,620		15.3	171	124,320	211,005	373,500	102,420

* Partly estimated. ‖ Estimated. ** Elephant Butte Reservoir closed January 1915.

⊕ Estimated from peak flow at El Paso and Upper Presidio stations.

RIO GRANDE AT LA NUTRIA STATION

DESCRIPTION: Water-stage recorder about 9.5 miles above Candelaria, Texas, 9.5 miles above San Antonio, Chihuahua, 64 miles above Presidio, Texas, and 62 miles above Ojinaga, Chihuahua, and 205.8 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,871.42 feet above mean sea level. United States Coast and Geodetic Survey datum.

RECORDS: Based upon 22 meter measurements by wading during the year for stages below 650 second feet. Station rating curve extended above 650 second feet by means of areas and water surface slopes shown by maximum stage pipe gages. Computations by shifting channel methods. 1940 records good. Records available: January 1935 to December 31, 1940. Records estimated from January 1 to June 15, 1935.

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

EXTREME FLOWS: The greatest recorded flow was on August 31, 1935, when the peak discharge was 7,480 second feet. The river is sometimes dry. A careful survey of flood marks shows that about 30,000 second feet passed this point prior to the establishment of the station. From persons continuously resident in this region since 1903 it is known that such a flow as 30,000 sec. ft. has not occurred here since 1903.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	362	221	142	* 70.0	27.6	63.7	363	871	187	55.8	120	220
2	317	215	140	* 52.8	31.7	46.4	342	920	2,480	45.1	122	207
3	287	213	138	* 41.5	44.6	37.0	333	1,050	1,280	39.4	106	197
4	276	204	135	* 37.7	45.0	25.4	221	528	372	40.4	141	190
5	270	218	132	* 36.1	33.5	21.1	122	1,030	293	42.1	150	183
6	262	218	125	* 32.9	27.7	31.8	76.9	462	233	37.4	150	178
7	247	211	125	* 31.2	112	17.0	56.1	410	175	39.8	192	167
8	257	189	121	* 28.9	248	14.9	78.7	274	134	114	280	170
9	250	185	131	* 26.9	76.0	17.1	101	273	106	91.6	257	177
10	245	193	139	* 24.9	40.4	101	59.9	344	87.1	83.2	220	191
11	247	176	122	* 22.8	58.6	59.3	38.2	261	76.0	355	210	196
12	231	185	102	* 21.0	39.6	102	28.9	242	74.5	547	201	196
13	242	189	85.5	* 18.9	28.4	43.8	22.2	138	74.1	634	182	173
14	232	187	86.6	* 17.2	21.6	* 17.6	16.7	1,130	66.4	395	158	169
15	234	174	97.0	* 15.7	24.7	* 13.1	13.1	666	58.2	412	* 152	172
16	191	144	127	* 14.3	51.2	* 12.0	41.3	342	51.4	319	* 152	183
17	199	140	134	* 12.9	57.0	26.0	62.5	211	47.7	269	150	172
18	213	140	129	* 11.4	46.4	29.0	10.8	571	41.1	* 245	148	169
19	216	133	106	* 10.6	94.6	51.9	8.9	631	36.5	* 220	143	156
20	220	133	100	11.0	* 91.8	70.9	6.3	191	38.2	213	149	171
21	168	173	136	11.7	76.1	204	4.9	129	40.8	218	166	160
22	212	184	133	11.8	109	145	14.7	93.0	40.5	195	186	158
23	228	248	130	11.8	527	416	15.3	67.1	36.8	178	184	162
24	201	257	146	16.3	206	562	85.7	123	34.6	182	169	149
25	235	252	101	24.0	107	917	179	163	53.5	184	178	141
26	243	215	152	26.3	123	376	143	313	122	166	176	138
27	236	170	110	29.1	103	512	102	1,520	116	147	201	142
28	234	156	91.3	29.5	106	549	74.2	576	100	129	186	136
29	242	146	92.5	30.5	124	328	61.8	249	91.6	151	184	143
30	240		111	27.8	751	531	191	164	75.1	148	200	143
31	228		91.7		126		316	146		136		129
Sum	7,465	5,469	3,711.6	* 757.5	3,558.5	5,341.0	3,190.1	14,088.1	6,622.1	6,031.8	5,213	5,238

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1935-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	4.50	3.75	1	369	21	158	241	14,800	10,995	15,000	" 3,000
Feb.	4.24	3.50	23	283	20	126	189	10,800	8,597	14,400	" 2,500
Mar.	3.97	3.12	24	215	20	79.7	120	7,360	6,347	13,600	" 500
Apr.	3.16	2.34	1	80.2	19	10.2	* 25.2	* 1,500	4,268	13,000	" 0
May	6.67	2.60	8	1,760	15	17.6	115	7,060	6,670	10,900	" 0
June	6.14	2.53	25	1,270	16	9.7	178	10,600	9,443	14,000	" 5,290
July	5.25	2.26	31	673	21	4.0	103	6,330	14,535	57,900	2,780
Aug.	7.60	3.16	2	2,700	24	48.1	454	27,900	21,000	40,300	10,500
Sept.	8.65	2.96	2	3,850	25	30.9	221	13,100	42,267	71,800	13,100
Oct.	6.86	2.91	11	1,960	7	32.8	195	12,000	21,650	42,700	12,000
Nov.	4.92	3.42	8	509	3	96.3	174	10,300	12,617	15,400	10,300
Dec.	4.15	3.72	1	230	31	127	169	10,400	14,033	17,600	10,400
Yearly	8.65	2.26		3,850		4.0	182	132,150	172,422	260,000	132,150

* Partly Estimated. " Estimated.

RIO GRANDE AT UPPER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located 7.7 river miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 277.6 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,579.82 feet above mean sea level, United States Coast and Geodetic Survey datum. This elevation was erroneously reported as 2,575.82 in Water Bulletins Nos. 6 and 7.

RECORDS: Based on 51 meter measurements during the year. Computations by shifting channel methods. 1940 records good. Records available: April 1900 to March 1914; September 1919 to March 1920; August 1923 to December 1940.

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

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

CORRECTION: The June, July and annual normals published in Water Bulletin No. 9 were erroneous. The normals below are correct. The monthly total for July was published as 7,300 acre feet in Water Bulletin No. 7. The correct figure is 7,350 acre feet.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 300	208	131	34.9	1.5	133	538	171	* 240	7.8	108	129
2	283	205	* 122	33.0	1.6	69.7	338	701	1,090	8.2	105	140
3	247	201	* 112	32.3	1.6	58.9	* 255	867	1,830	8.0	95.2	147
4	240	196	* 104	32.2	1.8	62.1	250	757	1,490	7.6	90.2	139
5	230	192	* 96.7	* 23.6	1.9	69.7	179	478	711	6.7	87.2	134
6	212	188	* 88.4	* 20.7	1.8	344	131	1,290	* 397	5.9	103	133
7	* 193	189	* 80.5	* 18.2	5.4	123	* 116	893	" 331	5.8	108	131
8	* 192	189	72.4	* 15.4	6.9	86.6	* 89.2	363	" 264	5.0	110	134
9	* 195	184	65.0	* 12.5	3.1	108	* 53.5	272	" 205	4.5	179	131
10	198	173	66.2	* 9.6	2.5	36.7	* 29.6	180	" 155	3.5	227	130
11	196	168	66.2	* 8.4	5.8	* 10.2	* 20.3	163	" 111	12.7	173	128
12	196	172	65.0	6.9	3.4	* 8.1	13.3	502	76.1	305	160	138
13	* 197	172	56.0	7.1	2.5	7.4	7.4	1,180	63.6	594	150	141
14	194	170	47.0	7.7	2.4	6.3	5.2	* 393	54.2	439	141	133
15	201	168	42.5	7.3	13.4	16.8	4.2	* 891	48.2	304	129	136
16	194	170	40.2	6.3	3.8	3.1	3.0	* 685	41.7	* 314	119	133
17	194	164	41.1	4.9	19.2	* 0	102	* 449	36.3	* 234	116	129
18	166	157	47.6	5.5	7.7	* 0	* 217	* 595	31.3	203	119	128
19	* 165	153	54.5	5.4	4.4	21.3	49.6	* 739	21.6	188	120	114
20	* 163	151	51.7	4.7	3.6	29.0	41.5	* 661	15.0	178	120	106
21	* 159	139	49.9	4.6	10.0	258	* 35.8	* 627	11.3	171	120	105
22	* 157	123	46.6	4.4	* 10.2	" 225	* 26.0	162	9.4	172	119	124
23	* 160	136	55.1	3.7	* 4.8	" 300	* 14.6	153	8.0	165	123	126
24	189	151	56.9	2.6	165	" 150	* 7.4	140	6.9	153	133	117
25	192	193	62.0	2.5	* 130	" 120	* 3.4	145	6.4	151	131	110
26	192	202	* 68.8	2.6	* 53.7	" 350	2.8	172	5.3	148	119	103
27	204	195	* 67.2	2.3	* 28.9	683	2.6	239	5.0	146	122	104
28	209	176	63.1	2.2	* 17.5	441	* 10.2	1,110	5.4	132	114	102
29	212	152	50.5	2.5	* 15.3	532	* 10.2	567	7.1	116	134	104
30	214		42.5	2.1	* 15.1	* 398	* 17.7	* 308	9.6	103	132	107
31	211		38.5		172		* 16.2	* 224		109		104
Sum	* 6,255	5,037	* 2,051.1	* 326.1	* 716.8	* 4,650.9	* 2,589.7	* 16,077	7,286.4	4,400.7	3,806.6	3,840

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
				High		Low		Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	* 2.36	1.75	1	* 315	22	* 157	*202	* 12,400	12,793	27,300	644
Feb.	2.02	1.59	1	211	22	121	174	10,000	11,565	29,400	1,420
Mar.	1.63	.92	1	133	31	33.6	* 66.2	* 4,070	10,389	41,500	285
Apr.	.97	.40	1	38.7	30	1.5	* 10.9	* 647	9,491	39,900	0
May	2.62	.37	24	402	1	1.5	* 23.1	* 1,420	13,628	55,300	0
June	3.97		6	1,100	‡17	* 0	*155	* 9,230	14,157	62,100	830
July	3.50	.32	1	748	26	2.5	* 83.5	* 5,140	17,991	68,800	13.3
Aug.	5.33	1.10	6	1,740	1	53.7	*519	* 31,900	34,959	81,700	2,170
Sept.	6.08	.66	3	2,040	28	4.7	243	14,400	37,323	82,500	3,140
Oct.	5.16	.56	13	1,680	10	2.9	142	8,730	29,479	78,000	0
Nov.	2.23	1.37	10	270	5	85.7	127	7,600	15,465	26,800	0
Dec.	1.72	1.33	3	153	31	95.0	124	7,600	13,883	21,700	374
Yearly	6.08			2,040		* 0	*156	* 113,137	221,120	531,300	54,315

" Estimated. * Partly Estimated. ‡ And other days.

RIO CONCHOS NEAR OJINAGA, CHIHUAHUA

DESCRIPTION: The Rio Conchos enters the Rio Grande about 4 miles above the international highway bridge between Presidio, Texas, and Ojinaga, Chihuahua, 1.6 miles above the Lower Presidio gaging station on the Rio Grande, 7.7 miles below the Upper Presidio gaging station on the Rio Grande and 285.3 river miles below the American Dam at El Paso, Texas.

RECORDS: Based on discharge records of the Rio Grande at Upper Presidio and Lower Presidio stations, and estimated irrigation diversions and arroyo inflow between these two stations. The normals shown here correspond with the revisions in Rio Conchos discharge shown in Water Bulletin No. 7, page 44. 1940 records fair. Records available: 1900 to 1913 and 1924 to 1940.

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

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

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.			‡ 29	1,340	26	580	812	49,900	54,527	147,500	14,410
Feb.			6	1,200	23	486	749	43,100	42,653	66,180	16,130
Mar.			3	1,010	18	258	448	27,600	39,259	70,240	20,870
Apr.			1	386	18	93.0	216	12,900	28,100	62,780	5,000
May			8	25,200	4	133	523	32,200	33,519	122,740	3,950
June			21	2,730	6	104	838	49,900	43,859	91,900	8,720
July			1	8,210	16	366	1,330	81,600	85,211	502,000	22,140
Aug.			6	4,660	26	460	1,500	92,300	121,988	435,400	18,900
Sept.			2	10,200	30	146	1,250	74,400	244,194	1,141,000	9,370
Oct.			15	7,000	7	166	562	34,600	135,672	798,000	34,600
Nov.			5	930	17	341	508	30,200	51,986	87,100	17,190
Dec.			16	661	25	257	387	23,800	48,622	76,000	15,280
Yearly				25,200		93.0	761	552,500	929,590	2,431,850	400,930

‡ And Other Days.

RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located about 2.25 miles above the international highway bridge between Presidio, Texas, and Ojinaga, Chihuahua, 1.7 miles below the confluence of the Rio Conchos with the Rio Grande, and 287.0 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,556.42 feet, United States Coast and Geodetic Survey sea level datum.

RECORDS: Based on 52 meter measurements during the year. Computations by shifting channel methods. 1940 records good. Records available: May 1900 to July 1915; September 1919 to March 1920; August 1923 to December 1940.

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

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

CORRECTION: The monthly and annual normals published in Water Bulletins Nos. 8 and 9 were erroneous. The normals below are correct.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,010	* 968	917	359	157	476	5,560	1,740	1,190	163	782	* 459
2	1,210	* 998	869	368	142	426	4,050	2,250	6,680	213	782	* 530
3	1,100	992	916	334	156	389	3,050	3,220	7,580	208	580	* 605
4	912	1,080	936	279	159	* 283	2,100	3,900	7,150	202	694	* 613
5	821	1,080	871	273	231	" 211	1,830	3,130	5,340	189	834	* 568
6	938	1,190	766	268	177	* 732	1,430	4,520	2,550	182	772	491
7	922	1,060	571	244	463	440	1,210	3,710	1,880	180	580	500
8	930	1,140	475	222	3,980	549	1,220	2,050	1,560	220	652	536
9	1,080	997	451	205	1,840	473	1,240	2,040	1,520	231	644	540
10	1,040	834	523	200	429	* 609	843	1,570	1,320	261	681	488
11	876	871	461	218	284	* 389	734	1,520	983	394	614	510
12	1,060	778	421	197	227	* 414	794	1,870	784	798	665	539
13	985	1,120	466	177	269	* 455	704	3,240	677	1,990	709	591
14	819	990	413	161	313	418	644	1,940	649	1,270	599	562
15	784	801	354	146	236	607	491	2,080	561	3,110	542	540
16	1,150	863	325	125	274	580	408	2,330	488	1,440	489	724
17	1,000	843	319	108	227	627	690	2,120	485	844	464	577
18	1,170	873	314	104	557	714	649	2,810	424	962	668	704
19	* 977	894	343	115	554	752	1,810	1,870	364	871	630	553
20	*1,040	984	452	127	885	733	1,490	1,600	350	754	726	513
21	* 936	896	390	154	670	1,400	927	1,270	316	628	570	488
22	*1,020	678	332	165	630	1,450	1,060	1,230	284	584	627	474
23	*1,200	633	312	206	454	1,380	1,260	937	275	554	731	444
24	*1,020	703	388	229	469	1,900	1,240	772	252	535	589	402
25	* 827	816	532	225	535	2,670	1,070	800	220	744	729	407
26	* 978	946	457	311	487	2,360	1,060	1,040	191	804	558	472
27	*1,010	991	696	297	377	2,090	948	1,320	177	821	593	424
28	*1,190	963	554	228	347	2,140	858	1,330	178	784	550	388
29	*1,170	787	446	193	341	2,000	1,580	1,470	170	649	504	393
30	*1,290		362	169	304	1,920	808	1,180	163	724	482	409
31	* 947		320		545		1,440	1,410		569		379
Sum	* 31,412	26,769	15,952	6,407	16,719	29,587	43,198	62,269	44,761	21,878	19,040	15,823

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	2.92	2.12	29	1,550	26	757	*1,010	* 62,300	67,316	174,800	24,500
Feb.	2.75	1.90	6	1,390	23	612	923	53,100	54,215	77,900	26,300
Mar.	2.50	1.39	3	1,120	18	299	515	31,600	49,601	76,300	21,200
Apr.	1.65	.90	1	425	18	98.0	214	12,700	36,930	66,500	4,460
May	10.22	1.01	8	25,200	4	135	539	33,200	46,777	150,400	3,660
June	4.14	* 1.27	21	3,360	6	* 179	986	58,700	57,668	106,000	9,250
July	6.29	1.40	1	8,830	16	369	1,390	85,700	102,277	564,000	23,900
Aug.	5.52	1.76	6	6,400	26	610	2,010	124,000	156,409	509,000	38,000
Sept.	8.08	1.00	2	11,700	30	156	1,490	88,800	281,595	1,200,000	16,000
Oct.	6.04	.96	15	7,300	7	171	706	43,400	165,205	859,000	41,000
Nov.	2.35	1.62	5	1,020	17	457	635	37,800	67,449	105,300	30,500
Dec.	2.06	1.44	16	794	29	366	510	31,400	62,503	94,600	28,900
Yearly	10.22	.90		25,200		98.0	913	662,700	1,147,945	2,651,800	599,000

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

ALAMITO CREEK STATION NEAR PRESIDIO, TEXAS

DESCRIPTION: Water-stage recorder, about 1,800 feet above confluence with the Rio Grande, and six miles below Presidio, Texas and Ojinaga, Chihuahua. This creek enters the Rio Grande .4 river mile below the lower end of the Presidio Valley and 298.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,541.42 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 4 meter measurements during the year by wading and a rating curve, the high points of which are determined by slope-area calculations; also upon numerous estimates by the hydrographer at low flow. Computations by shifting channel methods. 1940 records good. Records available: January 1, 1932, to December 31, 1940.

REMARKS: The flow of this spring-fed creek is modified by a small irrigation reservoir (San Estaban) 10.5 miles south of Marfa and by irrigation diversions for about 805 acres of land below the reservoir. The low flow is steady, being from springs. The high flow is erratic, being from storms. The drainage area above this station is 1,504 square miles, all in the United States, 461 square miles of which are above San Estaban Dam and 1,043 square miles below it.

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	4.0	4.0	4.0	4.0	4.0	116	23.5	4.0	4.0	3.0	1.9
2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	1.9
3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	24.8	4.0	4.0	2.9	1.9
4	4.0	4.0	4.0	4.0	4.0	18.6	4.0	7.9	4.0	4.0	2.8	1.9
5	4.0	4.0	4.0	4.0	4.0	147	4.0	" 4.0	10.2	4.0	2.7	1.9
6	4.0	4.0	4.0	4.0	4.0	224	4.0	149	4.0	4.0	2.6	1.9
7	4.0	4.0	4.0	4.0	4.0	10.0	4.0	256	4.0	4.0	2.5	1.9
8	4.0	4.0	4.0	4.0	5.0	4.0	4.0	8.0	4.0	4.0	2.4	1.9
9	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.3	1.9
10	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.2	1.9
11	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	59.3	2.1	1.9
12	4.0	4.0	4.0	4.0	4.0	241	4.0	172	4.0	793	2.0	1.9
13	4.0	4.0	4.0	4.0	4.0	5.5	4.0	437	4.0	1,420	1.9	1.9
14	4.0	4.0	4.0	4.0	4.0	4.0	4.0	266	4.0	481	1.9	1.9
15	4.0	4.0	4.0	4.0	4.0	4.0	4.0	80.0	4.0	246	1.9	1.9
16	4.0	4.0	4.0	4.0	109	4.0	70.7	4.0	4.0	9.0	1.9	1.9
17	4.0	4.0	4.0	4.0	6.0	4.0	24.2	4.0	4.0	4.0	1.9	1.9
18	4.0	4.0	4.0	4.0	4.0	10.7	" 4.0	4.0	4.0	4.0	1.9	1.9
19	4.0	4.0	4.0	4.0	4.0	36.5	432	4.0	4.0	4.0	1.9	1.9
20	4.0	4.0	4.0	4.0	4.0	5.0	8.5	4.0	4.0	4.0	1.9	1.9
21	" 4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.9	1.9
22	4.0	4.0	4.0	4.0	4.0	65.3	4.0	4.0	4.0	4.0	1.9	1.9
23	4.0	4.0	4.0	4.0	4.0	43.2	4.0	4.0	4.0	4.0	1.9	1.9
24	4.0	4.0	4.0	4.0	4.0	5.0	4.0	36.4	4.0	4.0	1.9	1.9
25	4.0	4.0	4.0	4.0	4.0	4.0	4.0	73.3	4.0	4.0	1.9	1.9
26	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.9	1.9
27	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.9	1.9
28	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.9	1.9
29	4.0	4.0	4.0	4.0	84.2	4.0	4.0	4.0	4.0	4.0	1.9	1.9
30	4.0		4.0	4.0	281	98.0	4.0	4.0	4.0	4.0	1.9	1.9
31	4.0		4.0		13.5		87.2	4.0		3.0		1.9
Sum	124.0	116.0	124.0	120.0	598.7	977.8	838.6	1,609.9	126.2	3,107.3	64.7	58.9

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940					Average Second Feet 1940	Acre Feet			
			High		Low				Total 1940	Period 1932-1940		
	High	Low	Day		Day					Average	Maximum	Minimum
Jan.	2.45	2.44	‡ 1	4.0	‡31	4.0	4.0		246	199	265	123
Feb.	2.45	2.41	‡ 1	4.0	‡29	4.0	4.0		230	188	234	111
Mar.	2.43	2.42	‡31	4.0	‡ 1	4.0	4.0		246	199	270	123
Apr.	2.43	2.38	‡ 1	4.0	‡30	4.0	4.0		238	219	519	119
May	4.20	2.30	30	1,720	‡19	4.0	19.3		1,190	1,346	8,520	189
June	4.00	1.75	12	1,450	‡ 8	4.0	32.6		1,940	2,118	* 6,360	206
July	4.00	2.03	19	1,450	‡30	4.0	27.1		1,660	3,238	6,650	249
Aug.	4.57	1.80	12	2,700	‡31	4.0	51.9		3,190	4,708	*16,330	378
Sept.	2.22	1.81	5	34.0	‡ 3	4.0	4.2		250	5,102	19,600	179
Oct.	5.14	2.10	13	5,280	31	3.0	100		6,160	1,427	6,160	157
Nov.	2.09	2.09	‡ 1	3.0	‡11	1.9	2.2		128	237	524	119
Dec.	2.09	2.07	‡ 1	1.9	‡26	1.9	1.9		117	201	246	117
Yearly	5.14	1.75		5,280		1.9	21.5		15,595	19,182	39,964	6,497

" Estimated. * Partly Estimated. ‡ And other days.

TERLINGUA CREEK STATION NEAR TERLINGUA, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car located about 12 miles south of Terlingua, Texas, 2.5 miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. This creek enters the Rio Grande 361.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,191.04+.5 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 14 meter measurements and numerous estimates by hydrographer at low flow, and rating curve, the higher points of which are determined by slope-area calculations. Computations by shifting channel methods. 1940 records fair. Records available: January 1, 1932 to December 31, 1940.

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

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, and June 17, 1939, when the discharge was .20 of a second foot.

CORRECTION: The normals for June and September and the annual normal published in Water Bulletins Nos. 8 and 9 were erroneous. The normals below are correct.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.5	1.6	2.2	2.2	1.9	2.9	4.8	3.8	28.4	2.0	2.0	2.0
2	1.5	1.6	2.2	2.2	1.9	2.9	4.6	2.6	71.6	2.0	2.0	2.0
3	1.5	1.6	2.1	2.2	1.9	2.9	4.4	‖ 2.5	2.3	2.0	2.0	2.0
4	1.5	1.7	2.1	2.2	1.9	3.2	4.2	3.4	2.0	2.0	2.0	2.0
5	1.5	1.7	2.1	2.2	1.9	2.9	4.0	‖ 2.5	2.0	2.0	2.0	2.0
6	1.5	1.7	2.1	2.1	30.5	53.3	3.8	66.0	2.0	2.0	2.0	2.0
7	1.5	1.8	2.1	2.1	35.2	32.6	3.5	24.6	2.0	2.0	2.0	2.0
8	1.5	1.8	2.1	2.1	240	2.9	3.3	‖ 2.0	2.0	2.0	2.0	2.0
9	1.5	1.9	2.1	2.1	4.9	2.9	3.1	‖ 2.0	2.0	2.0	2.0	2.0
10	1.5	1.9	2.1	2.1	4.6	2.9	2.9	‖ 2.0	2.0	2.0	2.0	2.0
11	1.5	1.9	2.0	2.0	4.6	2.9	2.7	‖ 2.0	2.0	182	2.0	2.0
12	1.5	2.0	2.0	2.0	4.6	2.9	4.3	20.9	2.0	1,080	2.0	2.0
13	1.5	2.0	2.0	2.0	4.6	6.4	3.0	106	2.0	773	2.0	2.0
14	1.5	2.0	2.0	2.0	4.6	‖ 2.9	2.7	158	2.0	470	2.0	2.0
15	1.5	2.0	2.0	2.0	4.6	‖ 2.9	2.7	88.6	2.0	87.8	2.0	2.0
16	1.5	2.0	2.0	2.0	4.6	‖ 2.9	9.6	5.0	2.0	* 52.0	2.0	2.0
17	1.5	2.1	2.0	2.0	4.6	‖ 2.9	27.0	‖ 2.0	2.0	‖ 30.0	2.0	2.0
18	1.5	2.1	2.1	2.0	4.4	‖ 2.9	30.9	8.5	2.0	‖ 10.0	2.0	2.0
19	1.5	2.1	2.1	2.0	4.3	‖ 2.9	‖ 2.5	‖ 2.1	2.0	‖ 3.0	2.0	2.0
20	1.5	2.1	2.1	2.0	4.1	‖ 2.9	‖ 2.5	‖ 2.0	2.0	‖ 3.0	2.0	2.0
21	1.5	2.1	2.1	2.0	4.0	8.5	‖ 2.5	‖ 2.0	2.0	‖ 2.5	2.0	2.0
22	1.5	2.1	2.1	1.9	3.8	6.0	‖ 2.5	‖ 2.0	2.0	‖ 2.5	2.0	2.0
23	1.5	2.1	2.2	1.9	3.7	8.9	19.1	‖ 2.0	2.0	‖ 2.5	2.0	2.0
24	1.5	2.2	2.2	1.9	3.5	11.3	2.9	‖ 2.0	2.0	2.0	2.0	2.0
25	1.5	2.2	2.2	1.9	3.4	4.8	‖ 2.5	13.2	2.0	2.0	2.0	2.0
26	1.5	2.2	2.2	1.9	3.2	4.8	‖ 2.5	59.5	2.0	2.0	2.0	2.0
27	1.5	2.2	2.3	1.9	3.1	4.8	119	20.1	2.0	2.0	2.0	2.0
28	1.5	2.2	2.3	1.9	2.9	4.8	71.1	‖ 2.0	2.0	2.0	2.0	2.0
29	1.5	2.2	2.3	1.9	10.2	4.8	110	45.0	2.0	2.0	2.0	2.0
30	1.5		2.3	1.9	4.4	4.8	3.3	* 46.5	2.0	2.0	2.0	2.0
31	1.5		2.3		4.4		24.9	36.3		2.0		2.0
Sum	46.5	57.1	66.0	60.6	416.3	205.4	486.8	737.1	156.3	2,734.3	60.0	62.0

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1932-1940 Average	Acre Feet Period 1932-1940 Maximum	Acre Feet Period 1932-1940 Minimum
Jan.	.84	.82	‡ 1	1.5	‡31	1.5	1.5	92.2	211	743	82.7
Feb.	.83	.82	‡29	2.2	‡ 1	1.6	2.0	113	136	223	90.6
Mar.	.83	.82	‡31	2.3	‡11	2.0	2.1	131	204	489	74.4
Apr.	.84	.80	‡ 1	2.2	‡22	1.9	2.0	120	328	1,230	55.1
May	9.95	.76	8	7,390	‡ 5	1.9	13.4	826	8,201	* 26,000	117
June	2.90	* .51	6	212	‡18	* 2.9	6.8	407	12,091	54,800	407
July	4.92	‖ .50	28	882	‡19	‖ 2.5	15.7	966	7,603	26,800	621
Aug.	4.27	‖ .20	26	593	‡ 7	‖ 2.0	23.8	1,460	6,037	* 26,680	254
Sept.	3.37	‖ .30	2	313	‡ 3	2.0	5.2	310	10,319	24,600	223
Oct.	10.70	‖ .30	12	9,200	‡ 1	2.0	88.2	5,420	3,283	8,100	50.8
Nov.				2.0		2.0	2.0	119	583	‖ 2,980	64.9
Dec.				2.0		2.0	2.0	123	472	3,080	90.0
Yearly	10.70	‖ .20		9,200		1.5	13.9	10,087.2	49,468	105,807	6,470.2

‖ Estimated. * Partly Estimated. ‡ And other days.

RIO GRANDE AT JOHNSON RANCH STATION

DESCRIPTION: Water-stage recorder and cable with stand-up cable car, with winch, located about 2 miles above Johnson Ranch, about 14 miles below Castolon, Brewster County, Texas and Santa Helena Ranch. Chihuahua, Mexico, and 383.2 river miles below the American Dam at El Paso, Texas. Zero of the gage is 2,046.00 feet above mean sea level, United States Geological Survey datum.

RECORDS: Based upon 18 meter measurements during the year. Computations by shifting channel methods. 1940 records good. Records available: April 1936 to December 1940.

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

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. The lowest flow to pass this station since records began was 23.1 second feet on June 6, 1938.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	990	1,210	820	372	152	482	2,030	1,310	1,630	173	642	512
2	902	981	734	327	136	418	4,840	1,500	2,250	173	581	477
3	1,010	956	875	315	125	418	3,060	1,670	8,270	208	703	530
4	1,160	1,020	754	340	124	439	2,560	2,380	6,520	205	656	506
5	965	958	890	317	122	505	2,130	2,860	4,290	201	544	549
6	855	1,090	811	282	160	1,030	* 1,850	3,340	3,060	191	650	577
7	838	1,040	806	262	1,930	1,670	1,460	5,100	2,370	191	717	504
8	871	1,120	671	246	1,790	1,280	1,250	3,400	1,760	184	687	446
9	856	1,020	559	240	8,720	495	1,200	2,140	1,590	212	2,050	461
10	932	1,090	488	230	1,660	539	1,200	2,000	1,410	230	762	494
11	1,060	887	457	197	769	491	* 1,160	1,730	1,240	265	674	501
12	924	863	488	180	465	1,200	* 1,110	1,650	918	3,110	664	477
13	916	826	434	168	546	647	1,240	3,110	741	18,800	655	477
14	1,040	857	404	168	305	667	777	4,370	741	5,060	644	512
15	892	1,110	419	163	274	439	812	3,090	706	4,070	678	535
16	804	917	394	148	328	541	706	2,410	565	2,260	645	508
17	860	852	359	139	280	493	777	2,490	494	1,530	565	545
18	1,120	838	326	130	300	504	918	2,550	* 435	1,280	530	624
19	954	895	313	124	250	608	811	3,630	438	1,060	512	574
20	1,140	871	296	121	397	739	1,380	1,920	404	874	583	626
21	938	846	309	113	474	862	1,440	1,690	* 344	767	600	519
22	930	978	369	103	698	807	988	1,340	300	693	671	488
23	1,050	805	363	98.6	568	1,500	852	1,240	283	651	636	463
24	1,060	703	330	102	525	1,720	1,120	1,160	265	632	618	448
25	1,150	683	307	106	431	1,930	976	1,120	240	618	671	396
26	976	721	354	120	415	2,590	948	1,360	212	706	618	360
27	849	876	446	136	454	2,250	1,180	1,850	194	777	671	365
28	995	834	436	148	420	2,120	1,150	1,540	194	777	618	408
29	1,040	1,010	554	178	378	2,250	1,740	1,500	187	777	607	371
30	1,160		492	168	844	2,030	1,520	1,560	* 173	689	565	331
31	1,170		421		777		1,180	1,320		665		336
Sum	30,407	26,857	15,679	5,741.6	24,817	31,664	44,365	68,330	42,224	48,029	20,417	14,920

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				ϕ Normal	⊕ Maximum	⊕ Minimum
Jan.	3.58	2.93	31	1,320	17	774	981	60,300	74,538	74,900	35,900
Feb.	3.59	2.74	1	1,330	25	664	926	53,300	59,648	72,300	39,400
Mar.	3.15	2.20	3	944	20	292	509	31,100	53,915	57,600	31,100
Apr.	2.39	1.53	1	389	24	95.4	191	11,400	39,049	20,100	8,990
May	10.01	1.62	9	18,300	5	118	801	49,200	58,650	61,300	19,900
June	4.93	2.19	24	3,130	2	352	1,060	62,800	71,600	127,000	17,700
July	6.32	2.59	2	6,110	20	611	1,430	88,000	114,541	620,000	43,900
Aug.	6.20	3.24	7	5,920	1	1,010	2,200	136,000	177,245	288,000	52,100
Sept.	7.50	1.82	3	9,870	30	173	1,410	83,800	309,836	1,144,000	* 59,800
Oct.	13.35	1.79	13	30,000	2	162	1,550	95,300	182,925	208,000	* 75,600
Nov.	4.95	2.38	9	3,200	5	509	681	40,500	74,989	101,000	40,500
Dec.	2.57	2.13	20	645	31	317	481	29,600	68,069	75,800	29,600
Yearly	13.35	1.53		30,000		95.4	1,020	741,300	1,285,005ϕ	2,755,000ϕ	610,000ϕ

* Partly Estimated.

⊕ The monthly maximums and minimums are for the period 1936 to 1940 only.

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

RIO GRANDE AT LANGTRY STATION, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and winch, located at Langtry, Texas, 78.4 miles above Villa Acuña, Coahuila and 602.2 river miles below the American Dam at El Paso, Texas. Zero of gage is 1,091.69 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 29 meter measurements during the year, 27 by the United States Section and 2 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: May 1900 to October 1914; December 1919 to March 1920; and January 1924 to December 1940.

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

EXTREME FLOWS: The highest recorded gage height was on June 18, 1922, when the extreme gage height was 56.9 feet; the estimated discharge for this stage from extension of the rating curve was 204,000 second feet. The lowest flow ever recorded was in May 1904, with an extreme of 270 second feet. On pages 75 and 76 of Water Bulletin No. 9 will be found a record of flood occurrences since 1864 at this station.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,300	1,320	1,120	780	406	896	2,510	2,000	2,520	599	1,170	957
2	1,280	1,440	1,120	819	417	948	2,300	1,840	2,290	595	1,130	931
3	1,390	1,460	1,210	760	436	1,200	2,720	1,470	2,490	585	1,060	924
4	1,270	1,460	1,120	713	474	1,070	4,980	1,630	3,760	556	1,080	881
5	1,220	1,290	1,050	766	475	1,040	" 3,770	1,780	8,170	532	1,030	863
6	1,300	1,250	1,120	800	457	1,410	" 3,300	2,730	5,650	518	1,090	844
7	1,410	1,280	1,070	697	462	1,630	" 2,700	3,340	4,240	504	1,100	830
8	1,260	1,260	1,130	690	552	1,030	" 2,320	4,130	3,530	476	1,010	888
9	1,180	1,360	1,120	685	6,480	2,340	* 2,010	5,270	2,960	471	1,080	904
10	1,160	1,350	1,100	637	3,290	2,400	1,770	3,710	2,530	481	1,700	907
11	1,180	1,400	1,030	610	6,590	1,370	1,590	2,610	2,170	486	3,410	881
12	1,170	1,320	921	568	* 2,690	1,170	1,530	2,380	1,970	535	1,700	849
13	1,220	1,340	829	553	* 1,510	933	1,490	2,800	1,840	1,210	1,250	871
14	1,310	1,200	763	548	* 1,190	1,430	1,410	4,100	1,690	15,400	1,120	917
15	1,210	1,170	728	543	1,090	1,610	1,570	7,730	1,480	13,500	1,090	854
16	1,190	1,170	752	539	* 1,090	1,060	1,130	5,050	* 1,270	6,050	1,050	816
17	1,280	1,230	732	524	1,100	1,060	1,170	3,510	1,140	4,670	1,070	838
18	1,200	1,350	723	504	889	919	1,050	* 2,580	1,050	3,330	1,080	842
19	1,130	1,220	725	495	1,290	842	1,130	3,060	998	2,490	1,030	874
20	1,160	1,160	717	490	957	1,010	1,270	2,610	934	1,930	987	851
21	1,360	1,140	702	486	2,400	874	1,150	4,110	877	1,610	949	932
22	1,290	1,150	705	482	10,900	927	1,100	2,690	833	1,460	924	909
23	1,400	1,170	702	463	2,180	1,140	1,830	* 1,950	811	1,440	989	947
24	1,280	1,160	698	449	1,120	1,570	1,540	* 1,790	773	2,650	1,000	912
25	1,250	1,240	851	435	1,150	1,730	1,240	* 1,790	730	2,040	1,030	860
26	1,320	1,140	731	427	1,180	2,210	1,140	2,760	710	1,420	968	844
27	1,350	1,050	713	418	1,100	2,350	1,320	1,790	674	1,210	972	810
28	1,400	1,000	716	423	1,030	2,470	1,260	1,940	648	1,090	1,020	806
29	1,280	1,020	704	415	1,120	4,880	1,240	2,250	634	1,050	964	790
30	1,190		702	411	1,150	2,430	2,840	2,810	613	1,140	1,010	780
31	1,250		729		956		2,390	2,010		1,170		799
Sum	39,190	36,100	27,033	17,130	56,131	45,949	58,770	90,220	59,985	71,198	35,063	26,911

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.22	.69	7	1,460	20	1,110	1,260	77,700	101,064	* 245,000	52,300
Feb.	1.30	.54	3	1,560	28	990	1,240	71,600	83,304	* 117,000	48,900
Mar.	.95	.15	3	1,250	30	692	872	53,600	79,418	118,000	48,100
Apr.	.72	-.41	5	1,020	30	406	571	34,000	64,806	105,000	30,100
May	13.68	-.42	22	25,800	1	402	1,810	111,000	96,056	233,000	32,300
June	5.82	.13	29	8,880	19	807	1,530	91,100	101,004	160,000	37,310
July	4.18	.40	4	5,580	19	1,000	1,900	117,000	149,414	719,000	56,100
Aug.	6.62	1.12	15	10,600	4	1,350	2,910	179,000	219,053	730,000	78,100
Sept.	5.73	-.06	5	8,850	30	608	2,000	119,000	373,704	1,100,130	35,700
Oct.	12.23	-.28	15	22,300	9	467	2,300	141,000	225,295	856,120	55,200
Nov.	3.52	.48	11	4,350	23	916	1,170	69,500	101,852	147,000	56,600
Dec.	.62	.26	1	994	30	768	868	53,400	93,132	134,000	49,800
Yearly	13.68	-.42		25,800		402	1,540	1,117,900	1,688,102	3,095,000	879,000

" 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 on the railroad 12 miles northwest of Comstock, Texas, 5.5 miles above the confluence with the Rio Grande. This river enters the Rio Grande 626.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is 1,058.01 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 13 meter measurements during the year, 12 by the United States and 1 by the Mexican Section. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1940 records good. Records available: March 17, 1898 to December 3, 1898, and May 1900 to December 1940.

REMARKS: The river flow is completely modified at this station by many irrigation diversions and drainage returns, and by the reservoirs of the Carlsbad irrigation project in New Mexico, and the Red Bluff reservoir in Texas.

EXTREME FLOWS: The greatest recorded flow was on September 1, 1932, when the extreme gage height was 38.25 feet and the extreme flow was 116,000 second feet. An extreme gage height of 35.75 feet was reported on April 6, 1900; discharge based upon 1935 rating curve was 107,000 second feet. The lowest flow ever recorded was on August 31, 1930, when the extreme gage height was -0.15 foot and the extreme flow was 97 second feet. On pages 75 and 76 of Water Bulletin No. 9 will be found a record of flood occurrences since 1899 at this station.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	295	278	283	244	180	244	776	193	443	190	261	302
2	292	242	262	226	190	228	502	184	339	190	247	293
3	291	256	259	244	190	212	484	184	265	196	257	293
4	291	245	259	236	190	212	361	182	265	196	260	293
5	283	251	263	291	196	212	322	179	248	198	271	288
6	290	248	270	384	190	212	284	329	265	186	260	288
7	285	249	253	291	292	209	248	869	248	192	267	308
8	282	252	257	251	195	209	284	850	265	199	299	291
9	277	304	253	259	427	215	284	387	265	208	338	287
10	288	349	260	246	275	275	248	503	265	198	401	284
11	280	354	264	228	186	269	248	379	265	195	374	310
12	286	384	257	235	178	228	259	305	265	228	358	310
13	289	354	264	238	172	212	302	362	265	224	337	286
14	274	318	260	216	166	244	284	323	265	350	337	285
15	285	330	257	206	165	261	259	389	265	256	332	289
16	277	314	264	203	163	244	262	503	201	239	336	289
17	284	310	253	203	165	228	256	498	201	238	336	288
18	276	311	260	206	163	228	256	494	201	237	332	284
19	283	300	264	207	1,020	377	242	416	201	290	313	281
20	278	296	260	197	334	244	248	362	187	346	331	284
21	281	300	261	197	236	247	234	283	201	454	335	283
22	284	281	261	194	2,420	228	228	265	187	366	312	280
23	276	274	261	191	813	261	218	283	201	314	316	283
24	273	281	261	198	363	789	225	265	193	287	315	286
25	272	282	283	202	376	4,380	212	265	193	" 665	311	279
26	282	282	258	198	376	1,820	205	265	196	343	330	261
27	281	282	261	190	316	987	202	232	193	292	295	267
28	262	282	261	200	298	439	199	232	187	299	314	253
29	248	283	261	184	280	2,820	193	232	190	266	298	263
30	258		254	185	376	1,350	196	265	187	262	294	248
31	254		250		297		193	265		261		280
Sum	8,657	8,492	8,094	6,750	11,188	18,084	8,714	10,743	7,112	8,365	9,367	8,816

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	.50	.40	1	299	29	248	279	17,200	23,109	55,880	12,900
Feb.	.80	.38	12	406	2	239	293	16,800	18,389	39,060	10,900
Mar.	.50	.38	25	290	‡30	247	261	16,100	18,112	32,870	11,100
Apr.	.76	.10	6	397	29	175	225	13,400	16,059	25,400	9,520
May	5.40	.02	22	4,720	‡16	163	361	22,200	39,516	156,000	10,800
June	6.02	.19	25	5,610	‡ 7	209	603	35,900	32,879	135,000	13,300
July	2.55	.16	1	1,530	30	187	281	17,300	22,643	84,200	7,620
Aug.	4.20	.12	7	3,170	5	176	347	21,300	19,531	50,400	7,620
Sept.	.90	.10	1	489	‡16	187	237	14,100	49,166	324,420	6,190
Oct.	" 2.40	.10	25	" 1,420	6	186	270	16,600	36,086	192,240	9,520
Nov.	.80	.34	10	423	2	244	312	18,600	22,176	73,260	10,300
Dec.	.60	.40	7	331	30	248	284	17,500	21,926	54,260	12,200
Yearly	6.02	.02		5,610		163	313	227,000	319,592	831,510	176,780

‡ And other days. " Estimated.

GOODENOUGH SPRING STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder and light cable (winch operated, for carrying current meter and light weights only), located 4,000 feet above confluence with Rio Grande and 11.75 miles southwest of Comstock, Val Verde County, Texas. The stream from this spring enters the Rio Grande 652.2 river miles below the American Dam at El Paso. Zero of gage is 971.9 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 12 meter measurements during the year. Computations by shifting channel methods. 1940 records good. Records available: February 23, 1929 to December 1939. Annual discharges for the years 1924 to 1928, inclusive, were estimated as were the monthly discharges for January and February 1929. See page 52, Water Bulletin No. 6.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	116	106	106	112	113	133	130	124	118	110	119	108
2	115	105	106	112	113	132	129	125	118	109	119	107
3	115	105	107	112	113	131	129	125	117	108	119	107
4	114	107	107	111	113	130	129	125	117	108	119	108
5	113	107	106	150	112	127	128	125	117	108	119	108
6	113	105	108	165	112	126	128	125	120	107	118	108
7	111	106	104	176	114	125	128	125	119	106	117	106
8	110	105	105	177	116	125	128	126	117	108	118	106
9	109	103	105	173	119	125	127	126	119	108	119	106
10	110	104	104	153	114	124	127	125	118	108	118	107
11	111	105	106	141	114	124	127	125	117	107	116	107
12	110	105	104	135	114	125	125	124	117	108	115	107
13	111	102	100	135	114	125	125	134	116	108	115	106
14	111	103	101	134	114	125	125	127	116	110	114	106
15	110	104	102	132	113	124	124	128	115	110	115	106
16	112	105	103	131	113	124	124	127	115	110	115	105
17	114	109	103	128	123	123	124	126	115	110	115	105
18	112	111	101	126	141	122	124	125	114	110	114	106
19	110	110	102	125	139	123	124	125	114	111	114	107
20	112	109	104	124	129	123	125	125	114	112	112	106
21	111	110	103	124	148	126	125	123	115	113	112	108
22	111	109	102	122	181	128	124	123	115	114	111	109
23	110	110	103	119	183	130	124	122	115	114	111	110
24	109	108	102	117	183	134	125	122	114	115	110	110
25	109	107	103	117	166	130	125	122	113	115	110	112
26	109	109	106	117	149	130	126	121	114	114	108	112
27	108	107	107	116	143	131	126	120	113	115	107	112
28	108	107	110	115	141	131	125	120	112	117	108	113
29	109	106	110	115	138	132	124	119	110	117	108	112
30	107		110	115	136	130	124	120	110	118	109	113
31	105		111		134		124	120		120		113
Sum	3,435	3,089	3,251	3,929	4,055	3,818	3,902	3,849	3,464	3,448	3,424	3,356

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
				High		Low		Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	ϕ Maximum	ϕ Minimum
Jan.	.53	.36	1	118	31	101	111	6,810	9,043	19,620	6,580
Feb.	.55	.37	18	112	13	101	107	6,130	8,081	17,030	5,890
Mar.	.63	.47	31	112	13	99.0	105	6,450	8,508	17,770	6,210
Apr.	1.87	.57	5	292	4	110	131	7,790	8,006	16,580	5,850
May	2.11	.54	19	352	6	111	131	8,040	8,644	16,840	6,950
June	1.63	.64	24	248	20	122	127	7,570	8,829	16,040	7,020
July	.80	.75	‡ 1	130	18	122	126	7,740	9,106	16,460	7,170
Aug.	2.45	.62	13	444	29	118	124	7,630	8,880	15,840	6,960
Sept.	1.08	.62	9	120	30	109	115	6,870	11,668	" 41,490	6,550
Oct.	1.49	.75	25	158	7	106	111	6,840	10,260	* 25,870	6,840
Nov.	.95	.64	1	120	27	106	114	6,790	9,454	21,850	6,600
Dec.	.67	.55	28	114	17	104	108	6,660	9,278	20,470	6,660
Yearly	2.45	.36		444		99.0	118	85,320	109,757	192,840	85,000

‡ And other days. " Estimated. * Partly Estimated.
ϕ Maximum and Minimum figures are for period 1929 to 1940 only.

DEVILS RIVER STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder on main highway bridge, 12 miles northwest of Del Rio, Texas, and 4.5 miles above confluence with the Rio Grande. Devils River enters the Rio Grande 667.8 river miles below the American Dam at El Paso, Texas. High stage measurements from highway bridge, low stage measurements by wading. Zero of gage is 951.80 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 12 meter measurements during the year. Computations by shifting channel methods. 1940 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, 1940, at highway bridge 2 miles upstream from railroad bridge.

REMARKS: The monthly flow of this spring-fed river is not modified, but the daily flow is modified by 2 power dams, the operation of which began in 1929. There are irrigation diversions for only 8 acres from this river.

EXTREME FLOWS: The highest recorded gage height was on September 1, 1932, when the extreme gage height was 41.0 feet at present station and the extreme flow was 597,000 second feet. (See Special Flood Report 1932 by United States Section of this Commission.) This corresponds to a flow of 147 second feet per square mile of watershed. Zero flow sometimes occurs for a few hours at this station. When this happens the gage height falls to .84 foot or below. On pages 75 and 76 of Water Bulletin No. 9 will be found a record of flood occurrences since 1832 at this station.

CORRECTION: In Water Bulletin No. 6, page 21, the daily discharge as published for January 28 was erroneous. The correct figure is 538 second feet. The January monthly total was correct as published.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	304	303	* 276	280	229	334	500	308	387	285	319	281
2	304	298	* 276	283	227	339	396	315	400	316	298	285
3	300	306	276	277	255	340	351	320	380	314	287	287
4	307	306	276	343	278	330	322	327	364	323	274	293
5	297	290	273	932	260	309	309	329	394	330	304	296
6	306	286	261	2,010	267	309	315	398	391	306	311	287
7	300	286	268	853	306	318	339	385	301	311	126	293
8	282	290	273	545	255	335	313	450	349	330	273	290
9	293	297	272	503	345	2,100	343	351	355	314	386	286
10	302	286	232	493	359	510	283	293	349	306	374	277
11	293	283	197	485	656	451	292	314	343	306	304	291
12	287	275	202	306	537	276	297	307	395	300	280	280
13	301	276	201	324	381	311	323	1,320	318	321	291	279
14	310	278	232	237	* 363	270	336	1,900	326	322	301	271
15	296	276	251	265	* 339	316	311	622	321	344	289	269
16	300	* 276	249	334	* 322	290	329	529	339	319	299	292
17	298	* 276	277	349	302	303	312	529	337	288	300	291
18	304	* 276	282	318	312	259	316	398	310	284	303	290
19	* 304	* 276	259	309	449	291	301	518	343	290	299	279
20	* 303	* 277	234	310	498	302	274	375	334	285	320	278
21	* 302	* 277	249	253	347	323	323	391	260	295	297	291
22	* 302	* 277	251	298	330	312	310	381	309	298	292	288
23	* 301	* 278	266	324	971	294	296	383	401	309	295	291
24	* 300	* 278	270	306	530	361	297	390	330	377	326	272
25	* 299	* 278	311	301	336	439	313	365	334	486	306	276
26	* 298	* 279	285	296	311	325	301	366	323	389	300	188
27	* 295	* 279	278	290	339	305	291	378	306	331	282	284
28	* 294	* 280	311	279	343	295	312	372	305	296	278	257
29	* 292	* 280	296	260	360	452	295	375	293	368	272	268
30	311		297	281	326	501	286	525	284	357	273	266
31	299		277		357		296	384		317		256
Sum	* 9,284	* 8,223	8,158	12,644	11,490	11,900	9,882	14,598	10,181	10,017	8,859	8,632

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1924-1940 Normal	Acre Feet Period 1924-1940 Maximum	Acre Feet Period 1924-1940 Minimum
Jan.	1.80	1.22	18	614	31	168	* 299	* 18,400	25,138	* 45,250	14,500
Feb.	1.73	1.18	1	600	12	152	* 284	* 16,300	22,429	* 36,880	13,300
Mar.	1.67	1.02	23	542	6	97.0	263	16,200	23,138	39,420	14,000
Apr.	3.40	1.07	5	4,790	12	143	421	25,100	26,329	67,800	11,100
May	2.35	.95	23	1,760	28	87.2	371	22,800	47,614	301,000	10,500
June	4.04	.89	9	7,440	14	83.0	397	23,600	45,494	285,000	16,100
July	1.66	.89	28	547	20	76.0	319	19,600	51,435	377,000	19,600
Aug.	3.01	.97	14	3,490	9	92.0	471	29,000	25,955	* 51,000	15,500
Sept.	1.91	.88	22	865	22	60.1	339	20,200	107,248	895,990	13,900
Oct.	1.99	1.12	25	979	18	123	323	19,900	52,033	349,000	18,600
Nov.	1.72	.87	9	592	7	45.4	295	17,600	26,232	56,350	15,900
Dec.	1.72	.91	26	599	26	61.8	278	17,100	25,881	49,520	15,900
Yearly	4.04	.87		7,440		45.4	339	245,800	478,926	1,284,080	237,400

* Partly Estimated.

RIO GRANDE AT DEL RIO STATION

DESCRIPTION: Water-stage recorder, located 900 feet upstream from international highway bridge between Del Rio, Texas and Villa Acuña, Coahuila, and 680.5 river miles below the American Dam at El Paso, Texas. High stage measurements from highway bridge, low stage measurements from boat on cable at gage well. Low water stages by frequent staff gage readings. Zero of gage is 864.80 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 21 meter measurements during the year, 20 by the United States and 1 by the Mexican Section. Computations by shifting channel methods. 1940 records fair. Records available: December 1923 to December 1940. Records are also available for station 11 miles upstream from May 1900 to April 1915; and for station 7.5 miles upstream at McKee's Switch from December 1919 to March 1920. Several small springs but no important tributaries enter the river between the various station sites.

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

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, 1940, when the extreme gage height was -.39 feet and the extreme flow 890 second feet. Numerous records of extreme flows may be found in previous Water Bulletins.

CORRECTION: In United States Geological Survey Water Supply Paper No. 668, page 104, the daily discharge published for October 29, 1927, is erroneous. The correct value is 2,910 second feet. Similarly, the correct daily discharge for December 31, 1929 is 2,390 second feet rather than the erroneous figure shown on page 109 of Water Supply Paper No. 703.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,200	1,960	1,690	1,520	1,040	1,880	4,180	3,190	3,020	1,310	2,050	1,730
2	2,130	2,040	1,770	1,550	989	1,790	4,080	2,720	3,380	1,270	1,980	1,730
3	2,070	2,260	1,780	1,580	1,010	1,740	3,870	2,540	3,010	1,310	1,940	1,730
4	2,190	2,290	1,900	1,590	1,090	2,010	4,650	2,330	3,360	1,310	1,910	1,690
5	2,090	2,280	1,860	6,100	1,170	1,930	5,560	2,470	5,590	1,310	1,940	1,660
6	2,030	2,040	1,740	4,870	1,200	1,790	4,150	3,430	7,820	1,270	1,840	1,660
7	2,090	1,960	1,760	3,100	1,340	2,190	3,650	4,180	6,120	1,230	1,770	1,620
8	2,170	2,020	1,710	2,150	1,460	2,480	3,560	5,070	4,980	1,230	1,870	1,620
9	2,090	2,000	1,770	2,010	3,110	6,160	3,300	5,630	4,280	1,210	1,940	1,700
10	1,980	2,170	1,820	1,970	5,920	3,540	2,890	6,140	3,830	1,210	2,210	1,700
11	1,930	2,240	1,780	1,900	5,880	3,220	2,660	4,370	3,330	1,240	3,150	1,700
12	1,970	2,310	1,720	1,650	6,510	2,370	2,520	3,470	3,080	1,240	3,850	1,700
13	1,960	2,200	1,590	1,410	3,610	2,060	2,460	8,230	2,780	1,270	2,660	1,700
14	2,010	2,200	1,490	1,480	2,600	2,070	2,550	6,800	2,660	3,880	2,250	1,700
15	2,080	2,010	1,470	1,370	2,270	2,330	2,340	6,700	2,530	17,300	2,100	1,660
16	1,970	1,990	1,470	1,390	2,080	2,560	2,480	7,750	2,330	8,470	2,040	1,620
17	1,920	1,980	1,510	1,410	2,010	2,030	2,070	5,820	2,140	6,000	1,940	1,660
18	2,040	1,990	1,480	1,360	2,050	1,960	1,910	4,740	1,940	4,770	1,870	1,620
19	1,930	2,190	1,460	1,320	5,520	2,160	1,800	4,160	1,870	3,710	1,910	1,620
20	1,850	1,990	1,460	1,310	2,990	2,180	1,910	3,890	1,800	3,180	1,840	1,660
21	1,850	1,900	1,440	1,260	1,960	1,920	1,980	3,860	1,660	2,820	1,800	1,680
22	2,120	1,870	1,420	1,260	6,380	1,810	1,910	4,720	1,590	2,650	1,760	1,700
23	2,000	1,900	1,370	1,280	11,100	1,800	1,870	3,440	1,630	2,600	1,730	1,730
24	2,150	1,910	1,660	1,260	3,430	4,130	2,510	3,160	1,550	2,550	1,800	1,730
25	2,010	1,880	1,540	1,220	2,210	4,640	2,260	2,830	1,520	3,870	1,840	1,660
26	1,970	1,990	1,640	1,230	2,120	4,410	2,010	2,700	1,450	3,000	1,840	1,590
27	2,060	1,900	1,550	1,240	2,110	3,740	1,840	3,350	1,410	2,460	1,800	1,590
28	2,070	1,770	1,520	1,230	2,090	3,530	1,980	2,570	1,380	2,120	1,760	1,550
29	2,140	1,690	1,510	1,160	2,080	8,600	1,940	2,700	1,340	2,050	1,800	1,550
30	1,990		1,480	1,100	1,960	7,100	2,120	3,380	1,310	1,940	1,730	1,550
31	1,910		1,480		2,160		3,540	3,450		1,980		1,590
Sum	62,970	58,930	49,840	53,280	91,449	90,130	86,550	129,790	84,690	91,760	60,920	51,400

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	* .65	.27	1	* 2,280	21	1,780	2,030	125,000	172,516	344,000	111,000
Feb.	.82	.17	5	2,540	29	1,610	2,030	117,000	144,793	229,970	96,200
Mar.	† 1.15	-.10	5	2,100	23	1,270	1,610	98,900	143,909	224,670	94,700
Apr.	† 7.28	-.35	6	‖ 10,000	30	960	1,780	106,000	129,449	196,000	83,300
May	7.40	-.39	23	21,200	1	890	2,950	181,000	207,768	* 700,000	68,200
June	5.48	.02	9	13,400	3	1,480	3,000	179,000	211,708	704,000	107,000
July	2.85	.15	5	6,400	19	1,610	2,790	172,000	246,612	*1,228,000	97,800
Aug.	5.80	.54	13	14,600	28	2,230	4,190	257,000	286,904	865,000	124,000
Sept.	3.87	-.22	6	8,300	30	1,140	2,820	168,000	578,239	2,754,590	72,600
Oct.	7.60	-.34	15	20,200	10	1,030	2,960	182,000	355,645	1,409,020	110,000
Nov.	* 2.12	.07	11	* 4,800	23	1,530	2,030	121,000	176,865	376,150	108,000
Dec.	* .41	-.10	1	* 1,920	‡30	1,240	1,660	102,000	166,185	295,180	102,000
Yearly	7.60	-.39		21,200		890	2,490	1,808,900	2,820,593	6,041,720	1,639,000

* Partly Estimated. ‖ Estimated. ‡ And other days.
† Gage height affected by back-water from Las Vacas Arroyo.

ARROYO LAS VACAS NEAR VILLA ACUNA, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car located 1.5 miles upstream from Villa Acuña, Coahuila, and 1.8 miles upstream from the confluence with the Rio Grande just above Del Rio-Villa Acuña international bridge and 680.6 river miles below the American Dam at El Paso, Texas. Zero of the gage is 884.15 feet, United States Coast and Geodetic Survey sea level datum. Prior to September 7, 1939 a staff gage at the same location and on the same datum was used.

RECORDS: Based upon 53 meter measurements during the year, 50 by the Mexican and 3 by the United States Section. Computations by shifting channel methods. Low stage measurements by wading; high stage flows from cable or estimated by extending the rating curve. All discharges above 100 second feet in 1940 were partly estimated. 1940 records fair. Records available: Occasional estimates from June 1935 to March 20, 1938, after which the present record extends to December 31, 1940.

REMARKS: This gaging station began operating March 20, 1938. The flow of this stream is spring-fed and is not modified by irrigation diversions or otherwise.

EXTREME FLOWS: The highest recorded flow was on April 5, 1940, when a flow of 39,200 second feet was recorded with a gage height of 8.14 feet. The lowest flow was 0.7 second foot during several days in November 1938.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	2.1	2.8	3.5	3.5	6.0	15.2	2.8	13.4	5.3	5.6	4.9
2	3.9	2.1	1.8	2.8	3.5	5.7	15.2	3.9	11.0	8.1	5.7	5.3
3	5.6	2.8	4.2	3.2	3.9	5.7	12.7	3.2	10.2	8.5	7.4	5.3
4	4.2	2.8	2.1	60.4	4.2	5.7	12.7	3.2	9.5	8.5	7.1	5.3
5	4.2	2.8	2.1	4,626	4.6	6.0	13.1	3.9	9.9	8.8	6.7	5.6
6	6.0	3.9	2.1	1,752	4.6	6.0	13.1	4.2	10.2	6.7	6.3	5.6
7	4.6	5.3	2.1	46.3	31.4	6.0	13.4	4.2	10.6	7.1	6.0	5.6
8	4.6	5.3	2.1	26.1	16.6	6.0	10.3	4.6	8.5	7.1	5.7	6.0
9	3.2	5.3	2.1	20.8	26.8	6.0	9.9	4.6	8.8	7.1	5.3	6.0
10	3.2	5.0	2.1	18.4	20.8	6.0	9.9	4.6	8.8	7.0	8.5	6.4
11	3.2	4.9	2.1	16.6	16.2	6.4	9.9	4.9	8.8	9.2	4.9	6.3
12	2.1	4.6	1.8	14.8	11.7	6.0	9.5	4.9	8.8	9.2	7.8	7.8
13	2.1	4.6	1.8	12.0	11.3	6.0	9.5	533.2	9.2	9.2	10.6	7.8
14	1.4	4.6	1.4	9.2	8.1	6.0	9.5	37.1	6.0	9.2	10.9	7.8
15	2.1	4.6	1.1	9.2	6.0	11.7	9.2	16.6	6.0	6.7	10.9	7.8
16	2.8	5.0	.7	9.2	6.4	6.0	6.7	14.5	6.0	6.7	10.2	6.4
17	2.1	7.1	2.8	8.8	37.8	5.7	6.7	11.0	6.4	4.9	9.5	6.3
18	3.2	7.1	2.8	6.3	21.9	5.7	6.4	15.2	6.7	3.5	9.2	6.4
19	3.2	4.9	3.2	6.0	17.7	32.5	4.2	24.4	6.7	4.6	8.5	6.3
20	2.1	4.9	1.0	5.6	15.9	5.7	4.2	16.3	7.1	4.6	8.5	6.4
21	2.1	3.2	1.4	5.6	16.3	5.7	3.9	14.5	5.0	4.6	5.6	6.3
22	2.1	3.2	1.8	5.3	16.2	5.7	3.5	13.1	4.9	4.6	5.7	6.4
23	2.5	3.2	2.1	5.3	13.1	8.1	3.2	10.9	5.3	4.6	5.7	4.6
24	2.5	3.2	1,194	5.3	9.5	168.0	3.5	11.7	5.7	8.8	5.3	4.6
25	3.1	5.0	299	5.3	9.2	23.3	3.5	12.0	5.7	12.3	5.3	3.2
26	1.8	4.9	8.8	5.3	6.7	16.2	3.6	12.7	5.7	9.2	5.3	2.1
27	2.5	4.9	3.9	5.3	6.4	11.7	3.5	8.8	7.7	9.5	5.3	2.1
28	2.5	4.2	3.9	5.3	8.5	12.0	3.5	8.1	5.3	7.1	5.3	3.2
29	2.5	3.5	4.2	3.5	6.0	57.6	3.6	8.8	5.3	6.7	8.1	3.2
30	2.5		4.6	3.5	6.0	21.5	3.5	37.1	5.3	8.8	7.8	4.6
31	2.1		2.1		6.0		3.5	22.6		6.0		4.6
Sum	91.8	125.0	1,568.0	6,706.9	376.8	480.6	240.1	877.6	228.5	224.2	214.7	170.2

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1938-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	1.08	.92	7	6.4	13	1.1	3.0	182	140	182	" 79.4
Feb.	1.12	.95	18	7.1	1	1.4	4.3	248	166	248	" 113
Mar.	4.95	1.02	24	4,980	16	.7	50.6	3,110	1,600	3,110	* 181
Apr.	8.14	.98	5	39,200	2	1.8	224	13,300	4,836	13,300	168
May	2.00	1.02	7	129	1	2.5	12.2	747	464	747	156
June	3.25	1.05	24	819	4	3.9	16.0	953	408	953	122
July	1.25	1.02	1	19.1	22	2.5	7.7	476	2,975	7,900	476
Aug.	4.13	.98	13	2,330	1	2.8	28.3	1,740	2,040	2,870	1,510
Sept.	1.25	1.05	1	15.5	30	3.5	7.6	453	457	800	119
Oct.	1.51	.98	24	43.8	18	2.5	7.2	445	273	445	134
Nov.	1.18	1.05	10	11.3	1	4.2	7.2	426	249	426	106
Dec.	1.18	1.05	‡12	7.8	‡26	2.1	5.5	338	203	338	132
Yearly	8.14	.92		39,200		.7	30.9	22,418	13,811	22,418	7,392

‡ And other days. " Estimated January and February 1938. * Partly estimated March 1938.

SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder at Silos farm road bridge 1.75 miles south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande and 4 miles below the Del Rio gaging station on the Rio Grande. This stream enters the Rio Grande 683.9 river miles below the American Dam at El Paso, Texas. Low and medium flow measurements by wading or from bridge. High flows by slope-area measurements. Zero of gage is 875.05 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 15 meter measurements during the year, 13 by the United States and 2 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: September 1, 1931 to December 31, 1940.

REMARKS: The flow of this spring-fed creek was greatly modified in 1940 by municipal diversions at Del Rio of 1,185 acre feet and by irrigation diversions above this station.

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

CORRECTION: In Water Bulletin No. 5, page 23, a typographical error gave the mean daily discharge of this creek as 234.0 second feet on June 5, 1935. This should be corrected to 334.0. The monthly totals were correct.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	67.3	32.0	30.8	30.8	31.5	41.7	57.7	39.4	50.3	48.0	35.5	31.0
2	67.3	30.7	30.1	30.2	31.0	43.4	55.1	39.5	49.4	43.4	34.7	31.0
3	66.2	32.9	30.8	30.3	31.2	41.9	54.3	36.7	48.6	42.6	33.9	31.0
4	66.2	30.8	31.5	29.1	32.0	40.5	55.1	35.3	47.1	42.6	33.9	31.0
5	67.3	30.9	31.5	716	33.6	41.3	56.9	35.3	46.3	42.7	33.8	31.0
6	67.3	31.0	32.2	552	33.1	41.4	56.9	40.9	46.3	42.7	33.7	31.0
7	66.2	31.1	30.1	51.5	66.0	41.5	56.9	38.8	47.1	42.7	34.4	30.4
8	67.3	30.5	29.5	46.4	35.6	41.5	56.9	37.4	47.1	42.0	34.3	30.4
9	69.3	31.3	31.0	45.6	160	1,810	56.9	37.4	46.3	42.0	34.3	30.5
10	70.4	31.4	32.5	43.4	45.0	77.6	55.2	38.1	46.3	41.9	34.3	32.4
11	53.5	30.0	54.6	46.7	44.4	67.7	52.6	37.4	46.3	42.6	33.6	32.4
12	49.9	29.4	37.0	44.8	43.8	62.1	50.1	36.7	47.1	42.5	33.6	31.9
13	53.6	28.8	36.3	42.3	37.7	96.0	48.4	370	49.4	43.2	33.6	31.9
14	56.5	28.2	38.0	* 41.3	35.7	109	50.1	192	50.3	42.4	32.9	31.9
15	57.6	29.0	38.1	37.3	35.1	65.0	49.2	53.7	46.3	42.3	33.6	32.0
16	54.8	38.5	36.6	34.2	69.9	56.7	48.4	50.3	46.3	42.2	33.6	32.0
17	47.5	29.2	36.0	34.7	75.3	52.4	46.9	47.8	45.6	42.2	32.9	32.1
18	43.3	29.2	36.0	34.5	39.6	48.2	46.9	119	45.6	40.6	32.9	32.1
19	40.9	29.3	36.1	33.7	95.0	54.2	46.2	68.5	45.6	39.8	32.2	32.7
20	38.5	28.7	36.9	33.5	42.2	55.8	46.2	50.3	46.4	39.8	32.2	32.8
21	34.8	28.8	37.8	34.7	45.3	59.6	46.2	49.4	45.6	39.0	32.2	32.8
22	35.7	29.5	35.6	33.8	122	52.5	45.4	48.6	46.4	38.2	32.9	32.2
23	* 35.0	29.5	35.0	33.6	157	50.0	42.3	47.8	46.4	38.2	32.3	32.3
24	* 35.1	28.8	179	34.9	49.8	554	41.6	47.1	46.4	46.6	31.7	31.6
25	* 34.4	28.8	54.8	33.9	45.0	* 41.7	38.7	47.8	46.4	38.0	31.7	31.0
26	* 33.7	30.2	48.7	35.6	45.8	31.3	38.7	47.1	46.5	37.3	31.7	31.7
27	* 33.8	30.2	47.9	37.3	46.7	29.5	39.4	46.3	47.3	37.9	31.7	31.7
28	* 33.2	30.2	47.2	33.0	75.9	27.8	42.3	45.5	48.0	37.8	31.7	31.1
29	* 33.2	30.1	* 45.6	32.5	78.9	190	41.6	69.0	48.8	36.4	31.0	31.8
30	* 32.5		* 46.6	32.0	47.7	62.3	42.3	149	48.8	36.3	31.7	31.8
31	* 32.6		38.7		47.0		40.1	52.0		35.5		38.0
Sum	1,544.9	879.0	1,312.5	2,299.6	1,778.8	3,986.6	1,505.5	2,054.1	1,414.3	1,269.4	992.5	987.5

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1932-1940 ⊕ Average	Acre Feet Period 1932-1940 ⊕ Maximum	Acre Feet Period 1932-1940 ⊕ Minimum
Jan.	1.36	* .89	9	72.6	31	* 31.9	49.8	3,060	4,358	7,070	934
Feb.	1.73	.81	16	120	13	27.4	30.3	1,740	2,999	5,490	487
Mar.	4.96	.81	24	894	8	29.5	42.3	2,600	2,914	4,190	1,560
Apr.	11.39	.78	5	5,460	4	28.4	76.7	4,560	3,075	* 6,120	566
May	4.95	.80	23	894	1	28.7	57.4	3,530	4,029	6,700	2,310
June	13.90	.89	9	9,360	28	27.0	133	7,910	8,450	* 47,900	1,510
July	1.15	.84	1	61.4	31	36.6	48.6	2,990	3,281	* 5,350	1,550
Aug.	6.91	.80	13	1,840	3	33.9	66.3	4,070	3,614	5,590	1,280
Sept.	1.08	.93	13	55.4	12	43.2	47.1	2,810	5,316	19,100	2,070
Oct.	1.78	.82	24	132	31	34.1	40.9	2,520	3,503	6,320	1,710
Nov.	.85	.77	1	36.2	29	30.4	33.1	1,970	3,173	5,560	526
Dec.	1.06	.73	31	52.9	7	27.9	31.9	1,960	3,353	5,820	496
Yearly	13.90	.73		9,360		27.0	54.7	39,720	48,065	98,137	22,202

* Partly Estimated.

⊕ The average, maximum, and mimimum discharges for September, October, November, and December are for the period 1931 to 1940.

PINTO CREEK STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder, cable with sit-down cable car equipped for winch and heavy weights, and concrete control dam, 0.6 mile below Del Rio-Eagle Pass highway and 5.5 miles above confluence with the Rio Grande. This creek enters the Rio Grande 702.1 river miles below the American Dam at El Paso, Texas. Zero of gage is 854.61 feet above mean sea level, United States Coast and Geodetic Survey datum. Also a series of pipe gages (high stage indicating gages) 750 feet upstream from the gage well.

RECORDS: Based upon 16 meter measurements during the year and stable rating curve. 1940 records good. Records available: November 1928 to December 1940.

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

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 watershed. This spring-fed creek is often dry.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.4	5.6	5.0	4.2	2.6	4.7	15.0	* .2	* 4.2	0	1.4	1.3
2	5.4	5.8	4.7	4.2	2.1	4.0	9.9	* .1	* 3.8	0	1.4	1.3
3	5.4	19.7	4.6	4.3	1.6	3.3	7.3	0	* 3.4	0	1.4	1.3
4	5.2	10.6	4.7	4.2	1.4	3.1	12.1	0	* 2.9	0	1.4	1.3
5	5.0	9.2	4.8	18.5	1.2	3.1	7.8	0	* 2.7	0	1.4	1.3
6	5.5	7.4	4.7	32.0	1.1	2.9	5.2	0	* 2.6	0	1.4	1.3
7	5.7	6.7	4.6	10.1	1.3	3.0	4.6	0	* 2.4	11.6	1.4	1.3
8	5.3	6.5	4.6	9.4	2.0	2.8	4.1	0	* 2.2	1.4	1.3	1.3
9	5.3	7.2	4.9	8.4	14.8	3.5	3.3	0	* 2.1	.5	1.3	1.3
10	5.3	6.5	4.7	7.5	12.3	2.9	2.7	0	* 1.9	.2	1.3	1.3
11	5.3	5.9	4.5	6.9	7.3	2.5	2.6	0	* 1.7	.1	1.3	5.1
12	5.5	5.7	4.4	5.7	5.1	2.4	2.2	0	* 1.6	0	1.3	3.8
13	5.5	5.3	4.0	5.6	4.2	2.2	2.0	54.0	* 1.4	0	1.3	2.9
14	5.1	5.1	3.7	5.6	3.7	13.4	1.9	5.8	* 1.2	0	1.3	2.7
15	4.9	5.1	3.9	5.4	3.4	7.7	1.8	1.3	* 1.1	0	1.3	2.3
16	5.1	7.7	4.0	5.0	3.0	3.4	3.8	.6	.9	0	1.3	1.9
17	5.3	5.6	4.1	4.6	3.3	2.2	3.1	.4	* .8	0	1.3	1.4
18	5.3	4.8	4.0	4.1	2.9	43.0	2.2	18.4	* .8	0	1.3	1.4
19	4.7	5.1	3.8	4.1	2.3	12.1	1.5	184	* .7	0	1.3	1.4
20	5.0	4.8	3.8	4.2	2.0	3.7	1.0	13.9	* .6	0	1.3	1.4
21	5.4	4.7	3.9	4.1	2.0	2.7	.8	7.9	* .5	0	1.3	1.4
22	6.2	4.7	3.8	4.0	158	2.1	.7	5.2	* .4	0	1.3	1.4
23	6.0	4.9	3.6	3.7	486	1.5	.5	4.4	* .4	0	1.3	1.4
24	5.8	5.0	91.5	3.6	16.8	65.8	.4	3.8	* .3	61.0	1.3	1.4
25	5.8	4.8	9.5	3.9	10.5	11.1	* .4	3.3	* .2	4.2	1.3	1.4
26	5.8	4.9	6.6	4.0	9.2	5.1	* .4	2.9	* .2	1.4	1.3	1.5
27	5.6	5.1	5.8	4.2	8.9	3.1	* .3	2.7	* .1	1.4	1.3	1.5
28	5.8	5.0	5.6	4.0	85.1	2.7	* .3	2.6	0	1.4	1.3	1.5
29	6.0	4.9	5.3	3.6	62.6	45.5	* .3	2.6	0	1.4	1.3	1.5
30	5.8		5.0	3.3	7.6	64.4	* .2	9.6	0	1.4	1.3	1.5
31	5.8		4.8		5.5		* .2	4.7		1.4		1.5
Sum	169.2	184.3	232.9	192.4	929.8	329.9	98.6	328.4	*41.1	87.4	39.7	53.3

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	⊕ Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	3.39	3.29	22	6.6	19	4.7	5.5	336	587	2,110	0
Feb.	4.15	3.27	3	84.0	22	4.6	6.4	366	507	1,860	8.3
Mar.	6.33	3.13	24	1,470	23	3.4	7.5	462	719	2,500	4.3
Apr.	4.52	3.00	5	267	30	2.8	6.4	382	899	3,600	43.0
May	7.71	2.32	23	2,660	7	1.0	30.0	1,840	2,843	20,500	28.0
June	5.01	2.45	18	730	24	1.1	11.0	654	3,040	30,000	0
July	3.72	1.49	1	21.3	31	.2	3.2	196	3,534	30,000	0
Aug.	5.59		19	1,010	‡ 3	0	10.6	651	4,474	48,700	0
Sept.	2.92		1	4.2	‡28	0	* 1.4	* 81.5	2,628	17,300	0
Oct.	5.09		24	735	‡ 1	0	2.8	173	1,110	4,000	0
Nov.	2.64	1.83	‡ 1	1.4	‡ 8	1.3	1.3	78.7	532	2,150	0
Dec.	3.45	2.70	11	9.0	‡ 1	1.3	1.7	106	640	2,180	0
Yearly	7.71			2,660		0	7.3	5,326.2	21,306	76,259.3	2,651.4

* Partly Estimated. ‡ And other days.

⊕ The annual figures only (partly estimated) are for the period 1924-1940. The monthly figures are for the period 1929-1940, except December which is for the period 1928 to 1940.

RIO SAN DIEGO STATION AT JIMENEZ, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car. Masonry Cipoletti weir control for measuring discharges up to 700 second feet. The station is located 4.4 miles west of Jimenez, Coahuila, and five miles above the confluence with the Rio Grande. This stream enters the Rio Grande 707.1 river miles below the American Dam at El Paso, Texas. Zero of the gage is 828.90 feet above United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon a rating table, the lower portion of which conforms to the weir table and the upper portion of which is based upon current meter measurements. The river discharge in 1940 exceeded the weir capacity only on 3 occasions of 28 hours total time.

REMARKS: This station was constructed in November, 1932, and has a weir of 700 second feet capacity. From 1924 to 1932 there was a staff-gage at Paso del Salto, 3.1 miles upstream from the present station on which readings were made by agents of the Department of Agriculture, Monterrey, N. L. The flow of this spring-fed stream is modified by two small storage reservoirs, San Miguel and Centenario on the Irrigation District of San Carlos, Coahuila, and by irrigation of Dolores Hacienda just above this station. One-fourth mile downstream from this gaging station water was diverted for the Jimenez Community.

EXTREME FLOWS: The highest determined flow was on June 14, 1935, when a peak flow of 32,100 second feet passed this station with a gage height of 12.11 feet on the present gage. From reports by local inhabitants, the water level in 1905 reached a height of 20.67 feet on the present gage scale, the discharge being unknown. The lowest flow recorded was 4.9 second feet on November 26, 1937.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	42.0	42.0	24.0	42.0	42.0	129	144	42.0	158.9	143.4	52.3	52.2
2	52.3	32.9	24.0	52.3	32.8	114	144	42.0	191.8	143.4	52.3	52.3
3	42.0	24.0	24.0	52.3	24.0	129	143	42.0	227.1	128.5	52.3	52.2
4	52.3	32.8	24.0	52.3	32.8	129	143	42.0	209.1	128.5	52.3	52.3
5	52.2	32.9	24.0	74.8	24.0	114	143	42.0	209.1	128.5	63.2	52.3
6	52.3	42.0	16.2	227	32.8	114	143	42.0	209.1	114.1	74.9	52.2
7	52.3	42.0	16.2	144	32.8	87.2	129	42.0	227.1	128.5	74.9	52.3
8	52.2	42.1	24.0	114	32.8	63.2	129	42.0	209.1	143.4	74.9	52.3
9	52.3	42.0	24.0	114	100	159	114	42.0	209.1	143.4	74.9	52.2
10	52.3	42.0	24.0	114	63.2	114	114	42.0	209.1	128.5	74.9	52.3
11	52.2	42.0	16.2	100	52.3	87.2	114	42.0	209.1	128.5	74.9	52.3
12	52.3	42.1	16.2	87.2	52.3	63.2	114	32.8	209.1	128.5	74.9	52.2
13	52.3	42.0	24.0	87.2	42.1	52.3	100	*1,405.5	209.1	114.1	74.9	52.3
14	52.2	42.1	24.0	74.8	42.0	52.2	87.2	413.2	209.1	100.3	74.9	52.3
15	52.3	32.8	24.0	74.8	42.0	42.0	74.9	175.2	191.8	100.3	74.9	52.2
16	52.3	32.8	24.0	74.8	42.1	42.0	74.8	158.9	209.1	87.2	74.9	52.3
17	52.3	32.9	24.0	74.8	100	42.0	74.9	100.3	209.1	87.2	74.9	52.3
18	52.2	32.8	16.2	63.2	100	94.3	74.9	42.0	245.4	100.3	74.9	52.2
19	52.3	32.8	16.2	63.2	100	74.8	74.9	264.5	227.1	100.3	74.9	52.3
20	42.0	32.9	16.2	63.2	114	63.2	74.9	114.1	209.1	87.2	74.9	52.3
21	52.3	24.0	16.2	63.2	389	63.2	74.9	87.2	209.1	87.2	63.2	52.2
22	52.3	24.0	16.2	52.3	304	52.3	74.9	87.2	191.8	87.2	52.3	52.3
23	42.0	24.0	16.2	52.3	484	52.3	74.9	87.2	191.8	87.2	52.3	52.3
24	52.3	32.8	175	52.3	367	144	63.2	100.3	175.2	143.4	52.3	52.2
25	52.3	32.8	246	52.3	346	143	42.0	87.2	158.9	100.3	52.3	52.3
26	52.3	32.9	129	52.3	304	143	42.0	87.2	143.4	100.3	52.3	52.3
27	42.0	32.8	87.2	52.3	284	143	32.8	74.9	143.4	100.3	52.3	52.2
28	42.0	24.0	87.2	52.3	246	143	32.8	74.9	143.4	87.2	52.3	52.3
29	42.0	24.1	74.8	52.3	209	175	42.0	172.7	143.4	87.2	52.3	52.3
30	42.0		74.8	52.3	175	159	42.0	* 508.5	143.4	87.2	52.3	52.2
31	42.0		63.2		144		42.0	245.4		74.9		52.3
Sum	1,528.1	991.3	1,411.2	2,283.8	4,356.0	2,983.4	2,774.0	*4,781.2	5,831.3	3,406.5	1,929.8	1,620.2

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1933-1940 ⊕ Average	Acre Feet Period 1933-1940 ⊕ Maximum	Acre Feet Period 1933-1940 ⊕ Minimum
Jan.	2.85	2.82	‡ 2	52.3	‡ 1	42.0	49.3	3,030	9,375	36,430	2,910
Feb.	2.85	2.76	10	52.3	‡ 2	24.0	34.2	1,970	6,292	25,760	1,970
Mar.	4.13	2.72	24	918	‡ 5	16.2	45.5	2,800	5,929	21,500	2,140
Apr.	3.41	2.82	6	325	‡ 1	42.0	76.1	4,530	6,310	16,800	1,110
May	4.13	2.76	21	918	‡ 3	24.0	141	8,640	20,085	120,000	1,290
June	3.67	2.79	18	509	17	32.8	99.4	5,920	13,051	62,200	1,420
July	3.08	2.79	‡ 1	143	‡27	32.8	89.5	5,500	8,994	21,500	1,210
Aug.	5.28	2.79	13	3,110	12	32.8	*154	*9,480	9,036	20,000	2,020
Sept.	3.31	3.05	18	265	25	129	194	11,560	14,676	64,500	2,210
Oct.	3.54	2.85	24	413	31	52.3	110	6,760	23,633	146,640	1,950
Nov.	2.92	2.85	‡ 5	74.9	‡ 1	52.3	64.3	3,830	13,400	68,290	1,960
Dec.	2.85	2.85	‡ 1	52.3	‡ 1	52.3	52.3	3,210	9,840	45,160	2,060
Yearly	5.28	2.72		3,110		16.2	92.6	67,230	140,621	381,320	27,460

⊕ The Average, Maximum, and Minimum Discharges for October, November, and December are for the period 1932 to 1940.

* Partly Estimated. ‡ And other days.

RIO SAN RODRIGO STATION NEAR EL MORAL, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, and masonry control weir located 10.6 miles west of the town of El Moral, Coahuila, 19.3 miles northwest from Piedras Negras and 11.2 miles above the confluence with the Rio Grande. Zero of the gage is 873.85 feet above sea level, United States Coast and Geodetic Survey datum. This stream enters the Rio Grande 719.3 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon a rating table the lower portion of which conforms to the weir table and the upper portion of which is based upon meter measurements. 1940 records good. Records available: 1922 to 1940.

REMARKS: From 1922 to 1932 there were made daily 3 staff-gage readings at this station, on the same gage used at this station prior to December, 1938. This station was constructed in October 1932, at a point 1,640 feet upstream from Paso de las Mulas. In December 1938 the station was moved 3,300 feet downstream to the present site. Flow exceeded the weir capacity on 4 occasions, totaling 113 hours in 1940. The flow of this spring-fed river was modified by irrigation diversions above and below this station.

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 river is sometimes dry.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	12.0	8.1	* 16.3	8.1	8.1	16.2	4.9	104	79.5	50.1	43.8
2	0	8.1	4.9	* 16.3	8.2	8.2	16.3	4.9	87.6	79.5	50.2	43.8
3	0	67.8	8.1	* 16.3	8.1	8.1	21.2	4.9	79.5	71.7	50.1	43.8
4	0	31.4	8.1	* 12.0	8.1	8.1	16.2	4.9	79.5	71.7	43.8	43.8
5	0	21.2	5.0	* 12.0	8.1	8.1	16.3	4.9	71.7	64.3	50.2	43.8
6	0	16.3	4.9	12.0	8.1	8.1	16.2	4.9	79.5	64.3	50.1	43.8
7	0	16.2	4.9	12.0	8.1	8.2	16.3	4.9	79.5	64.3	50.2	43.8
8	0	16.3	5.0	16.3	8.1	8.1	16.2	4.9	71.7	64.3	57.2	43.8
9	0	16.2	4.9	12.0	12.0	8.1	16.3	4.9	71.7	57.2	57.2	43.8
10	0	16.3	4.9	8.1	8.2	8.1	16.2	4.9	71.7	57.2	57.2	43.8
11	0	16.2	8.1	8.1	8.1	8.1	21.2	4.9	71.7	57.2	50.2	43.8
12	0	16.3	4.9	8.1	12.0	8.2	16.3	4.9	71.7	64.3	57.2	43.8
13	0	12.0	4.9	8.1	12.0	23.0	16.2	4,340	79.5	64.3	57.2	43.8
14	0	12.0	8.1	8.2	8.1	37.4	16.3	705	79.5	57.2	57.2	37.4
15	0	16.2	4.9	8.1	8.1	12.0	16.2	173	79.4	57.2	* 57.2	37.5
16	0	12.0	12.0	8.1	8.1	8.1	16.3	105	79.5	57.2	* 57.2	37.4
17	0	8.1	12.0	8.1	12.0	8.1	16.2	79.5	79.5	57.2	* 57.2	37.5
18	0	8.2	8.1	8.1	79.5	12.0	21.2	71.7	79.4	50.2	* 57.2	31.4
19	0	8.1	12.0	8.2	87.6	21.2	21.2	71.7	79.5	50.1	* 57.2	31.4
20	2.1	12.0	12.0	8.1	43.8	21.2	21.2	71.7	79.5	50.1	* 50.1	31.5
21	2.1	12.0	4.9	8.1	16.3	31.4	21.2	64.3	79.4	43.8	* 50.2	31.4
22	5.0	12.0	4.9	8.1	16.2	21.2	16.2	50.1	79.5	50.1	* 50.1	31.4
23	8.1	12.0	8.1	8.1	16.3	16.3	16.2	43.8	79.5	50.1	* 50.2	26.1
24	8.1	12.0	* 156	8.1	16.2	16.2	12.0	43.8	79.4	64.3	* 50.1	26.1
25	8.2	12.0	* 114	8.2	12.0	12.0	12.0	37.4	79.5	79.5	43.8	26.1
26	12.0	12.0	* 43.8	8.1	16.3	8.1	8.1	31.4	79.5	57.2	* 43.8	21.2
27	8.1	12.0	57.2	8.1	16.2	8.1	8.1	31.4	79.5	57.2	* 43.8	26.1
28	8.1	8.2	31.4	8.1	16.3	8.2	5.0	31.4	79.4	57.2	* 43.8	31.4
29	8.2	8.1	21.2	8.1	16.2	12.0	4.9	31.4	79.5	50.1	* 43.8	31.5
30	8.1		16.3	* 8.1	16.3	21.2	5.0	419	79.5	57.2	* 43.8	31.4
31	8.1		16.2		16.2		4.9	173		50.1		31.4
Sum	86.2	443.2	*619.8	*295.6	538.9	395.2	463.3	6,633.4	2,370.3	1,855.8	*1,537.6	1,127.6

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1932-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	.13	0.00	26	12.0	‡ 1	0	2.8	171	3,860	14,850	171
Feb.	1.28	.07	3	403	18	4.9	15.3	879	2,770	11,580	554
Mar.	" 2.26	.03	24	1,170	‡ 6	2.1	*19.9	*1,230	2,747	9,900	575
Apr.	.20	.10	8	21.2	‡10	8.1	*9.9	* 586	2,262	6,870	380
May	.62	.10	18	113	‡ 1	8.1	17.4	1,069	6,924	42.300	57.5
June	.72	.07	18	142	‡ 8	4.9	13.2	784	5,852	37,600	30.0
July	.20	.07	‡ 3	21.2	‡27	4.9	14.9	919	4,081	12,200	0
Aug.	8.04	.03	13	12,190	‡ 1	2.1	214	13,160	3,893	13,160	39.3
Sept.	.66	.46	1	123	‡ 4	71.7	79.0	4,700	32,408	* 253,960	471
Oct.	.72	.33	24	142	‡16	43.8	59.9	3,680	12,269	81,360	815
Nov.	.43	.33	12	64.3	‡ 1	43.8	*51.3	*3,050	5,308	24,450	534
Dec.	.33	.20	‡ 1	43.8	26	21.2	36.4	2,240	4,291	19,060	130
Yearly	8.04	0.00		12,190		0	44.7	32,468	86,665	414,310	7,427

* Partly Estimated. " Estimated. ‡ And other days.

RIO GRANDE AT EAGLE PASS STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch located .5 mile above the international highway bridge between Eagle Pass, Texas and Piedras Negras, Coahuila, and 738.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 151 meter measurements, 142 by the Mexican and 9 by the United States Section during the year. Computations by shifting channel methods. 1940 records good. Records available: May 1900 to April 1916; November 1923 to December 1940.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,280	1,940	1,730	1,640	1,070	2,160	5,120	2,960	3,190	1,410	1,890	1,760
2	2,340	2,020	1,740	1,600	1,030	1,890	4,410	2,740	3,000	1,430	1,880	1,820
3	2,280	2,610	1,790	1,640	954	1,790	4,030	* 2,420	3,230	1,440	1,940	1,790
4	2,220	2,450	1,900	1,650	1,020	1,700	3,780	* 2,390	3,040	1,390	2,060	1,760
5	2,340	2,460	1,980	3,390	1,030	2,000	5,300	* 2,310	* 3,290	1,370	2,120	1,730
6	2,230	2,370	1,890	12,640	1,110	1,850	* 4,560	* 2,440	7,310	1,350	1,830	1,660
7	2,180	2,200	1,750	6,710	1,250	1,710	* 4,200	* 3,370	7,730	1,460	1,890	1,670
8	2,300	2,060	1,710	3,360	1,420	2,120	* 3,890	* 4,060	6,320	1,350	1,930	1,630
9	2,340	2,130	1,670	2,400	2,740	6,430	* 3,340	4,980	* 6,250	1,320	1,980	1,640
10	2,210	2,020	1,780	2,340	5,930	3,780	* 3,020	* 5,510	* 4,630	1,290	2,010	1,730
11	2,100	2,230	1,840	2,300	4,100	4,020	2,730	* 4,870	* 3,710	1,290	2,090	1,950
12	2,050	2,270	1,940	2,040	7,770	3,040	2,610	* 3,600	3,200	1,320	3,600	1,920
13	2,060	2,260	1,790	1,940	4,870	2,310	2,440	9,010	3,050	1,360	3,100	1,840
14	2,010	2,230	1,640	1,580	3,210	2,250	2,390	10,700	2,860	1,400	2,380	1,710
15	2,080	2,260	1,490	1,710	2,310	2,150	2,510	6,080	2,730	10,310	2,160	1,710
16	2,080	2,170	1,470	1,400	2,080	2,440	2,280	7,730	2,560	14,160	2,090	1,790
17	1,980	2,150	1,520	1,470	2,020	2,450	2,390	6,320	2,390	6,040	2,000	1,720
18	1,910	2,050	1,510	1,730	2,030	2,000	1,940	5,470	2,280	5,470	1,900	1,650
19	2,010	2,070	1,520	1,420	2,740	2,730	1,940	6,220	2,230	4,590	1,920	1,640
20	1,960	2,160	1,470	1,360	4,940	2,630	1,840	* 4,980	2,110	3,460	1,950	1,720
21	2,020	1,980	1,480	1,350	4,170	2,180	1,800	* 3,990	2,040	3,040	1,930	1,720
22	2,030	1,890	1,390	1,420	2,620	1,970	1,920	4,730	1,900	2,800	1,920	1,670
23	2,270	1.900	1,350	1,310	14,730	1,830	1,830	4,700	1,720	2,560	1,920	1,760
24	2,110	1,920	1,480	1,330	6,640	1,830	1,730	3,670	1,800	2,550	1,880	1,760
25	2,230	1,940	2,590	1,300	3,780	5,610	2,350	3,310	1,720	2,960	1,930	1,760
26	2,130	1,960	2,040	1,270	2,310	4,410	2,210	2,900	1,630	4,660	1,920	1,760
27	2,050	2,010	1,940	1,280	2,480	3,850	1,910	3,090	1,590	2,710	1,860	1,580
28	2,080	1,910	1,840	1,260	2,640	3,810	1,780	2,930	1,540	2,480	1,800	1,630
29	2,180	1,820	1,790	1,280	4,380	5,610	1,860	2,420	1,490	2,190	1,740	1,590
30	2,190		1,790	1,110	2,140	10,560	1,870	3,600	1,480	2,000	1,790	1,590
31	2,040		1,650		2,040		1,980	3,780		2,040		1,590
Sum	66,290	61,440	53,470	67,230	101,554	93,110	85,960	*137,280	92,020	93,200	61,410	53,250

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1924-1940 Normal	Maximum	Minimum
Jan.	3.28	2.89	1	2,510	19	1,860	2,140	131,490	191,777	365,000	116,000
Feb.	3.54	2.72	3	3,060	29	1,670	2,120	121,870	157,056	254,250	99,200
Mar.	3.58	2.33	25	3,290	24	1,260	1,720	106,060	155,063	247,440	95,900
Apr.	8.92	2.30	6	20,480	30	1,020	2,240	133,350	142,856	219,000	92,100
May	9.45	2.17	23	22,530	6	886	3,280	201,430	249,669	869,000	77,500
June	7.12	2.62	9	13,630	7	1,500	3,100	184,680	256,293	1,005,000	113,340
July	5.12	2.76	1	6,990	24	1,630	2,770	170,500	268,482	1,255,000	125,000
Aug.	9.58	" 3.12	13	23,410	29	2,310	*4,430	*272,290	307,376	969,000	136,000
Sept.	5.94	2.53	7	8,830	30	1,360	3,070	182,500	610,791	2,857,410	80,900
Oct.	8.73	2.40	15	19,180	10	1,170	3,010	184,860	403,622	1,603,480	121,000
Nov.	4.30	2.62	12	4,200	6	1,520	2,050	121,810	205,167	486,390	109,000
Dec.	3.12	2.62	11	2,280	18	1,480	1,720	105,620	186,585	369,760	105,620
Yearly	9.58	2.17		23,410		886	2,640	1,916,460	3,134,737	6,668,460	1,798,000

* Partly Estimated. " Estimated.

RIO ESCONDIDO STATION AT VILLA FUENTE, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, located 3.1 miles southwest of the City of Piedras Negras, Coahuila on the outskirts of Villa de Fuente, 5 miles above the confluence with the Rio Grande and 5.6 miles below the confluence of the Rio San Antonio. This stream enters the Rio Grande 742.4 river miles below the American Dam at El Paso, Texas. Zero of gage is 717.78 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 48 meter measurements. Computations by shifting channel methods. 1940 records fair. Records available: 1922 to 1940.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.9	3.2	3.2	6.3	6.7	23.3	18.4	2.5	60.0	19.4	17.3	26.8
2	9.9	3.2	3.9	6.7	4.9	20.8	16.2	2.5	50.2	19.4	15.2	27.2
3	11.0	18.3	3.9	7.8	4.6	19.4	24.0	2.5	55.8	18.0	16.3	26.1
4	11.0	6.0	3.9	7.4	4.6	19.4	13.8	2.5	57.6	14.8	17.0	27.9
5	11.0	3.5	3.9	12.4	4.2	20.8	11.6	2.5	60.7	12.7	17.6	26.8
6	11.0	3.2	4.2	39.9	4.2	20.1	8.8	2.1	50.5	12.4	19.8	26.1
7	11.0	2.8	4.2	37.4	498	19.4	8.1	3.2	41.0	119	19.8	25.1
8	11.0	2.8	4.2	9.2	38.5	17.7	8.1	3.2	35.3	19.8	21.2	24.0
9	8.8	2.8	4.2	5.3	27.2	62.5	8.5	2.8	30.0	15.5	20.8	23.3
10	4.6	2.5	20.5	4.9	16.9	31.1	7.1	2.8	24.7	15.2	20.8	22.2
11	4.6	2.5	106	5.3	8.5	22.2	7.1	2.8	18.0	13.8	20.8	22.6
12	4.6	2.5	3.5	5.6	8.5	20.5	6.3	2.5	17.3	13.4	20.8	29.3
13	4.6	2.5	3.5	6.0	8.5	20.1	5.7	2,154	16.3	12.0	20.8	28.2
14	4.2	2.5	3.5	6.0	8.5	19.8	5.6	2,984	15.5	11.7	21.9	27.5
15	4.2	2.5	3.5	6.3	8.5	78.7	5.7	113	13.1	11.3	20.5	24.0
16	4.2	2.8	3.5	6.7	8.5	33.9	5.7	22.3	13.4	14.1	20.5	20.1
17	4.2	3.2	3.5	7.4	14.5	23.7	5.6	11.0	13.8	13.8	21.9	16.9
18	4.2	3.2	3.9	7.1	46.6	18.0	5.7	8.5	14.1	12.4	20.5	23.7
19	3.9	3.2	4.9	7.1	27.9	23.0	5.3	24.7	14.8	12.0	20.1	31.1
20	4.2	3.2	4.9	7.1	21.5	15.2	5.3	17.7	14.1	10.6	21.5	41.3
21	4.6	2.8	4.9	7.1	107	12.0	4.2	14.5	14.8	8.8	21.9	41.0
22	4.9	2.8	5.7	7.1	117	12.0	3.9	7.8	15.5	8.8	23.3	35.7
23	4.9	2.8	6.4	7.1	48.7	10.6	3.5	6.4	16.3	9.2	23.7	35.3
24	4.9	2.8	232	8.1	49.4	9.2	3.5	6.0	14.8	9.5	23.7	35.0
25	4.6	3.2	957	12.4	41.0	5.7	3.5	4.9	15.5	14.8	24.0	35.0
26	4.2	3.2	48.7	13.4	28.9	6.4	3.5	4.6	19.1	11.7	24.0	35.0
27	4.2	3.2	20.8	10.6	25.1	6.7	3.2	3.5	19.1	11.3	24.4	35.0
28	3.9	3.9	12.0	9.2	98.5	7.4	3.2	2.8	20.5	11.0	24.7	35.0
29	3.5	3.2	9.5	9.2	309	9.2	3.2	2.8	20.1	10.6	25.1	35.0
30	3.5		8.5	7.4	51.5	53.0	3.2	1,748	20.1	8.8	26.8	35.0
31	3.5		8.1		30.7		3.2	157		13.8		37.8
Sum	188.8	104.3	1,510.4	293.5	1,678.1	661.8	220.7	7,325.4	792.0	509.6	636.7	915.0

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1932-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	2.07	1.71	‡ 3	10.9	‡10	3.5	6.1	375	3,645	15,990	375
Feb.	3.22	1.71	3	71.0	‡10	2.5	3.6	207	2,151	9,990	179
Mar.	8.89	1.77	25	2,660	1	3.2	48.7	3,000	1,957	6,910	219
Apr.	3.08	1.80	7	57.9	10	4.9	9.8	582	2,278	5,360	582
May	6.96	1.57	7	1,540	‡ 4	4.2	54.1	3,330	5,232	23,800	494
June	3.81	1.77	9	154	25	5.7	22.1	1,310	4,716	19,700	618
July	3.48	1.57	3	105	31	2.8	7.1	438	2,866	9,290	271
Aug.	14.53	1.51	13	9,180	‡ 6	2.1	236	14,530	2,797	14,530	174
Sept.	2.43	1.35	1	95.0	15	13.1	26.4	1,571	3,520	14,340	186
Oct.	3.44	1.25	7	477	30	6.7	16.4	1,011	6,073	39,790	117
Nov.	1.61	1.44	30	26.8	1	14.5	21.2	1,260	3,812	25,590	101
Dec.	2.23	1.57	20	75.6	17	17.0	29.5	1,815	3,824	20,720	336
Yearly	14.53	1.25		9,180		2.1	40.5	29,429	⊕ 44,242	⊕ 126,090	⊕ 8,350

‡ And other days. ⊕ For period 1924 - 1940

RIO GRANDE AT LAREDO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car. Cable and car located about 2.5 miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo, 868.9 river miles below the American Dam at El Paso, Texas. Zero of gage at recorder is at elevation 351.50 feet. Zero of gage at the cable is elevation 353.15 feet. All gage elevations are on United States Coast and Geodetic Survey sea level datum. For history of this gage see previous Water Bulletins.

RECORDS: Based upon 178 meter measurements, 169 by the Mexican and 9 by the United States Section. Computations by shifting channel methods. 1940 records fair. Records available: May 1900 to March 1914; from October 1922 to December 1940.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,310	2,270	1,970	1,800	1,180	2,560	12,200	1,760	7,630	1,570	1,930	1,980
2	2,240	2,200	1,870	1,800	1,130	2,530	8,860	1,980	5,160	1,560	2,000	1,980
3	2,350	2,150	1,710	1,720	985	2,380	5,330	2,780	3,990	1,520	2,020	1,870
4	2,480	2,440	1,660	1,610	982	2,180	4,630	2,570	3,810	1,440	2,050	1,870
5	2,440	2,960	1,700	1,580	975	1,950	3,890	2,140	3,570	1,490	2,110	1,870
6	2,490	2,870	1,790	3,530	936	1,770	4,560	2,170	3,360	1,580	2,210	1,870
7	2,600	2,740	1,830	9,960	1,250	1,780	6,360	2,140	5,470	1,550	2,150	1,870
8	2,360	2,620	1,770	8,160	2,630	1,600	4,950	2,480	8,020	1,550	1,900	1,840
9	2,290	2,510	1,630	3,740	3,530	2,930	4,340	3,450	6,600	1,700	1,930	1,800
10	2,290	2,230	1,640	2,850	7,520	6,920	3,850	4,700	5,580	1,540	1,970	1,760
11	2,350	2,240	1,790	2,270	4,200	4,800	3,260	4,770	4,980	1,440	1,950	1,730
12	2,240	2,200	1,840	2,100	5,610	3,850	3,060	5,120	4,170	1,470	1,950	1,840
13	2,200	2,290	1,930	2,110	5,260	3,740	2,760	4,480	3,350	1,490	2,060	1,920
14	2,210	2,200	1,700	2,060	6,360	2,900	3,160	7,060	3,090	1,480	3,850	2,020
15	2,110	2,210	1,630	1,980	3,920	2,840	2,780	15,400	3,000	1,580	3,070	2,050
16	2,120	2,160	1,570	1,780	3,670	2,250	2,640	6,670	2,710	2,680	2,660	1,980
17	2,190	2,150	1,510	1,930	7,880	2,200	2,360	6,570	2,510	17,000	2,420	1,910
18	2,260	2,140	1,460	1,540	6,990	2,420	2,220	7,240	2,330	8,020	2,180	1,870
19	2,230	2,070	1,560	1,390	3,570	9,250	2,280	6,140	2,240	6,140	2,170	2,040
20	2,220	2,040	2,160	1,480	5,300	8,690	2,040	8,830	2,210	4,700	1,900	1,930
21	2,320	2,120	1,720	1,510	6,960	5,090	1,960	5,650	2,110	3,600	2,030	1,950
22	2,140	2,180	1,540	1,520	6,890	3,080	1,980	4,410	2,010	3,320	2,110	2,020
23	2,060	2,120	1,480	1,460	12,500	2,390	2,000	4,170	1,920	3,110	2,030	1,980
24	2,040	2,140	1,720	1,410	15,600	2,050	2,120	4,980	1,810	5,720	1,990	2,010
25	2,130	2,060	3,600	1,190	7,310	7,880	1,990	4,020	1,700	25,200	1,950	2,030
26	2,210	2,030	3,920	1,310	3,670	5,930	1,820	3,460	1,700	6,920	2,030	1,970
27	2,280	1,960	3,530	1,260	3,290	5,010	2,070	3,240	1,640	4,770	2,020	1,970
28	2,220	1,940	2,500	1,210	3,710	5,160	2,160	3,100	1,640	3,420	1,990	1,910
29	2,170	1,990	2,000	1,160	7,520	8,860	1,830	3,410	1,630	2,390	2,050	1,840
30	2,250		1,810	1,250	13,000	14,500	1,790	3,430	1,620	2,250	2,010	1,830
31	2,280		1,760		4,030		1,840	11,300		2,180		1,850
Sum	70,080	65,230	60,300	68,670	158,358	129,490	107,090	149,620	101,560	124,380	64,690	59,360

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	5.25	4.89	7	2,660	24	1,980	2,260	139,000	185,782	352,000	114,000
Feb.	5.58	4.76	5	3,390	28	1,840	2,250	129,400	152,378	237,380	99,400
Mar.	6.43	4.40	26	5,830	18	1,420	1,950	119,600	151,262	223,020	95,680
Apr.	8.92	4.27	7	12,800	25	1,150	2,290	136,200	151,214	401,000	95,640
May	10.14	4.04	24	22,400	7	904	5,110	314,100	278,238	906,000	113,000
June	10.89	4.59	30	26,500	9	1,380	4,320	256,800	297,089	1,357,000	89,190
July	8.46	4.63	1	14,200	26	1,670	3,450	212,400	277,269	1,250,000	128,770
Aug.	10.70	4.69	15	22,800	1	1,710	4,830	296,800	300,357	888,000	127,000
Sept.	7.55	4.59	1	10,200	30	1,620	3,390	201,400	651,486	3,116,670	87,260
Oct.	12.80	4.40	25	32,600	‡ 4	1,440	4,010	246,700	451,322	2,071,590	126,000
Nov.	5.68	4.69	14	4,240	10	1,720	2,160	128,300	210,121	570,800	122,000
Dec.	4.86	4.69	19	2,040	11	1,730	1,910	117,800	186,230	352,680	107,000
Yearly	12.80	4.04		32,600		904	3,170	2,298,500	3,292,748	7,310,310	1,873,000

‡ And other days.

RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and two masonry Cipoletti weirs located at the place called "El Cable" about 6.2 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southwest of Ciudad Guerrero, Tamaulipas. This stream enters the Rio Grande 930.8 river miles below the American Dam at El Paso, Texas. Zero of gage is 265.74 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 118 meter measurements during the year and the weir discharge records. Computations by shifting channel methods. 1940 records good. Records available: 1901 to 1912; 1923 to 1940.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	108.4	3.9	162	260	1.8	13,740	6.7	130	9.9
2	0	0	0	79.8	2.8	103	590	.7	1,410	5.3	97.8	9.9
3	0	0	0	60.0	1.8	149	519	.7	519	3.9	72.4	9.9
4	0	0	0	48.7	1.7	119	2,048	0	590	3.9	60.0	11.3
5	0	0	0	40.6	1.8	88.3	484	0	752	3.9	48.7	12.7
6	0	0	0	33.2	1.8	66.0	169	0	463	3.9	40.6	12.7
7	0	0	0	28.6	1.7	48.7	113	0	1,116	2.8	35.7	11.3
8	0	0	0	24.4	1.8	38.1	103	0	2,950	2.8	35.7	11.3
9	0	0	0	20.5	1.8	31.1	88.3	0	1,510	1.8	38.1	9.9
10	0	0	0	18.4	.7	24.4	69.2	1.8	360	1.8	48.7	9.9
11	0	0	0	16.6	2.1	558	57.2	6.7	341	1.8	43.4	9.9
12	0	0	0	14.5	63.9	632	43.4	6.7	260	1.8	33.2	9.9
13	0	0	0	12.7	350	791	35.7	6.7	162	1.8	26.5	9.9
14	0	0	0	11.3	175	3,404	40.6	5.3	108	.7	24.4	9.9
15	0	0	0	22.2	103	4,910	51.6	6.7	75.6	1,865	20.5	9.9
16	0	0	0	26.5	69.2	879	26.5	20.5	57.2	4,520	18.4	9.9
17	0	0	0	22.2	48.7	360	26.5	18.4	45.9	590	16.6	9.9
18	0	0	0	18.4	38.1	183	20.5	72.4	35.7	244	16.6	8.5
19	0	0	0	14.5	28.6	124	38.1	143	31.1	130	14.5	9.9
20	0	0	0	12.7	203	190	45.9	88.3	26.5	97.8	12.7	12.7
21	0	0	1,100	11.3	689	72.4	33.2	703	24.4	79.8	12.7	84.0
22	0	0	3,600	9.9	315	48.7	22.3	371	24.4	60.0	12.7	220
23	0	0	1,380	8.5	381	35.7	18.4	162	22.2	48.7	12.7	212
24	0	0	4,840	6.7	197	82.3	12.7	92.9	18.7	189	12.7	162
25	0	0	18,750	6.7	636	2,355	9.9	60.0	14.5	1,540	11.3	88.3
26	0	0	13,420	6.7	389	3,673	8.5	40.6	11.3	2,260	11.3	97.8
27	0	0	3,567	5.3	227	2,045	6.7	28.6	9.9	3,637	9.9	79.8
28	0	0	834	3.9	294	1,345	3.9	22.3	9.9	1,162	9.9	60.0
29	0	0	399	3.9	1,084	431	3.9	16.6	8.5	530	9.9	45.9
30	0		227	3.9	473	286	2.8	5,791	6.7	313	9.9	38.1
31	0		149		331		1.8	12,713		197		33.2
Sum	0	0	48,266	701.0	6,692.5	23,234.7	4,953.6	20,380.7	24,703.5	17,506.2	947.5	1,330.3

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
				High	Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.		1.02					0	0	20,639	144,110	0
Feb.		.89					0	0	14,559	98,520	0
Mar.	14.01	.66	25	20,400	‡ 1	0	1,560	95,740	15,005	95,740	52.0
Apr.	2.79	1.41	1	124	30	2.8	23.4	1,390	14,472	54,500	56.4
May	6.17	1.31	29	1,670	11	0	216	13,280	47,076	* 253,000	5,120
June	10.20	1.74	15	8,370	11	18.4	774	46,090	40,382	192,000	2,710
July	6.92	1.38	4	3,130	31	1.8	160	9,820	22,364	100,000	228
Aug.	13.25	1.21	31	16,300	‡ 4	0	657	40,420	20,127	67,200	81.0
Sept.	13.29	1.51	1	16,700	30	6.7	823	49,000	103,672	600,000	3,310
Oct.	9.61	1.35	16	7,380	‡14	.7	565	34,720	86,225	673,070	1,710
Nov.	2.99	1.54	1	162	30	8.5	31.6	1,880	31,555	248,590	246
Dec.	3.48	1.54	22	277	17	8.5	42.9	2,640	22,911	198,160	46.0
Yearly	14.01	.66		20,400		0	406	294,980	438,987	1,350,260	101,796

* Partly Estimated. ‡ And other days.

RIO GRANDE AT ZAPATA STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch located about 3 miles below the town of Zapata, Texas, 7.5 miles northeast of Guerrero, Tamaulipas, 1.6 miles below the confluence of the Rio Salado with the Rio Grande, and 932.4 river miles below the American Dam at El Paso, Texas. Zero of the gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 59 meter measurements during the year, 48 by the United States and 11 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: January 1932 to December 1940.

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

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

CORRECTION: In Water Bulletin No. 8, page 37, the total acre feet for September 1938 was in error as published. The correct figure is 1,081,000. Consequently, the correct annual acre footage figure should be 4,762,000 for 1938. Also the corresponding September and annual period average figures published in Water Bulletins Nos. 8 and 9 were erroneous and can be corrected accordingly.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,330	2,310	1,900	1,970	1,330	4,300	11,600	1,870	28,300	1,600	2,380	1,950
2	2,460	2,350	1,880	1,900	1,270	2,960	11,300	1,880	7,770	1,510	2,280	1,890
3	2,400	2,210	1,740	1,830	1,240	2,620	6,760	2,070	4,940	1,480	2,410	1,830
4	2,470	2,100	1,670	1,740	1,160	2,580	6,930	2,990	3,990	1,410	2,130	1,770
5	2,510	2,470	1,620	1,730	1,080	2,270	5,220	2,750	4,410	1,380	2,070	1,790
6	2,450	3,000	1,620	1,680	1,060	2,060	4,120	2,590	3,880	1,360	2,380	1,770
7	2,430	2,830	1,760	6,990	1,010	1,930	5,000	2,370	4,650	1,420	2,420	1,760
8	2,520	2,500	1,780	13,800	1,000	2,070	5,440	2,210	11,300	1,400	2,440	1,760
9	2,430	2,350	1,790	6,640	2,380	2,040	4,530	2,830	9,720	1,380	2,000	1,740
10	2,340	2,160	1,710	4,040	4,970	10,500	4,090	4,710	6,800	1,540	2,060	1,700
11	2,450	2,140	1,730	3,170	7,030	10,000	3,620	4,790	5,520	1,420	2,030	1,660
12	2,470	2,260	1,800	2,600	6,340	8,020	3,230	5,460	4,780	1,310	1,990	1,640
13	2,350	2,260	1,860	2,420	5,220	5,890	5,140	5,300	4,210	1,320	2,030	1,650
14	2,240	2,390	2,110	2,310	7,030	7,410	3,330	4,430	3,620	1,410	2,380	1,860
15	2,200	2,420	1,830	2,180	5,660	9,050	3,900	16,900	3,270	5,850	3,790	2,000
16	2,170	2,300	1,670	2,050	3,980	6,280	3,990	11,400	3,050	7,200	3,090	2,030
17	2,130	2,260	1,570	1,790	3,430	3,010	2,980	7,270	2,870	10,800	2,620	1,900
18	2,200	2,240	1,500	1,730	7,730	2,530	2,540	8,370	2,720	12,000	2,320	1,780
19	2,280	2,150	1,470	1,590	6,260	2,710	2,330	7,370	2,620	6,300	2,180	1,800
20	2,240	2,170	1,560	1,480	3,430	13,300	2,360	7,200	2,520	5,410	2,110	1,960
21	2,180	2,140	4,620	1,480	7,470	8,550	2,010	9,430	2,450	4,540	2,060	2,440
22	2,260	2,160	5,700	1,490	6,270	4,590	1,930	5,930	2,220	3,530	2,080	2,260
23	2,200	2,290	3,270	1,400	7,460	3,190	1,880	4,530	2,130	3,140	2,060	1,980
24	2,130	2,170	19,500	1,370	12,000	3,460	1,790	4,050	2,070	3,160	2,040	2,100
25	2,140	2,080	35,200	1,350	15,400	9,210	1,960	4,820	2,020	43,100	1,980	1,940
26	2,370	1,980	23,100	1,300	6,600	12,600	1,890	3,880	1,850	22,900	2,060	1,990
27	2,310	1,910	9,370	1,290	4,100	8,650	1,740	3,390	1,840	12,600	1,980	1,970
28	2,390	1,910	4,450	1,310	5,460	7,130	2,160	3,170	1,770	7,740	2,020	1,940
29	2,320	1,900	2,740	1,350	5,120	5,370	2,200	2,930	1,730	4,370	2,010	1,890
30	2,260		2,420	1,310	12,000	16,900	1,940	14,100	1,680	2,960	2,010	1,800
31	2,290		2,220		8,440		1,770	24,000		2,740		1,800
Sum	71,920	65,410	147,160	77,290	162,930	181,180	119,680	184,990	140,700	178,280	67,410	58,350

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1932-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	220.68	220.45	4	2,580	17	2,070	2,320	143,000	210,252	* 484,450	119,000
Feb.	221.02	220.38	5	3,360	29	1,840	2,260	130,000	170,909	* 361,350	111,000
Mar.	233.10	220.07	24	57,500	20	1,450	4,750	292,000	185,341	292,000	138,000
Apr.	224.30	219.90	8	17,300	26	1,250	2,580	153,000	156,019	226,000	110,000
May	225.22	219.64	25	19,700	8	979	5,260	323,000	287,106	584,000	134,000
June	226.08	220.28	30	25,200	8	1,880	6,040	359,000	369,162	1,517,000	115,000
July	224.22	220.22	1	16,800	27	1,670	3,860	237,000	357,967	1,238,000	132,000
Aug.	228.80	220.28	31	35,400	1	1,760	5,970	367,000	300,487	665,000	163,000
Sept.	228.96	220.18	1	34,900	30	1,620	4,690	279,000	942,686	2,895,330	172,000
Oct.	231.88	219.98	25	54,500	12	1,300	5,750	354,000	615,860	2,396,440	165,000
Nov.	221.34	220.38	14	4,110	27	1,960	2,250	134,000	243,727	748,020	133,000
Dec.	220.91	220.30	21	2,920	12	1,620	1,880	116,000	216,796	591,380	116,000
Yearly	233.10	219.64		57,500		979	3,980	2,887,000	4,056,312	8,038,070	2,231,000

* Partly Estimated.

RIO ALAMO STATION AT CD. MIER, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and weir for measurement of flows up to 177 second feet, located about 3 miles from the confluence of the Rio Alamo with the Rio Grande and .7 of a mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Cantaro". This stream enters the Rio Grande 969.5 river miles below the American Dam near El Paso, Texas. Zero of gage is 187.04 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 12 meter measurements during the year. Computations by shifting channel methods, except at low flows. 1940 records good. Records available: July 1923 to December 31, 1940.

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

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 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.0	8.1	1.1	6.0	0	27.9	33.9	0	4,273	6.0	13.1	6.0
2	6.0	8.1	1.0	6.0	0	10.6	24.7	0	222	6.0	8.1	6.0
3	6.0	8.1	1.1	6.0	0	6.0	21.5	0	84.8	6.0	8.1	6.0
4	6.0	8.1	1.0	4.2	0	2.5	349.6	0	54.7	6.0	6.0	6.0
5	6.0	6.0	1.1	4.2	0	2.5	273	0	40.6	4.2	6.0	8.1
6	8.2	4.2	1.0	2.5	0	1.1	104	0	30.7	4.2	10.6	8.1
7	8.1	2.5	1.1	2.5	0	1.1	43.8	2.5	1,285	35.3	33.9	8.1
8	8.1	2.5	1.0	2.5	0	1.1	30.7	0	5,474	448	15.9	8.1
9	8.1	2.4	1.1	1.1	0	0	21.5	0	3,708	120	13.1	8.2
10	8.2	1.0	1.0	1.0	0	1.1	15.9	0	862	37.1	13.1	8.1
11	8.1	1.1	1.1	1.1	0	79.1	13.1	0	184	18.7	10.6	8.1
12	8.1	1.1	1.0	1.0	0	24.7	10.6	38.9	104	13.1	10.6	8.1
13	8.1	1.0	1.1	1.1	0	13.4	30.0	13.1	63.2	10.6	8.1	8.1
14	8.1	1.1	1.0	1.0	0	3,182	282	90.4	43.8	8.1	8.1	8.2
15	8.2	1.1	1.1	1.1	0	2,190	138	15.9	33.9	1,734	8.2	10.6
16	8.1	1.0	1.0	1.0	0	172	1,420	6.0	27.9	410	8.1	10.6
17	8.1	1.1	1.1	1.1	0	54.7	198	2.5	27.9	153	8.1	10.6
18	8.1	1.1	1.0	0	0	27.9	40.6	150	27.9	54.7	8.1	10.6
19	6.0	1.0	1.1	0	0	18.7	15.9	523	24.7	30.7	8.1	10.6
20	6.0	2.5	27.5	0	2,288	30.4	8.1	1,677	18.7	18.7	8.2	10.6
21	8.2	2.5	855	0	75.9	76.3	6.0	466	15.9	15.9	8.1	1,144
22	8.1	2.5	84.8	0	18.7	21.6	4.2	491	13.1	13.1	8.1	904
23	8.1	2.4	21.5	0	13.1	10.6	4.2	67.1	13.1	13.1	8.1	84.8
24	8.1	1.1	2,172	0	6.0	1,400	2.5	65.0	10.6	10.6	8.1	33.9
25	8.1	2.5	664	0	6.0	8,264	2.5	40.6	10.6	3,090	8.1	21.6
26	8.2	2.5	109	0	2.5	5,121	1.1	18.7	8.1	915	8.2	13.1
27	8.1	1.1	33.9	0	1.1	1,084	1.0	10.6	8.1	51.2	8.1	8.1
28	8.1	1.0	18.7	0	1.1	142	0	8.1	8.1	27.9	8.1	8.1
29	8.1	1.1	10.6	0	6.0	63.2	0	6.0	6.0	21.5	8.1	8.1
30	8.1		6.0	0	299	40.6	0	2,758	6.0	18.7	8.1	8.1
31	8.2		6.0		131.4		0	3,320		24.7		8.2
Sum	237.0	79.8	4,029.0	43.4	2,848.8	22,070.1	3,096.4	9,770.4	16,690.4	7,326.1	295.2	2,410.8

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.51	1.44	10	10.6	‡ 1	6.0	7.6	470	6,145	34,900	0
Feb.	1.48	1.35	‡ 1	8.1	‡11	1.1	2.8	158	4,569	25,500	67.2
Mar.	11.61	1.35	24	10,030	‡ 1	1.1	130	7,990	4,067	19,800	63.0
Apr.	1.44	1.31	‡ 1	6.0	‡18	0	1.4	86.0	7,608	26,700	86.0
May	7.61	.89	20	4,980	‡ 1	0	91.9	5,650	18,747	* 137,000	209
June	13.32	1.31	25	12,290	‡ 9	0	736	43,780	16,678	83,230	0
July	6.46	1.31	16	4,240	‡28	0	99.9	6,140	9,580	37,590	256
Aug.	11.61	1.12	31	9,610	‡ 1	0	315	19,380	9,440	56,900	0
Sept.	10.07	1.44	1	7,560	‡29	6.0	556	33,110	29,246	190,520	* 135
Oct.	7.81	1.41	25	5,580	‡ 4	4.2	236	14,530	15,351	51,620	0
Nov.	1.87	1.44	7	43.8	‡ 4	6.0	9.8	586	4,880	21,940	0
Dec.	5.68	1.44	21	2,680	‡ 1	6.0	77.8	4,780	5,104	15,000	124
Yearly	13.32	.89		12,290		0	188	136,660	131,415	316,803	11,898.7

‡ And other days. * Partly Estimated.

RIO GRANDE AT ROMA STATION

DESCRIPTION: Water-stage recorder at international bridge between Roma, Texas, and San Pedro, Tamaulipas, and 976.9 river miles below the American Dam at El Paso, Texas. Zero of gage is 145.90 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 199 meter measurements, 186 by the Mexican and 13 by the United States Section, during the year from bridge. Computations by shifting channel methods. 1940 records good. Records available: August 1900 to March 1914; November 1922 to December 1940.

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

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,190	2,150	1,880	2,180	1,230	5,650	14,200	1,670	37,430	1,670	2,830	1,960
2	2,130	2,260	1,860	1,900	1,220	3,250	11,550	1,740	14,120	1,570	2,440	1,930
3	2,230	2,260	1,830	1,850	1,190	2,550	8,090	1,780	6,140	1,460	2,430	1,910
4	2,170	2,050	1,760	1,730	1,140	2,400	6,990	2,110	4,030	1,450	2,390	1,880
5	2,400	1,960	1,620	1,600	1,090	2,310	6,430	2,720	4,030	1,400	2,200	1,820
6	2,390	2,620	1,510	1,660	1,040	2,080	3,960	2,500	4,240	1,480	2,240	1,820
7	2,280	2,910	1,600	1,810	950	1,880	3,440	2,460	4,660	1,820	2,630	1,780
8	2,270	2,600	1,720	12,540	904	1,820	5,400	2,180	12,500	2,120	2,550	1,770
9	2,400	2,310	1,790	8,930	1,190	1,890	4,660	2,190	13,310	1,740	2,500	1,760
10	2,250	2,060	1,790	4,770	2,930	5,330	4,340	3,390	8,300	1,380	2,120	1,740
11	2,310	2,050	1,700	3,350	6,600	10,240	3,880	4,340	5,830	1,500	2,210	1,710
12	2,590	2,130	1,720	2,710	5,540	9,960	3,400	5,050	4,980	1,380	2,120	1,800
13	2,490	2,160	1,710	2,350	6,180	6,000	3,600	5,790	4,380	1,340	2,080	1,680
14	2,270	2,180	1,810	2,250	4,450	10,140	6,110	4,800	3,880	1,370	2,150	1,760
15	2,140	2,320	1,880	2,140	6,920	13,770	6,670	7,170	3,360	5,260	3,090	1,920
16	2,080	2,310	1,780	2,010	4,380	8,690	5,540	14,620	3,030	10,240	3,640	2,040
17	2,030	2,180	1,690	1,880	3,490	4,100	4,480	8,300	2,880	7,170	2,990	2,020
18	1,970	2,170	1,600	1,680	5,720	2,870	2,880	7,030	2,820	15,330	2,580	1,950
19	1,990	2,210	1,530	1,600	7,700	2,490	2,480	8,300	2,670	9,640	2,320	1,940
20	2,060	2,100	1,530	1,410	7,660	8,050	2,300	8,510	2,600	7,630	2,150	2,020
21	2,070	2,000	4,560	1,360	4,520	11,020	2,300	9,540	2,480	5,690	2,130	3,640
22	2,100	2,010	4,700	1,440	7,880	6,250	2,020	8,330	2,310	4,590	2,060	4,030
23	2,130	2,090	4,980	1,420	6,360	3,360	1,830	5,230	2,080	3,740	2,150	2,390
24	2,050	2,140	10,170	1,300	10,450	3,670	1,690	4,200	2,070	3,490	2,130	2,200
25	1,970	2,010	47,300	1,330	14,830	28,460	1,720	4,980	2,010	34,610	2,060	2,140
26	1,980	1,980	30,260	1,330	9,040	23,520	1,810	4,560	1,880	30,720	2,020	1,970
27	2,210	1,970	12,570	1,240	5,120	10,910	1,810	3,510	1,700	11,050	1,900	1,950
28	2,140	1,950	6,570	1,240	4,450	7,880	1,770	3,230	1,710	8,020	1,900	1,950
29	2,190	1,950	3,500	1,280	6,320	6,040	2,080	3,040	1,700	5,690	1,920	1,920
30	1,960		2,680	1,270	8,020	8,400	1,900	9,680	1,680	3,710	1,970	1,860
31	2,020		2,530		11,760		1,740	22,320		3,030		1,790
Sum	67,460	63,090	164,130	73,560	160,274	214,980	131,070	175,270	164,810	191,290	69,900	63,050

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	1.02	.52	12	2,650	18	1,850	2,180	133,800	223,652	467,370	119,000
Feb.	1.48	.43	6	3,150	5	1,880	2,180	125,100	182,731	349,000	108,000
Mar.	16.86	-.07	25	55,100	20	1,470	5,290	325,600	187,605	325,600	99,000
Apr.	6.73	-.07	8	15,300	27	1,210	2,450	145,900	184,437	400,000	104,000
May	7.84	-.43	25	17,300	9	1,190	5,170	317,900	350,994	683,000	133,000
June	13.55	.46	25	39,200	8	1,800	7,170	426,400	391,114	1,586,000	92,600
July	8.17	.66	1	19,500	24	1,660	4,230	260,000	334,137	1,217,000	131,000
Aug.	9.74	.66	31	26,500	1	1,660	5,650	347,600	318,083	743,000	157,000
Sept.	13.39	.56	1	42,400	30	1,660	5,490	326,900	805,385	3,047,630	117,000
Oct.	15.98	.20	25	55,400	12	1,290	6,170	379,400	565,708	2,371,870	163,000
Nov.	2.56	.85	15	3,960	28	1,900	2,330	138,600	250,134	735,960	127,000
Dec.	3.54	.56	21	6,250	13	1,660	2,400	125,100	221,671	565,140	114,000
Yearly	16.86	-.43		55,400		1,190	4,200	3,052,300	4,015,651	8,098,030	2,227,000

RIO SAN JUAN STATION AT SANTA ROSALIA, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, located about 27.5 miles above the confluence with the Rio Grande and 15 miles south of Ciudad Camargo, Tamaulipas, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station. This stream joins the Rio Grande 993.0 river miles below the American Dam at El Paso, Texas. Zero of gage is 205.15 feet, U.S.C. & G.S. sea level datum.

RECORDS: Based upon 208 meter measurements during the year, 202 by the Mexican and 6 by the United States Section. Computations by shifting channel methods. 1940 records good. Records available: May 1, 1900 to 1913; 1923 to 1940.

REMARKS: This station has not always been at its present site. For detailed history of gage changes see previous Water Bulletins. When the river at this station rises above a gage height of 36.1 feet, water overflows the west river bank above the station and returns to the river below. 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.

EXTREME FLOWS: On August 30, 1909, there occurred a flood which reached a height of 49.21 feet, present scale, and a discharge of approximately 353,000 second feet. On August 30, 1938, the peak discharge was 233,000 second feet, with a gage height of 42.65 feet. The river is dry at times.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	161	78.4	21.2	103	9.9	954	2,567	76.6	3,280	381	3,110	343
2	162	85.1	20.8	90.7	6.7	653	1,540	63.2	2,120	346	876	343
3	162	85.5	17.3	92.2	7.7	313	947	60.0	1,170	345	533	338
4	163	86.2	17.0	79.8	6.7	177	756	79.1	696	332	484	312
5	155	86.5	20.5	74.2	6.4	113	706	75.9	505	291	445	307
6	158	76.6	18.4	69.2	6.4	78.8	851	55.8	417	253	410	302
7	151	73.1	17.7	60.4	6.4	61.8	544	47.0	572	224	392	305
8	153	68.5	14.8	60.4	4.9	49.8	512	47.0	21,540	639	442	290
9	148	68.5	13.4	54.7	823	34.3	505	47.0	25,210	554	583	267
10	135	58.3	12.0	49.1	3,990	403	395	47.7	9,890	498	551	273
11	135	56.5	11.0	44.8	862	781	309	48.7	4,660	413	530	297
12	136	55.1	11.0	37.4	311	1,420	235	315	2,970	378	484	328
13	136	50.9	11.3	33.2	187	2,550	259	459	2,140	332	452	323
14	137	50.1	12.4	28.9	116	7,660	519	272	1,760	307	427	313
15	136	49.8	13.1	25.4	85.1	10,030	1,690	491	1,540	307	417	300
16	133	44.8	12.7	25.8	60.4	4,590	2,860	2,030	1,370	833	420	298
17	129	43.4	10.2	26.1	43.8	3,890	1,820	886	1,230	1,176	438	291
18	122	38.5	9.9	22.2	33.2	1,210	784	459	1,120	639	442	285
19	117	33.9	11.7	19.4	33.2	773	438	445	1,040	420	441	297
20	111	31.1	11.0	21.9	5,900	550	325	7,628	1,010	357	434	308
21	109	24.4	62.2	21.5	5,050	309	253	10,560	886	324	417	4,700
22	101	25.8	83.0	18.4	939	208	212	4,520	823	288	413	13,490
23	90.8	24.4	42.4	14.1	381	145	190	2,447	929	262	403	4,273
24	86.2	25.4	812	10.2	218	149	182	2,218	805	280	385	2,105
25	85.5	26.8	5,050	10.6	139	18,650	166	1,170	639	3,779	374	1,335
26	85.1	25.4	759	10.6	102	20,690	160	1,208	572	1,709	357	1,080
27	80.2	23.3	445	9.5	85.1	8,230	169	851	515	1,137	348	929
28	87.2	21.5	406	8.8	82.6	2,890	144	611	466	611	346	791
29	94.3	23.0	266	10.6	399	1,850	121	498	431	410	345	699
30	86.2		172	10.2	727	1,370	109	473	413	15,470	344	675
31	77.3		130		1,800		90.1	420		10,490		657
Sum	3,822.8	1,440.8	8,515.0	1,143.3	22,422.5	90,782.7	20,358.1	38,609.0	90,719	43,785	16,043	36,854

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1924-1940 Normal	Acre Feet Period 1924-1940 Maximum	Acre Feet Period 1924-1940 Minimum
Jan.	2.72	2.36	4	163	31	77.3	123	7,580	33,471	93,500	7,580
Feb.	2.43	1.94	3	91.1	28	18.7	49.7	2,860	21,304	92,810	2,860
Mar.	14.37	1.87	25	11,700	18	9.9	275	16,890	16,521	56,570	1,810
Apr.	2.53	1.90	1	108	27	7.1	38.1	2,270	17,855	98,500	1,670
May	15.29	1.74	20	10,000	8	4.9	723	44,470	54,749	136,360	3,500
June	21.46	2.07	25	38,500	10	26.5	3,030	180,100	109,646	586,000	5,160
July	10.43	2.40	16	4,100	31	84.4	657	40,380	80,909	280,000	2,840
Aug.	17.06	2.20	20	16,200	‡ 7	47.0	1,250	76,580	⊕ 110,635	⊕ 802,000	2,120
Sept.	21.59	3.48	8	39,900	30	399	3,020	179,900	⊕ 245,774	1,411,080	22,790
Oct.	18.70	2.99	30	22,600	7	224	1,410	86,850	157,601	772,040	18,970
Nov.	11.68	3.35	1	4,450	30	344	535	31,820	55,859	221,640	12,900
Dec.	18.54	3.08	22	21,400	10	264	1,190	73,100	43,408	135,490	12,000
Yearly	21.59	1.74		39,900		4.9	1,020	742,800	947,732	3,387,480	328,180

⊕ Includes the water which by-passed to the west of the station
‡ And other days.

RIO GRANDE AT RIO GRANDE CITY STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located about 4 miles by river below Rio Grande City, Texas, 3.7 miles northeast of Camargo, Tamaulipas, 6.5 miles below the confluence of the Rio San Juan with the Rio Grande and 999.5 river miles below the American Dam at El Paso, Texas. Zero of gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 104 meter measurements during the year, 85 by the United States and 19 by the Mexican Section. Computations by shifting channel methods. 1940 records good. Records available: January 1, 1932 to December 31, 1940.

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

When floods in the Rio San Juan exceed a gage height of about 38 feet or a flow of about 172,000 second feet at the Santa Rosalia station, water begins to overflow the right bank of that river at several places from El Azucar (20 miles below Santa Rosalia station) downstream. This overflow water cuts across country and reaches the Rio Grande about 9 river miles below Rio Grande City gaging station and is therefore not measured there. In the 1932 flood 411,000 acre feet and in 1938, 12,000 acre feet of water are estimated to have thus by-passed the Rio Grande City station and reached the Rio Grande, but these estimated amounts of by-pass water are included in the tabulation below. The river flow here is greatly modified by many irrigation diversions, drainage returns, and large reservoirs in the United States and Mexico.

EXTREME FLOWS: The highest reported gage height was in 1909, when the extreme gage height was 159.2 feet, present gage datum, as reported by residents and confirmed by extreme gage height at Rio Grande City Weather Bureau gage and other points in the vicinity, as found in Joint Report of International Boundary Commission 1910-11. The lowest recorded flow was on May 9, 1940 when the extreme gage height was 124.10 feet and the extreme flow 946 second feet.

CORRECTION: In Water Bulletin No. 2, page 37, the total acre feet for August was in error as published. The correct figure is 290,660. Consequently, the correct annual acre footage figure should be 9,133,530 for 1932. Also the corresponding August and annual period average figures published in Water Bulletins Nos. 3 to 9, inclusive, were erroneous and can be corrected accordingly.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,580	2,310	1,970	2,730	1,300	9,560	18,200	1,820	33,700	2,010	7,810	2,340
2	2,500	2,360	2,000	2,320	1,270	5,210	14,200	1,800	24,800	1,970	5,040	2,340
3	2,560	2,400	1,970	2,020	1,220	3,420	11,800	1,910	8,590	1,900	3,210	2,290
4	2,600	2,360	1,880	1,840	1,170	2,690	8,720	1,990	6,090	1,830	3,320	2,270
5	2,590	2,270	1,810	1,740	1,120	2,460	8,600	2,800	4,840	1,720	3,170	2,240
6	2,670	2,330	1,740	1,700	* 1,040	2,200	6,480	2,840	4,900	1,630	3,110	2,220
7	2,620	2,990	1,700	1,700	* 1,050	1,940	5,310	2,610	4,450	1,640	3,250	2,220
8	2,580	2,950	1,830	6,800	* 995	1,800	5,560	2,480	16,300	2,230	3,430	2,190
9	2,610	2,570	1,890	10,600	976	1,790	5,860	2,320	42,900	2,860	3,320	2,170
10	2,600	2,440	1,910	6,280	3,620	2,400	5,120	2,580	24,900	2,020	3,110	2,130
11	2,510	2,320	1,870	4,450	6,780	9,210	4,620	4,390	12,800	1,860	2,820	2,090
12	2,520	2,250	1,810	3,510	7,320	14,100	4,150	5,000	9,200	1,870	2,730	2,070
13	2,680	2,280	1,830	2,900	6,520	11,700	3,700	5,900	7,590	1,620	2,630	2,090
14	2,580	2,340	1,810	2,620	5,760	13,000	5,360	5,750	6,640	1,550	2,610	2,110
15	2,350	2,390	1,990	2,550	6,460	25,900	10,000	5,470	5,970	2,910	2,730	2,210
16	2,320	2,440	1,900	2,470	5,760	16,700	8,870	15,300	5,300	10,400	3,940	2,320
17	2,290	2,400	1,780	2,260	4,060	10,700	10,800	10,400	4,770	9,330	3,750	2,390
18	2,250	2,320	1,720	1,930	3,480	6,830	5,830	7,610	4,350	13,700	3,220	2,340
19	2,260	2,330	1,660	1,720	6,420	4,020	3,710	8,680	4,020	10,800	2,900	2,280
20	2,320	2,300	1,670	1,600	9,560	4,840	2,980	20,500	3,830	7,230	2,700	2,360
21	2,350	2,240	3,800	1,440	11,100	11,300	2,810	14,100	3,630	5,870	2,580	6,590
22	2,320	2,210	5,400	1,410	10,400	8,240	2,400	14,700	3,360	5,320	2,540	21,400
23	2,330	2,200	5,820	1,480	7,880	4,940	2,170	8,230	3,060	4,690	2,540	9,340
24	2,340	2,300	7,440	1,440	9,900	3,400	2,050	6,970	3,070	4,400	2,510	5,420
25	2,300	2,240	56,200	1,370	14,700	34,200	1,860	6,590	2,790	25,900	2,480	4,290
26	2,280	2,150	44,200	1,360	13,600	54,600	1,900	6,150	2,570	45,200	2,450	3,270
27	2,330	2,080	20,300	1,350	7,290	30,500	1,880	5,150	2,400	17,300	2,380	3,020
28	2,360	2,030	9,390	1,310	4,910	15,100	1,810	4,330	2,260	10,300	2,320	2,880
29	2,350	1,990	5,770	1,320	5,680	9,920	1,900	3,940	2,210	7,500	2,310	2,690
30	2,340		4,000	1,320	6,010	7,520	2,130	5,500	2,090	11,400	2,340	2,570
31	2,310		3,120		14,400		1,980	22,600		18,700		2,480
Sum	75,600	67,790	202,180	77,540	181,751	330,190	172,760	210,410	263,380	237,660	93,250	108,620

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	125.92	125.48	6	2,690	18	2,220	2,440	150,000	262,827	521,000	140,000
Feb.	126.24	125.13	8	3,060	29	1,980	2,340	134,000	209,764	* 368,690	125,000
Mar.	143.35	124.59	25	62,400	19	1,630	6,520	401,000	212,751	401,000	108,000
Apr.	131.57	124.58	8	12,800	28	1,290	2,580	154,000	205,278	395,000	118,000
May	133.43	124.10	25	18,400	9	946	5,860	361,000	416,239	719,000	153,000
June	143.12	125.00	26	58,000	9	1,730	11,000	655,000	505,812	1,737,000	94,300
July	134.10	124.98	1	21,100	29	1,770	5,570	343,000	426,146	1,240,000	152,000
Aug.	134.75	124.92	31	25,200	1	1,760	6,790	417,000	408,122	1,280,000	163,000
Sept.	139.79	125.42	9	45,800	30	2,050	8,780	522,000	1,040,781	3,723,800	147,000
Oct.	141.58	124.87	26	54,300	14	1,530	7,670	471,000	745,128	2,852,270	204,000
Nov.	130.70	125.44	1	10,600	♀ 28	2,300	3,110	185,000	314,619	829,260	156,000
Dec.	134.36	125.19	22	26,300	♀ 11	2,070	3,500	215,000	271,238	625,260	143,000
Yearly	143.35	124.10		62,400		946	5,520	4,008,000	5,018,705	9,537,640	2,642,000

* Partly Estimated. ♀ And Other Days.

RIO GRANDE AT HIDALGO STATION

DESCRIPTION: Water-stage recorder on the United States end of the Hidalgo-Reynosa international bridge near Hidalgo, Texas, and Reynosa, Tamaulipas, 1,065.4 river miles below the American Dam at El Paso, Texas and about 144.6 river miles from the Gulf of Mexico. Zero of the gage is 79.28 feet above mean sea level, United States Coast and Geodetic Survey datum. Meter measurements are from the bridge.

RECORDS: Discharges based upon 9 meter measurements during the year. Discharge computations by shifting channel methods. Discharge records available: July 1928 to December 1931; September and October 1932; peak flows in September 1933, and in 1934, also January to July, and September 1935; peak flows May and October, and full record July and September 1936; full record April 26 to December 31, 1938, and January to November, 1939. Complete gage height record and discharges only during peaks in 1940.

REMARKS: When the river at this station reaches a stage of about 21.5 feet, or a flow of about 60,000 second feet at this station, water begins to flow into two floodway inlets on the United States side, viz: Hackney Lake Inlet about 4 miles upstream and Mission Inlet about 15 miles above this station, but the river may begin to overflow at Granjeno and Jardin de Flores at stages about 3.5 feet lower. The bottom of the river at this station is subject to considerable erosion during floods. See Water Bulletin No. 3, page 38. Due to reconstruction work on the suspension bridge, the water-stage recorder was operated in 1940 only from January 31 to July 27, and on December 30 and 31.

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

Mean Daily Gage Height in Feet — 1940

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	# 3.2	1.91	1.13	* 5.20	1.04	8.90	9.14	# 2.0	*# 9.90	# 3.1	#10.20	# 3.5
2	# 3.0	1.88	1.28	4.85	1.19	* 7.40	10.18	# 2.0	ϕ15.50	# 3.1	# 6.45	# 3.4
3	# 2.6	2.08	1.50	4.33	.91	* 5.72	9.53	# 1.7	# 11.20	# 3.1	# 6.8	# 3.3
4	# 2.6	2.54	1.43	4.11	1.14	* 3.91	8.63	# 1.9	# 7.35	# 2.8	# 5.9	# 3.0
5	# 2.7	2.28	1.27	3.86	1.44	2.93	7.88	# 1.8	# 5.4	# 2.7	# 5.3	# 3.0
6	# 2.7	2.00	1.38	3.60	.89	2.45	7.54	# 1.8	# 5.97	# 3.1	# 4.9	# 3.0
7	# 3.2	1.86	.87	3.39	.37	2.10	6.65	# 2.6	# 6.05	# 2.6	# 4.8	# 3.0
8	# 3.7	2.24	.63	3.10	⊕ .18	1.85	5.98	# 2.7	# 5.97	# 2.4	# 4.8	# 3.4
9	# 3.1	2.71	.97	6.37	.69	1.87	6.03	# 2.5	# 12.18	# 2.6	*# 4.8	# 3.5
10	# 2.9	2.77	1.62	* 8.27	1.70	1.82	6.13	2.3	ϕ 16.10	# 3.0	*# 4.8	# 3.5
11	# 2.8	2.72	1.43	* 6.82	2.86	2.30	5.70	2.4	# 11.88	# 3.3	# 4.8	# 3.4
12	# 2.8	2.09	1.07	* 5.45	6.22	6.98	5.33	3.4	# 9.2	# 2.8	# 4.5	# 3.3
13	# 2.8	1.57	.94	4.76	6.70	8.76	4.92	4.4	# 8.05	# 3.1	# 4.4	# 3.0
14	# 3.1	1 57	.97	4.25	6.39	8.01	4.79	5.0	# 7.35	# 2.9	# 4.2	# 2.7
15	# 3.1	1.71	1.28	3.82	5.99	* 9.91	5.86	5.3	# 6.95	# 2.1	# 4.3	# 3.0
16	# 2.7	1 50	1.31	3.45	6.23	# 12.10	7.59	5.0	# 6.45	# 3.0	# 4.3	# 3.0
17	# 2.6	2.12	2.05	3 32	6.19	# 9.40	7.65	9.7	# 5.97	# 7.45	# 4.9	# 3.0
18	# 2.1	2.78	1.51	3.04	5.14	# 7.82	7.74	7.6	# 5.8	# 7.45	# 5.1	# 3.4
19	# 2.0	2.78	1.17	2.72	4.72	# 7.55	6.03	6.5	# 5.2	# 9.6	# 4.6	# 3.4
20	# 2.7	1.78	1.61	2.50	5.90	* 4.32	4.65	7.2	# 5.0	# 7.92	# 4.4	# 3.7
21	# 2.9	1.72	2.56	2.68	8.40	5.60	4.09	11.5	# 5.0	# 6.95	# 4.4	# 4.2
22	# 2.9	1 65	3.07	2.07	8.46	7.92	* 3.65	10.7	# 5.0	# 6.27	# 3.9	# 5.8
23	# 2.9	1.64	4.85	1.92	* 8.05	7.05	* 3.35	9.4	# 4.9	# 5.9	# 3.8	#11.2
24	# 2.7	1.60	5.48	1.35	* 7.17	5.55	3.12	7.0	# 4.6	# 5.3	# 4.1	*# 9.15
25	# 2.9	1.87	9.52	1.38	* 8.35	* 6.65	2.94	6.4	# 4.3	# 5.0	# 4.1	# 6.95
26	# 2.9	1.80	ϕ 18.25	1.46	10.26	16.15	2.73	6.4	# 4.0	# 15.75	# 4.0	# 6.25
27	# 2.8	1 40	* 15.73	1.49	* 8.48	ϕ 18.55	# 2.5	6.0	# 3.7	ϕ 16.80	# 3.7	# 5.97
28	# 2.9	1.26	* 10.24	1.81	* 6.65	12.74	# 2.8	5.4	# 3.7	# 10.92	# 3.7	# 5.2
29	# 2.9	1.21	* 8.13	1.61	* 5.36	9.87	# 2.0	4.8	# 3.7	# 8.7	# 3.5	# 4.9
30	# 2.8	-	* 6 60	1.24	5.36	8.35	# 1.8	4.4	# 3.5	# 7.55	# 3.3	# 4.5
31	# 2.1	-	* 5.81	-	6.75		# 2.1	4.1	-	# 10.8	-	# 4.5
Sum												

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Mar.	18.25		26	52,000							
May		.18			8	670					
June	18.55		27	54,000							
Sept.	15.50		2	37,500							
Sept.	16.10		10	40,200							
Oct.	16.80		27	44,500							
Yearly	18.55	.18		54,000		670					

Based on Weather Bureau Gage Heights at 8:00 A. M.
ϕ Maximum Gage Height.
⊕ Minimum Gage Height.
* Partly Estimated.

RIO GRANDE AT MERCEDES BRIDGE STATION

DESCRIPTION: Water-stage recorder located 380 feet downstream from the international bridge between Mercedes, Texas and Rio Rico, Tamaulipas and 1,104.9 river miles below the American Dam at El Paso, Texas. Zero of the gage is United States Coast and Geodetic Survey mean sea level datum. Meter measurements are made from the bridge.

RECORDS: Based upon 44 current meter measurements during the year, 35 by the United States and 9 by the Mexican Section, and the previous rating curve. Computations by shifting channel methods. 1940 gage height record good and discharge records fair. Records of discharge are available for September and October 1932; April 28 to October 3, 1935; July 1 to 31, September 1 to October 3, 1936; October 24 to December 31, 1937; June 7 to June 17, July 26 to August 7, August 29 to September 6, and September 12 to October 7, 1938; May 5 to 8, June 5 to 12, July 6 to 8, September 22 and 23, and October 12 to 15, 1939. Mean daily gage height records for 1938, 1939 and 1940 are available in Water Bulletins. Unpublished records of daily river stage are available for each year from 1910 to 1937, except 1913, for a staff-gage located at the Mercedes pumping plant about 500 feet upstream from this station.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions, drainage returns and large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande, as part finds outlet to the Gulf of Mexico through flood channels in both countries, which divert from the Rio Grande within 54.5 miles above this station.

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

Mean Daily Gage Height in Feet — 1940

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	55.63	54.10	52.63	57.99	52.53	ó 60.5	ó 61.9	ó 53.9		ó 55.4	ó 64.6	ó 56.1
2	55.59	53.76	52.47	57.35	52.43	ó 61.0	ϕ 64.30	ó 54.4	ϕ 68.40	ó 55.2	ó 61.0	ó 55.4
3	55.42	53.72	52.78	56.86	52.82	ó 59.1	ó 63.2	ó 53.4	ó 67.7	ó 55.1	ó 59.6	ó 55.1
4	55.17	54.19	52.92	56.18	52.88	ó 57.4	ó 63.2	ó 53.4	ó 61.7	ó 54.9	ó 58.8	ó 55.1
5	55.09	54.24	52.85	55.79	53.01	ó 56.0	ó 61.8	ó 53.4	ó 59.7	ó 54.2	ó 57.7	ó 55.1
6	55.25	54.03	52.92	55.65	52.66	ó 55.1	ó 61.2	ó 53.9	ó 58.9	ó 54.9	ó 57.5	ó 55.2
7	55.46	53.81	52.92	55.57	51.97	ó 54.3	ó 60.7	ó 54.1	ó 58.9	ó 54.8	ó 57.5	ó 55.4
8	55.53	53.53	52.40	55.40	51.34	ó 54.0	ó 60.2	ó 54.8	ó 59.1	ó 54.3	ó 57.5	ó 55.6
9	55.41	54.19	52.22	56.35	51.36	ó 53.7	ó 59.4	ó 54.8	ó 61.5	ó 54.4		ó 55.8
10	55.29	54.76	52.93	60.68	53.24	ó 53.8	ó 59.4	ó 54.7	ϕ 70.00	ó 54.2		ó 55.6
11	55.17	54.85	53.14	59.99	54.03	ó 53.9	ó 59.4	ó 54.9	ó 68.0	ó 54.8	ó 57.8	ó 55.4
12	55.23	54.42	52.98	58.69	56.42	ó 55.1	ó 58.6	ó 53.7	ó 63.5	ó 54.6	ó 57.1	ó 55.0
13	55.21	53.81	53.00	57.91	59.16	ó 60.6	ó 58.2	ó 56.0	ó 61.4	ó 54.9	ó 55.8	ó 55.3
14	55.21	53.32	53.05	57.37	59.13	ó 60.8	ó 58.2	ó 56.8	ó 60.5	ó 55.2	ó 56.1	ó 55.2
15	55.28	53.44	52.82	56.57	58.72	ó 60.1	ó 58.2	ó 57.2	ó 60.0	ó 54.4	ó 56.1	ó 55.5
16	54.94	53.45	53.24	56.16	58.57	ϕ 65.26	ó 59.9	ó 57.5	ó 59.6	ó 54.5	ó 56.6	ó 55.7
17	54.68	53.67	53.75	55.82	ó 59.1	ó 64.0	ó 60.8	ó 61.4	ó 58.7	ó 57.4	ó 56.6	ó 55.9
18	54.82	54.67	53.98	55.38	ó 58.8	ó 61.0	ó 61.4	ó 61.3	ó 58.4	ó 59.6	ó 56.8	ó 55.9
19	54.67	54.50	53.64	54.86	ó 57.9	ó 59.7	ó 60.9	ó 59.8	ó 58.1	ó 61.2	ó 56.6	ó 56.1
20	55.19	53.90	53.74	54.54	ó 57.0	ó 58.5	ó 59.1	ó 59.5	ó 57.7	ó 61.2	ó 56.5	ó 56.2
21	55.39	53.40	54.26	54.51	ó 58.4	ó 57.4	ó 58.1	ϕ 64.66	ó 57.2	ó 60.5	ó 56.4	ó 56.4
22	55.52	53.24	55.02	54.59	ó 61.2	ó 60.2	ó 57.3	ó 62.9	ó 57.8	ó 58.6	ó 56.3	ó 57.3
23	55.50	53.16	55.95	53.58	ó 61.2	ó 60.8	ó 57.3	ó 63.6	ó 57.9	ó 57.8	ó 56.0	ó 65.2
24	54.98	53.20	57.27	* 52.69	ó 60.6	ó 59.4	ó 56.4	ó 60.3	ó 57.5	ó 57.3	ó 56.3	
25	55.00	53.31	59.66	* 52.55	ó 59.7	ó 57.9	ó 56.1	ó 59.6	ó 57.1	ó 57.3	ó 56.4	ó 60.1
26	55.35	53.66	* 69.05	* 52.48	ó 62.1	ó 65.8	ó 55.9	ó 58.9	ó 56.3	ó 63.4	ó 56.4	ó 59.4
27	55.47	53.34	* 70.70	52.95	ϕ 62.78	ϕ 71.94	ó 55.2	ó 58.6	ó 56.2	ϕó 70.9	ó 56.3	ó 58.8
28	55.46	*52.94	66.24	53.50	ó 60.1	ó 71.7	ó 55.4	ó 58.4	ó 56.0	ó 66.9	ó 56.0	ó 58.4
29	55.28	52.77	61.94	53.45	ó 58.8	ó 65.9	ó 55.6	ó 57.9	ó 56.2	ó 62.9	ó 56.2	ó 57.9
30	54.77		59.99	53.13	ó 57.5	ó 63.3	ó 55.4	ó 57.2	ó 55.9	ó 61.0	ó 56.1	ó 57.7
31	54.35		58.88		ó 57.8		ó 53.2	ó 56.9		ó 60.5		ó 57.4

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
March	71.20		27	34,000							
April	60.88		10	8,000							
May		* 50.28			9	* 0					
May	62.78		27	13,000							
June	65.26		16	20,000							
June	71.94		27	36,000							
July	64.30		2	13,700							
Aug.	ϕ 64.66		21	19,000							
Sept.	ϕ 68.40		2	25,000							
Sept.	70.00		10	31,500							
Oct.	ϕ 70.9		27	32,500							

* Partly Estimated.
ϕ Peak Gage Height.
ϕ Approximate Peak Gage Height.
ó Deduced from Weather Bureau Reading at 7:00 A.M.

RIO GRANDE FLOODWAY DISCHARGES IN THE LOWER RIO GRANDE VALLEY

On The United States Side

There are three floodways on the United States side of the Rio Grande delta which divert excess Rio Grande flood waters to the Gulf of Mexico. Such floodway discharges are measured at gaging stations known as North Floodway South of McAllen, South Floodway South of McAllen, and Rancho Viejo Floodway near Brownsville. The first two of these gaging stations are described in Water Bulletin No. 2, page 41. The third one is described in Water Bulletin No. 6, page 41.

In 1940 Rio Grande flood water flowed through the Rancho Viejo Floodway only. A statement of that flood flow follows:

Rancho Viejo Floodway Near Brownsville, Texas

Mean Daily Discharge in Second Feet and Period Summary — 1940

Date	Second Feet	Date	Second Feet	Date	Second Feet
March 27 March 28	* 137 64.2	June 27 June 28 June 29	* 86.2 * 278 * 13.9	October 27 October 28	* 149 * 17.7
The Period	* 201.2		* * 378.1		* 166.7

Period Summary			
Period	Gage	Second Feet	Acre Feet
	Extreme Feet High	Extreme High	Total
March June October	42.20 42.40	250 315 " 200	* 399 * 750 * 331
The Period	42.40	315	* 1,480

* Partly Estimated. " Estimated.

North Floodway Near Sebastian, Texas — 1940

The channel of the North Floodway in the vicinity of Sebastian, Texas, serves as a drainage channel as well as a floodway. During the last 3 months of 1940 two measurements per month were made of this drainage flow. From these measurements and rainfall records the following table of estimated drainage flow was made. The salt burden carried by this drainage flow will be found elsewhere in this bulletin under the heading, "Chemical Analyses of Water Samples".

Estimated Discharge

	October	November	December	Period
Maximum Mean Daily Second Feet	4.0	25.4	160	160
Minimum Mean Daily Second Feet	1.9	4.0	17.7	1.9
Average Mean Daily Second Feet	2.2	14.5	72.9	30.0
Total Acre Feet	136	861	4,480	5,477

On The Mexican Side

There are three floodways on the Mexican side of the Rio Grande delta which divert excess Rio Grande flood waters to the Gulf of Mexico. These are the Retamal Canal, Control No. 2, and Control No. 3. In 1940 Rio Grande flood water flowed through the Retamal Canal and Control No. 3.

In 1940 Rio Grande water was diverted through the Retamal Canal at other times than during excessive floods. Part of the flow of this canal was used for irrigation. A statement of all flow through the Retamal Canal in 1940 will be found elsewhere in this bulletin under the heading, "Diversions from the Rio Grande".

The gate structure on Control No. 3 was closed after the flood at the end of March and remained closed during the June floods. The maximum discharge through Control No. 3 was estimated at 2,600 second feet at a gage height of 10.06 meters at 11:00 p.m., October 27, 1940.

RIO GRANDE AT MATAMOROS STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and winch. The water-stage recorder is attached to the central pier of the railroad bridge over the Rio Grande between Matamoros, Tamaulipas and Brownsville, Texas, about 50.1 miles upstream from the Gulf of Mexico and 1,159.9 river miles below the American Dam at El Paso, Texas. The cable and car are located 0.3 mile upstream from the bridge. Zero of present gage is 15.26 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 157 meter measurements during the year, 147 by the Mexican and 10 by the United States Section. The river bottom shifts greatly at this station. Computations by shifting channel methods. 1940 records good. Records available: 1901 to 1913; 1923 to December 1940.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions and by large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande as part finds outlet to the Gulf of Mexico through flood channels in both countries, which divert from the Rio Grande within 109.5 miles above this station. In May 1924 a recorder was established .6 mile upstream from the bridge. In September 1925 the recorder was moved to its present location. On October 3, 1930 the zero of the gage was lowered 5 feet.

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,280	565	104	3,640	79.5	4,380	9,500	399	6,990	1,200	14,970	1,780
2	1,460	720	107	3,050	77.3	7,490	9,920	505	15,400	950	10,910	1,770
3	1,490	636	55.4	2,620	50.9	6,960	10,310	713	19,180	756	6,430	1,300
4	1,480	572	36.0	2,330	25.1	4,840	10,740	487	10,910	657	4,700	1,120
5	1,320	763	38.8	1,960	15.2	3,110	9,530	597	5,830	516	3,460	1,190
6	1,340	717	38.1	1,590	12.4	1,900	8,020	427	4,730	301	2,790	1,170
7	1,570	713	24.0	1,480	49.8	1,270	7,420	367	4,270	555	2,680	1,230
8	1,790	586	20.8	1,470	57.9	1,010	6,220	253	4,340	668	2,730	1,460
9	1,660	484	20.5	1,410	49.1	847	4,730	586	5,720	431	2,630	1,670
10	1,440	505	19.4	2,420	40.3	653	3,990	936	18,790	266	2,730	1,540
11	1,410	752	17.7	5,790	67.1	706	4,270	1,020	23,590	131	2,810	1,440
12	1,300	1,060	71.0	5,120	484	1,160	4,100	1,190	15,010	119	2,650	1,390
13	1,150	858	98.5	3,960	2,240	3,160	3,670	1,090	9,110	351	2,310	1,280
14	1,300	562	73.3	3,490	4,560	8,090	3,670	1,430	6,850	607	2,010	1,350
15	1,570	297	78.4	2,970	5,190	7,910	3,570	2,000	6,110	809	1,830	1,430
16	1,420	183	111	2,200	4,910	14,690	3,780	2,360	5,370	487	1,810	1,570
17	1,270	238	114	1,710	4,700	17,510	5,760	4,380	4,240	392	1,980	1,810
18	1,090	349	416	1,460	4,980	10,980	6,920	8,620	3,370	3,200	2,140	1,830
19	1,200	600	600	1,250	4,770	7,340	7,380	7,310	3,120	6,150	2,040	1,800
20	1,360	791	703	1,010	3,990	5,540	6,250	6,460	2,920	8,550	1,960	2,040
21	1,690	590	1,100	975	3,510	3,960	4,700	12,430	2,490	6,530	1,930	2,410
22	1,920	381	1,390	1,010	5,680	4,030	3,390	14,970	2,640	4,800	1,900	2,860
23	1,990	242	1,580	777	7,770	6,670	2,580	14,160	3,000	3,640	1,860	12,110
24	1,990	191	1,990	487	8,330	6,920	2,310	9,250	2,800	3,200	1,900	12,250
25	1,510	223	2,900	210	7,490	6,180	2,060	6,220	2,540	3,150	2,040	7,490
26	1,260	206	19,460	81.2	8,550	12,960	1,770	5,020	2,140	6,640	2,120	5,860
27	1,540	209	28,920	58.6	12,180	26,490	1,540	4,130	1,700	22,990	1,960	4,800
28	1,950	205	22,210	47.0	8,510	29,240	1,280	3,570	1,500	21,080	1,940	4,170
29	1,970	158	12,610	52.3	6,070	23,130	1,410	3,300	1,430	12,570	1,890	3,600
30	1,590		6,180	193	4,870	13,670	1,210	2,550	1,470	7,700	1,760	3,120
31	1,190		4,520		3,960		788	2,330		7,380		2,760
Sum	46,500	14,356	105,609.9	54,821.1	113,268.6	242,796	152,788	119,060	197,560	126,776	94,870	91,600

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1924-1940		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.	5.94	4.36	23	2,110	18	1,040	1,500	92,230	228,245	491,000	92,230
Feb.	4.43	1.77	12	1,090	29	139	495	28,470	157,731	328,330	28,470
Mar.	20.44	.39	27	30,300	11	13.4	3,410	209,480	130,611	240,770	27,860
Apr.	10.47	2.23	11	6,110	29	40.6	1,830	108,740	122,765	318,000	56,900
May	13.78	1.80	27	12,700	5	12.0	3,650	224,670	294,368	503,000	99,400
June	20.87	3.67	28	29,500	10	540	8,090	481,590	383,330	1,180,380	31,700
July	13.06	3.74	2	11,300	31	523	4,930	303,050	322,254	629,000	54,400
Aug.	14.21	2.95	22	16,100	8	219	3,840	236,160	309,697	834,000	73,200
Sept.	19.09	5.31	11	24,900	29	1,400	6,590	391,860	610,350	1,259,620	124,060
Oct.	19.00	2.26	27	26,200	12	60.4	4,090	251,460	554,308	1,287,410	124,280
Nov.	14.57	5.09	1	16,100	30	1,720	3,160	188,170	285,972	827,490	95,700
Dec.	13.25	4.07	23	17,800	4	1,110	2,950	181,690	230,424	594,220	69,700
Yearly	20.87	.39		30,300		12.0	3,720	2,697,570	3,630,055	5,745,160	1,969,900

RIO GRANDE AT LOWER BROWNSVILLE STATION

DESCRIPTION: Water-stage recorder and cable with stand up cable car and winch, located about 1,000 feet below the El Jardín pumping plant, about 8.5 river miles below Brownsville, Texas, and Matamoros, Tamaulipas, about 41.3 miles upstream from the Gulf of Mexico and 1,168.7 river miles below the American Dam at El Paso, Texas. Zero of gage is on United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon 81 current meter measurements, 72 by the United States and 9 by the Mexican Section, made during the year. Computations by shifting channel methods. 1940 records good. Records available: January 1934 to December 1940.

REMARKS: The river flow at this station is greatly modified by many irrigation diversions, drainage returns, and large reservoirs in the United States and Mexico. During floods only a portion of the river flow discharges past this station through the channel of the Rio Grande as part finds outlet to the Gulf of Mexico through flood channels in both countries, which divert from the Rio Grande within 128.3 miles above this station.

EXTREME FLOWS: On June 10, 1935, a peak discharge of 31,000 second feet was reached with an estimated gage height of 32.10 feet. Additional data concerning peaks may be found in previous Water Bulletins. The river was dry at this station a few days in 1930 and March 25-28, 1935; also June 16-19, 1938, and several days in 1940.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,250	926	122.	3,830	20.0	3,860	9,480	347	6,490	1,250	13,500	1,730
2	1,370	779	89.5	3,070	0	7,090	9,780	456	16,300	957	11,800	1,760
3	1,470	714	* 61.5	*2,530	0	7,270	12,400	645	21,800	706	7,340	1,320
4	1,460	670	17.2	*2,210	0	5,090	11,300	434	13,000	612	5,650	1,090
5	1,400	657	5.0	*1,860	0	3,160	10,100	525	5,570	583	3,000	1,160
6	1,370	690	* 2.0	*1,580	0	1,930	8,250	355	3,920	507	2,500	1,130
7	1,440	683	* 1.0	1,400	0	1,280	7,590	293	3,270	517	2,400	1,140
8	1,640	333	* 1.0	1,420	0	1,020	6,320	173	3,310	* 513	2,400	1,360
9	1,650	272	0	*1,400	0	864	4,820	519	4,550	* 460	2,400	1,630
10	1,540	315	0	2,370	0	761	4,010	718	17,800	201	2,400	1,590
11	1,360	620	0	6,330	0	706	4,230	923	22,500	67	2,350	1,490
12	1,240	1,010	0	4,720	283	1,020	4,160	1,170	15,800	70	2,300	1,460
13	1,130	798	8.9	4,010	1,790	2,670	3,620	1,060	9,570	432	2,100	1,360
14	1,290	577	8.1	3,550	3,890	7,370	3,570	1,320	6,940	472	2,090	1,390
15	1,520	361	5.7	3,210	4,730	8,590	3,460	1,990	6,260	551	1,880	1,470
16	1,210	219	41.0	2,180	4,730	14,500	3,370	2,480	5,530	* 487	1,830	1,550
17	1,120	208	26.4	1,640	4,550	16,400	5,440	4,230	4,530	* 391	2,010	1,770
18	1,030	280	246	1,330	4,820	9,510	6,900	9,580	3,590	* 2,050	2,240	1,830
19	965	471	498	1,180	4,750	7,220	7,600	8,290	* 3,230	5,510	2,160	1,820
20	1,110	735	838	* 968	3,940	5,390	6,480	6,740	* 3,050	8,650	2,030	2,020
21	1,360	552	1,080	952	3,340	4,030	4,750	10,600	2,940	6,750	1,940	2,240
22	1,670	355	1,300	945	5,150	3,930	3,300	14,300	2,820	4,760	1,930	2,530
23	1,770	191	1,470	807	7,780	6,600	2,370	14,100	2,940	3,490	1,870	12,000
24	1,890	118	1,730	479	8,300	7,420	2,070	10,300	* 2,900	3,170	1,920	11,000
25	1,720	132	2,520	* 124	7,260	5,430	1,830	6,480	2,580	3,135	2,100	7,800
26	1,480	144	16,700	* 23.0	7,550	7,750	1,600	5,530	2,250	6,450	2,240	6,010
27	1,450	170	24,500	* 19.0	11,200	25,700	1,420	4,700	1,730	21,500	2,160	5,100
28	1,700	164	23,600	* 24.0	8,610	28,100	1,190	4,200	1,460	21,000	2,040	4,310
29	1,870	138	13,600	* 35.0	6,530	21,000	1,270	3,760	1,350	12,500	1,960	3,660
30	1,710		7,040	* 66.0	5,270	11,800	1,220	3,050	1,450	7,320	1,800	3,190
31	1,290		4,740		4,040		910	2,490		5,850		2,850
Sum	44,475	13,282	100,251.3	54,262	108,533	227,461	154,810	121,758	199,430	120,911	94,340	90,760

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1934-1940 Average	Maximum	Minimum
Jan.	16.91	* 14.99	24	1,920	31	* 848	1,430	88,200	194,743	299,000	88,200
Feb.	16.30	11.80	12	1,560	24	108	458	26,300	132,043	237,000	26,300
Mar.	31.40	11.00	27	25,600	‡ 9	0	3,230	199,000	127,614	199,000	29,700
Apr.	21.76	12.60	11	6,780	‡ 27	0	1,810	108,000	106,343	242,000	50,500
May	25.33		27	11,700	‡ 2	0	3,500	215,000	307,000	491,000	110,000
June	31.75	14.65	28	28,300	11	635	7,580	451,000	354,857	* 1,161,000	32,000
July	25.13	* 13.62	3	12,800	31	* 767	4,990	307,000	322,700	587,000	65,900
Aug.	25.16		22	14,900	8	173	3,930	242,000	269,271	679,000	77,900
Sept.	30.36	15.38	11	23,400	29	1,310	6,650	396,000	553,143	1,045,000	150,000
Oct.	30.05		28	22,900	11	67	3,900	240,000	403,857	‖ 629,000	200,000
Nov.	26.04	15.36	1	15,400	30	1,710	3,140	187,000	178,600	‖ 349,000	94,200
Dec.		14.07	23	12,000	4	1,060	2,930	180,000	172,943	‖ 302,000	64,800
Yearly	31.75	11.00		28,300		0	3,640	2,639,500	3,123,114	* 4,877,700	1,911,600

*Partly Estimated. ‖ Estimated. ‡ And Other Days.

RIO GRANDE AT BELOW ELEPHANT BUTTE DAM STATION

DESCRIPTION: Water-stage recorder on left river bank 1 mile below Elephant Butte Dam. Measurements from cable at same site.

RECORDS: Furnished by the El Paso office of the United States Bureau of Reclamation. Records available 1915 to 1940, inclusive.

REMARKS: Storage of water in Elephant Butte Reservoir began on January 6, 1915. How much water passed the dam from then until March 21, 1915 is not known. The following record is from the files of the El Paso office of the Bureau of Reclamation. It constitutes all of the known record from those files for the years 1915 and 1916. In United States Geological Survey Water Supply Paper No. 458 there is published a similar record for the last 3 months of 1916, but that record does not correlate with the recorded flow at El Paso for the same period as the record below does. As far as known the record below has not been published before.

EXTREME FLOWS: No record. The greatest mean daily flow during 1915 and 1916 occurred June 4, 1915, when the flow was 7,500 second feet.

Mean Daily Discharge in Second Feet 1915 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				750	2,100	4,500	2,950	2,380	1,670	700	0	1,000
2				755	3,100	3,000	2,200	2,600	1,670	700	0	1,000
3				750	2,700	2,250	2,000	2,600	1,670	700	0	1,000
4				750	2,700	7,500	2,000	2,600	1,670	700	0	1,000
5				750	1,120	4,500	2,000	2,050	1,660	*700	0	1,000
6				750	1,250	6,000	2,000	2,600	1,670	700	0	682
7				750	1,250	5,840	2,000	2,600	1,670	700	0	0
8				750	2,650	5,680	2,000	2,600	1,670	700	0	0
9				750	3,300	5,680	1,880	2,600	1,670	700	0	0
10				790	2,250	4,500	1,880	2,600	1,660	700	0	0
11				855	1,510	4,500	1,880	1,960	1,670	600	0	300
12				860	2,300	4,500	1,880	1,020	1,670	500	0	300
13				805	2,150	4,500	1,740	1,040	1,670	500	0	300
14				710	2,000	4,500	1,600	1,080	486	500	0	300
15				905	2,000	4,500	1,600	1,670	1,030	500	15	300
16				1,100	3,300	4,500	1,600	1,670	1,500	500	15	350
17				1,100	3,300	4,500	1,600	1,670	1,500	500	15	400
18				1,130	3,380	4,500	1,600	1,670	1,060	104	15	600
19				1,220	3,760	4,300	1,600	1,670	0	0	15	600
20				1,240	4,500	4,500	1,600	1,670	750	0	15	600
21			250	1,400	4,500	3,450	1,460	1,660	1,200	0	15	512
22			407	1,550	4,500	2,400	1,460	1,670	1,200	0	15	400
23			407	1,400	4,500	2,400	1,460	1,670	1,340	0	0	400
24			407	1,730	4,500	2,400	1,030	1,080	1,340	0	1,000	100
25			420	2,200	4,500	2,400	1,520	1,670	1,340	0	1,000	100
26			500	2,200	4,500	2,950	1,520	1,070	1,340	0	1,000	100
27			680	2,000	4,500	3,500	1,120	1,670	1,020	0	1,000	100
28			680	2,000	4,500	3,500	2,180	1,670	700	0	1,000	100
29			835	2,250	4,500	3,500	3,400	1,670	700	0	1,000	100
30			800	2,500	4,500	3,500	3,900	1,670	700	0	1,000	100
31			750		4,500		3,030	1,660		0		100
Sum			6,136	36,700	100,120	124,250	59,690	57,510	38,896	10,704	7,120	11,844

Month	Extreme Gage		ϕ Extreme Second Feet — 1915				Average Second Feet 1915	Acre Feet			
			High		Low			Total 1915	Period		
	High	Low	Day		Day				Normal	Maximum	Minimum
Jan.											
Feb.											
Mar.	21 to 31						558	12,200			
Apr.			30	2,500	14	710	1,220	72,800			
May			‡ 20	4,500	5	1,120	3,230	198,600			
June			4	7,500	3	2,250	4,140	246,400			
July			30	3,900	24	1,030	1,930	118,400			
Aug.			‡ 2	2,600	12	1,020	1,860	114,100			
Sept.			‡ 1	1,670	19	0	1,300	77,200			
Oct.			‡ 1	700	‡ 19	0	345	21,200			
Nov.			‡ 24	1,000	‡ 1	0	237	14,100			
Dec.			‡ 1	1,000	‡ 7	0	382	23,500			
Yearly				7,500		0	1,580	898,500			

‡ And Other Days.
ϕ Mean Daily.

RIO GRANDE AT BELOW ELEPHANT BUTTE DAM STATION

DESCRIPTION: Water-stage recorder on left river bank 1 mile below Elephant Butte Dam. Measurements from cable at same site.

RECORDS: Furnished by the El Paso office of the United States Bureau of Reclamation. Records available 1915 to 1940, inclusive.

REMARKS: See preceding page for remarks.

Mean Daily Discharge in Second Feet 1916 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	100	5	774	1,000	2,500	3,900	2,640	1,600	1,120	1,600	0	2,000
2	100	362	774	1,000	2,120	3,900	2,640	1,600	1,000	1,600	0	2,000
3	100	600	774	1,000	1,600	3,900	2,640	1,600	1,000	1,600	0	2,000
4	100	545	600	1,000	1,920	4,000	2,640	705	1,000	1,600	0	2,000
5	100	545	600	1,000	2,500	4,000	2,640	1,600	1,000	1,600	0	3,000
6	100	545	600	1,000	1,630	4,060	2,640	1,600	1,000	1,600	0	3,000
7	100	545	600	1,000	15	4,060	2,510	1,600	1,000	1,600	0	2,950
8	35	545	600	1,000	15	4,060	1,800	1,600	1,000	1,600	0	2,540
9	0	579	600	1,000	410	4,060	1,800	1,600	1,000	1,600	0	2,000
10	0	800	913	1,000	1,200	4,060	1,800	1,400	1,000	1,600	0	2,000
11	0	1,000	1,100	1,000	1,800	4,060	1,800	1,600	1,000	1,350	0	2,000
12	0	1,000	1,100	1,000	2,350	4,060	1,800	1,600	1,000	1,200	0	2,000
13	0	1,000	1,100	1,500	2,500	4,000	1,670	1,600	1,000	450	0	2,000
14	0	1,000	1,100	1,830	2,500	2,930	1,600	1,600	1,000	0	0	2,000
15	0	1,000	1,300	2,000	2,500	2,400	3,000	1,200	1,000	0	0	2,000
16	0	1,000	1,400	2,000	2,680	2,640	1,600	1,200	1,000	0	0	2,000
17	0	1,000	1,410	2,330	2,680	2,640	1,600	1,200	1,000	0	0	2,000
18	5	1,000	1,410	2,500	2,670	2,640	1,600	1,200	1,000	0	0	2,000
19	5	1,000	1,410	2,500	4,000	2,640	1,600	1,200	1,000	0	0	2,000
20	5	1,000	1,410	2,190	3,770	2,640	1,600	1,200	1,000	0	0	2,000
21	5	1,000	1,410	2,500	3,300	2,640	1,600	1,200	1,000	0	0	2,000
22	5	774	1,410	2,500	4,000	2,640	1,600	1,200	1,200	0	0	2,000
23	5	774	1,410	2,500	4,000	2,640	1,600	1,200	1,200	0	0	2,000
24	5	774	1,410	2,500	3,900	2,640	1,600	1,200	1,200	0	0	2,000
25	5	774	1,410	2,500	3,900	2,640	1,600	1,200	1,200	0	0	2,000
26	5	774	1,410	2,500	3,900	2,640	1,600	1,200	1,600	0	0	2,000
27	5	774	1,410	2,500	3,600	2,640	1,600	1,200	1,600	0	1,330	0
28	5	774	1,410	2,500	3,300	2,640	1,600	1,200	1,600	0	2,000	0
29	5	774	1,410	2,500	3,900	2,640	1,600	1,200	1,600	0	2,000	3,000
30	5		1,410	2,500	3,900	2,640	1,600	1,200	1,600	0	2,000	3,000
31	5		1,410		3,900		1,600	1,200		0		3,000
Sum	805	22,263	35,085	53,850	82,960	97,050	59,220	41,705	33,920	19,000	7,330	64,490

Month	Extreme Gage High	Extreme Gage Low	ϕ Extreme Second Feet — 1916 High Day	High	Low Day	Low	Average Second Feet 1916	Acre Feet Total 1916	Period Normal	Period Maximum	Period Minimum
Jan.			‡ 1	100	‡ 9	0	26.0	1,600			
Feb.			‡ 11	1,000	1	5.0	768	44,200			
Mar.			‡ 17	1,410	‡ 4	600	1,130	69,600			
Apr.			‡ 18	2,500	‡ 1	1,000	1,800	106,800			
May			‡ 19	4,000	‡ 7	15.0	2,680	164,500			
June			‡ 6	4,060	15	2,400	3,240	192,500			
July			15	3,000	‡ 14	1,600	1,910	117,500			
Aug.			‡ 1	1,600	4	705	1,350	82,700			
Sept.			‡ 26	1,600	‡ 2	1,000	1,130	67,300			
Oct.			‡ 1	1,600	‡ 14	0	613	37,700			
Nov.			‡ 28	2,000	‡ 1	0	244	14,500			
Dec.			‡ 5	3,000	‡ 27	0	2,080	127,900			
Yearly				4,060		0	1,410	1,026,800			

‡ And Other Days.
ϕ Mean Daily

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

The data below cover all reservoirs in the Rio Grande Basin having over 17,000 acre-foot capacity.

The names of the reservoirs on the following pages and the sources of the data are: Rio Grande, Continental, Santa Maria, Terrace and Sanchez data are from the office of Colorado Division Engineer W. B. Carroll. Bluewater data are from the Secretary of the Bluewater-Toltec Irrigation District. Costilla data are from the office of New Mexico State Engineer. El Vado data are from Middle Rio Grande Conservancy District. Elephant Butte, Caballo, Alamogordo, McMillan and Avalon data are from the United States Bureau of Reclamation. Red Bluff data are from the office of the Pecos Joint Investigation.

The data for Boquilla Reservoir are from the Compañia Agricola y de Fuerza Electrica del Rio Conchos, S. A. The data for Don Martin, Centenario and San Miguel are from the Banco Nacional de Credito Agricola, S. A. Data for Culebron are from the Chief of the office of Obras de Defensa at Matamoros, Tamaulipas, Mexico. The data shown for Elephant Butte were modified to conform to capacity curves revised yearly for progressive silt deposition.

In Thousands of Acre Feet

Date	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Total	Normal
Rio Grande — Capacity 51,700 Acre Feet																		
Jan. 1				38.7			4.6	3.9	15.4	4.2	2.2	24.2	9.6	1.9	33.2	0	137.9	12.5
Feb. 1				39.8			5.2	5.3	16.8	5.5	3.2	25.5	10.7	2.5	34.2	0	148.7	13.5
Mar. 1				40.8			5.8	7.0	17.6	7.0	4.4	26.0	12.2	4.2	35.6	4.1	164.7	15.0
Apr. 1				41.7			6.8	8.4	18.8	7.8	4.5	26.5	13.7	5.9	36.5	5.3	175.9	16.0
May 1			14.8	32.7		34.0	5.7	2.7	15.3	4.9	.2	25.6	16.2	17.5	36.8	4.2	208.6	16.0
June 1			43.0	46.0		23.9	5.9	38.2	12.7	.7	.2	23.4	44.3	51.1	34.1	0	325.5	24.9
July 1			46.9	35.1		13.0	.5	51.5	20.3	.4	51.1	8.5	42.9	51.1	16.8	0	338.1	26.0
Aug. 1			33.3	11.9		8.2	.2	36.7	3.9	.4	42.1	.2	17.7	33.4	0	0	188.0	14.5
Sept. 1			18.9	2.7		1.8	.2	17.9	0	.4	22.6	1.3	.3	12.8	0	0	78.9	6.1
Oct. 1				0		1.9	.2	17.2	0	.4	21.4	1.1	0	16.5	0	0	58.7	4.9
Nov. 1				0		.2	.2	12.0	0	.4	21.5	5.0	0	26.0	0	0	65.3	5.4
Dec. 1			36.5			2.8	1.8	13.8	2.1	1.1	4.1	7.5	.4	31.0	0	0	101.1	8.4
Continental — Capacity 26,700 Acre Feet																		
Jan. 1							.9	0	6.5	2.6	.6	3.3	.5	.7	5.1	1.1	21.3	2.1
Feb. 1							.9	0	6.5	2.6	.6	3.3	.5	.7	5.1	1.1	21.3	2.1
Mar. 1							.9	.1	6.5	2.6	.6	3.3	.5	.7	5.1	1.0	21.3	2.1
Apr. 1							.9	0	6.5	2.6	.6	3.3	.5	.7	5.1	1.1	21.3	2.1
May 1				.2	2.3	6.7	.9	0	6.5	2.6	.8	3.3	.5	3.9	6.6	2.5	36.8	2.8
June 1				4.4	5.1	5.1	.8	10.5	5.4	2.3	.3	4.0	2.3	6.5	6.4	2.2	55.3	4.3
July 1				5.2	8.1	3.5	0	11.4	4.4	1.9	7.7	2.5	2.2	8.4	4.7	1.0	61.0	4.7
Aug. 1				.4	4.1	1.5	0	10.1	3.0	1.4	6.5	1.4	1.4	4.9	3.1	.5	38.5	2.9
Sept. 1				.1	5.2	.9	.1	6.8	2.4	1.5	4.2	.9	.8	4.0	1.7	.1	28.7	2.2
Oct. 1				.4	3.5	.8	0	6.1	1.7	1.5	8.4	.5	.7	3.7	1.2	0	30.5	2.3
Nov. 1				.3		.8	0	6.1	1.6	.6	3.3	.5	.6	3.7	1.1	0	18.6	1.6
Dec. 1				0		.9	.1	6.1	2.6	.6	3.3	.5	.7	5.1	1.0		20.9	1.9
Santa Maria — Capacity 43,600 Acre Feet																		
Jan. 1							10.5	2.2	4.4	4.8	3.3	5.7	5.1	4.0	11.4	1.9	53.3	5.3
Feb. 1							10.7	3.1	5.4	5.6	4.0	5.9	5.9	4.6	11.9	2.6	59.7	6.0
Mar. 1							11.0	3.9	6.1	6.3	4.6	6.5	6.6	5.4	12.3	3.4	66.1	6.6
Apr. 1				23.4			11.5	4.7	7.1	6.8	4.7	6.9	7.4	6.2	13.1	3.8	95.6	8.7
May 1				23.9	9.9	29.8	12.2	4.8	7.0	6.8	4.6	6.9	9.5	10.8	15.1	3.8	145.1	11.2
June 1				30.8	18.4	30.0	12.2	12.0	8.6	6.0	6.1	7.9	19.1	21.6	17.9	3.7	194.3	14.9
July 1				28.5	24.8	21.5	6.4	20.2	12.0	5.6	11.3	5.3	20.9	33.9	11.6	1.9	203.9	15.7
Aug. 1				6.9	15.9	9.9	1.5	19.2	5.7	4.7	11.8	2.5	9.8	26.2	2.2	1.2	117.5	9.0
Sept. 1				1.6		9.4	.6	2.7	2.7	3.1	3.9	2.1	3.3	7.8	0	1.0	38.2	3.2
Oct. 1				2.5		9.2	.7	2.7	3.2	2.6	3.8	2.3	3.1	8.6	0	1.1	39.8	3.2
Nov. 1				2.6		9.3	.7	2.7	3.2	2.8	3.8	3.5	3.1	11.7	0	.7	44.1	3.7
Dec. 1						10.1	1.3	3.5	3.9	2.5	4.8	4.3	3.3	11.7	1.1		46.5	4.6
Terrace — Capacity 17,700 Acre Feet																		
Jan. 1								2.5	0	0	.6	5.9	4.6	0	5.3	.4	19.3	2.1
Feb. 1								2.8	0	0	.8	5.4	4.5	1.2	5.6	1.2	21.5	2.4
Mar. 1								3.5	.3	.9	.8	4.6	4.5	2.5	6.0	1.8	24.9	2.8
Apr. 1			3.2		3.3	7.2	1.0	4.1	.6	.9	1.3	4.9	4.4	2.7	6.8	2.2	42.6	3.3
May 1	1.0		3.4	7.2	4.5	7.0	1.0	1.9	.6	1.5	1.3	6.4	4.5	9.6	7.5	1.7	59.1	4.2
June 1	2.2		3.3	13.0	13.8	5.0	2.2	11.4	2.0	1.0	1.9	10.9	14.8	15.6	6.9	2.2	106.2	7.1
July 1	11.8		12.3	7.8	12.8	3.8	.9	16.0	6.4	.9	17.7	8.6	13.9	15.9	5.8	1.7	136.3	9.1
Aug. 1	.7		10.1	3.1	9.0	5.2		14.9	4.2	.5	13.8	5.7	9.4	3.5	3.0	.7	83.8	6.4
Sept. 1	.8		7.2	0	10.2	2.5		4.6	0	0	9.3	4.8	3.4	4.0	.7	0	47.5	3.7
Oct. 1	1.0		11.9	0	12.1	1.6	1.1	2.1	0	0	8.5	3.5	.2	3.1	0	0	45.1	3.2
Nov. 1	2.0		10.3	0	10.7	1.1	1.3	.7	0	0	8.0	4.2	0	4.7	0	0	43.0	3.1
Dec. 1				0			1.9	0	0	.4	7.1	4.7	0	5.3	0		19.4	1.9
Sanchez — Capacity 103,200 Acre Feet																		
Jan. 1			8.0					5.4	9.7	8.5	5.2	11.6	12.8	12.8	18.1	7.1	99.2	9.9
Feb. 1			8.0					5.8	9.9	8.4	5.8	11.6	12.6	15.1	17.9	7.2	102.0	10.2
Mar. 1			8.0					6.0	9.2	8.7	6.5	11.6	12.4	15.3	17.6	7.3	102.6	10.3
Apr. 1			10.0					6.9	9.6	9.3	7.8	11.8	12.9	15.7	19.6	8.1	111.7	11.2
May 1			10.4			13.0		10.2	10.2	12.0	7.4	13.7	17.6	19.2	22.9	10.9	147.5	13.4
June 1			9.7			10.7	11.1	19.4	18.9	11.3	10.9	16.6	26.0	30.5	25.4	21.4	211.9	17.7
July 1			7.9			7.5	10.6	16.9	17.9	7.0	15.1	6.3	28.8	31.2	16.5	12.8	178.5	14.9
Aug. 1			4.3			9.6	5.7	12.3	11.7	3.1	12.3	1.6	20.9	19.5	7.5	5.2	113.7	9.5
Sept. 1			3.3				1.9	10.1	7.8	2.4	9.7	8.5	15.6	14.7	5.9	2.7	84.6	7.7
Oct. 1			8.4					7.5	8.3	4.1	10.7	10.4	14.8	16.8	5.0	3.7	91.7	9.2
Nov. 1			10.4					9.7	8.4	4.2	11.8	12.3	15.3	16.4	6.1	5.1	99.7	10.0
Dec. 1							5.0	9.9	8.4	4.2	11.8	12.5	13.0	18.1	6.7		89.6	10.0
Bluewater — Capacity 50,300 Acre Feet																		
Jan. 31				0	0	‡ 4.7	‡ 1.4	.3	‡17.5	‡5.0	0	8.0	7.8	‡17.5	‡ 4.0	0	* 66.2	5.1
Feb. 28				0	0	4.7	1.3	5.6	17.0	‡4.5	1.3	7.5	9.6	17.5	3.8	0	* 72.8	5.6
Mar. 31				0	1.3	6.5	2.0	23.0	16.4	4.4	9.3	15.3	18.7	20.5	10.0	.5	127.9	9.8
Apr. 30				1.8	2.2	8.0	3.4	29.0	13.4	3.4	16.4	19.3	33.6	19.1	8.9	4.7	163.2	12.6
May 31				1.1	1.0	7.0	2.8	26.9	11.5	1.1	‡14.0	15.9	29.3	15.8	5.9	2.9	*135.2	10.4
June 30			2.0	.3	0	4.7	1.8	23.6	8.6	.1	‡12.0	13.8	24.8	13.0	3.7	1.9	*110.3	7.9
July 31			.8	0	1.1	2.8	.4	21.0	7.5	0	‡11.0	10.4	22.7	10.2	2.4	1.1	* 91.4	6.5
Aug. 31			0	0	2.5	2.1	0	20.2	7.0	0	‡10.0	9.3	20.2	6.0	.5	1.0	* 78.8	5.6
Sept. 30			0	0	5.6	1.8	0	19.8	6.5	0	‡ 9.0	9.0	20.5	5.5	.4	0	* 78.1	5.6
Oct. 31			0	0	‡5.0	‡1.6	0	‡19.0	6.0	0	9.0	‡8.5	‡19.0	5.1	0	0	* 73.2	5.2
Nov. 30			0	0	5.3	1.5	0	‡18.0	6.0	0	8.6	8.3	‡19.5	‡5.0	0	0	* 72.2	5.2
Dec. 31			0	0	‡5.0	‡1.5	0	‡17.0	5.5	0	‡8.0	‡ 8.0	‡18.0	‡4.0	0	0	* 67.0	4.8

Costilla — Capacity 20,800 Acre Feet.

Date	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Total	Average
Jan. 31		2.5	8.7	2.7	‡ 0	1.8	3.0	‡1.6	‡6.5	‡6.7	‡2.2	‡5.1	‡2.2	‡1.9	‡5.0	‡5.5	‡5.2	‡6.6	‡2.3	*69.5	3.9
Feb. 28		2.9	9.3	3.2	‡ 0	2.1	3.4	‡1.8	‡7.0	‡6.9	‡2.7	‡5.1	‡2.5	‡2.4	‡5.4	‡5.7	5.5	‡7.0	‡2.6	*75.5	4.2
Mar. 31		3.3	9.8	3.9	.7	2.6	3.8	‡2.1	‡7.7	7.3	‡5.5	‡5.6	‡3.0	3.0	‡6.2	‡6.1	‡5.9	‡7.5	‡3.1	*85.1	4.7
Apr. 30		4.3	11.0	4.5	2.7	3.7	5.0	‡2.7	8.3	8.6	‡5.1	6.5	4.4	‡4.0	7.8	9.3	8.3	‡9.6	4.0	*109.8	6.1
May 31	14.0	6.5	14.9	3.8	6.0	4.7	9.0	5.8	6.0	7.6	9.4	8.1	4.9	5.6	9.8	14.6	13.3	11.2	6.6	161.8	8.5
June 30	8.7	7.3	13.6	2.2	5.5	4.5	6.6	3.6	2.9	4.8	9.4	8.4	2.9	9.0	7.4	14.5	14.9	8.3	4.8	139.3	7.3
July 31	2.6	3.7	5.9	2.0	4.8	1.3	3.5	2.3	3.2	1.6	6.5	3.8	1.1	7.5	4.4	9.5	10.2	4.4	1.2	79.5	4.2
Aug. 31	2.4	4.2	2.8	1.5	2.0	.9	1.2	2.9	5.7	.8	4.4	1.3	1.0	5.9	4.0	5.1	4.7	1.7	.4	52.9	2.8
Sept. 30	1.9	5.3	‡1.8	.6	1.2	1.2	.8	4.3	5.1	.8	‡3.6	‡1.2	.6	4.4	3.4	3.6	4.7	1.1	.2	*45.8	2.4
Oct. 31	1.5	6.9	1.7	‡ 0	.9	1.9	.9	‡5.0	5.7	‡1.1	‡3.9	‡1.3	‡ .9	‡4.3	‡4.3	‡4.3	‡5.3	‡1.2	.7	*51.8	2.7
Nov. 30	1.8	7.7	1.9	‡ 0	1.0	2.4	‡1.3	‡5.4	‡6.1	‡1.4	‡4.2	‡1.6	‡1.1	‡4.5	‡4.9	‡4.7	‡5.7	‡1.5	‡1.3	*58.5	3.1
Dec. 31	2.2	8.2	2.2	‡ 0	1.4	2.7	‡1.4	‡6.0	‡6.3	‡1.7	‡4.5	‡1.8	‡1.5	‡4.9	‡5.2	‡5.0	‡6.2	‡1.8	‡2.0	*65.0	3.4

‡ Estimated. * Partly Estimated. Bluewater Estimations by I.B.C.

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

In The United States

In Thousands of Acre Feet

Month	El Vado (Capacity 198.8)				Elephant Butte (Capacity 2,219.0)				Caballo (Capacity 346.0)			
	Year 1940		Average 1935-1940		Year 1940		Normal 1924-1940		Year 1940		Average 1938-1940	
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change
Jan. 31	21.9	+ 2.3	50.6	- 6.5	839.2	+ 25.1	1,095.7	+ 46.5	80.1	+ .8	96.2	+ 16.4
Feb. 29	25.4	+ 3.5	51.9	+ 1.3	874.7	+ 35.5	1,108.9	+ 13.2	70.7	- 9.4	56.0	- 40.2
Mar. 31	53.2	+ 27.8	59.3	+ 7.4	886.7	+ 12.0	1,094.9	- 14.0	12.1	- 58.6	15.5	- 40.5
Apr. 30	112.2	+ 59.0	118.4	+ 59.1	789.7	- 97.0	1,087.0	- 7.9	17.4	+ 5.3	25.1	+ 9.6
May 31	179.2	+ 67.0	169.0	+ 50.6	732.7	- 57.0	1,186.9	+ 99.9	18.3	+ .9	19.7	- 5.4
June 30	148.9	- 30.3	152.7	- 16.3	625.4	- 107.3	1,179.5	- 7.4	24.1	+ 5.8	20.1	+ .4
July 31	94.2	- 54.7	114.9	- 37.8	522.3	- 103.1	1,095.4	- 84.1	16.3	- 7.8	17.4	- 2.7
Aug. 31	61.5	- 32.7	77.0	- 37.9	451.0	- 71.3	1,011.1	- 84.3	16.7	+ .4	19.8	+ 2.4
Sept. 30	28.9	- 32.6	56.5	- 20.5	429.9	- 21.1	983.5	- 27.6	9.2	- 7.5	28.1	+ 8.3
Oct. 31	18.5	- 10.4	50.6	- 5.9	447.5	+ 17.6	992.5	+ 9.0	12.9	+ 3.7	40.1	+ 12.0
Nov. 30	17.7	- .8	48.1	- 2.5	470.1	+ 22.6	1,004.7	+ 12.2	16.4	+ 3.5	44.4	+ 4.3
Dec. 31	21.1	+ 3.4	51.1	+ 3.0	438.5	+ 18.4	1,016.3	+ 11.6	42.1	+ 25.7	67.3	+ 22.9
Annual	⊕ 65.2	+ 1.5	83.3	- 6.0	⊕ 629.8	- 325.6	1,071.4	- 32.9	⊕ 28.0	- 37.2	37.5	- 12.5
Maximum	‡183.6	167.1	‡ 195.7		‡ 900.6	482.1	‡1,986.4		‡ 80.8	72.7	‡ 114.2	
Minimum	‡ 16.5		0		‡ 418.5		‡ 418.5		‡ 8.1		0	

Month	Alamogordo (Capacity 157.0)				McMillan and Avalon (Capacity 44.8)				Red Bluff (Capacity 284.0)			
	Year 1940		Average 1937-1940		Year 1940		Normal 1924-1940		Year 1940		Average 1936-1940	
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change
Dec. 31	* 99.4	* + 7.9	* 75.1	* + 3.7	* 11.4	* - 1.6	* 32.9	* + 1.1				
Jan. 31	98.0	- 1.4	78.0	+ 2.9	12.5	+ 1.1	34.5	+ 1.6	65.9	+ 7.9	117.9	+ 2.8
Feb. 29	102.0	+ 4.0	82.0	+ 4.0	12.6	+ .1	33.7	- .8	73.1	+ 7.2	123.2	+ 5.3
Mar. 31	76.0	- 26.0	62.2	- 19.8	21.1	+ 8.5	30.9	- 2.8	70.7	- 2.4	121.4	- 1.8
Apr. 30	58.0	- 18.0	59.0	- 3.2	11.9	- 9.2	19.6	-11.3	50.9	- 19.8	98.2	- 23.2
May 31	67.0	+ 9.0	57.8	- 1.2	24.2	+ 12.3	28.6	+ 9.0	57.2	+ 6.3	94.6	- 3.6
June 30	41.0	- 26.0	39.0	- 18.8	22.4	- 1.8	23.1	- 5.5	53.7	- 3.5	153.6	+ 59.0
July 31	26.0	- 15.0	56.6	+ 17.6	6.8	- 15.6	20.1	- 3.0	33.4	- 20.3	133.1	- 20.5
Aug. 31	37.0	+ 11.0	58.4	+ 1.8	7.1	+ .3	18.5	- 1.6	31.3	- 2.1	115.9	- 17.2
Sept. 30	18.0	- 19.0	64.1	+ 5.7	2.2	- 4.9	25.4	+ 6.9	28.4	- 2.9	112.5	- 3.4
Oct. 31	19.0	+ 1.0	69.5	+ 5.4	7.0	+ 4.8	30.2	+ 4.8	43.0	+ 14.6	95.6	- 16.9
Nov. 30	25.0	+ 6.0	59.8	- 9.7	8.0	+ 1.0	30.4	+ .2	49.7	+ 6.7	98.3	+ 2.7
Dec. 31	32.0	+ 7.0	64.4	+ 4.6	7.7	- .3	31.5	+ 1.1	57.2	+ 7.5	103.5	+ 5.2
Annual	⊕ 49.9	- 67.4	62.6	- 10.7	⊕ 12.0	- 3.7	27.2	- 1.4	⊕ 51.2	- 0.8	114.0	- 11.6
Maximum	102.0	84.0	108.3		24.2	22.0	85.5		‡ 76.0	48.0	‡ 305.0	
Minimum	18.0		0		2.2		0		‡ 28.0		0	

In Mexico

Month	Boquilla (Capacity 2,116.0)				Centenario and San Miguel (Capacity 19.9)				Centenario and San Miguel (Capacity 19.9)			
	Year 1940		Normal 1924-1940		Year 1939		Average 1936-1939		Year 1940		Average 1936-1940	
	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change	Storage	Change
Jan. 31	1,799.1	- 16.5	1,373.3	+ 9.3	11.8	+ 2.1	11.2	+ .7	9.9	+ 2.1	11.0	+ 1.2
Feb. 29	1,771.2	- 27.9	1,340.3	- 33.0	9.2	- 2.6	10.1	- 1.1	11.8	+ 1.9	10.4	- .6
Mar. 31	1,706.9	- 64.3	1,283.2	- 57.1	4.6	- 4.6	8.4	- 1.7	9.8	- 2.0	8.7	- 1.7
Apr. 30	1,616.0	- 90.9	1,216.1	- 67.1	2.5	- 2.1	5.6	- 2.8	15.4	+ 5.6	7.6	- 1.1
May 31	1,539.9	- 76.1	1,140.5	- 75.6	1.4	- 1.1	5.2	- .4	19.6	+ 4.2	8.1	+ .5
June 30	1,480.9	- 59.0	1,081.5	- 59.0	1.3	- .1	4.0	- 1.2	17.5	- 2.1	6.7	- 1.4
July 31	1,392.6	- 88.3	1,129.0	+ 47.5	1.8	+ .5	5.6	+ 1.6	15.3	- 2.2	7.6	+ .9
Aug. 31	1,493.6	+101.0	1,277.3	+148.3	4.3	+ 2.5	7.0	+ 1.4	16.7	+ 1.4	8.9	+ 1.3
Sept. 30	1,528.3	+ 34.7	1,447.7	+170.4	5.4	+ 1.1	10.0	+ 3.0	18.2	+ 1.5	11.6	+ 2.7
Oct. 31	1,482.1	- 46.2	1,437.1	- 10.6	7.0	+ 1.6	10.3	+ .3	19.6	+ 1.4	12.1	+ .5
Nov. 30	1,455.5	- 26.6	1,388.1	- 49.0	6.7	- .3	9.2	- 1.1	17.9	- 1.7	10.9	- 1.2
Dec. 31	1,432.3	- 23.2	1,368.0	- 20.1	7.8	+ 1.1	9.8	+ .6	15.6	- 2.3	11.0	+ .1
Annual	⊕1,558.2	-383.3	1,290.2	⊕ + 4.0	5.3	- 1.9	8.0	- .7	⊕ 13.6	+ 7.8	9.6	+ 1.2
Maximum	ϕ1,815.6	423.0	2,152.0		11.8	10.5	19.9		19.6	9.8	19.9	
Minimum	1,392.6		54.0		1.3		.6		9.8		.6	

Month	Don Martin (Capacity 1,123.0)				Culebron (Capacity 56.8)				Culebron (Capacity 56.8)			
	Year 1940		Normal 1930-1940		Year 1939				Year 1940		Average 1939-1940	
	Storage	Change	Storage	Change	Storage	Change			Storage	Change	Storage	Change
Jan. 31	33.7	- 4.8	445.6	- 48.0	48.8							
Feb. 29	31.5	- 2.2	429.5	- 16.1	39.2	- 9.6						
Mar. 31	42.5	+ 11.0	410.8	- 18.7	30.0	- 9.2						
Apr. 30	41.1	- 1.4	397.0	- 13.8	30.0	0						
May 31	67.5	+ 26.4	382.5	- 14.5	58.6	+ 28.6			76.2		62.5	
June 30	90.5	+ 23.0	385.9	+ 3.4	48.8	- 9.8			64.0	- 12.2	54.4	- 8.1
July 31	81.0	- 9.5	380.7	- 5.2	44.9	- 3.9			69.7	+ 5.7	50.2	- 4.2
Aug. 31	70.3	- 10.7	369.9	- 10.8	30.7	- 14.2			76.2	+ 6.5	55.1	+ 4.9
Sept. 30	87.6	+ 17.3	430.2	+ 60.3	34.0	+ 3.3			89.2	+ 13.0	73.0	+ 17.9
Oct. 31	86.6	- 1.0	440.5	+ 10.3	56.8	+ 22.8			73.0	- 16.2	63.3	- 9.7
Nov. 30	88.3	+ 1.7	454.3	+ 13.8	53.6	- 3.2			76.2	+ 3.2	63.4	+ 0.1
Dec. 31	88.5	+ .2	456.8	+ 2.5	50.6	- 3.0						
Annual9	⊕ 67.4	+ 50.0	415.3	- 36.8	⊕ 43.8							
Maximum	90.5	59.0	1,163.4		‡ 74.1							
Minimum	31.5		0		‡ 28.0							

⊕ Average. ‡ Daily maximum or minimum. ϕ January 1, 1940.
* Changed from figures in Water Bulletin No. 9 to conform to latest reservoir silt survey and capacity curve.

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

In Thousands of Acre Feet

Elephant Butte						
Date	1915	1916	1917	1918	1919	1920
Jan. 31		393.3	793.0	532.5	230.8	1,006.8
Feb. 28		395.2	726.8	503.5	236.2	1,056.5
Mar. 31	54.2	473.7	656.0	474.5	270.8	1,055.7
Apr. 30	250.6	583.0	631.1	420.0	479.8	1,078.8
May 31	441.3	873.8	737.9	432.3	875.8	1,498.0
June 30	487.3	861.4	960.2	400.5	924.9	1,957.3
July 31	568.2	772.7	931.3	328.7	1,051.8	1,937.5
Aug. 31	433.9	785.7	818.1	257.1	1,022.6	1,825.1
Sept. 30	365.5	731.3	703.1	185.2	936.8	1,697.8
Oct. 31	347.7	856.8	581.3	171.0	938.5	1,627.9
Nov. 30	347.5	915.4	535.3	167.7	944.1	1,621.3
Dec. 31	350.1	841.7	506.3	202.7	983.3	1,602.7

Elephant Butte						
Date	1921	1922	1923	Total	Average 1915-1923	Normal 1915-1940
Jan. 31	1,625.8	1,681.9	1,317.7	7,581.8	947.7	1,048.3
Feb. 28	1,610.1	1,653.8	1,304.6	7,486.7	935.8	1,053.5
Mar. 31	1,582.1	1,613.9	1,286.6	7,467.5	829.7	1,003.1
Apr. 30	1,508.3	1,556.7	1,226.9	7,735.2	859.5	1,008.3
May 31	1,557.6	1,703.2	1,333.4	9,453.3	1,050.4	1,139.6
June 30	1,925.7	1,819.8	1,363.0	10,700.1	1,188.9	1,182.8
July 31	1,932.2	1,684.6	1,244.5	10,451.5	1,161.3	1,118.2
Aug. 31	1,922.5	1,539.2	1,204.7	9,808.9	1,089.9	1,038.4
Sept. 30	1,821.8	1,461.7	1,230.2	9,133.4	1,014.8	994.4
Oct. 31	1,724.4	1,341.1	1,263.9	8,852.6	983.6	989.4
Nov. 30	1,671.7	1,318.4	1,338.6	8,860.0	984.4	997.7
Dec. 31	1,670.8	1,298.4	1,386.2	8,842.2	982.5	1,004.6

Total in United States Reservoirs (Capacity 3,563.6)			Total in Mexican Reservoirs (Capacity 3,315.7)		
Date	Year 1940 Storage	Estimated Normal	Date	Year 1940 Storage	Estimated Normal
Jan. 31	1,132.0	1,468.7	Jan. 31	* 1,842.7	* 1,829.9
Feb. 28	1,178.7	1,446.9	Feb. 28	* 1,814.5	* 1,780.2
Mar. 31	1,143.9	1,348.2	Mar. 31	* 1,759.2	* 1,702.7
Apr. 30	1,071.9	1,394.9	Apr. 30	* 1,672.5	* 1,620.7
May 31	1,117.6	1,597.1	May 31	* 1,627.0	* 1,531.1
June 30	939.6	1,656.9	June 30	1,665.1	1,536.6
July 31	708.9	1,513.3	July 31	1,552.9	1,571.7
Aug. 31	609.8	1,359.3	Aug. 31	1,650.3	1,706.3
Sept. 30	521.6	1,311.8	Sept. 30	1,710.3	1,944.6
Oct. 31	554.4	1,307.1	Oct. 31	1,677.5	1,962.7
Nov. 30	ϕ 588.2	1,313.8	Nov. 30	1,634.7	1,916.6
Dec. 31	ϕ 650.6	1,362.5	Dec. 31	1,612.6	1,899.2
Annual ⊕	851.4	1,423.4		1,684.9	1,750.2
Maximum	1,178.7			1,842.7	
Minimum	521.6			1,552.9	

⊕ Average. * Not including Culebron.
ϕ Not including Santa Maria, Continental Terrace, or Sanchez Reservoirs.

SOURCES OF RIVER FLOW
1924-1940

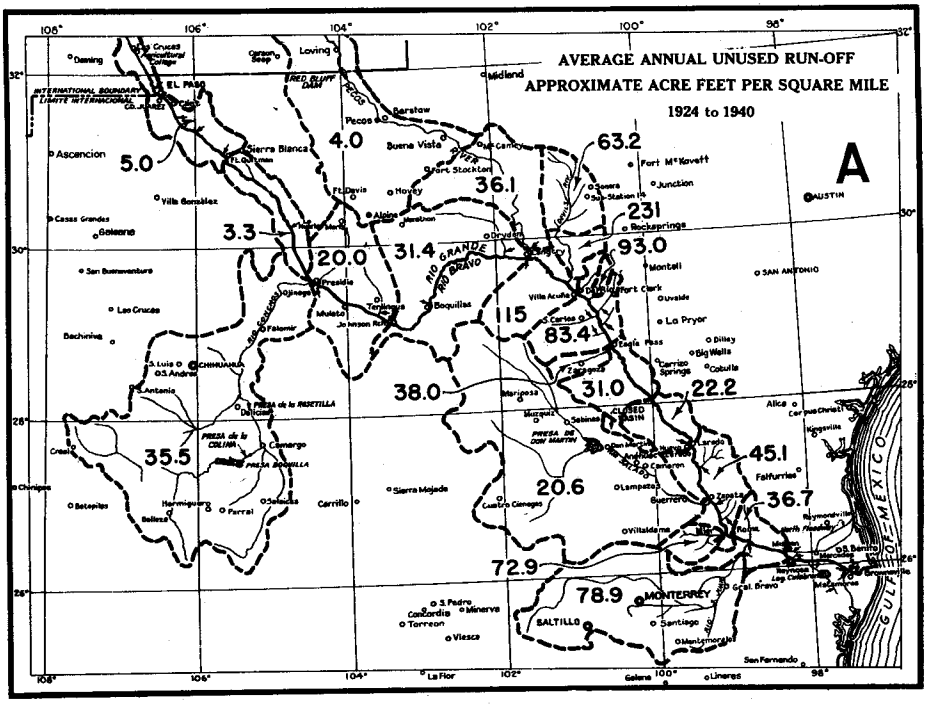
Subdivisions of the Rio Grande basin, especially below Fort Quitman on the main river, and below Sheffield on the Pecos River, are shown on the following maps.

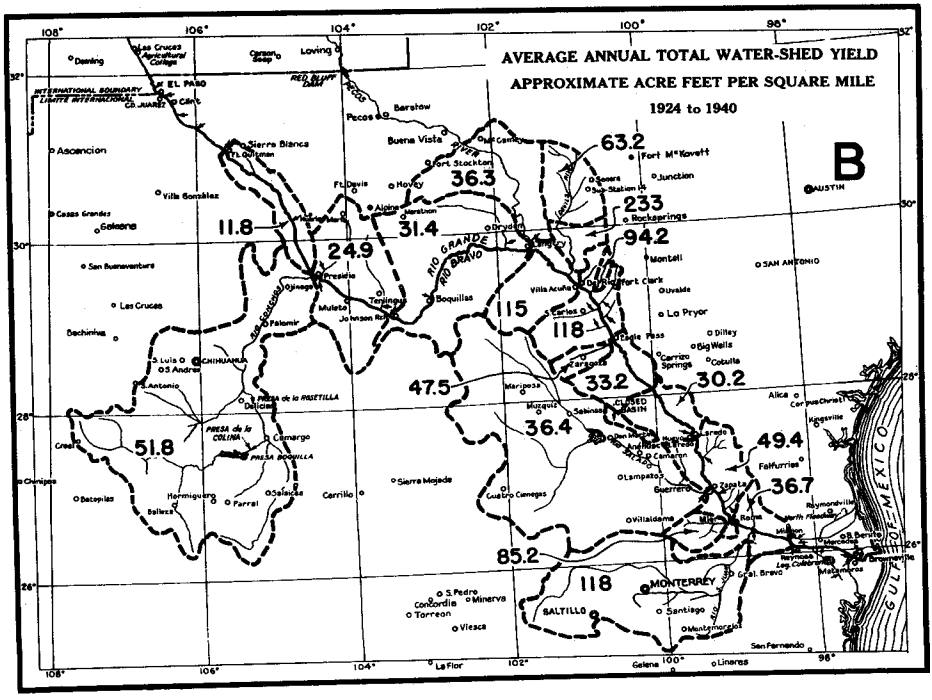
The large figures on the first map, "A" show in terms of acre feet per square mile, the approximate average annual unused run-off which originated on each water-shed subdivision during the 17-year period, 1924 to 1940, and which either flowed from or was reservoired within the subdivision.

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

SOURCES OF RIVER FLOW

continued

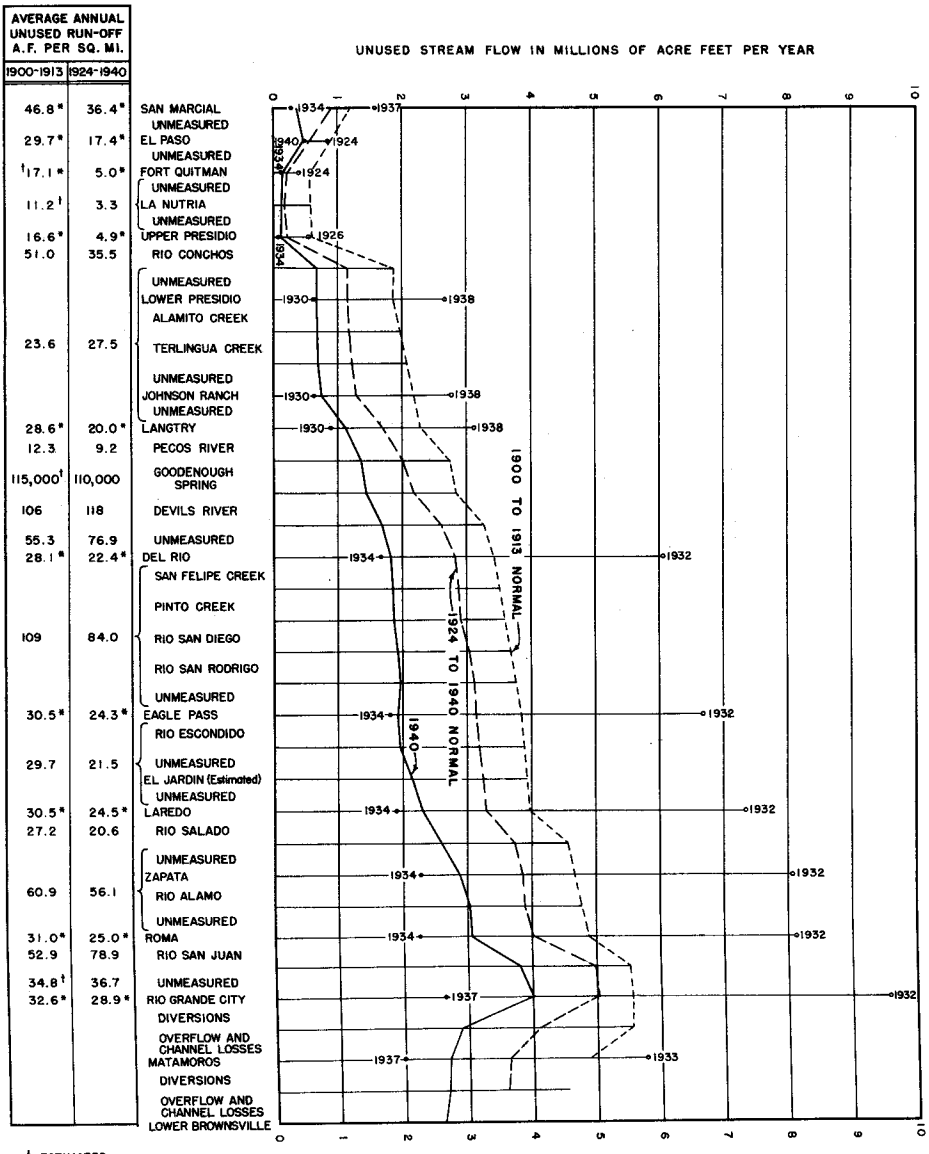




SOURCES OF RIVER FLOW

continued

A distinction must be made clear between the figures in the table at the lower or left side of this page showing average annual unused run-off and the graphical part of the page showing unused stream flow. As an illustration of this distinction, consider the unused stream flow at Upper Presidio. The amounts shown graphically above or to the right of the page are the millions of acre feet of water which actually flowed past this station, while the amounts shown by figures below or to the left of the page are acre feet per square mile of unused run-off which includes: (a) the water which actually flowed past the station and from which has been subtracted, (b) the water which ran off the water-shed into Elephant Butte reservoir in years prior to 1924 and was drawn from the reservoir during the period 1924 to 1940 and to which has been added, (c) the water which has been impounded since 1924 and remained in El Vado reservoir and Caballo reservoir at the close of the year 1940. This subtractive carry-over storage in Elephant Butte reservoir averaged 53,000 acre feet per year. The additive carry-over storage in El Vado reservoir and Caballo reservoir averaged 3,720 acre feet per year. Other carry-over storage figures are: Boquilla reservoir on the Rio Conchos, 50,700 acre feet per year, subtractive. Alamogordo, McMillan, Avalon, and Red Bluff reservoirs on the Pecos River, 2,990 acre feet per year additive. Centenario and San Miguel reservoirs on the Rio San Diego, 919 acre feet per year, additive. Don Martin reservoir on the Rio Salado, 5,210 acre feet per year, additive.



† ESTIMATED

* UNUSED RUN-OFF AT AND ABOVE GAGING STATION

○ MAXIMUM YEAR

● MINIMUM YEAR

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

This concrete-lined canal diverts water from the Rio Grande at the American Dam near El Paso, Texas, 2.1 river miles above the International Dam near Ciudad Juarez, Chihuahua. The gaging station is an open channel rating station with water-stage recorder located 396 feet below the canal head-gates. The zero of the gage is 3,712.30 feet above U.S.C. & G.S. sea level datum. 1940 record good.

This canal was constructed by the United States Section in connection with the American Dam. Operation began June 2, 1938. Water from this canal discharges into the Franklin Canal from which some is frequently returned to the Rio Grande at spillways 2.2, 2.7 and 3.6 river miles below the American Dam. At times 2 small diversions are made from this canal. See the lower part of this page for details.

RECORDS: Based upon 6 current meter measurements during the year and a stable rating curve. Records available June 2, 1938 (when the operation of this canal began) to December 31, 1940.

EXTREME FLOWS: The greatest mean daily flow in the canal occurred July 31, 1940, with a flow of 1,730 second feet. The lowest flow in the canal was 1 second foot on many occasions.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.0	1.0	145	893	571	617	940	1,010	863	454	222	176
2	1.0	1.0	134	833	546	818	695	1,000	974	483	228	179
3	1.0	1.0	133	803	596	893	766	977	924	633	75.0	182
4	1.0	1.0	259	821	536	881	795	924	848	556	2.0	172
5	1.0	1.0	348	786	691	821	983	1,030	757	377	2.0	168
6	1.0	1.0	318	845	746	768	780	1,040	698	345	2.0	170
7	1.0	1.0	291	786	649	766	780	1,050	698	318	2.0	170
8	1.0	1.0	380	836	649	771	842	973	830	296	68.7	172
9	1.0	1.0	357	809	720	902	771	839	715	280	203	175
10	1.0	1.0	392	789	630	1,030	821	774	693	260	191	179
11	1.0	55.3	620	771	684	942	1,010	798	695	269	182	188
12	1.0	84.9	594	712	617	939	986	1,210	674	194	179	180
13	1.0	85.9	498	792	644	881	924	1,080	614	1.0	169	182
14	1.0	110	424	795	687	893	896	921	574	1.0	173	183
15	1.0	201	570	836	684	836	860	851	628	1.0	170	183
16	1.0	217	655	866	617	821	1,070	795	698	1.0	176	176
17	1.0	284	588	872	576	860	967	737	612	1.0	176	188
18	1.0	342	748	777	698	798	945	709	558	1.0	94.6	185
19	1.0	386	715	706	660	712	1,010	743	594	1.0	2.0	182
20	1.0	441	* 649	684	720	718	1,040	930	554	1.0	2.0	179
21	1.0	434	* 633	746	754	800	1,120	974	641	1.0	2.0	180
22	1.0	366	* 655	786	712	798	1,110	860	845	150	2.0	182
23	1.0	228	* 536	723	695	1,220	1,010	766	737	211	2.0	185
24	1.0	191	647	795	743	1,160	945	698	549	210	2.0	126
25	1.0	179	970	754	625	1,070	905	763	434	206	2.0	2.0
26	1.0	178	743	641	526	879	857	990	405	204	2.0	2.0
27	1.0	173	729	663	599	907	812	1,020	369	206	2.0	2.0
28	1.0	162	792	676	548	995	818	879	342	204	136	2.0
29	1.0	152	789	676	531	881	967	810	354	236	186	2.0
30	1.0		655	625	614	918	1,160	786	360	256	183	2.0
31	1.0		646		723		1,160	774		245		2.0
Sum	31.0	4,280.1	16,613	23,097	19,991	26,295	28,745	27,711	19,237	6,602.0	2,838.3	4,256.0

Month	Extreme Gage Feet — 1940 High	Extreme Gage Feet — 1940 Low	Extreme Second Feet — 1940 High Day	Extreme Second Feet — 1940 High	Extreme Second Feet — 1940 Low Day	Extreme Second Feet — 1940 Low	Average Second Feet 1940	Acre Feet Total 1940	Acre Feet Period 1938-1940 ⊕ Average	Acre Feet Period 1938-1940 ⊕ Maximum	Acre Feet Period 1938-1940 ⊕ Minimum
Jan.			‡ 1	1.0	‡ 1	1.0	1.0	61.5	61.5	61.5	61.5
Feb.	6.91		20	496	‡ 1	1.0	148	8,490	11,145	13,800	8,490
Mar.	8.83	3.45	25	1,040	1	* 3.0	536	33,000	33,800	34,600	33,000
Apr.	8.53	7.12	1	942	25	546	770	45,800	47,750	49,700	45,800
May	8.03	6.88	20	792	2	488	645	39,700	42,900	46,100	39,700
June	10.51	7.26	23	1,640	1	581	876	52,200	53,533	54,300	52,200
July	10.74	7.55	31	1,730	2	658	927	57,000	59,133	60,700	57,000
Aug.	9.80	7.63	12	1,370	18	679	894	55,000	58,300	61,000	55,000
Sept.	8.69	6.25	2	993	28	316	641	38,200	42,433	45,600	38,200
Oct.	7.73		3	706	‡13	1.0	213	13,100	22,267	27,300	13,100
Nov.	5.91	3.50	2	234	‡ 4	2.0	94.6	5,630	10,277	13,000	5,630
Dec.	5.71	3.50	11	198	‡25	2.0	137	8,440	10,257	13,600	8,440
Yearly	10.74			1,730		1.0	491	356,621.5	391,856	412,792	356,622

⊕ The average, maximum and minimum discharges for January through May are for the period 1939 to 1940.
* Partly Estimated. ‡ And other days.

DIVERSIONS FROM THE RIO GRANDE BETWEEN AMERICAN DAM AND INTERNATIONAL DAM

Near El Paso, Texas

Two small diversions on the American side and none on the Mexican side were made in this section in 1940, either directly from the Rio Grande, or from the American Canal. From information furnished by the American Smelting and Refining Company and the Globe Mills, Inc., and from frequent inspections, it is estimated that the Smelter diversion averaged 1 second foot and the Globe Mill averaged .5 second foot. Thus a total of 1,089 acre feet were diverted in 1940.

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

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

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

The record is based upon 151 current meter measurements at this station during the year, 86 by the National Irrigation Commission of Mexico, 60 by the Mexican and 5 by the United States Section of this Commission. Computations by shifting channel methods. 1940 records good.

Of the water diverted by this canal in 1939, 54,406 acre feet were distributed to 13,967 acres of land irrigated in the first unit under the canal where a diversion duty of 3.90 acre feet per acre was obtained. In 1940, 49,452 acre feet were distributed to 17,090 acres of land irrigated in the first unit under the canal where a diversion duty of 2.89 acre feet per acre was obtained. In both of these years the remainder of the water from this canal was used, together with drainage water (which entered the canal at the lower end of the first unit) to irrigate lands farther down the canal.

The average annual evaporation from standard United States Weather Bureau pan in this region is approximately 99.5 inches per year. See evaporation records elsewhere in this Water Bulletin.

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	189	206	169	112	323	54.7	3.2	0	0
2	0	0	9.5	196	194	191	126	161	65.3	0	0	0
3	0	0	11.3	215	194	202	148	73.8	57.5	0	0	0
4	0	0	35.7	218	186	209	133	70.6	50.5	0	0	0
5	0	0	77.7	216	204	212	171	72.0	51.9	0	0	0
6	0	0	105	248	183	212	138	74.9	53.7	0	0	0
7	0	0	126	210	197	210	151	77.7	52.3	0	0	0
8	0	0	137	220	236	193	153	74.5	50.5	0	0	0
9	0	0	116	193	237	206	169	69.2	57.2	0	0	0
10	0	0	84.8	209	200	192	130	70.3	65.3	0	0	0
11	0	0	101	198	193	200	127	68.9	59.0	0	0	0
12	0	0	96.4	190	184	196	122	67.1	53.0	0	0	0
13	0	0	80.9	203	210	196	128	68.5	51.5	0	0	0
14	0	0	87.9	173	199	233	143	75.6	58.3	0	0	0
15	0	0	95.0	177	197	217	137	86.9	56.8	0	0	0
16	0	0	90.7	169	200	216	126	75.9	53.3	0	0	0
17	0	0	94.3	172	194	220	118	74.9	50.1	0	0	0
18	0	0	92.5	180	195	202	134	74.9	49.1	0	0	0
19	0	0	101	171	188	209	124	72.8	48.4	0	0	0
20	0	0	110	165	214	221	123	77.3	47.7	0	0	0
21	0	0	109	167	221	211	124	74.5	47.7	0	0	0
22	0	0	108	173	217	211	122	69.2	45.9	0	0	0
23	0	0	112	227	196	179	124	63.9	50.1	0	0	0
24	0	0	117	239	204	145	117	68.2	43.8	0	0	0
25	0	0	119	207	194	197	108	70.6	47.0	0	0	0
26	0	0	90.1	181	190	183	123	71.3	45.9	0	0	0
27	0	0	105	198	183	198	129	71.0	48.4	0	0	0
28	0	0	106	195	166	207	127	90.1	57.6	0	0	0
29	0	0	107	195	174	198	120	106	56.2	0	0	0
30	0		90.4	213	190	195	238	67.8	53.0	0	0	0
31	0		77.3		203		232	59.0		0		0
Sum	0	0	2,733.5	5,907	6,149	6,030	4,277	2,621.4	1,581.7	3.2	0	0

Month	Rainfall Average 1940	Rainfall Normal 1924 to 1940	Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1938-1940 Average	Maximum	Minimum
Jan.	.45	.37					0	0	0	0	0
Feb.	.28	.27					0	0	0	0	0
Mar.	.04	.26	8	147	1	0	90.1	5,540	3,670	5,540	1,800
Apr.	.01	.26	6	339	22	148	197	11,720	8,880	11,720	6,040
May	.54	.42	9	251	6	167	198	12,190	12,595	13,000	12,190
June	.67	.42	23	441	24	57.6	201	11,960	11,273	12,100	9,760
July	1.19	1.50	31	441	1	95.7	138	8,480	8,797	10,000	7,910
Aug.	.96	1.60	1	396	20	57.9	84.6	5,200	7,173	9,920	5,200
Sept.	.21	1.19	10	72.4	1	35.3	52.7	3,140	5,030	9,710	2,240
Oct.	.72	.82	1	50.9	‡ 2	0	.1	6.3	206	328	6.3
Nov.	.79	.40					0	0	0	0	0
Dec.	.18	.40					0	0	0	0	0
Yearly	6.04	7.91		441		0	80.2	58,236.3	57,624	60,558	58,236.3
Acreage Irrigated On the First Unit Only.								17,090			
Mean Acre Feet Per Acre On the First Unit Only.								3.41			
Average Rainfall in Inches								6.04	ϕ 7.91	ϕ 13.09	ϕ 3.88

ϕ Period 1924 to 1940.

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

Together With Corresponding

ACREAGE, CULTIVATED, WATER DUTY AND RAINFALL

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

The diversions were measured for the 66,268 acres, or 98.8% of the total area. This area lies above the lower end of the Hudspeth County Conservation and Reclamation District Number One. These water measurement and acreage records were furnished by the El Paso office of United States Bureau of Reclamation. For the 782 acres, (or 1.2% of the total area) lying below the Hudspeth District and above the Fort Quitman gaging station, the diversions were estimated.

From the gross diversions into the Franklin Canal below the Leon Street Wasteway and from the Riverside Canal, there has been deducted the water spilled back to the river at 3 points, viz: 9.0, 19.0, and 26.1 river miles below the American Dam at El Paso. There is considerable re-use in this area of drainage and waste water from within the area. Final drainage water returns to the Rio Grande. This record began July 1, 1938.

The average annual evaporation from standard Weather Bureau pan in this region is approximately 99.5 inches per year. See evaporation records elsewhere in this Water Bulletin.

Mean Daily Discharge in Second Feet 1940 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	134	942	654	689	958	786	833	499	204	161
2	0	0	47	1,010	610	745	886	1,023	929	488	254	175
3	0	0	194	945	717	892	818	1,032	868	613	182	175
4	0	0	238	908	678	897	874	1,060	1,020	478	286	156
5	0	36	354	940	728	912	931	955	897	399	152	98
6	0	99	363	981	854	920	949	1,064	764	364	218	157
7	0	122	311	872	757	833	883	1,092	781	283	203	199
8	0	107	358	995	736	846	942	1,092	886	335	164	264
9	0	99	331	958	805	877	810	921	796	297	169	143
10	0	94	394	942	692	954	963	887	784	293	176	272
11	0	121	465	964	750	873	992	907	787	274	169	243
12	0	0	624	724	662	890	1,075	1,015	826	221	167	236
13	0	58	581	845	692	884	999	902	691	69	161	231
14	0	113	463	858	702	885	999	935	653	293	159	175
15	0	143	589	943	687	912	971	912	675	292	153	210
16	0	207	669	955	678	834	1,125	925	725	220	159	156
17	0	303	677	898	577	738	1,117	839	724	245	150	244
18	0	406	724	807	601	852	1,006	759	654	131	120	175
19	0	427	750	773	660	720	1,094	825	643	208	88	167
20	0	479	712	755	685	782	1,004	959	592	213	84	97
21	0	516	684	885	778	810	983	1,104	718	234	120	184
22	0	461	690	800	753	844	932	977	559	170	231	163
23	0	298	500	805	690	669	1,019	880	619	215	112	144
24	0	226	708	804	655	686	1,070	769	574	277	200	192
25	0	141	868	862	626	825	998	774	492	302	125	204
26	0	185	798	711	663	809	971	873	471	247	151	127
27	0	157	824	701	723	740	872	958	414	221	148	125
28	0	144	869	829	732	831	851	894	360	211	156	105
29	0	134	914	740	597	783	1,035	891	385	239	188	36
30	0		758	665	689	819	862	870	392	345	173	29
31	0		671		787		925	792		335		38
Sum	0	5,076	17,262	25,817	21,618	24,751	29,914	28,672	20,512	9,011	5,022	5,081

Month	Rainfall Average 1940	Rainfall Normal 1924 to 1940	⊕ Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1938-1940 Average	Maximum	Minimum
Jan.	.45	.37		0		0	0	0	0	0	0
Feb.	.28	.27	21	516	‡ 1	0	175	10,100	11,150	12,200	10,100
Mar.	.04	.26	29	914	2	47	557	34,200	34,100	34,200	34,000
Apr.	.01	.26	2	1,010	30	665	861	51,200	50,300	51,200	49,400
May	.54	.42	6	854	17	577	697	42,900	43,950	45,000	42,900
June	.67	.42	10	954	23	669	825	49,100	50,750	52,400	49,100
July	1.19	1.50	16	1,125	9	810	965	59,300	53,000	59,300	44,200
Aug.	.96	1.60	21	1,104	18	759	925	56,900	55,333	57,100	52,000
Sept.	.21	1.19	4	1,020	28	360	684	40,700	34,167	40,700	22,500
Oct.	.72	.82	3	613	13	69	291	17,900	22,367	25,700	17,900
Nov.	.79	.40	4	286	20	84	167	9,960	13,020	17,000	9,960
Dec.	.18	.40	10	272	30	29	164	10,100	11,200	11,800	10,100
Yearly	6.04	7.91		1,125		0	527	382,360	379,337	394,300	382,360
Irrigated Acreage								67,050			
Mean Acre Feet Per Acre								5.70			
Average Rain Fall in Inches								6.04	ϕ 7.91	ϕ 13.09	ϕ 3.88

‡ And other days. ⊕ Mean Daily Extreme. ϕ Period 1924-1940

DIVERSIONS FROM THE RIO GRANDE INTO THE MAVERICK CANAL EXTENSION BELOW THE POWER PLANT

Near Eagle Pass, Texas, Together With Corresponding ACREAGE, CULTIVATED, WATER DUTY AND RAINFALL

The Maverick Canal diverts water for power and irrigation from the Rio Grande into Texas at a point 13.3 river miles below the international bridge between Del Rio, Texas and Villa Acuña, Coahuila, and 697.2 river miles below the American Dam at El Paso, Texas. The tail water from the power plant returns to the river about 32.2 miles farther downstream.

The Maverick Canal Extension begins at the power plant about 9 miles northward from Eagle Pass, Texas. The water-stage recorder is located on a wooden pile bridge about 1 mile below the headgate. Meter measurements are from bridge. Irrigation first began from this canal extension in June 1938. Records of canal discharge began April 1, 1939, and extend to December 1940.

From this canal extension in 1940 there were 9,070 acres of land irrigated, northward and southward from Eagle Pass, as indicated in the table below. Under the Maverick Canal above the power plant the Maverick County Water Control and Improvement District reported that in 1940 the cultivated area was 6,800 acres, of which 4,160 acres were irrigated.

Small amounts of waste water from this canal extension reach the river below the Eagle Pass gaging station.

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

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	62.2	91.8	91.2	56.5	74.7	71.9	69.6	76.5	81.1	103	91.5	124
2	61.9	91.8	90.4	55.7	75.6	70.3	70.5	73.8	81.2	96.6	91.1	118
3	61.6	31.9	92.8	56.7	77.6	68.0	58.6	74.0	81.6	99.4	89.2	110
4	61.2	‡ 31.9	92.6	86.6	77.7	66.3	68.3	80.0	81.7	100	49.3	109
5	60.9	‡ 34.0	91.7	83.5	70.7	66.8	68.6	71.4	81.5	101	3.1	110
6	60.6	‡ 36.1	91.5	42.7	76.3	66.1	69.4	67.7	81.3	104	67.8	110
7	60.2	‡ 38.2	90.1	34.8	75.3	66.6	69.0	70.6	79.9	100	97.5	107
8	59.9	‡ 40.3	91.8	12.1	* 1.4	67.6	68.6	67.6	80.5	96.4	97.6	109
9	59.6	‡ 42.5	92.3	7.0	* 1.4	66.5	67.4	69.2	80.6	93.5	97.2	98.7
10	59.6	‡ 44.6	91.5	7.2	* .8	69.2	67.6	71.9	80.8	95.0	97.3	102
11	59.7	‡ 46.7	90.6	5.3	* .8	70.3	68.3	77.0	80.2	93.7	96.9	101
12	59.8	‡ 48.8	89.8	5.3	* .7	70.8	68.8	72.5	80.4	91.8	96.5	105
13	59.8	50.9	87.2	6.5	* .6	68.3	68.8	67.6	80.9	94.5	95.4	99.4
14	59.8	57.7	88.9	6.7	79.5	65.2	70.8	39.5	80.3	94.0	94.6	102
15	59.9	57.2	90.0	7.0	81.7	68.0	79.2	69.2	80.9	93.2	94.7	106
16	60.0	54.9	89.3	129	76.0	69.1	78.4	69.2	79.9	92.4	94.3	102
17	60.0	52.2	90.5	85.2	72.9	69.6	79.1	73.6	79.6	93.3	94.8	102
18	60.0	56.3	88.4	84.7	80.7	68.0	78.4	77.6	79.4	93.0	93.6	101
19	60.1	58.2	88.3	87.1	81.4	65.8	78.2	77.9	79.2	92.7	94.2	104
20	60.2	75.9	88.4	87.1	78.0	74.4	78.2	76.6	78.7	95.6	93.9	95.9
21	60.2	88.6	88.6	87.7	* 6.0	74.0	78.2	77.0	78.6	93.5	89.0	90.4
22	60.2	90.6	88.7	80.1	* .7	74.2	78.0	78.1	78.6	94.0	89.8	96.5
23	60.3	90.3	89.5	80.1	* .1	75.0	77.2	77.6	77.8	94.6	91.5	91.6
24	60.4	89.4	78.3	80.1	* 0	74.0	77.2	78.0	77.9	94.7	98.2	91.5
25	60.4	90.8	60.8	80.0	* 18.1	74.2	77.8	78.5	77.5	77.9	94.8	95.5
26	60.4	90.5	59.2	80.3	74.7	73.8	77.8	76.6	77.6	77.7	94.1	89.3
27	60.5	90.7	58.4	69.4	68.0	74.0	76.9	76.3	83.4	78.6	87.8	93.5
28	60.6	90.4	58.6	82.0	65.7	71.6	78.4	76.0	92.2	79.1	88.8	90.5
29	60.6	90.8	58.3	75.0	60.2	71.8	76.8	74.2	94.0	92.4	102	96.5
30	91.7		57.9	69.4	75.3	72.0	75.8	40.7	97.5	94.4	119	94.9
31	91.8		57.0		73.6		71.7	78.6		93.9		96.0
Sum	1,934.1	1,854.0	2,562.6	1,730.8	1,526.2	2,103.4	2,271.6	2,235.0	2,444.8	2,893.9	2,685.5	3,142.2

Month	Rainfall Average 1940	Rainfall Normal 1924 to 1940	Extreme Second Feet — 1940 High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet Total 1940	Period 1939-1940 Average	Maximum	Minimum
Jan.	.33	.80	31	91.8	♀ 9	59.6	62.4	3,840	2,990	3,840	‡ 2,140
Feb.	1.53	.70	22	93.1	3	0	63.9	3,680	2,900	3,680	‡ 2,120
Mar.	1.98	.88	3	95.3	31	56.5	82.7	5,080	3,115	5,080	‡ 1,150
Apr.	2.44	1.51	16	160	11	3.7	57.7	3,430	3,940	4,450	3,430
May	6.11	3.27	15	83.0	♀13	0	49.2	3,030	2,935	3,030	2,840
June	3.93	2.54	19	80.7	13	32.9	70.1	4,170	4,735	5,300	4,170
July	.62	1.94	31	86.0	31	26.1	73.3	4,510	4,900	5,290	4,510
Aug.	5.04	1.59	29	81.6	30	0	72.1	4,430	3,955	4,430	3,480
Sept.	.19	2.73	29	104	23	74.4	81.5	4,850	4,725	4,850	4,600
Oct.	1.12	1.58	4	112	31	64.4	93.4	5,740	5,435	5,740	5,130
Nov.	.86	.76	30	127	♀ 5	0	89.5	5,330	4,750	5,330	4,170
Dec.	1.02	1.31	1	127	9	31.6	101	6,230	5,255	6,230	4,280
Yearly	25.17	19.61		160		0	74.8	54,320	49,635	54,320	44,950
Irrigated Acreage								9,070			
Mean Acre Feet Per Acre								5.99			
Average Rainfall in Inches								25.17	ϕ 19.61	ϕ 29.27	ϕ11.80

‡ Estimated. * Partly Estimated. ♀ And Other Days. ϕ Period 1924 to 1940.

DIVERSIONS FROM THE RIO GRANDE

ON THE UNITED STATES SIDE BELOW RIO GRANDE CITY STATION

Together with

ACREAGE CULTIVATED, WATER DUTY AND RAINFALL

Diversions from the Rio Grande for irrigation are made here almost entirely by pumping. 94.2% of the water diverted was measured at the diversion point. The remainder was estimated. A very small part of the measurements were made by plant efficiency and power input; otherwise measurements were by Venturi Meters, open channel rating stations and Deflection Meters developed by this Commission. There is some re-use within the area of drainage water from the area. Drainage water from this area does not return to the Rio Grande. During the year 58,670 acre feet of water were diverted and used on the new Willacy County Irrigation District, where 82,480 acres were cultivated, of which 16,770 acres were irrigated. The cultivated area and water diverted to Willacy County are included in the tables below.

The cultivated areas shown here are supplied with irrigation facilities. More than one crop per year is often grown on some of the land. The area actually irrigated this year was 77.9% of the cultivated area. The average annual evaporation from natural water surfaces in this vicinity is approximately 55 inches per year. See Water Bulletin No. 5, page 58.

Mean Daily Diversions in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	992	2,080	2,310	852	1,750	1,420	1,830	1,570	1,220	1,600	1,020	641
2	1,290	2,240	1,930	854	1,610	1,120	2,150	1,720	2,610	1,610	788	1,370
3	1,260	1,730	1,830	1,100	1,640	2,260	1,730	1,540	2,880	1,750	709	1,565
4	1,440	1,290	2,160	941	1,190	2,290	752	1,310	2,320	1,980	1,610	1,328
5	1,280	2,000	2,110	1,130	916	2,430	685	1,880	1,760	1,400	1,320	1,266
6	1,010	1,980	1,960	835	1,450	2,520	673	1,960	880	1,120	861	1,228
7	313	2,130	2,260	760	1,770	2,420	522	1,820	200	1,980	308	549
8	1,030	2,300	2,190	880	1,350	2,060	1,190	1,980	54.4	1,810	286	200
9	1,030	1,760	1,540	714	1,010	1,650	1,610	1,790	903	1,910	112	587
10	1,320	1,750	1,220	864	319	1,770	1,290	1,350	1,310	2,300	174	780
11	1,640	1,720	2,130	592	122	1,200	1,300	931	1,630	2,100	595	1,110
12	1,560	2,440	2,130	917	52	917	1,440	1,630	1,380	1,490	996	793
13	1,150	2,470	1,800	547	445	1,240	959	2,170	1,490	1,160	1,080	695
14	665	2,260	1,630	266	478	1,080	197	2,350	693	2,280	815	306
15	1,420	2,460	1,900	1,090	624	870	814	2,470	529	1,420	729	58.1
16	1,460	2,330	1,390	1,100	399	638	826	2,170	1,680	1,370	485	140
17	1,510	1,290	1,000	1,270	408	1,410	943	1,360	1,650	1,840	652	295
18	1,330	954	1,780	1,430	388	1,890	1,150	980	1,710	2,280	1,930	291
19	551	2,390	1,190	1,570	186	1,920	818	1,840	1,730	1,680	1,630	237
20	169	2,460	393	1,230	691	1,310	352	1,870	1,520	1,470	1,430	33.0
21	189	2,480	151	772	630	1,310	475	1,960	859	2,370	1,400	19.2
22	262	2,420	1.1	1,840	923	857	1,170	2,040	207	2,440	918	22.4
23	391	2,310	41.0	2,050	636	822	843	2,270	665	2,440	444	75.7
24	1,130	2,030	264	2,060	1,220	1,660	863	1,600	900	1,800	142	46.4
25	1,030	1,840	455	1,950	1,230	1,710	918	1,350	1,420	1,170	317	104
26	404	2,450	671	1,790	486	1,150	1,350	2,170	1,720	698	562	53.3
27	232	2,440	539	1,340	1,500	1,710	990	2,370	1,470	705	608	41.0
28	222	2,410	512	1,080	1,290	2,020	605	2,250	993	1,530	357	33.0
29	1,120	2,320	844	1,860	1,310	1,300	1,510	2,320	760	1,250	868	46.9
30	1,830		776	1,890	1,480	1,300	1,820	2,240	1,640	1,050	601	182
31	1,940		694		1,620		1,740	1,580		1,240		189
Sum	31,170	60,734	39,801.1	35,574	29,123	46,254	33,515	56,841	38,783.4	51,243	23,747	14,285

Month	Rainfall: Average 1940	Rainfall: Normal 1922 to 1940	Extreme Second Feet — 1940: High Day	High	Low Day	Low	Average Second Feet 1940	Acre Feet: Total 1940	Period 1922 - 1940: Normal	Maximum	Minimum
Jan.	.24	1.35	31	1,940	20	169	1,010	61,800	38,327	71,000	7,690
Feb.	.24	1.02	21	2,480	18	954	2,090	120,000	63,033	134,000	6,950
Mar.	4.26	1.26	1	2,310	22	1.1	1,280	78,900	81,250	156,000	23,900
Apr.	.05	1.23	24	2,060	14	266	1,190	70,600	66,867	119,000	30,000
May	3.21	3.30	7	1,770	12	52	939	57,800	58,454	135,000	4,500
June	2.65	2.71	6	2,520	16	638	1,540	91,700	55,118	91,700	1,500
July	2.14	2.24	2	2,150	14	197	1,080	66,500	50,788	103,000	10,000
Aug.	.76	1.71	15	2,470	11	931	1,830	113,000	66,703	113,000	19,100
Sept.	1.86	5.04	3	2,880	8	54.4	1,290	76,900	45,202	110,000	8,010
Oct.	2.25	2.09	‡22	2,440	26	698	1,650	102,000	56,039	102,000	21,400
Nov.	1.49	1.41	18	1,930	9	112	792	47,100	46,596	96,700	11,500
Dec.	6.68	2.10	3	1,565	21	19.2	461	28,300	33,930	103,000	10,400
Yearly	25.83	25.46		2,880		1.1	1,260	914,600	662,307	914,600	484,750
Average Acreage Cultivated below Rio Grande City								504,910	335,785	504,910	216,000
Mean Acre Feet per Acre								1.81	1.97	2.68	1.29
Average Rainfall in Inches								25.83	25.46	36.09	16.68

‡ And Other Days.

DIVERSIONS FROM THE RIO GRANDE INTO THE RETAMAL CANAL

Near Rio Bravo, Tamaulipas

The Retamal Canal was constructed by the Flood Control Works Commission of the Lower Rio Grande Valley. During floods this canal is used as a floodway. It empties into Culebrón Lake which serves as a reservoir. The spillway at Culebrón permits flood water to escape to the Gulf of Mexico through Floodway No.1. In combination with Culebrón Lake the Retamal Canal is used in irrigation.

Retamal Canal has a capacity of about 7,000 second feet. Its intake is 24.6 river miles below the Hidalgo-Reynosa bridge near Hidalgo, Texas and 1,089.9 river miles below the American Dam at El Paso, Texas. About 1,000 feet below its intake there is a control gate .9 mile below which are several gages where gage readings are taken as often as required by the variations of flow. Measurements are made by current meter during low flows and by floats during floods. In July 1940 a water-stage recorder was installed at this point. The records below are based upon 18 measurements by floats and 4 by meter during low flows. The flow records of this canal began September 1, 1939. The 1940 record is fair. No records are available as to the duty of water for 1940, but approximately 12,000 acres were irrigated during the year.

Mean Daily Discharge in Second Feet 1940 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	54.0	20.5	0.7	396	7.8	1,030	81.6	7.4	1,500	131	1,450	165
2	47.3	12.7	.4	272	6.7	869	87.6	6.7	2,160	103	961	181
3	36.7	23.0	.4	211	7.4	579	78.8	6.7	1,610	95.3	777	151
4	33.2	4.9	.7	181	7.4	279	66.7	6.7	869	87.6	646	103
5	31.1	10.2	.4	160	7.4	107	60.7	6.7	632	87.6	519	111
6	32.1	0	0	126	6.7	49.1	57.9	6.0	498	87.6	434	118
7	39.9	17.7	0	91.5	5.3	31.4	51.2	3.5	477	69.9	417	118
8	41.3	2.5	0	66.7	5.3	21.9	40.3	2.8	516	53.7	396	141
9	42.7	0	.4	339	4.9	23.7	36.0	2.8	1,740	55.8	417	170
10	36.7	25.4	0	950	3.9	19.4	38.1	2.8	2,390	81.6	424	160
11	33.2	20.5	0	756	6.0	23.7	38.1	2.8	1,840	111	406	131
12	29.0	7.8	0	509	243	381	36.0	2.8	1,270	84.8	343	107
13	34.6	0	0	308	622	961	34.6	6.0	999	87.6	293	103
14	35.7	0	0	205	586	915	26.8	25.1	876	95.3	272	103
15	41.3	2.5	0	146	533	1,150	32.8	81.6	809	49.1	264	126
16	26.5	0	0	103	498	1,720	44.8	188	763	78.8	257	160
17	27.5	0	0	91.5	554	1,300	47.0	586	632	689	334	160
18	26.5	7.8	0	72.7	417	833	47.0	487	544	823	406	170
19	27.5	20.5	0	47.0	272	682	42.7	351	456	1,060	317	193
20	29.0	0	0	31.4	360	367	28.3	586	385	936	279	199
21	33.2	0	0	26.8	788	279	25.1	1,030	360	777	223	223
22	35.7	7.8	2.5	23.7	936	406	21.9	950	396	689	199	727
23	38.1	4.9	78.8	13.4	869	103	14.5	777	385	593	211	1,170
24	31.1	0	217	10.2	749	69.9	12.4	487	317	487	235	1,030
25	32.1	0	1,050	10.2	823	60.7	12.4	417	272	470	257	890
26	33.2	2.5	2,570	10.2	1,250	131	11.3	378	235	1,990	243	802
27	34.6	0	2,480	10.2	1,060	279	10.2	360	199	2,480	223	667
28	33.2	0	1,520	10.2	735	165	9.5	301	181	1,750	199	554
29	36.7	0	943	10.2	533	99.2	9.2	229	187	1,190	193	434
30	27.5	-	713	9.5	424	81.6	8.5	181	175	961	160	385
31	12.7	-	554	-	579	-	7.8	293	-	1,400	-	343
Sum	1,053.9	191.2	10,131.3	5,197.4	12,899.8	13,016.6	1,119.8	7,771.4	23,673	17,654.7	11,755	10,095

Month	Extreme Gage Feet — 1940		Extreme Second Feet — 1940				Average Second Feet 1940	Acre Feet			
			High		Low			Total 1940	Period 1939-1940		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	64.01	63.12	1	54.0	31	10.2	34.0	2,090			
Feb.	63.39	62.66	10	27.5	‡ 6	0	6.6	379			
Mar.	74.47	62.34	26	2,610	‡ 6	0	327	20,100			
Apr.	69.03	63.62	10	982	‡ 24	9.5	173	10,300			
May	70.57	63.25	26	1,380	10	3.5	416	25,600			
June	72.08	63.91	16	1,820	10	18.4	434	25,800			
July	65.03	63.48	2	95.3	31	7.4	36.1	2,220			
Aug.	69.72	63.09	21	1,150	8	2.1	251	15,400			
Sept.	74.02	65.58	10	2,450	30	170	789	47,000	25,485	47,000	3,970
Oct.	74.41	64.30	27	2,590	15	36.0	570	35,000	38,450	41,900	35,000
Nov.	71.69	65.49	1	1,700	30	155	392	23,300	15,420	23,300	7,540
Dec.	70.73	65.03	23	1,430	4	95.3	326	20,000	11,535	20,000	3,070
Yearly	74.47	62.34		2,610		0	313	227,189			

MUNICIPAL WATER USES

Tabulated below are the yearly and monthly figures showing for recent years the amounts of water pumped into the municipal distribution systems of five towns along the Rio Grande on the United States side. The Del Rio water supply comes from San Felipe Springs, the others from the Rio Grande. The municipal and industrial water supply for the El Paso area in Texas and Cd. Juarez in Chihuahua comes from deep wells. (See Outfalls From Deep Wells in this bulletin.)

In Acre Feet

Del Rio

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Maximum	Minimum	Average
1,010	1,006	*	1,694	1,381		1,299	1,161	1,016	1,185	1,694	1,006	1,219

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum	97.5	77.9	92.4	113.2	148.7	155.4	162.3	129.4	152.3	104.2	69.8	70.2
Minimum	45.5	46.0	53.8	79.8	81.4	92.5	101.1	79.8	65.1	70.5	59.3	51.9
Average	66.7	60.1	78.8	100.1	110.5	126.4	133.7	113.5	107.5	93.3	64.6	59.3

Eagle Pass

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Maximum	Minimum	Average
	673	914	898	698	701	788	759	811	756	914	673	778

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum	64.2	64.3	66.7	83.9	76.3	92.6	106	100	98.6	81.3	72.5	69.7
Minimum	37.7	40.2	38.6	60.3	55.4	49.4	61.2	695	51.2	34.9	39.9	35.1
Average	48.2	49.9	54.6	68.8	64.6	76.0	83.1	87.5	78.6	62.8	54.5	49.1

Laredo

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Maximum	Minimum	Average
2,876	2,858	2,720	2,730	2,448	2,609	3,045	3,066	3,065	2,865	3,066	2,448	2,828

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum	192	211	241	304	304	332	327	352	309	290	270	213
Minimum	148	159	186	188	202	182	250	225	212	175	174	140
Average	170	179	207	258	249	283	294	305	261	229	218	175

Roma

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Maximum	Minimum	Average
135	136	135	135	135	136	135	135	135	53.6	136	53.6	127

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum	9.5	8.9	9.5	9.2	14.3	13.8	14.3	14.3	13.8	9.5	9.2	9.5
Minimum	9.5	8.6	2.9	2.8	4.3	4.1	4.3	4.3	4.1	2.9	2.8	2.9
Average	9.5	8.7	8.8	8.6	13.3	12.8	13.3	13.3	12.8	8.8	8.6	8.8

Rio Grande City

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Maximum	Minimum	Average
248	238	235	269	301	286	290	270	278	330	330	235	275

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Maximum	" 20.9	21.2	27.6	31.7	36.8	39.6	34.5	34.9	29.1	28.7	20.6	23.2
Minimum	13.2	12.3	18.6	20.6	23.8	23.2	23.8	21.2	16.3	14.4	14.3	12.8
Average	17.4	17.6	22.2	24.1	27.8	29.0	29.8	28.5	22.6	21.5	17.3	16.9

" Estimated * Record for January, February, March and April only.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES

1940

Gravimetric Percentages of Dried Silt in the Rio Grande at San Marcial, New Mexico, as Determined from Water Samples During 1940

The gravimetric percentages of dry silt reported here were determined from water samples taken by the United States Section of the International Boundary Commission in small necked bottles by lowering the open bottle into the water at one or more verticals in the stream cross section, being careful to approach but not to strike bottom, and thus to secure an integrated sample of the suspended silt at all depths. The samples were analyzed at El Paso by the United States Section of the Commission by determining the silt in a single monthly composite sample which was composed by using from each daily sample an amount proportional to the river flow at the time the sample was taken.

For visualization and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom,which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds. See Water Bulletin No. 7 for data showing the approximate weight per cubic foot of silt in Elephant Butte reservoir.

Tons of Suspended Silt Passing San Marcial in the Rio Grande – 1940

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1925 to 1940		
					Normal	Maximum	Minimum
Jan.	49,710,000	108,400	.218	74.7	195.7	374.4	27.8
Feb.	51,350,000	80,600	.157	55.5	282.3	1,027	23.3
Mar.	52,980,000	89,500	.169	61.6	300.0	1,012	45.5
Apr.	24,520,000	27,000	.110	18.6	774.6	3,780	18.6
May	54,750,000	137,400	.251	94.6	1,305.1	4,483	5.8
June	12,230,000	13,500	.110	9.3	1,226.3	9,322	2.4
July	26,970,000	693,100	2.57	477.3	1,135.1	6,672	0
Aug.	52,570,000	1,493,000	2.84	1,028.2	1,997.8	11,710	83.4
Sept.	46,850,000	988,500	2.11	680.8	2,702.0	17,470	156.4
Oct.	30,920,000	187,700	.607	129.3	739.8	6,520	0
Nov.	37,460,000	164,100	.438	113.0	126.3	301.2	7.2
Dec.	62,110,000	185,700	.299	127.9	163.9	346.4	30.3
Yearly	502,420,000	4,168,500	.830	2,870.8	10,948.9	41,317.6	2,459.7

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES

1940 — continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Eagle Pass, Texas, as Determined from Water Samples During 1940

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

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

For visualization and comparison the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds. On page 63 of Water Bulletin No.7 there is given some data showing the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.002	.003	" .003	.059	* .003	* .030	" .262	" .496	.234	" .001	.026	.007
2	.003	.020	" .003	.072	" .003	" .025	" .295	" .902	.185	" .002	" .026	.009
3	.004	.026	.003	.032	.031	.020	" .328	1.309	" .207	.002	" .026	" .007
4	.007	" .021	.004	* .033	*1.023	.002	" .361	.519	.230	.003	" .025	.006
5	.006	" .014	" .004	.077	" .019	" .016	" .394	.524	.213	.003	" .025	" .004
6	.006	" .009	" .004	* .400	" .019	.030	" .427	.752	" .490	" .003	.025	.003
7	.008	.003	" .004	.087	.019	* .028	" .460	.345	.766	" .002	.008	.003
8	.003	.003	" .004	" .058	.019	" .067	.493	.409	.305	.002	" .029	" .003
9	.012	.002	" .004	" .030	" .057	.107	" .403	.385	.757	.003	" .050	" .003
10	.006	.004	" .004	.001	" .096	.119	" .312	" .518	.573	" .002	" .070	.003
11	000	.007	" .004	.001	.133	* .166	.222	.651	.582	.001	.092	.004
12	.001	* .003	.021	000	1.091	" .166	.219	.619	" .398	" .002	.075	.002
13	.001	.003	.037	000	1.037	.166	.074	.397	.216	" .003	" .113	" .002
14	.001	.003	" .028	" 000	1.203	" .118	.082	.417	.214	" .003	" .152	" .001
15	.001	.004	" .016	.020	.228	.069	.064	.289	.135	2.379	.191	" .001
16	000	.266	.007	.015	" .248	.065	" .059	" .412	.132	2.317	.210	.001
17	000	.285	.011	" .015	" .267	.073	" .055	.537	.075	2.111	" .176	.003
18	" .001	.006	.014	.044	.288	" .084	.051	.367	.079	"1.536	.141	" .003
19	.001	.002	" .014	.001	.365	.094	.053	* .471	" .046	* .961	.142	.003
20	.002	.064	.023	.014	.366	.091	" .031	" .522	.012	.964	* .081	.003
21	000	* .010	.014	.018	.331	* .085	.008	" .574	.009	.554	.060	.002
22	000	.009	.018	.015	" .330	* .089	" .011	.627	.007	.565	.110	" .002
23	.001	.008	.003	.006	" .330	.051	.015	.629	" .004	.440	" .077	.188
24	.001	.006	" .003	.014	* .229	" .051	.040	.330	.003	.421	.044	.016
25	.001	.003	.048	" .013	" .126	.117	.025	.345	.009	.592	.015	.112
26	000	.003	.090	" .012	" .024	.112	" .058	.280	.004	.060	.014	.006
27	000	" .003	.020	.012	" .024	.142	.092	" .393	" .003	.062	.004	.004
28	000	" .003	.010	.031	.024	.163	.103	.506	.003	.097	.006	.006
29	000	" .003	.011	.020	.080	" .196	.090	.283	.001	.101	" .004	" .006
30	.001		.003	* .022	.029	" .229	" .090	.278	.001	" .076	.004	" .004
31	.001		" .003		.026		" .090	" .256		" .051		" .004

Tons of Suspended Silt Passing Eagle Pass in the Rio Grande During 1940

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1940		
					Average	Maximum	Minimum
Jan.	178,983,000	4,218.1	.002	2.9	24.6	124.0	.1
Feb.	165,888,000	46,667.0	.028	32.1	11.8	32.1	2.6
Mar.	144,369,000	21,688.0	.015	14.9	38.3	187.9	4.7
Apr.	181,521,000	185,588.6	.102	127.8	36.0	127.8	3.0
May	274,195,800	932,887.1	.340	642.5	414.7	1,339.0	31.2
June	251,397,000	294,846.8	.117	203.1	1,422.7	3,821.0	24.5
July	232,092,000	511,211.0	.220	352.1	1,322.9	7,835.8	95.2
Aug.	370,656,000	1,755,689.0	.474	1,209.2	945.3	2,013.0	217.8
Sept.	248,454,000	760,339.2	.306	523.6	3,075.3	6,098.0	60.7
Oct.	251,640,000	2,555,892.6	1.016	1,760.3	766.1	1,760.3	190.0
Nov.	165,807,000	116,952.0	.071	80.5	97.4	204.9	14.3
Dec.	143,775,000	19,880.2	.014	13.7	18.7	84.1	1.1
Yearly	2,608,777,800	7,205,859.6	.276	4,962.7	8,173.8	17,020.2	1,768.3

" Estimated. * Partly Estimated.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES

1940 —— continued

Gravimetric Percentages of Dried Silt in the Rio Alamo at Mier, Tamaulipas, as Determined from Water Samples During 1940

The gravimetric percentages of dry silt reported here were determined by the Mexican Section of the International Boundary Commission from 17 samples taken by that section during the year. The samples were taken in small necked bottles at three points at the surface of the stream, viz: At the mid-point, and at each side, one-sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy. The daily figures below were made in accordance with the foregoing.

For visualization and comparison the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds. See Water Bulletin No. 7, page 63, for data as to the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	1.5708	0	0	•0
2	0	0	0	0	0	0	0	0	.7854	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	.2020	0	0	0	0	0
5	0	0	0	0	0	0	.1720	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	.7411	0	0	0
8	0	0	0	0	0	0	0	0	1.4823	0	0	0
9	0	0	0	0	0	0	0	0	.8605	0	0	0
10	0	0	0	0	0	0	0	0	.4303	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	.7825	0	0	0	0	0	0
15	0	0	0	0	0	.3912	0	0	0	.9384	0	0
16	0	0	0	0	0	0	1.4805	0	0	.4692	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	.1356	0	0	0	0
19	0	0	0	0	0	0	0	.2716	0	0	0	0
20	0	0	0		.6320	0	0	.4066	0	0	0	0
21	0	0	.7886	0	0	0	0	.2711	0	0	0	.4510
22	0	0	0	0	0	0	0	.1356	0	0	0	.3840
23	0	0	0	0	0	0	0	0	0	0	0	.0488
24	0	0	.7190	0	0	.5200	0	0	0	0	0	0
25	0	0	.3120	0	0	1.7400	0	0	0	.8810	0	0
26	0	0	0	0	0	1.2500	0	0	0	.3890	0	0
27	0	0	0	0	0	1.4380	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	.3299	0	0	.9050	0	0	0	0
31	0	0	0	0	0	0	0	1.2379	0	0	0	0

Tons of Suspended Silt Passing Mier in the Rio Alamo During 1940

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1940'		
					Average	Maximum	Minimum
Jan.	640,000	0	0	0	3.1	21.8	0
Feb.	215,000	0	0	0	.1	.6	0
Mar.	10,879,000	65,963.3	.6063	45.4	9.7	45.4	0
Apr.	117,000	0	0	0	49.0	227.4	0
May	7,692,000	41,705.7	.5422	28.7	54.5	229.7	7.0
June	59,589,000	683,911.3	1.1477	471.0	85.4	471.0	0
July	8,360,000	59,936.9	.7169	41.3	27.3	73.8	0
Aug.	26,380,000	206,353.5	.7822	142.1	113.5	396.0	0
Sept.	45,064,000	526,890.6	1.1692	362.9	87.0	362.9	1.5
Oct.	19,780,000	132,240.0	.6686	91.1	106.2	557.9	0
Nov.	797,000	0	0	0	1.8	5.2	0
Dec.	6,509,000	23,414.9	.3597	16.1	3.1	16.1	0
Yearly	186,022,000	1,740,416.2	.9356	1,198.6	540.7	1,198.6	154.5

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES,

1940 — continued

Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas, as Determined from Water Samples During 1940

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

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

For visualization and comparison the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds. On page 63 of Water Bulletin No. 7, there is given some data showing the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* .001	.003	.001	.085	.041	.332	.658	.002	.684	.030	.120	.010
2	000	.003	000	.043	* .034	.188	.276	.007	.515	.009	.088	.014
3	.001	.003	.002	.032	.019	.126	.226	.006	.395	.014	.057	.011
4	.002	.003	.002	.031	* .031	.094	.361	.006	* .273	.008	.080	.010
5	.003	.001	.004	.025	.022	.079	.262	.010	.145	.003	.076	.010
6	.001	.007	.003	.025	.002	.060	.239	.010	.107	.002	.058	.009
7	.001	.018	.007	.030	.009	* .035	.206	.007	.128	.066	.044	.008
8	.003	.014	.006	.310	.007	.024	.248	.012	.434	.066	.042	.001
9	.001	.015	.007	.458	.024	.022	* .252	.012	.316	.018	.036	.003
10	000	.010	.019	.394	.025	.020	.235	.060	.428	.007	.032	.003
11	* 000	.051	.016	.254	.096	.540	* .348	* .116	* .519	* .006	* .029	.002
12	.003	.045	.020	.196	.126	.381	.182	.145	.756	.003	.021	.001
13	.003	.022	.021	.102	.165	.283	.183	.484	.835	.003	.016	.002
14	.006	.014	.009	.062	.143	.569	.283	.566	1.034	.002	.008	.003
15	.007	.011	.009	.050	.162	.366	.434	.415	.922	.738	.006	.006
16	.004	* .010	* .015	.036	.068	.629	.235	1.624	.612	.522	.067	.006
17	.004	.013	.006	.045	.107	* .189	.302	1.060	.314	.834	.080	.008
18	.003	.018	.008	* .035	* .088	.265	.219	.579	.310	.724	* .037	.003
19	.013	.013	* .014	.026	.304	.062	.107	.364	.271	.824	.008	* .002
20	.006	.010	.012	.019	.719	.075	.070	* .590	.236	1.488	.008	.013
21	.001	.010	.372	.018	.382	.482	.051	.652	.163	2.026	.006	.185
22	.001	.010	.118	.020	.714	.320	.036	.646	.120	1.889	.008	.255
23	.003	.015	.593	.014	.356	.194	.034	.552	* .088	1.644	.007	.031
24	.002	.006	* .438	.018	.377	.107	.024	.294	.066	1.383	.006	.010
25	.003	.009	1.140	.008	.890	.818	.019	.431	.018	1.835	.057	.002
26	.002	.009	.794	.006	.504	.786	.004	.293	.012	* .740	* .059	.001
27	.003	.006	.431	.009	.558	.327	.003	.499	.010	.565	.054	.003
28	.001	.009	.525	.014	.524	* .319	.004	.526	.011	.566	.046	.003
29	.002	.003	.279	.014	.476	.109	.004	.416	.008	.272	.050	.002
30	000		* .097	.014	.294	.095	.008	.333	.006	.212	.043	.001
31	.001		.057		.597		* .003	.738		.163		.003

Tons of Suspended Silt Passing Roma in the Rio Grande During 1940

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1929 — 1940		
					Normal	Maximum	Minimum
Jan.	182,142,000	4,698.1	.003	3.2	36.7	168.7	.4
Feb.	170,343,000	21,332.9	.013	14.7	29.1	121.0	.8
Mar.	443,151,000	2,650,397.6	.598	1,825.3	191.0	1,825.3	1.3
Apr.	198,612,000	343,010.0	.173	236.2	293.7	1,345.0	.7
May	432,739,800	1,682,415.2	.389	1,158.7	1,107.2	2,474.0	88.6
June	580,446,000	2,452,974.0	.423	1,689.4	1,345.9	7,216.0	52.7
July	353,889,000	947,536.0	.268	652.6	1,363.4	9,070.0	19.3
Aug.	473,229,000	2,655,829.2	.561	1,829.1	1,174.8	3,251.2	113.2
Sept.	444,987,000	2,021,339.0	.454	1,392.1	4,296.4	17,998.0	42.8
Oct.	516,483,000	4,780,446.9	.926	3,292.3	2,071.7	9,241.0	133.0
Nov.	188,730,000	81,487.0	.043	56.1	108.4	293.0	4.8
Dec.	170,235,000	55,713.8	.033	38.4	64.6	319.0	1.0
Yearly	4,154,986,800	17,697,179.7	.426	12,188.1	12,082.9	30,839.0	2,314.0

* Partly Estimated.

SILT SAMPLING OF WATER FROM RIO GRANDE AND TRIBUTARIES, 1940 — continued

Gravimetric Percentages of Dried Silt in the Rio San Juan at Santa Rosalia, Tamaulipas, Mexico, as Determined from Water Samples During 1940

The gravimetric percentages of dry silt reported here were determined by the Mexican Section of the International Boundary Commission from samples taken by that section about every third day except at times of high flow when samples were taken more frequently. The samples were taken in small necked bottles at three points at the surface of the stream, viz: At the mid-point, and at each side, one-sixth of the width from the edge of the stream. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy. The daily figures below were made in accordance with the foregoing.

For visualization and comparison the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds. See Water Bulletin No. 7, page 63, for data as to the average density of Rio Grande silt in Elephant Butte reservoir.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	.0096	.0326	.0002	.0963	.0001	.0908	0
2	0	0	0	0	0	.0067	.0245	0	.0418	0	.0616	0
3	0	0	0	0	0	.0037	.0164	0	.0227	0	.0323	0
4	0	.0001	0	0	0	.0026	.0084	0	.0043	0	.0030	0
5	0	.0001	0	0	0	.0015	.0090	0	.4621	0	.0028	0
6	0	.0001	0	0	0	.0013	.0097	0	.9198	0	.0027	0
7	0	0	0	0	0	.0010	.0072	0	1.3776	0	.0023	0
8	0	0	0	0	0	.0008	.0047	0	1.8354	.0001	.0019	0
9	0	0	0	0	0	.0006	.0030	0	1.2345	0	.0014	0
10	0	0	0	0	.1065	.0003	.0013	.0003	.5568	0	.0012	0
11	0	0	0	0	.0072	.1737	.0012	.0005	.3074	0	.0009	0
12	0	0	0	0	.0057	.3472	.0010	.0008	.1959	0	.0006	0
13	0	0	0	0	.0042	.1773	.0016	.0007	.0843	0	.0002	0
14	0	.0001	0	0	.0037	.5194	.0022	.0006	.0663	0	.0001	0
15	0	.0001	0	0	.0032	.6853	.0029	.0041	.0482	.0001	0	0
16	0	0	0	0	.0022	.4971	.0100	.0076	.0302	.0002	0	0
17	0	0	0	0	.0012	.3089	.0090	.0072	.0212	.0003	0	0
18	0	0	0	0	.0012	.2400	.0081	.0069	.0122	.0001	0	0
19	0	0	0	0	.0012	.1710	.0071	.0065	.0101	.0001	0	0
20	0	0	0	0	.7295	.1021	.0058	1.9187	.0080	0	0	0
21	0	0	.0002	0	.5466	.0541	.0045	5.4576	.0064	0	0	.3997
22	0	0	.0001	0	.2489	.0062	.0032	3.1861	.0045	0	0	.7994
23	0	0	.1174	0	.1316	.0038	.0024	1.0315	.0030	0	0	.1895
24	0	0	.2347	0	.0143	.0013	.0016	.3444	.0023	.1856	0	.1342
25	0	0	.3520	0	.0095	1.8651	.0014	.2054	.0015	.3712	0	.0789
26	0	0	.0021	0	.0047	1.4237	.0012	.0664	.0011	.1936	0	.0659
27	0	0	.0001	0	.0064	.9575	.0010	.0523	.0006	.1354	0	.0528
28	0	0	.0002	0	.0082	.4913	.0009	.0382	.0005	.0772	0	.0398
29	0	0	.0002	0	.0099	.0251	.0007	.0328	.0003	.4049	0	.0356
30	0		.0001	0	.0112	.0217	.0005	.0274	.0001	.7326	0	.0314
31	0		0		.0126		.0003	.0220		.3770		.0273

Tons of Suspended Silt Passing Santa Rosalia in Rio San Juan – 1940

Month	Tons of Water	SUSPENDED SILT					
		Tons of Silt	Average Percent by Weight	Acre-Feet at 1,452 Tons Per Acre Foot			
				Total Acre-Feet	Period 1934 to 1940		
					Average	Maximum	Minimum
Jan.	10,322,000	0	0	0	5.8	26.9	0
Feb.	3,890,000	.8	T	0	.3	1.8	0
Mar.	22,990,000	53,234.0	.2316	36.7	5.6	36.7	0
Apr.	3,087,000	0	0	0	7.0	43.5	0
May	60,541,000	211,243.3	.3489	145.5	311.9	1,062.0	1.6
June	245,113,000	2,417,731.0	.9864	1,665.1	334.4	1,665.1	0
July	54,967,000	6,293.9	.0114	4.3	169.5	857.8	.9
Aug.	104,244,000	2,441,200.8	2.3418	1,681.3	1,525.9	8,932.0	.1
Sept.	244,941,000	2,173,596.8	.8874	1,497.0	752.4	2,148.0	3.3
Oct.	118,220,000	470,995.7	.3984	324.4	571.1	3,133.1	2.7
Nov.	43,316,000	9,671.2	.0223	6.7	18.5	67.3	0
Dec.	99,506,000	380,046.0	.3819	261.7	50.3	261.7	0
Yearly	1,011,137,000	8,164,013.5	.8074	5,622.7	3,752.7	9,395.5	246.6

T - Trace

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1940

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

Water samples from the stations at Eagle Pass, Rio Salado and Rio San Juan were gathered by the Mexican Section of the Commission, the others by the United States Section, except those for Caballo Dam and Leasburg Dam. In these cases the data were furnished by the El Paso, Texas office of the United States Bureau of Reclamation and the Riverside, California laboratory office of the Department of Agriculture. The composite samples were composed by taking from each sample an amount of water proportional to the acre footage of river flow represented by that sample.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: HCO_3, 61; CL, 35.5; SO_4, 48; Ca, 20; Mg, 12.16; Na, 23; NO_3, 62.

Conductance, reported in the tables as ($K \times 10^5$ 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.

Descriptions of the sampling stations will be found in the foreword part of this bulletin where the stream discharges are reported for these same stations.

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean $K \times 10^5$ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Water Samples from Rio Grande at San Marcial Station															
Jan.	31	0.96	35,040	104	0.18	7.9	47	23	4.11	1.74	5.14	3.53	4.68	2.47	0.01
Feb.	29	0.88	33,180	96.6	0.18	8.0	48	23	3.78	1.47	4.80	3.30	4.26	2.25	0.02
Mar.	31	0.84	32,680	92.1	0.17	7.9	47	21	3.63	1.35	4.42	3.20	4.10	1.95	0.01
Apr.	30	0.90	16,200	103	0.24	8.3	50	24	3.82	1.37	5.10	3.29	4.48	2.50	0.01
May	31	0.85	34,170	95.3		8.0	50	23	3.42	1.29	4.76	2.99	4.42	2.25	0.03
June	30	0.96	8,620	104		8.3	51	26	3.71	1.34	5.34	3.22	4.52	2.69	0.03
July	31	1.33	26,330	140		8.3	49	18	5.55	1.95	7.07	3.01	8.89	2.67	0.04
Aug.	31	1.42	54,810	147		8.3	49	18	5.85	2.03	7.44	2.76	9.84	2.77	0.04
Sept.	30	1.12	38,530	116	0.20	7.5	45	15	5.07	1.55	5.31	2.76	7.56	1.77	0.02
Oct.	31	0.92	20,880	99.5	0.19	7.9	46	19	4.12	1.44	4.72	3.23	5.03	1.92	0.02
Nov.	30	0.98	26,950	105		7.9	48	23	4.29	1.49	5.26	3.28	4.90	2.40	0.01
Dec.	30	0.87	39,670	96.3	0.20	7.8	48	23	3.80	1.31	4.70	3.23	4.21	2.20	0.01
Mean ●	ϕ365	1.00	ϕ367,060	107.4		8.0	48	21	4.25	1.53	5.28	3.14	5.55	2.28	0.02
Period Average		0.78	617,500	87.3			43	19	3.65	1.26	3.78	2.83	4.28	1.63	
Tons of constituents, 1940									42,700	9,330	60,900	47,300	134,000	40,600	
Average Tons Period 1933-1940									79,100	16,600	94,000	92,000	223,000	62,500	
Water Samples from Rio Grande at Caballo Dam															
Jan.	4	1.10	161	126	0.21	8.3	54	24	4.27	1.67	6.89	5.17	4.94	3.18	0.04
Feb.	15	0.73	9,271	82.4	0.16	8.0	48	22	3.06	1.29	3.98	2.44	3.94	1.84	T
Mar.	31	0.83	69,969	94.4	0.17	7.9	48	27	3.57	1.38	4.50	2.69	4.07	2.56	0.02
Apr.	30	0.79	87,690	88.7	0.17	8.2	46	20	3.46	1.37	4.17	2.74	4.50	1.79	T
May	31	0.83	75,945	90.0	0.18	8.2	47	21	3.57	1.37	4.36	2.80	4.46	1.90	0.01
June	30	0.82	93,480	91.7	0.16	8.3	47	21	3.63	1.21	4.27	2.80	4.55	1.95	0.01
July	31	0.83	107,070	90.0	0.14	8.2	46	21	3.59	1.38	4.24	2.70	4.52	1.90	0.02
Aug.	31	0.82	93,480	90.3	0.17	8.1	47	21	3.38	1.39	4.23	2.61	4.39	1.90	T
Sept.	30	0.84	57,792	91.8	0.14	8.3	48	21	3.55	1.38	4.53	2.76	4.54	1.96	0.03
Oct.	8	1.00	2,840	117.0	0.20	7.9	49	32	4.27	1.60	5.58	3.27	4.75	3.72	0.01
Nov.	30	1.06	3,604	123	0.22	7.9	49	34	4.58	1.68	6.04	3.17	5.04	4.24	T
Dec.	4	1.03	86	115	0.19	7.9	50	25	4.71	1.28	5.99	4.49	4.42	3.03	0.03
Mean ●	ϕ275	0.82	ϕ601,388	90.9	0.16	8.2	47	22	3.53	1.35	4.31	2.73	4.44	1.99	0.01
Period Average		0.77	593,088	83.3			44	18	3.57	1.29	3.86	2.86	4.39	1.54	
Tons of Constituents, 1940									70,400	16,300	98,600	81,500	212,200	70,200	
Average Tons Period 1931-1940									74,600	16,300	92,400	89,300	219,700	57,000	
Water Samples from Rio Grande at Leasburg Dam															
Jan.	5	1.71	3,330	209	0.28	8.0	64	50	5.37	1.55	12.44	4.55	5.54	10.16	0.01
Feb.	24	0.88	10,370	100	0.17	7.9	45	25	4.13	1.39	4.52	3.18	4.46	2.56	0.02
Mar.	31	0.89	64,150	102	0.20	8.0	45	27	4.22	1.39	4.60	3.17	4.25	2.72	0.02
Apr.	30	0.84	86,540	93.2	0.15	8.0	45	21	3.73	1.41	4.27	2.84	4.55	1.95	T
May	31	0.88	74,750	95.2	0.17	8.1	47	21	3.77	1.27	4.41	2.90	4.65	2.00	0.01
June	30	0.84	90,200	94.1	0.18	8.3	46	20	3.73	1.43	4.36	2.90	4.62	1.90	0.01
July	31	0.86	103,540	93.3	0.16	8.1	46	21	3.74	1.36	4.36	2.80	4.62	1.95	0.03
Aug.	31	0.85	89,440	95.0	0.21	7.9	48	21	3.71	1.33	4.69	2.99	4.58	2.00	0.01
Sept.	30	0.91	61,760	98.1	0.19	8.3	47	22	3.84	1.50	4.81	2.96	4.87	2.16	0.03
Oct.	31	1.19	10,710	138	0.20	7.7	54	36	4.60	1.64	7.29	3.53	5.21	4.95	0.01
Nov.	30	1.22	5,380	132	0.23	7.9	47	29	5.30	1.79	6.41	3.52	6.04	3.99	0.01
Dec.	31	1.29	2,190	138	0.19	7.9	46	26	5.83	1.94	6.74	3.74	6.85	3.74	0.01
Mean ●	3354	0.87	ϕ602,360	96.7	0.18	8.1	47	22	3.83	1.39	4.56	2.95	4.62	2.15	0.02
Period Average		0.84	617,539	89.3			45	20	3.86	1.38	4.26	3.01	4.61	1.95	
Tons of Constituents, 1940									71,998	15,856	98,371	83,033	208,155	71,511	
Average Tons, Period 1931-1940									77,731	16,830	98,357	90,730	222,145	69,434	

● Weighted Mean
ϕ Total
** Percent of Total Cations
*** Percent of Total Anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1940—continued

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Water Samples from Rio Grande at El Paso, Texas															
Jan.	31	1.87	20,009	206	0.29	8.2	56	35	6.65	2.61	11.99	4.99	8.78	7.51	0.01
Feb.	29	1.58	20,066	175	0.26	8.2	57	34	5.73	2.19	10.30	4.37	7.52	6.20	0.01
Mar.	31	1.18	45,666	133	0.19	8.3	52	31	4.77	1.80	7.11	3.71	5.69	4.30	0.01
Apr.	30	1.14	65,892	128	0.21	8.3	51	29	4.62	1.75	6.62	3.53	5.64	3.75	0.01
May	31	1.15	60,030	131	0.22	8.0	52	29	4.43	1.88	6.96	3.33	6.07	3.85	0.03
June	30	1.12	76,496	122	0.18	8.3	52	28	4.32	1.53	6.27	3.07	5.90	3.45	0.01
July	31	1.13	77,857	126	0.18	8.3	52	28	4.48	1.77	6.67	3.37	5.92	3.62	0.03
Aug.	31	1.16	70,760	131	0.26	8.3	52	29	4.63	1.66	6.81	3.47	5.96	3.82	0.01
Sept.	30	1.31	54,627	144		7.7	53	30	4.97	1.95	7.69	3.73	6.60	4.39	T
Oct.	31	1.66	31,540	182	0.32	7.9	57	34	5.88	2.07	10.36	4.39	7.87	6.41	T
Nov.	30	1.85	22,015	201	0.20	7.9	58	35	6.51	2.44	12.38	4.90	8.77	7.50	0.01
Dec.	31	1.88	20,680	209	0.33	8.1	59	37	6.40	2.50	12.76	4.95	8.77	8.05	T
Mean @	ϕ366	1.25	ϕ565,638	139		8.2	53	30	4.80	1.83	7.47	3.60	6.28	4.28	0.01
Period Average		1.19	619,455	128			53	31	4.80	1.76	7.30	3.69	5.97	4.26	
Tons of Constituents 1940									59,379	13,737	106,046	66,680	186,197	93,680	
Average Tons Period 1931-1940									67,898	15,083	118,568	78,270	202,646	106,756	
Water Samples from Rio Grande at Fort Quitman, Texas															
Jan.	8	3.08	47,120	347	0.38	8.2	61	54	10.08	3.94	21.66	4.89	11.25	18.95	0.04
Feb.	5	3.16	33,500	359	0.34	8.2	61	57	10.13	3.97	22.40	4.57	11.21	20.74	0.02
Mar.	9	3.33	21,680	381	0.33	8.3	63	59	10.21	4.44	24.58	4.06	11.77	22.89	0.01
Apr.	9	4.46	14,320	516	0.27	8.3	63	65	12.88	6.24	33.21	3.73	14.45	34.05	0.01
May	8	3.47	19,430	399	0.40	8.1	62	61	10.48	4.68	24.81	3.73	12.07	24.30	0.03
June	9	2.33	31,690	266		8.3	60	54	7.37	2.93	15.76	3.32	8.99	14.35	0.03
July	10	2.57	28,010	300		8.3	62	58	8.12	3.40	18.53	3.27	9.11	17.45	0.04
Aug.	10	2.76	58,240	318	0.36	8.3	61	58	8.95	3.43	19.33	3.48	10.04	18.61	0.03
Sept.	8	3.59	25,060	403		7.7	63	62	10.70	4.44	25.45	3.53	12.14	25.25	0.01
Oct.	9	3.50	36,750	403	0.39	7.9	63	61	10.83	4.43	25.39	3.74	12.30	24.59	0.01
Nov.	6	3.26	32,930	365	0.32	7.9	62	57	10.39	4.08	23.50	4.34	11.88	21.65	0.01
Dec.	8	3.37	33,430	380	0.37	8.1	62	58	10.74	4.40	24.65	4.70	12.05	22.85	0.01
Mean @	ϕ99	3.07	ϕ382,160	351		8.2	62	58	9.70	3.93	21.93	3.95	11.01	20.61	0.02
Period Average		2.74	483,718	307			62	58	8.77	3.54	20.08	3.95	9.66	18.77	
Tons of Constituents 1940									32,870	8,080	85,270	20,040	89,410	123,560	
Average Tons, Period 1931-1940									42,170	10,320	110,831	28,430	111,393	159,791	
Water Samples from Rio Grande at La Nutria Station															
Jan.	4	3.11	46,030	352		8.1	62	56	9.59	4.15	22.12	4.13	11.58	19.76	0.02
Feb.	4	3.06	33,050	349	0.37	8.0	64	57	8.94	3.79	22.64	3.61	11.39	20.17	0.01
Mar.	6	2.80	20,610	325	0.40	8.0	65	58	7.79	3.71	21.21	2.84	10.61	18.89	0.01
Apr.	7	3.93	5,900	449	0.54	8.3	61	61	12.39	5.37	27.75	2.90	14.81	27.90	0.01
May	9	2.11	14,900	247	0.29	7.9	61	54	6.79	2.64	14.80	2.31	8.80	13.30	0.03
June	5	1.74	18,440	200		8.3	60	47	5.81	1.91	11.81	2.91	7.58	9.38	0.04
July	7	1.86	11,770	220	0.24	8.3	62	52	5.72	2.51	13.17	2.71	7.45	11.22	0.06
Aug.	8	0.98	27,340	115		8.3	61	40	3.38	0.98	6.72	2.35	4.11	4.43	0.11
Sept.															
Oct.	11	2.70	67,770	314		7.9	63	60	8.49	3.01	19.24	2.47	10.08	18.63	0.01
Nov.	5	3.39	34,920	377		7.9	64	60	9.68	4.30	24.98	3.08	12.50	23.20	T
Dec.	5	3.12	32,450	353	0.39	7.9	65	59	8.81	3.51	23.28	3.48	11.30	21.25	0.01
Mean @	71 ϕ	2.37	313,180 ϕ	272		8.1	63	56	7.26	2.85	17.04	2.91	9.07	15.18	0.04
Period Average		2.43	421,240	279			61	57	7.80	3.10	17.17	3.01	9.16	15.83	
Tons of constituents, 1940									26,150	6,230	70,430	15,690	78,290	96,730	
Average tons, period 1936-1940									36,900	8,914	93,288	21,324	103,922	132,612	
Water Samples from Rio Grande at Upper Presidio Station															
Jan.	4	3.13	38,810	354		8.2	62	56	9.55	4.16	22.53	3.78	11.91	20.01	0.01
Feb.	5	3.18	31,800	363	0.41	7.9	64	58	9.31	4.02	23.31	3.35	11.94	21.30	0.01
Mar.	4	3.66	14,900	412		8.0	61	60	11.46	5.02	26.20	3.05	13.99	25.19	0.01
Apr.	3	4.23	2,740	471		8.3	55	62	15.72	5.96	26.89	2.99	15.68	29.95	0.01
May	5	3.30	4,690	368		8.1	56	59	11.96	4.33	21.06	2.41	12.73	22.15	0.03
June	4	1.13	10,430	128		8.1	48	40	5.45	1.11	6.00	1.94	5.52	4.92	0.03
July	4	1.31	6,730	154		8.3	61	47	4.13	1.90	9.34	2.76	5.09	6.99	0.11
Aug.	4	1.24	39,560	148	0.22	8.3	59	47	4.46	1.28	8.41	2.40	5.04	6.69	T
Sept.															
Oct.	9	2.05	47,410	241		7.9	59	57	7.33	2.42	14.00	2.42	7.73	13.43	0.02
Nov.	4	3.51	26,680	390		7.9	64	60	9.90	4.48	25.60	3.03	13.12	24.15	T
Dec.	4	3.44	26,140	387	0.43	7.9	63	59	10.05	4.56	25.27	3.33	12.86	23.75	T
Total	50		249,890												
Mean		2.21		254		8.1	61	55	7.25	2.72	15.45	2.75	8.54	14.00	0.01
Average 1935-1940		2.11	313,600												

@ Weighted Mean
ϕ Total

** Percent of Total Cations
*** Percent of Total Anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES— 1940 — continued

Month	No. of Samples	Total Tons of Per Acre Foot	Total Tons of Dissolved Solids	Mean $K \times 10^5$ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	$CO_3 + HCO_3$	SO_4	Cl	NO_3
Water Samples from Rio Conchos near Ojinaga, Chihuahua															
Jan.	4	0.81	40,420	85.7	0.17		39	14	4.24	1.44	3.65	3.07	4.39	1.21	0.01
Feb.	5	0.76	32,750	82.2	0.19	7.9	42	13	3.79	1.18	3.66	3.05	4.13	1.08	0.01
Mar.	4	0.80	22,080	87.9		7.9	43	18	3.90	1.21	3.86	2.79	4.57	1.59	0.01
Apr.	4	0.97	12,510	106	0.26	8.3	50	21	4.06	1.41	5.40	2.89	5.66	2.25	0.01
May	5	0.83	26,730	89.3		8.0	44	17	4.01	0.96	3.88	2.26	5.18	1.50	0.03
June	3	0.78	38,920	80.3		8.3	43	14	3.72	0.98	3.52	2.51	4.46	1.17	0.01
July	4	0.59	48,140	62.8		8.3	41	12	3.07	0.78	2.69	2.61	2.89	0.75	0.03
Aug.	5	0.49	45,230	53.5	0.13	8.3	37	11	2.75	0.70	2.01	2.40	2.32	0.60	0.03
Sept.															
Oct.	10	0.54	58,860	58.5		7.9	42	16	2.70	0.73	2.45	2.32	2.49	0.91	0.03
Nov.	3	0.83	25,070	89.2		7.9	43	15	4.12	1.11	3.90	2.88	5.00	1.35	T
Dec.	4	0.95	22,610	104	0.24	8.0	46	17	4.29	1.33	4.84	3.08	5.58	1.75	T
Total Mean	51	0.68	373,320	72.6			42	15	3.39	0.95	3.12	2.61	3.60	1.06	0.02
Average 1935-1940		0.56	524,570												
Water Samples from Pecos River Station															
Jan.	3	5.47	94,080	593		8.2	59	61	14.49	11.30	37.35	2.92	21.73	37.80	0.02
Feb.	3	5.24	88,030	572		8.0	59	61	13.77	10.53	35.65	2.84	20.34	36.25	0.01
Mar.	5	5.95	95,800	649	0.40	7.9	61	63	14.35	12.27	42.13	2.38	22.99	42.75	0.01
Apr.	4	4.90	65,660	557	0.36	8.0	63	63	11.65	9.41	35.24	1.96	18.86	36.25	0.04
May	8	2.24	49,730	265	0.21	7.9	59	60	6.02	4.71	15.32	1.96	8.29	15.55	0.06
June	7	1.96	70,360	228	0.18	8.3	57	59	5.67	3.74	12.69	1.89	7.29	13.03	0.04
July	4	3.35	57,960	369	0.20	8.3	59	60	8.71	6.55	21.83	2.55	12.40	22.71	0.04
Aug.	9	3.67	78,170	415	0.26	8.3	59	60	9.71	7.65	24.78	2.50	14.39	25.40	0.04
Sept.	14	3.11	43,850	344	0.23	7.5	57	57	8.55	6.43	19.93	2.45	12.45	20.10	0.02
Oct.	17	4.24	70,380	473	0.33	7.8	60	61	10.82	8.62	29.10	2.42	16.49	29.69	0.03
Nov.	14	4.03	74,960	438	0.26	7.9	59	61	10.56	8.48	27.63	2.62	15.58	28.15	0.03
Dec.	16	5.56	97,300	588	0.36	7.9	62	64	13.18	10.93	39.80	2.73	20.26	40.50	0.02
Total Mean	104	3.90	886,280	432		8.0	60	61	10.09	7.90	26.73	2.39	14.97	27.26	0.03
Average 1935-1940		3.21	1,043,010												
Water Samples from Rio Grande at Eagle Pass Station															
Jan.	9	1.41	185,400	160	0.20	8.2	50	44	5.29	2.81	8.22	3.22	5.79	6.96	0.03
Feb.	7	1.42	173,060	163	0.17	8.0	51	45	5.19	2.77	8.44	3.10	5.73	7.32	0.03
Mar.	5	1.37	145,300	164	0.20	7.9	52	47	4.88	2.94	8.60	2.89	5.66	7.53	0.04
Apr.	9	0.98	130,680	119	0.16	8.3	48	45	3.97	2.18	5.61	2.70	3.69	5.20	0.06
May	7	0.78	157,120	91.4	0.15	8.0	43	34	3.61	1.53	3.35	2.46	3.30	3.00	0.11
June	5	0.66	121,890	80.4		8.3	42	36	3.22	1.35	3.36	2.35	2.63	2.82	0.06
July	6	0.90	153,450	101		8.2	42	32	4.34	1.50	4.19	2.81	3.89	3.22	0.06
Aug.	7	0.69	187,880	80.7	0.09	8.3	45	33	3.35	0.99	3.53	2.40	2.77	2.57	0.04
Sept.	6	0.74	135,050	79.8		7.6	40	29	3.68	1.14	3.27	2.81	2.82	2.27	0.04
Oct.	4	0.87	160,830	100		7.9	45	35	4.12	1.47	4.57	2.73	3.62	3.48	0.06
Nov.	3	1.05	127,900	126		7.9	50	41	4.43	1.86	6.26	2.78	4.46	5.15	0.04
Dec.	5	1.44	152,090	171	0.19	7.9	53	48	5.08	2.87	8.82	3.03	5.60	8.10	0.03
Total Mean	73	0.96	1,830,650	111		8.1	47	39	4.10	1.78	5.21	2.72	3.88	4.29	0.05
Average 1935-1940		0.85	2,505,650												
Water Samples from Rio Salado Station															
Jan. ●	0		0												
Feb. ●	0		0												
Mar.	6	0.44	42,130	53.5		7.9	33	23	2.71	0.83	1.75	1.88	2.11	1.18	0.03
Apr.	4	0.33	459	40.4		8.0	30	18	2.19	0.51	1.15	1.97	1.13	0.70	0.06
May	14	0.68	9,030	77.8	0.22	8.0	40	30	3.28	1.24	3.06	1.91	3.35	2.25	0.06
June	13	0.42	19,360	49.0	0.13	8.0	33	24	2.44	0.58	1.52	1.69	1.83	1.11	0.04
July	6	0.39	3,830	45.8		8.0	31	20	2.58	0.54	1.40	1.89	1.56	0.86	0.04
Aug.	5	0.45	18,190	52.7		7.9	37	26	2.52	0.68	1.84	1.58	2.09	1.31	0.04
Sept.	8	0.43	21,070	46.9		7.5	32	18	2.68	0.55	1.49	1.84	1.91	0.81	0.02
Oct.	8	0.50	17,360	59.4		7.8	35	23	3.04	0.77	2.08	1.72	2.70	1.31	0.02
Nov.	5	0.47	884	54.4		7.7	34	19	2.83	0.71	1.82	1.77	2.51	1.00	0.03
Dec.	4	0.47	1,240	56.4		7.8	34	19	2.82	0.70	1.80	2.02	2.29	1.00	0.02
Total Mean	73	0.45	133,553	53.1		7.8	34	23	2.70	0.72	1.77	1.79	2.14	1.17	0.03
Average 1935-1940		0.99	253,410												

● No flow in the river during January and February.

** Percent of Total Cations

*** Percent of Total Anions

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1940—continued

Month	No. of Samples	Total Tons of: Per Acre Foot	Total Tons of: Dissolved Solids	Mean Kx10⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Water Samples from Rio San Juan Station															
Jan.	5	0.88	6,670	89.5		8.0	28	14	4.57	2.28	2.73	2.72	5.34	1.36	0.03
Feb.	4	0.96	2,740	99.8	0.16	7.9	32	16	4.73	2.53	3.39	2.59	6.06	1.69	0.03
Mar.	4	0.94	15,880	102		7.9	38	19	4.30	2.27	4.08	2.13	6.23	2.00	0.02
Apr.	3	1.19	2,700	126	0.28	8.2	43	24	4.74	2.56	5.50	2.35	7.32	3.10	0.03
May	8	1.19	52,920	135	0.33	7.8	52	35	4.13	2.37	6.91	1.87	6.78	4.65	0.03
June	7	0.48	86,450	55.2		8.3	38	22	2.71	0.68	2.07	1.99	2.19	1.17	0.04
July	4	0.63	25,440	67.5	0.11	8.0	31	18	3.60	1.14	2.16	2.15	3.23	1.21	0.04
Aug.	7	0.66	50,540	71.4		8.3	28	15	4.19	1.08	2.01	2.35	3.83	1.06	0.04
Sept.	7	0.50	89,950	54.1	0.10	7.5	23	10	3.38	0.75	1.23	2.04	2.70	0.56	0.04
Oct.	6	0.54	46,900	60.0		7.8	40	24	2.67	0.86	2.37	1.72	2.63	1.41	0.03
Nov.	4	0.40	12,730	44.8		7.9	27	13	2.58	0.93	1.32	1.92	2.09	0.60	0.03
Dec.	5	0.40	29,240	45.9		7.7	28	14	2.44	0.76	1.26	1.72	1.99	0.60	0.03
Total Mean	64	0.57	422,160	63.1		7.9	34	19	3.19	0.97	2.15	1.99	3.00	1.20	0.04
Average 1935-1940		0.63	513,940												
Water Samples from Rio Grande at Rio Grande City															
Jan.	4	1.31	196,500	151		8.0	51	44	4.81	2.80	7.82	2.87	5.57	6.55	0.04
Feb.	5	1.30	174,200	157	0.16	7.9	52	45	4.74	2.64	8.06	2.74	5.82	6.96	0.03
Mar.	6	0.74	296,740	89.7		7.9	50	41	2.99	1.37	4.32	1.98	3.05	3.48	0.04
Apr.	6	0.78	120,120	95.3		8.3	47	42	3.39	1.40	4.22	2.30	2.95	3.80	0.06
May	6	0.71	256,310	83.2	0.13	8.0	43	37	3.21	1.45	3.50	2.46	2.86	3.10	0.04
June	8	0.44	288,200	52.5	0.13	8.3	39	24	2.52	0.57	2.00	1.94	1.83	1.22	0.04
July	5	0.71	243,530	83.5	0.11	8.4	45	37	3.38	1.08	3.61	2.10	2.80	2.94	0.11
Aug.	7	0.56	233,520	64.8		8.3	40	28	2.90	0.85	2.53	2.20	2.35	1.76	0.04
Sept.	6	0.52	271,440	55.9	0.11	7.5	35	24	3.05	0.80	2.04	2.30	2.12	1.41	0.04
Oct.	22	0.52	244,920	61.9	0.15	7.8	43	27	2.74	0.79	2.67	2.17	2.27	1.62	0.03
Nov.	13	0.94	173,900	109	0.17	7.9	48	39	4.07	1.67	5.25	2.47	4.05	4.25	0.03
Dec.	13	0.97	208,550	114		7.9	50	41	3.88	1.72	5.66	2.27	4.23	4.60	0.02
Total Mean	101	0.68	2,707,930	79.1		8.0	45	35	3.18	1.15	3.50	2.22	2.82	2.70	0.04
Average 1935-1940		0.76	3,513,880												
North Floodway Near Sebastian, Texas															
Oct. Nov. Dec.	6	1.53	ϕ- 7,430	176	0.66		56	46	4.94	2.82	9.77	3.23	6.15	7.85	0.01
Water Samples from Rio Grande at Lower Brownsville Station															
Feb.	21	1.35		156		8.2			5.15	2.69	7.73	3.25	5.58	6.66	0.03
Mar.	15	1.42		164		8.3			5.60	3.07	8.19	3.91	5.74	7.12	0.03
Apr. May June	5	0.74		86.9		8.2			3.32	1.65	3.70	2.89	2.48	3.10	0.04
July Aug.	7	0.84		97.2		8.3			3.80	1.31	4.28	2.30	3.57	3.32	0.03
Sept. Oct.	13	0.72		82.5	0.15	7.8			3.64	1.32	3.60	2.68	2.87	2.63	0.03

SALTY WATER AND LOW RIO GRANDE FLOW

Date 1940	Flow at Rio Grande City Second Feet	Rio Grande at Rio Grande City: K x 10⁵ @25°C.	Rio Grande at Rio Grande City: Tons Per Acre Foot	Rio Grande at Mission Pump: K x 10⁵ @25°C.	Rio Grande at Mission Pump: Tons Per Acre Foot	Mission Main Canal 1 Mile South of Mission: K x 10⁵ @25°C.	Mission Main Canal 1 Mile South of Mission: Tons Per Acre Foot	Rio Grande at Hidalgo Bridge: K x 10⁵ @25°C.	Rio Grande at Hidalgo Bridge: Tons Per Acre Foot	Rio Grande at Mercedes Bridge: K x 10⁵ @25°C.	Rio Grande at Mercedes Bridge: Tons Per Acre Foot	Farm 7½ Miles North of Mercedes: K x 10⁵ @25°C.	Farm 7½ Miles North of Mercedes: Tons Per Acre Foot	Rio Grande at El Jardin Pumps: K x 10⁵ @25°C.	Rio Grande at El Jardin Pumps: Tons Per Acre Foot	Flow at Lower Brownsville Second Feet
March				172	1.42	171	1.41									
1	1,970			171	1.41	170	1.40							150	1.30	122
2	2,000													152	1.32	89.5
3	1,970													155	1.34	61.5
4	1,880													158	1.37	17.2
5	1,810													159	1.38	5.0
6	1,740	174	1.44											161	1.39	2.0
7	1,700													173	1.50	1.0
8	1,830													164	1.42	1.0
9	1,890							177	1.46					165	1.43	0
10	1,910													158	1.37	0
11	1,870							172	1.42					164	1.42	0
12	1,810							172	1.42					162	1.40	0
13	1,830							171	1.41					155	1.34	8.9
14	1,810							171	1.41	169	1.39	178	1.47	155	1.34	8.1
15	1,990	168	1.39					166	1.37	170	1.40	178	1.47	162	1.40	5.7
16	1,900							160	1.32					157	1.36	41.0
17	1,780													169	1.46	26.4
18	1,720							169	1.39					183	1.58	246
19	1,660													174	1.51	498
20	1,670	159	1.31													838

ϕ Calculated by weighted monthlies.

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

San Marcial Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 1	101	Feb. 11	97.4	Mar. 23	97.0	May 3	125	June 13	143	July 24	97.9	Sept. 3	151	Oct. 14	99.0	Nov. 24	101
2	106	12	94.1	24	97.2	4	109	14	137	25	105	4	133	15	104	25	98.6
3	108	13	96.4	25	95.5	5	117	15	150	26	105	5	134	16	98.2	26	101
4	106	14	92.7	26	97.3	6	124	16	131	27	131	6	130	17	97.9	27	95.4
5	103	15	96.3	27	97.3	7	144	17	108	28	125	7	140	18	106	28	114
6	100	16	92.8	28	94.9	8	152	18	99.0	29	142	8	140	19	107	29	110
7	99.2	17	98.3	29	98.1	9	135	19	101	30	193	9	140	20	112	30	105
8	95.6	18	98.0	30	90.1	10	117	20	108	31	161	10	133	21	110	Dec. 1	105
9	94.4	19	92.8	31	97.7	11	116	21	123	Aug. 1	162	11	109	22	114	2	107
10	96.2	20	93.2	Apr. 1	92.2	12	106	22	120	2	174	12	155	23	113	3	98.5
11	94.8	21	93.2	2	92.5	13	104	23	128	3	164	13	146	24	110	4	99.4
12	98.9	22	92.0	3	92.6	14	105	24	137	4	109	14	142	25	100	5	101
13	102	23	93.0	4	94.4	15	101	25	109	5	112	15	128	26	94.4	6	99.5
14	102	24	93.8	5	95.2	16	99.7	26	97.2	6	110	16	123	27	96.3	7	105
15	105	25	92.3	6	96.4	17	95.3	27	95.3	7	110	17	124	28	95.8	9	99.5
16	131	26	92.8	7	93.0	18	100	28	116	8	97.8	18	95.2	29	100	10	94.0
17	94.0	27	90.6	8	91.8	19	102	29	115	9	99.3	19	91.1	30	92.7	11	91.8
18	94.2	28	92.6	9	95.1	20	102	30	132	10	117	20	94.7	31	87.4	12	95.1
19	111	29	91.9	10	98.1	21	113	July 1	122	11	113	21	97.0	Nov. 1	90.2	13	95.3
20	189	Mar. 1	92.3	11	96.6	22	87.2	2	121	12	114	22	103	2	90.7	14	94.0
21	123	2	90.8	12	96.5	23	89.6	3	97.0	13	117	23	101	3	98.3	15	94.0
22	114	3	93.2	13	126	24	102	4	97.6	14	122	24	105	4	99.0	16	103
23	133	4	93.3	14	126	25	77.8	5	110	15	121	25	122	5	98.1	17	93.3
24	114	5	95.8	15	125	26	79.9	6	137	16	117	26	99.5	6	106	18	93.4
25	114	6	96.6	16	143	27	88.6	7	120	17	122	27	101	7	105	19	92.1
26	106	7	87.6	17	146	28	76.0	8	107	18	124	28	92.2	8	97.1	20	93.1
27	98.5	8	87.7	18	146	29	77.7	9	108	19	115	29	94.0	9	111	21	96.8
28	98.5	9	88.8	19	104	30	79.6	10	117	20	128	30	97.8	10	113	22	91.8
29	91.6	10	89.0	20	104	31	83.9	11	114	21	124	Oct. 1	93.0	11	123	23	93.3
30	90.0	11	87.6	21	105	June 1	84.8	12	131	22	114	2	91.1	12	128	24	93.8
31	93.0	12	89.0	22	103	2	84.6	13	133	23	138	3	95.3	13	123	25	93.6
Feb. 1	93.8	13	86.8	23	104	3	89.1	14	115	24	137	4	104	14	122	26	93.6
2	93.8	14	86.1	24	112	4	90.0	15	136	25	151	5	106	15	106	27	93.6
3	92.9	15	87.1	25	105	5	88.7	16	121	26	186	6	101	16	118	28	92.6
4	109	16	83.7	26	105	6	93.2	17	161	27	182	7	97.1	17	116	29	92.3
5	109	17	87.3	27	99.0	7	108	18	127	28	187	8	96.9	18	119	30	96.8
6	102	18	87.2	28	100	8	90.5	19	124	29	171	9	98.7	19	123	31	95.7
7	97.4	19	85.4	29	100	9	138	20	124	30	171	10	99.4	20	125		
8	96.3	20	88.8	30	105	10	133	21	124	31	133	11	101	21	118		
9	95.6	21	88.4	May 1	127	11	136	22	125	Sept. 1	129	12	100	22	109		
10	96.5	22	95.7	2	125	12	131	23	99.1	2	137	13	99.0	23	111		

El Paso Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 1	199	Feb. 11	216	Mar. 23	131	May 3	133	June 13	121	July 23	122	Sept. 2	130	Oct. 13	184	Nov. 23	209
2	199	12	216	24	127	4	139	14	120	24	124	3	130	14	184	24	210
3	199	13	218	25	121	5	134	15	126	25	126	4	135	15	191	25	208
4	206	14	216	26	128	6	131	16	128	26	126	5	136	16	182	26	210
5	202	15	171	27	130	7	133	17	127	27	131	6	144	17	187	27	193
6	195	16	162	28	130	8	117	18	126	28	130	7	143	18	194	28	202
7	203	17	159	29	136	9	129	19	127	29	125	8	133	19	198	29	190
8	203	18	148	30	142	10	131	20	130	30	122	9	141	20	198	30	199
9	203	19	139	31	146	11	123	21	129	31	110	10	143	21	199	Dec. 1	205
10	204	20	132	Apr. 1	130	12	135	22	134	Aug. 1	109	11	139	22	197	2	199
11	204	21	131	2	131	13	131	23	124	2	122	12	144	23	196	3	202
12	204	22	133	3	125	14	130	23	117	3	129	13	146	24	198	4	208
13	205	23	132	4	122	15	129	24	111	4	128	14	147	25	199	5	206
14	212	24	173	5	125	16	131	25	113	5	126	15	146	26	203	6	210
15	206	25	178	6	121	17	134	26	111	6	127	16	143	27	203	7	213
16	207	26	185	7	127	18	129	27	120	7	129	17	144	28	202	8	212
17	207	27	194	8	124	19	131	28	122	8	122	18	147	29	203	9	212
18	207	28	197	9	123	20	130	29	129	9	125	19	146	30	161	10	211
19	213	29	200	10	126	21	126	30	120	10	136	20	146	31	190	11	209
20	210	Mar. 1	201	11	132	22	127	July 1	125	11	136	21	139	Nov. 1	196	12	209
21	210	2	211	12	124	23	131	2	134	12	120	22	131	2	195	13	212
22	210	3	208	13	126	24	129	3	128	13	126	23	133	3	197	14	211
23	209	4	180	14	124	25	129	4	127	14	125	24	142	4	202	15	212
24	209	5	140	15	125	26	131	5	123	15	130	25	152	5	203	16	208
25	206	6	141	16	124	27	133	6	129	16	134	26	158	6	202	17	211
26	207	7	140	17	125	28	134	7	125	17	140	27	172	7	206	18	211
27	209	8	133	18	126	29	126	8	126	18	143	28	172	8	203	19	211
28	210	9	138	19	127	30	127	9	133	19	140	29	172	9	202	20	212
29	212	10	133	20	127	31	122	10	132	20	133	30	175	10	206	21	212
30	213	11	128	21	127	June 1	133	11	131	21	127	Oct. 1	162	11	206	22	212
31	215	12	122	22	126	2	126	12	127	22	129	2	157	12	205	23	214
Feb. 1	215	13	128	23	125	3	125	13	125	23	136	3	146	13	209	24	213
2	213	14	131	24	123	4	126	14	133	24	140	4	140	14	208	25	213
3	206	15	130	25	121	5	123	15	128	25	136	5	168	15	208	26	212
4	211	16	125	26	129	6	120	16	127	26	131	6	175	16	212	27	215
5	211	17	127	27	126	7	114	17	127	27	126	7	184	17	207	28	210
6	204	18	123	28	130	8	116	18	125	28	126	8	188	18	206	29	215
7	215	19	125	29	127	9	115	19	123	29	132	9	189	19	206	30	213
8	217	20	127	30	129	10	115	20	122	30	135	10	193	20	208	31	213
9	214	21	127	May 1	123	11	119	21	120	31	134	11	202	21	209		
10	215	22	126	2	124	12	122	22	120	Sept. 1	135	12	195	22	208		

Fort Quitman Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 2	330	Feb. 20	310	Apr. 2	646	May 11	451	June 18	321	July 24	271	Aug. 28	342	Oct. 5	401	Nov. 13	400
6	341	28	332	6	646	13	376	22	431	27	463	31	334	9	471	20	371
9	324	Mar. 5	381	9	642	18	452	24	186	31	182	Sept. 4	353	12	360	27	361
13	352	5	387	13	701	21	377	27	244	Aug. 3	243	7	515	16	374	Dec. 4	386
16	370	9	372	16	679	25	351	July 1	150	7	318	11	471	19	385	7	368
23	341	12	374	20	456	28	418	3	367	10	330	14	655	23	392	11	393
27	342	16	369	23	465	June 1	759	6	479	14	290	18	493	26	432	14	377
30	357	19	291	27	421	4	758	10	683	17	381	21	592	30	396	18	394
Feb. 6	378	23	453	30	375	8	632	13	696	21	625	25	561	Nov. 2	374	21	394
13	381	26	449	May 4	462	10	520	17	701	24	520	28	505	5	380	28	407
18	416	30	529	7	411	15	354	20	480	28	341	Oct. 2	565	9	357	30	387

La Nutria Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 7	334	Feb. 24	340	Apr. 3	425	May 9	81.6	June 4	352	July 16	322	Aug. 24	261	Sept. 24	484	Nov. 14	360
20	364	Mar. 2	318	9	393	14	533	16	190	23	86.2	26	186	Oct. 5	414	16	369
24	364	4	346	13	423	20	388	26	198	30	297	29	99.5	9	571	19	384
27	355	9	374	19	465	21	324	27	198	Aug. 4	137	Sept. 7	331	15	241	Dec. 3	344
Feb. 4	347	16	367	23	457	23	149	July 1	252	13	144	7	330	19	341	4	349
10	342	18	378	30	547	24	148	2	149	14	35.6	14	396	29	393	9	342
17	366	26	180	May 4	483	28	331	9	304	20	54.7	17	469	Nov. 2	410	24	393
17	362	Apr. 2	399	7	81.0	June 2	203	16	310	24	205	18	457	5	403	28	412

Upper Presidio Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 9	340	Feb. 15	378	Mar. 31	418	May 20	202	June 27	145	Aug. 15	197	Sept. 26	421	Nov. 7	413	Dec. 22	403
12	348	22	393	Apr. 4	425	23	440	July 4	150	23	189	Oct. 3	559	14	375	27	410
23	374	29	310	18	510	30	295	11	319	29	96.9	10	500	21	418		
25	354	Mar. 7	380	25	544	June 6	95.2	18	57.7	Sept. 5	133	17	286	28	393		
Feb. 2	357	14	433	May 2	585	13	356	25	370	12	338	24	370	Dec. 8	377		
5	369	21	451	9	530	20	81.1	Aug. 8	97.4	19	388	31	410	12	383		

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

Rio Conchos near Ojinaga, Chihuahua — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 8	89.5	Feb. 15	77.9	Mar. 31	85.9	May 9	62.2	June 20	71.1	Aug. 5	39.9	Sept. 16	82.6	Oct. 17	49.3	Dec. 5	99.3
12	85.2	22	81.9	Apr. 4	93.9	17	100	27	60.0	8	40.9	26	96.3	29	87.0	12	104
22	83.5	29	78.9	16	112	23	94.6	July 4	52.4	17	62.8	30	99.7	31	92.8	19	101
25	79.6	Mar. 7	80.6	25	107	31	93.9	11	67.0	25	68.7	Oct. 3	106	Nov. 7	83.9	27	103
Feb. 2	84.1	17	92.6	30	103	June 6	96.8	18	80.6	29	70.5	10	113	14	88.8		
8	80.6	21	93.7	May 2	107	13	88.2	25	69.7	Sept. 6	34.7	14	74.6	21	91.3		

Pecos River Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 13	592	Apr. 6	528	June 1	426	Aug. 3	410	Sept. 9	252	Oct. 3	351	Oct. 25	856	Nov. 18	556	Dec. 13	602
21	602	13	634	8	404	7	407	11	255	5	360	27	396	20	550	15	609
27	605	20	530	15	419	7	369	13	319	7	369	29	404	23	562	18	620
Feb. 3	566	27	482	22	338	10	272	15	353	9	373	31	366	25	556	19	627
10	516	May 4	366	24	307	17	482	17	351	11	367	Nov. 2	297	27	547	21	642
17	837	9	212	25	156	24	546	19	365	14	398	4	314	29	545	23	642
24	622	11	345	29	138	27	419	21	377	15	386	6	317	Dec. 1	573	25	650
Mar. 2	633	18	434	29	117	29	352	23	380	17	320	8	302	3	579	27	654
9	645	19	429	July 6	369	31	323	25	372	19	433	10	304	5	599	29	599
18	645	22	91.4	13	362	Sept. 2	326	27	361	21	503	12	342	7	599	31	638
23	664	23	269	20	338	4	458	29	309	23	727	14	433	9	596		
30	641	25	198	27	404	7	289	Oct. 1	335	24	939	16	565	11	599		

Eagle Pass Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 3	147	Feb. 8	148	Mar. 16	163	Apr. 22	136	May 31	104	July 20	96.2	Aug. 30	73.6	Oct. 22	93.2	Dec. 31	181
5	159	10	151	22	157	27	128	June 4	138	22	95.9	Sept. 6	77.5	28	116		
8	156	12	149	29	150	30	125	10	44.7	29	108	14	71.4	Nov. 16	109		
12	159	17	174	Apr. 2	160	May 8	120	15	93.2	Aug. 4	90.8	16	69.4	19	134		
15	162	19	195	6	67.6	11	98.3	17	123	9	107	21	87.0	23	159		
20	166	24	171	10	122	15	101	24	94.6	14	41.0	28	93.1	Dec. 6	159		
22	161	26	173	13	117	18	109	July 8	103	21	84.6	30	92.1	20	179		
26	164	Mar. 4	172	15	141	21	56.9	12	50.3	23	85.1	Oct. 5	88.9	24	175		
29	167	12	167	19	144	27	6.5	15	102	26	104	11	93.2	28	175		

Rio Salado Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 5	50.4	Mar. 21	37.5	May 3	43.5	May 28	92.5	June 15	43.4	July 12	39.8	Sept. 1	44.8	Oct. 15	41.9	Nov. 29	50.6
12	38.7	21	76.3	10	45.1	29	145	16	36.3	19	56.8	6	50.5	16	70.1	Dec. 6	51.5
19	39.5	22	198	12	48.6	30	55.1	21	32.4	26	70.2	7	54.3	18	34.4	13	52.5
26	48.4	23	134	13	83.5	31	69.6	25	35.8	Aug. 2	75.0	8	41.6	25	32.2	20	52.5
Feb. 9	40.3	24	36.7	14	86.3	June 7	44.5	26	43.6	9	77.3	9	49.0	26	30.3	27	57.5
16	37.3	29	33.0	17	142	11	36.2	27	28.4	16	105	13	40.5	27	74.0		
23	38.6	Apr. 5	36.7	24	55.9	12	29.6	28	73.8	23	123	20	39.9	Nov. 1	53.4		
Mar. 1	40.2	12	39.3	25	69.3	13	53.3	July 4	45.8	30	63.2	27	39.0	8	55.3		
8	57.4	19	41.7	26	52.0	14	79.3	5	43.2	30	39.5	Oct. 4	41.0	15	51.2		
15	62.1	26	42.2	27	40.7	14	69.9	6	33.9	31	42.7	11	43.7	21	50.2		

Rio San Juan Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 3	85.8	Feb. 28	99.7	May 1	424	June 5	44.1	July 10	45.2	Aug. 23	53.4	Sept. 27	41.2	Nov. 15	28.6		
10	87.4	Mar. 6	105	9	436	12	166	16	78.0	31	48.5	Oct. 4	63.4	20	75.9		
17	87.4	13	104	10	222	13	76.1	24	53.6	Sept. 2	69.7	11	94.9	27	78.7		
24	91.9	20	104	15	67.6	15	43.5	Aug. 2	83.9	8	58.7	18	85.2	Dec. 4	80.5		
31	97.1	27	96.6	20	74.7	20	67.2	7	56.4	9	48.4	25	96.6	11	83.8		
Feb. 7	98.3	Apr. 3	109	21	151	25	36.2	14	47.6	10	43.9	30	43.3	20	61.2		
15	98.3	10	112	21	71.6	30	39.7	21	92.1	13	50.3	31	28.1	22	22.0		
21	101	17	152	29	56.6	July 4	68.6	22	50.4	20	67.0	Nov. 6	29.8	31	60.7		

Rio Grande City Station —1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Jan. 3	145	Mar. 21	142	May 25	53.0	July 3	73.0	Sept. 2	53.5	Oct. 16	64.8	Oct. 26	46.6	Nov. 20	112	Dec. 20	146
11	156	26	42.0	26	39.8	11	97.1	9	47.0	18	88.0	26	41.4	22	117	22	81.5
16	153	27	58.5	27	70.0	15	64.4	10	62.4	21	74.1	29	54.4	25	116	23	78.5
29	149	Apr. 4	112	June 7	42.7	25	98.3	11	64.9	25	46.7	31	42.4	27	108	25	99.5
Feb. 7	157	11	84.3	15	64.7	27	99.2	23	70.3	25	50.1	Nov. 2	80.1	29	111	27	122
16	148	18	67.9	16	67.0	Aug. 5	96.0	30	76.9	25	48.2	4	120	Dec. 2	136	30	131
23	151	20	116	17	54.7	6	104	Oct. 2	78.1	25	59.1	6	124	4	133		
28	149	24	123	18	51.6	9	109	4	83.3	25	62.1	8	144	6	140		
29	153	27	122	25	48.6	14	95.1	7	85.8	25	51.4	11	91.7	9	150		
Mar. 6	174	May 6	147	26	46.2	15	79.4	9	99.5	26	46.4	13	105	11	144		
15	168	12	137	27	45.0	19	47.4	11	85.1	26	46.7	15	95.0	16	150		
20	159	18	91.3	28	39.3	31	52.3	14	88.1	26	47.0	18	107	18	151		

Hidalgo Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Mar. 9	177	Mar. 13	171	Mar. 16	160	Apr. 25	135	Apr. 30	117	May 3	139	May 7	153		
11	172	14	171	18	169	27	124	May 1	119	4	144	8	154		
12	172	15	166	Apr. 24	117	29	124	2	126	6	151	9	149		

Mercedes Bridge Station — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Mar. 15	169	Mar. 15	170												

North Floodway Near Sebastian, Texas — 1940

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Oct. 11	194	Oct. 29	163	Nov. 16	191	Nov. 29	171	Dec. 11	195	Dec. 23	137				

* Lower Brownsville Station — 1939

Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Mar. 11	132	Mar. 17	138	Mar. 31	137	Apr. 2	143	Apr. 7	152	Apr. 9	152	Apr. 12	142	Apr. 14	137	July 11	124
16	136	30	136	Apr. 1	140	6	153	8	152	10	150	13	139	July 10	123		

Lower Brownsville Station — 1940

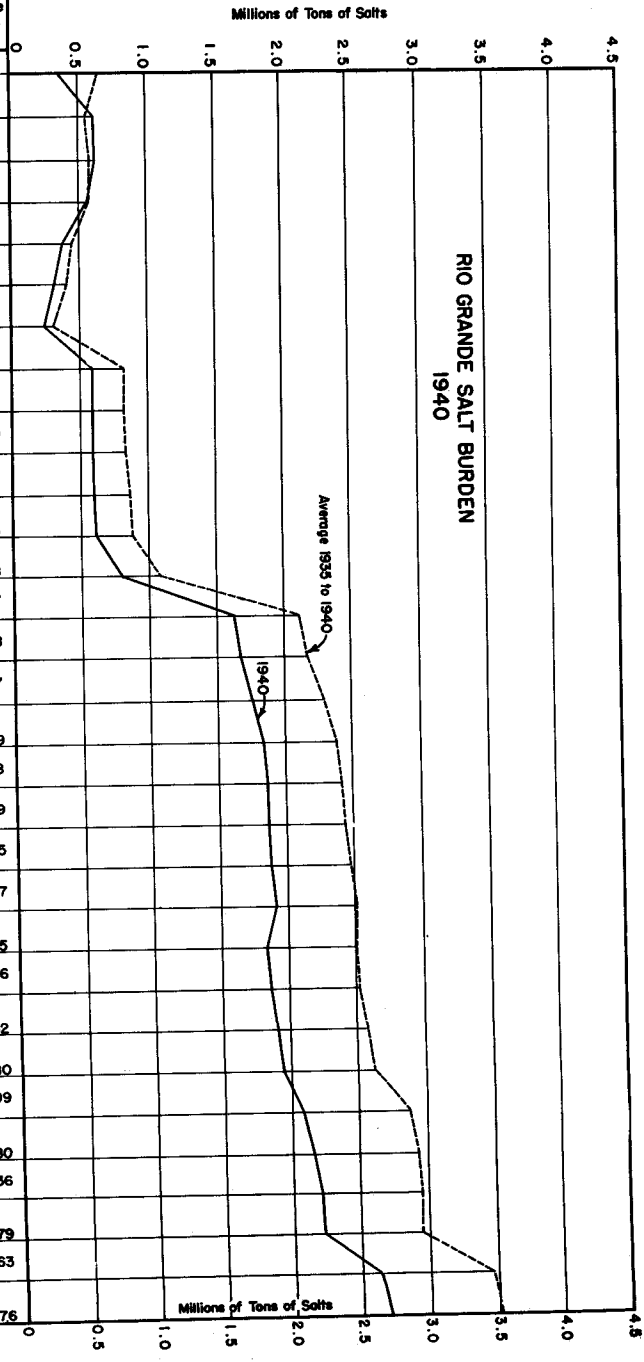
Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C	Date	$K \times 10^5$ @25°C
Feb. 3	157	Feb. 16	157	Feb. 27	152	Mar. 7	173	Mar. 16	157	Apr. 30	78.5	May 10	97.1	Aug. 9	102	Oct. 13	84.2
4	158	17	156	28	151	8	164	17	169	May 1	79.7	11	99.6	Oct. 6	75.8	14	84.5
5	157	18	159	29	150	9	165	18	183	2	83.7	12	99.8	7	75.4	15	87.6
6	155	19	161	Mar. 1	150	10	158	19	174	3	85.2	Aug. 1	87.1	7	75.4	16	86.9
7	152	22	140	2	152	11	164	Apr. 25	68.1	4	87.8	2	90.2	8	76.4	17	86.9
8	156	23	148	3	155	12	162	26	69.2	5	86.8	5	98.3	9	78.3		
9	159	24	151	4	158	13	155	27	73.8	7	93.9	6	98.9	10	80.9		
10	159	25	153	5	159	14	155	28	77.9	8	100	7	100	11	81.5		
15	158	26	153	6	161	15	162	29	77.2	9	97.9	8	101	12	85.5		

* Complete Data for 1939.

RIO GRANDE SALT BURDEN

The graphical and tabular results below are based upon the chemical analyses shown on the preceding pages as well as upon similar data in previous Water Bulletins. For some tributaries the results are based upon curves showing the relationship between salt concentration and amount of stream flow. For other stations and tributaries the results are arrived at by secondary deductions. Small adjustments were required in the 1940 records for Upper Presidio, Rio Conchos and Pecos River to obtain a balance.

	Concentration Tons Acre Foot	
	1940	Average 1935 to 1940
SAN MARCIAL	1.00	.73
UNMEASURED		
CABALLO DAM	.82	.76
UNMEASURED		
LEASBURG DAM	.87	.83
UNMEASURED		
EL PASO	1.25	1.17
UNMEASURED		
FORT QUITMAN	3.07	2.66
UNMEASURED		
LA NUTRIA	2.37	2.43
UNMEASURED		
UPPER PRESIDIO	2.11	2.08
RIO CONCHOS	.65	.55
UNMEASURED		
LOWER PRESIDIO	.89	.76
ALAMITO CREEK	.37	.50
TERLINGUA CREEK	.75	.51
UNMEASURED		
JOHNSON RANCH	.82	.73
UNMEASURED		
LANGTRY	.70	.68
PECOS RIVER	3.73	3.17
GOODENOUGH SPRING	.58	.58
DEVILS RIVER	.34	.27
UNMEASURED		
DEL RIO	1.01	.89
SAN FELIPE CREEK	.59	.58
PINTO CREEK	.59	.59
RIO SAN DIEGO	.47	.35
RIO SAN RODRIGO	.26	.67
UNMEASURED		
EAGLE PASS	.96	.85
RIO ESCONDIDO	.46	.56
UNMEASURED		
EL JARDIN (Estimated)	.90	.82
UNMEASURED		
LAREDO	.86	.80
RIO SALADO	.45	.99
UNMEASURED		
ZAPATA	.77	.80
RIO ALAMO	.32	.36
UNMEASURED		
ROMA	.75	.79
RIO SAN JUAN	.57	.63
UNMEASURED		
RIO GRANDE CITY	.68	.76



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

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

At El Paso Gaging Station

Date 1940	Hour 1940	Water Temperature °C. 1940	Mean Daily Second Feet River Flow 1940	Total Bacteria per c. c. in Agar-Agar at 37.5 °C. 1940	Total Bacteria per c. c. in Agar-Agar at 37.5 °C. Average 1937 — 1940	Escherichia Coli (B. Coli) Per 100 c. c. 1940	Escherichia Coli (B. Coli) Per 100 c. c. Average 1937 — 1940
January 9	9:15 A.M.	8.9	171	200		45	
January 22	12:25 P.M.	4.2	186	400	Jan. # 667	68	Jan. # 215
February 13	11:20 A.M.	11.1	136	300	Feb. ⊕ 35,638	14	Feb. ⊕ 422
March 5	7:45 A.M.	8.5	440	300		790	
March 12	10:00 A.M.	10.5	691	2,400		230	Mar. # 416
March 26	8:40 A.M.	14.5	839	1,200	Mar. # 2,748	490	
April 9	8:45 A.M.	14.0	994	2,100	Apr. ⊕ 2,430	490	Apr. ⊕ 472
June 18	7:20 A.M.	25.0	997	700	May ϕ 3,150	170	May ϕ 456
June 25	9:20 A.M.	22.0	1,880	700	June 36,319	1,100	June 784
July 9	11:20 A.M.	23.5	941	500		2,500	
July 26	10:00 A.M.	25.0	977	770	July 6,671	230	July 942
August 13	10:15 A.M.	23.0	1,150	8,800		1,300	
August 30	9:50 A.M.	24.0	847	33,000	Aug. 12,588	790	Aug. 1,188
September 10	9:35 A.M.	23.0	757	2,900	Sept. 11,887	490	Sept. 2,533
September 24	10:00 A.M.	21.0	599	1,330		700	
October 8	10:10 A.M.	19.0	298	1,300	Oct. 4,240	490	Oct. 1,399
October 22	10:00 A.M.	16.5	244	2,100		170	
November 12	11:20 A.M.	11.0	186	1,100	Nov. 3,514	170	Nov. 422
November 26	11:20 A.M.	12.0	184	1,900		260	
December 11	8:30 A.M.	12.0	194	9,600	Dec. 4,044	310	Dec. 336
Monthly Average		16.4		3,740	10,325	540	799

Just Above Ysleta-Zaragoza Bridge

January 9	6:35 P.M.	10.4	139	26,700	Jan. # 42,767	350,000	Jan. # 563,500
January 22	5:30 P.M.	5.2	199	5,300		11,000	
February 13	8:10 P.M.	10.9	163	15,100	Feb. # 46,803	79,000	Feb. # 254,667
March 5	8:45 A.M.	9.0	240	43,500		350,000	
March 12	9:15 A.M.	10.5	480	7,300	Mar. # 33,367	49,000	Mar. # 313,000
March 26	9:30 A.M.	15.0	702	6,200		33,000	
April 9	9:30 A.M.	15.0	656	18,700	Apr. # 99,608	350,000	Apr. # 201,500
June 18	8:50 A.M.	25.0	670	13,500	May ϕ 29,725	220,000	May ϕ 85,500
June 25	10:20 A.M.	23.5	1,347	25,600	June 166,388	70,000	June 192,375
July 9	12:10 P.M.	26.0	506	13,700	July 152,825	79,000	July 132,375
July 26	11:10 A.M.	25.5	662	67,000		110,000	
August 13	11:00 A.M.	24.5	1,141	13,600	Aug. 109,088	110,000	Aug. 364,750
August 30	10:40 A.M.	24.5	558	175,000		130,000	
September 10	10:30 A.M.	24.0	492	32,600	Sept. 183,600	220,000	Sept. 285,167
September 24	10:50 A.M.	22.5	541	41,000		240,000	
October 8	11:05 A.M.	22.0	157	216,000	Oct. 156,350	1,600,000	Oct. 481,125
October 22	11:45 A.M.	18.0	339	108,000		350,000	
November 12	12:30 P.M.	14.0	17	61,000	Nov. 41,134	1,600,000	Nov. 291,538
November 26	12:15 P.M.	12.0	146	35,000		110,000	
December 11	10:30 A.M.	10.5	195	54,000	Dec. 41,025	540,000	Dec. 268,708
Monthly Average		17.4		47,618	91,890	337,545	286,184

DISSOLVED OXYGEN IN RIO GRANDE WATER NEAR EL PASO

The following determinations of dissolved oxygen in Rio Grande water near El Paso, Texas, were furnished by the Department of Water and Sewerage of the City of El Paso. The outfall into the river from El Paso City Sewage Disposal Plant is 6.6 river miles below the American Dam.

Date 1940	Dissolved Oxygen														
	Courchesne Bridge			Immediately above El Paso Sewage Outfall			Juarez Station			4.6 Miles Below Juarez Station			Ysleta-Zaragoza Bridge		
	Water °°C.	Parts per Million	Percent Saturation	Water °°C.	Parts per Million	Percent Saturation	Water °°C.	Parts per Million	Percent Saturation	Water °°C.	Parts per Million	Percent Saturation	Water °°C.	Parts per Million	Percent Saturation
Jan. 3	13.3	8.95	85.0	13.3	8.32	79.0	16.1	4.77	48.0	12.8	7.14	67.0	12.2	7.12	66.0
Jan. 17	10.0	10.12	89.3	11.1	8.67	78.4	12.2	7.32	67.9	10.6	7.77	69.5	10.0	8.73	77.1
Feb. 7	13.3	9.05	85.9	13.3	7.85	74.5	14.4	6.40	62.3	13.3	6.52	61.9	12.2	8.05	74.7
Feb. 20	10.0	10.00	88.3	13.3	8.85	84.0	14.4	6.40	62.3	12.8	7.90	74.2	12.2	8.00	74.2
Mar. 26	17.8	7.75	80.9	18.9	6.67	71.2	20.0	5.55	60.5	18.9	6.83	72.9	18.3	6.95	73.3
Apr. 11	17.8	8.03	83.8	20.0	7.90	86.2	20.0	6.30	68.7	18.9	6.97	74.4	18.9	8.27	88.3
Apr. 25	20.0	7.68	83.8	21.1	7.40	82.5	21.1	5.46	60.9	21.1	7.10	79.2	21.1	8.84	98.6
May 10	20.0	8.23	89.7	21.1	6.70	74.7	22.2	5.56	63.2	21.1	5.48	61.1	21.1	7.00	78.0
June 6	23.3	6.58	76.2	26.7	6.55	80.7	26.7	4.48	55.2	25.6	5.54	66.9	25.6	6.10	73.7
June 26	25.6	5.45	65.8	27.8	5.25	66.0	27.8	4.55	57.2				26.7	4.55	56.0
July 17	24.4	6.73	79.5	26.7	6.55	80.7	26.7	5.74	70.7				26.7	6.88	84.7
Aug. 1	26.7	5.75	70.8	26.7	5.95	73.3							26.7	4.55	56.0
Aug. 27	24.4	6.15	72.6	25.6	6.25	75.5	26.7	5.31	65.4				26.7	6.25	77.0
Oct. 10	20.0	8.00	87.2	20.0	5.40	58.9	22.2	0.40	4.5	24.4	6.20	73.2	22.2	6.30	71.6
Oct. 29	16.7	8.74	89.2	20.0	7.90	86.2	22.2	1.56	17.7	20.0	6.38	69.6	20.0	7.14	77.9
Dec. 3	13.3	8.85	84.0	15.6	7.28	72.6				15.6	6.75	67.3	15.6	6.25	62.3
Average 1936-1940			82.0			75.6			52.7			68.5			73.1

1938-1939-1940. ⊕ 1935-1938-1939-1940. ϕ 1938-1939. * Temperature of water in °C.

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

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

Period	Chemical Analysis — Parts per Million					Bacteriological Analysis	
	Turbidity	Total Alkalinity	Phenolphthalein Alkalinity	Total Hardness	Magnesia	Total Bacteria Per c. c. in Agar-Agar at 37.5° C.	Bacilus Coli Per 100 c. c.
Average 1940							
January	91	162	4	379	52	208	670
February	174	159	5	383	51	186	813
March	299	136	5	354	55	772	3,651
April	592	133	7	305	47	1,286	4,476
May	2,959	113	4	232	32	8,867	26,258
June	1,244	114	4	210	28	4,455	10,170
July	2,392	138	6	264	33	2,931	11,648
August	5,219	134	7	246	29	9,429	12,564
September	3,746	136	7	238	30	8,948	8,676
October	5,399	125	6	245	34	20,077	14,503
November	570	149	7	327	43	1,396	5,120
December	104	146	7	370	55	238	1,135
Total	22,789	1,645	69	3,553	489	58,793	99,684
Average	1,899	137	6	296	41	4,899	8,307
Maximum	5,399	162	7	383	55	20,077	26,258
Minimum	91	113	4	210	28	186	670
Minimum 1940							
January	53	150	3	335	36	10	0
February	60	150	3	331	32	20	50
March	61	95	3	215	28	20	100
April	40	95	3	140	20	35	100
May	38	65	0	125	8	35	1,000
June	37	80	0	120	16	135	100
July	220	75	3	195	12	35	100
August	215	105	3	140	16	75	500
September	162	95	5	150	20	80	100
October	72	65	3	85	12	25	100
November	123	125	5	260	36	190	100
December	53	130	5	205	15	65	100
Maximum 1940							
January	164	185	5	440	80	2,345	10,000
February	1,370	180	5	445	76	1,050	10,000
March	2,375	180	8	415	68	5,920	10,000
April	5,040	155	10	380	60	12,000	10,000
May	8,700	140	8	325	56	44,000	100,000
June	3,600	145	8	335	56	38,500	100,000
July	5,466	160	8	420	60	12,000	100,000
August	15,483	190	10	330	44	59,000	100,000
September	16,250	155	10	295	50	76,000	100,000
October	23,214	145	8	380	50	190,000	100,000
November	1,800	160	10	395	56	21,000	10,000
December	256	160	8	410	72	1,100	10,000
Annual Averages							
1932	1,434	132	4.4	340	22.7	7,878	2,357
1933	644	133	5.0	297	23.4	2,193	499
1934	494	132	5.3	262	25.9	4,717	947
1935	1,298	128	5.7	245	30.0	7,878	1,858
1936	1,292	135	5.1	275	34.6	1,373	409
1937	1,920	127	5.0	330	40.0	2,670	581
1938	1,435	134	5.7	307	39.0	5,241	664
1939	972	140	5.6	296	36.0	999	402
1940	1,899	137	6.0	296	41.0	4,899	8,307
1932 - 1940	1,265	133	5.3	294	32.5	4,205	1,780
Extremes							
Maximum	32,700	241	15	768	108	272,000	100,000
Dates	Sept. 1937	Aug. 1934	Dec. 1937	July 1935	Dec. 1935	April 1938	Sept. 1932†
Minimum	19	48	0	80	0.0	4	0
Dates	Jan. 1933	Apr. 1935	Nov. 1934†	May 1935	Sept. 1932†	Jan. 1937	Jan. 1936†

† And other days.

OCCURRENCE OF FLOOD PEAKS ON THE RIO GRANDE AT EL PASO, TEXAS

There was reported in Water Bulletin No. 6, on pages 79 to 81, rather complete data on the occurrence of flood peaks on the Rio Grande at San Marcial and El Paso gaging stations for the 108-year period from 1828 to 1936. The data presented for El Paso station for the last 22 years of that period were based upon the assumption that Elephant Butte Reservoir had not intercepted the floods (as in fact it did do) during that 22 years.

Since January 1915 Elephant Butte Reservoir has intercepted all flood flows from the 26,464 square miles of watershed above it, no water having escaped over its spillway. Elephant Butte Reservoir thus reduced the flood-yielding area tributary to the El Paso station from 29,267 to 2,803 square miles, the latter area being only 9.6% of the former area. Caballo Reservoir was closed in January 1938 and effectively reduced the flood-yielding area 1,290 square miles more, so that there are only 1,513 square miles of flood-yielding area now tributary to the El Paso station. This is only about 5.2% of the original area.

The matter and tabulations below deal with peak flood discharges at the El Paso station during the 23-year period, 1915 to 1937, inclusive, during which time the tributary flood-yielding area was 2,803 square miles. The two tables below and the occurrence curves corresponding thereto cover the same 23-year period. Table I and its corresponding curve cover all floods reaching El Paso during the period regardless of whether they originated entirely from the watershed below Elephant Butte or whether the peaks of the floods were increased by flow from the gates of Elephant Butte Reservoir. Table II and its corresponding curve cover only those floods or parts of floods remaining after subtracting the Elephant Butte Reservoir discharge (if any) which contributed to the flood peak.

Exact information is not available showing the magnitude of the peaks of floods at the El Paso station from January 1915 (when Elephant Butte Reservoir was closed) to August 1928 because the water-stage recorder charts for this station were lost. From August 1928 to the beginning of 1938 (when the storage of water began in Caballo Reservoir) full information is available on all peak discharges at this station. The following tables are based upon: (a) Mean daily discharges and notes on peak flows contained in United States Geological Survey Water Supply Papers, and data from the files of this Commission covering the period 1915 to 1928, and for these years some peak flows were estimated; (b) upon data contained in previous Water Bulletins and the files of this Commission covering the period August 1928 to January 1938. It is likely that some of the estimated peak discharges, as set out in the tables, are not correct, but any such errors could not materially influence the location of the occurrence curves shown below representing this period. As a record of occurrences of floods during the period January 1915 to January 1938 the occurrence curves shown below are dependable, but as a guide to future occurrences at the El Paso station the curves are not dependable: (a) Because the period was too short to establish the frequencies; (b) because the tributary flood-yielding area was reduced from 2,803 square miles to 1,513 square miles in January 1938 by Caballo Reservoir.

For comparison there is reproduced below the occurrence curve from Water Bulletin No. 6 showing the generalized data mentioned in the first paragraph of this page and covering 108 years with a tributary flood-yielding area of 29,267 square miles.

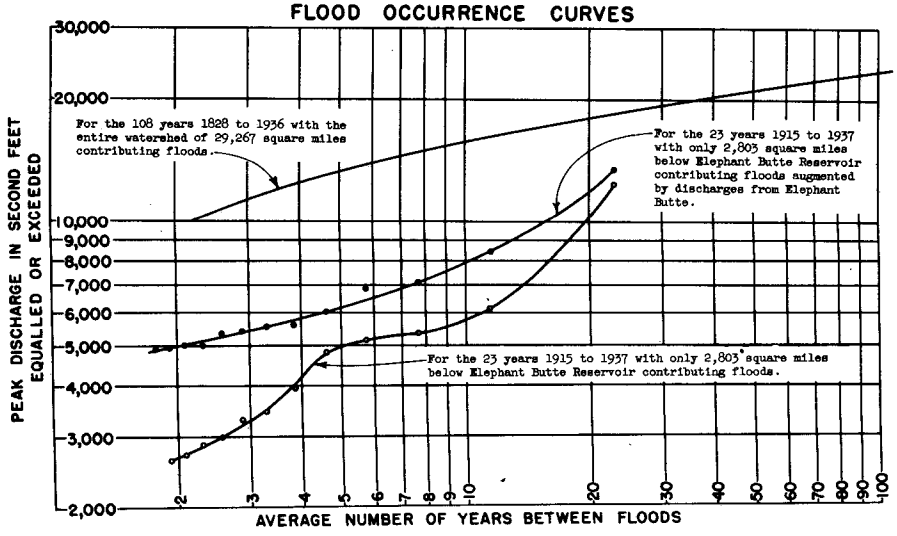
TABLE I

Date	Peak ϕ Discharge in Second Feet	# Order of Magnitude	● Period	** Average No. of Years
Sept. 3, 1925	13,550	1	23	23
Aug. 1, 1925	8,400	2	23	11.5
Aug. 31, 1935	7,120	3	23	7.67
Aug. 11, 1929	6,870	4	23	5.75
Oct. 15, 1916	* 6,000	5	23	4.6
July 12, 1926	* 5,600	6	23	3.84
June 10, 1915	* 5,500	7	23	3.29
July 11, 1929	5,430	8	23	2.88
July 26, 1927	5,350	9	23	2.56
Aug. 5, 1933	5,010	10	23	2.3
Aug. 24, 1929	5,000	11	23	2.09
July 18, 1933	4,940	12	23	1.92
Sept. 1, 1935	4,900	13	23	1.77

TABLE II

Date	Peak ϕ Discharge in Second Feet	# Order of Magnitude	● Period	** Average No. of Years
Sept. 3, 1925	12,040	1	23	23
Aug. 1, 1925	6,100	2	23	11.5
Aug. 11, 1929	5,330	3	23	7.67
Aug. 31, 1935	5,150	4	23	5.75
Oct. 15, 1916	* 4,800	5	23	4.6
Aug. 24, 1929	3,910	6	23	3.84
July 11, 1929	3,450	7	23	3.29
July 12, 1926	* 3,300	8	23	2.88
Aug. 13, 1929	2,990	9	23	2.56
Aug. 5, 1933	2,870	10	23	2.3
July 26, 1927	2,690	11	23	2.09
June 28, 1937	2,600	12	23	1.92

ϕ These are extreme peak discharges and not mean daily discharges.
"Order of Magnitude" with reference to all other floods within the same period.
● Period of years during which all floods are known which had peak discharges equaling or exceeding the lowest flood under consideration in the period.
** Average number of years between floods having a peak discharge equaling or exceeding any given magnitude, i.e., "Period" divided by "Order of Magnitude".
* Partly estimated.



RAINFALL IN THE LOWER RIO GRANDE VALLEY
1871 — 1940

Rainfall records covering the 70-year period 1871 to 1940 are generalized on the two following pages of graphs. The area covered is the American side of the Lower Rio Grande Valley from Rio Grande City to the Gulf and lying within the outer limits of present irrigation districts or farmed areas. During some of the earlier years rainfall records were kept only at Rio Grande City and Brownsville. In the later years, however, when from 6 to 12 rainfall stations were maintained over the Valley, it was found that a dependable relationship existed between the Valley average rainfall and the rainfall at Rio Grande City and Brownsville. This relationship was used in the calculations. Also all known dependable rainfall records for this region were weighted into the computations for the following graphs, which represent weighted average rainfalls over the entire area. The graphs are, therefore, not applicable to rainfall at any one rainfall station in the Valley, but are applicable to the Valley as a whole. In what follows the word rainfall is intended to mean the average rainfall over the entire Valley.

Magnitudes and Frequencies

The twelve monthly curves and one annual curve which follow show the average frequency of monthly and annual rainfalls which in the past have equaled or exceeded various departures from the median rainfall. Average, median and normal values are shown with each of these curves. From the weighted Valley average rainfalls the normal values were computed by the method of least squares, while the median and average values were determined in the usual manner.

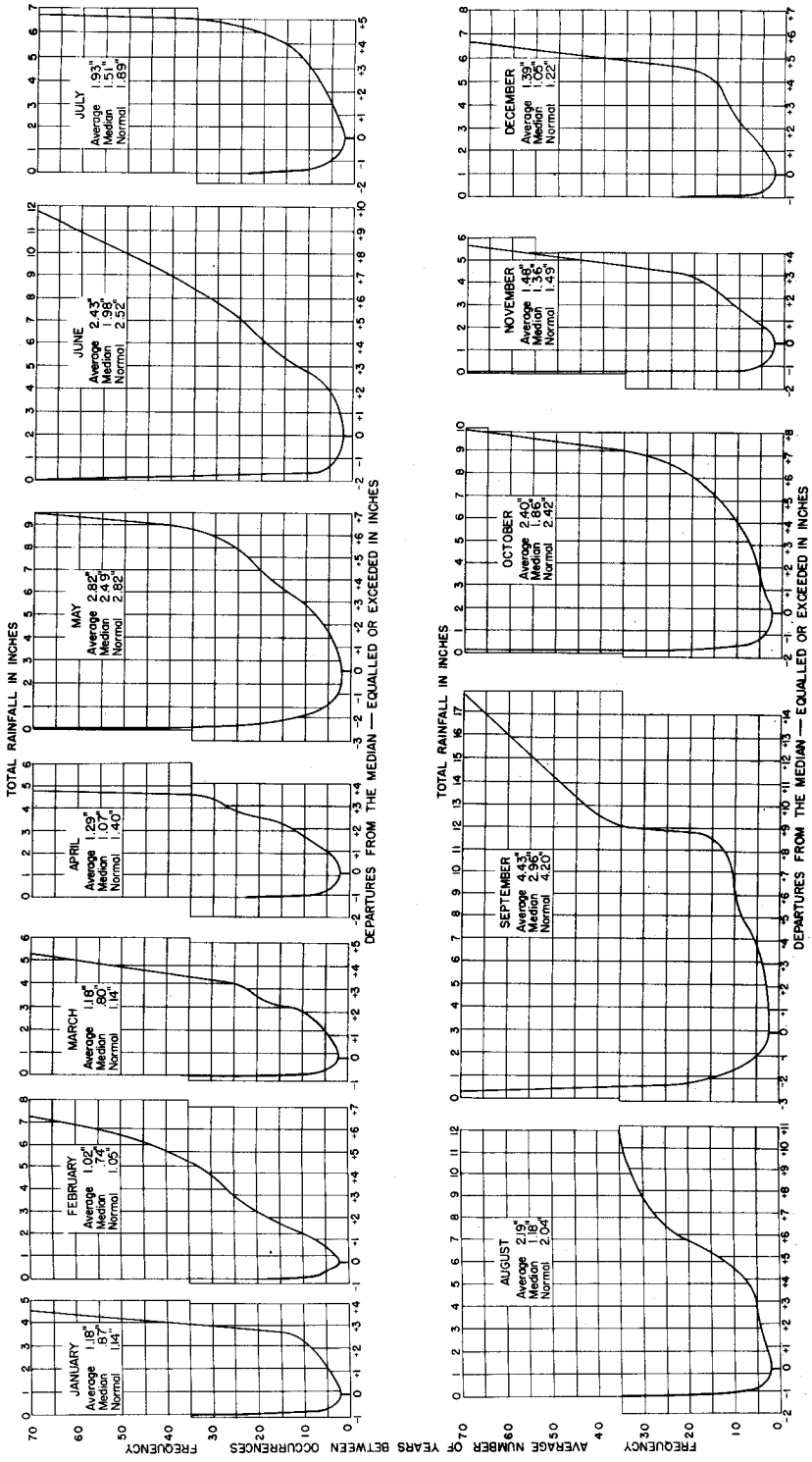
The use of the curves may be illustrated by the following example, using the October curve. In looking first at the bottom horizontal scale and then at the vertical scale, it will be seen that during the past 70 years, October rainfalls of 4.0 inches or more above the median and also rainfalls of 1.5 inches or more below the median, have occurred over the Lower Rio Grande Valley on the average of once in ten years. Then by looking at the top and bottom horizontal scales, it is seen that a rainfall of 4.0 inches above the median corresponds to a total rainfall of 5.86 inches, and that rainfalls of 1.5 inches below the median correspond to a total rainfall of .36 inches.

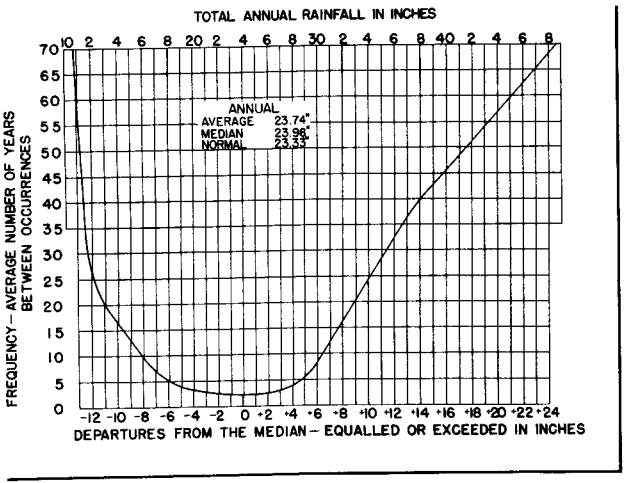
In cases in which the maximum departure (either positive or negative) from the median occurred 2 times during the 70-year period (see the August curve), then the average frequency of occurrence of such maximum was once in 35 years (70 divided by 2). It should be noted that in all cases the median values are less than the average and that all of the frequency curves are unsymmetrical or skewed.

Periods of Drought and Periods of Plenty

The long graph on the second page shows the rainfall trends for the 70-year period in the Lower Rio Grande Valley. The most significant disclosure of this graph is the 33-year drought or downward trend from the autumn of 1889 to the autumn of 1922. During this 33 years the average downward trend was (81.5 inches divided by 33 years) 2.47 inches per year below normal. The 19-year period 1922 to 1940, inclusive, was a period of plenty during which the upward trend averaged (40 inches divided by 19 years) 2.12 inches per year above normal. It should be noted that in general the periods of plenty are shorter and more extreme than the periods of drought.

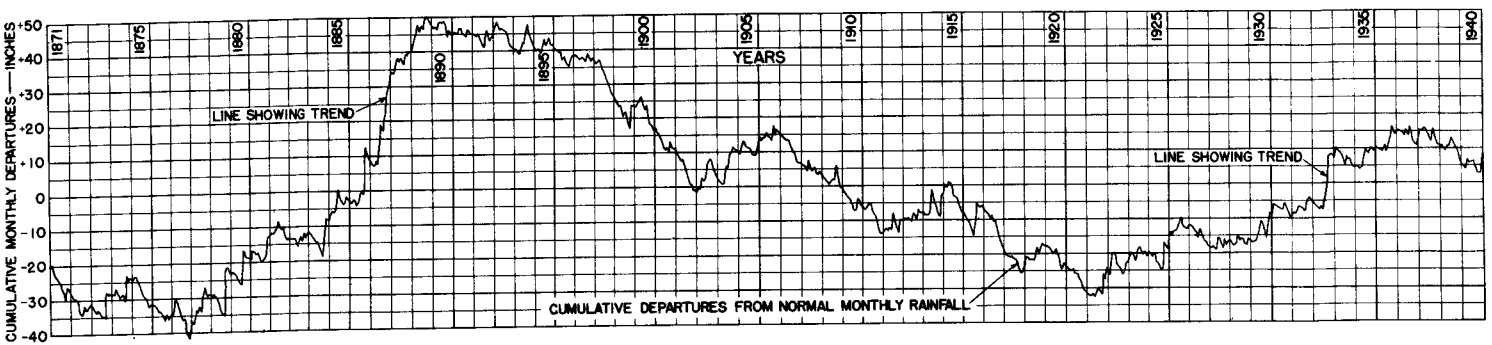
WEIGHTED AVERAGE OF RAINFALLS OVER THE LOWER RIO GRANDE VALLEY DURING THE 70 YEAR PERIOD 1871 TO 1940
MONTHLY CURVES SHOWING AVERAGE FREQUENCY OF OCCURRENCE OF VALLEY AVERAGE RAINFALLS GREATER OR LESS THAN THE MEDIAN





UPWARD AND DOWNWARD TRENDS OF RAINFALL IN THE LOWER RIO GRANDE VALLEY DURING THE 70 YEAR PERIOD 1871 TO 1940.

PERIOD (BOTH DATES INCLUSIVE)	NO. OF YEARS	VALLEY AVERAGE RAINFALL	
		INCHES PER YEAR ABOVE (+) OR BELOW NORMAL (−)	IN INCHES
1887	1	+25.37	48.70
1886 TO 1888	3	+14.43	37.76
SEPT., 1884 TO AUG., 1889	5	+13.67	37.00
OCT., 1877 TO SEPT., 1889	12	+ 7.49	30.82
SEPT., 1922 TO AUG., 1936	14	+ 3.30	26.63
1922 TO 1940	19	+ 2.12	25.45
1871 TO AUG. 15, 1925	54.7	NORMAL	23.33
SEPT. 1889 TO AUG. 1922	33	− 2.47	20.86
1907 TO 1921	15	− 3.14	20.19
1898 TO 1911	14	− 3.58	19.75
1898 TO 1902	5	− 7.80	15.53
MAY, 1898 TO APRIL, 1901	3	− 7.73	15.60
1917	1	− 12.58	10.75



RAINFALL ON UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

The rainfall records shown below have not been published elsewhere. The source of each record, and the type of rain gage used, are shown below.

In the Index to Precipitation Records elsewhere in this bulletin will be found the latitude, longitude and elevation of each rainfall station shown below and many others.

American Dam Near El Paso — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January				.10																	.14											.24	.64
February								.01														.02										.03	.09
March										.02																						.02	.12
April																							.02									.02	.08
May								.10							.01			.03	.01		.23											.38	.14
June													.05						.01		.02	.17	.05	.56					.19			1.05	1.53
July			T	T	.01												.23	.13					.05				.03	.01	.02	T	1.36	3.84	1.35
August	T			.02	.59	.02				.06	.02												.04	T	.01							.76	1.13
September														T				.03		.07	.05								.05	.07		.27	1.12
October			.04					.01		.12	.06	.27	.12																			.62	.50
November							.07	.01										.35	.01				.15	.02								.61	.49
December										.01	.01						.02	T							.02							.07	.13	.13
Yearly																																5.97	7.32

Fort Bliss, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1924-1940
January					.20																.17	T										.37	.38
February	.01	.32			T			T	T													.01										.34	.34
March										T													T									T	.25
April																							T									T	.27
May						T		T										.04	.04		.02	.70										.80	.55
June					T							T	.07						.06	T	T	.15	T	.20				T	.15			.63	.55
July			T	.01	.01	.05						T				.19	.14	.05	.04			T	.01			T	T	T	T	T	.72	1.22	1.39
August			T	.01	T	T		T		.12	.06							T					.05		T							.24	1.85
September	T			T	.01									T						.03	.08								T	.01	.22	.35	1.16
October			.04					.04		T	.14	.30	.84																			1.36	.76
November						T	.07	.03										.20	.04				.73	.10								1.17	.49
December						T			T	T	.04					.02	.02								.15					T	.18	.41	.40
Yearly																																6.89	8.39

Yaleta, Texas — 1939

Standard 8 inch rain gage. Record by U. S. Bureau of Reclamation.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January	Record began January 24, 1939.																																
February		T																														T	
March																				.17	.01	T	.08	T								.26	
April																												.09	T			.09	
May																													.05			.05	
June																																0	
July	T		.23				.05				T		T					.18							T			T		T		.46	
August			.93			T								T	T	.39																1.32	
September													.28	.05	.67	T																.98	
October						T	.79	.24														.12										1.15	
November								.05																.65		.02		.23				.95	
December																						.07			.04							.11	
Yearly																																	

Island Station — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January					.20																	.05										.25	.60
February	.02	.25																														.27	.14
March																																0	.06
April																																0	.06
May								±.10											.20	±.08												±.38	.22
June													.01		.01							.17		.28	.01					.01		.49	.24
July	T	.01			.02	.05												.19	.04	.01							.01	.02	.03	.15	.08	.61	.58
August											.10														.37							.47	.54
September		.01																.03	.03											.01		.08	.82
October			.02		.01			.04			.02	.42																				.51	.58
November							.22	.01	.01									.08	.06				.20		.01							.59	.64
December										.01							.01								.03					.05	.18	.28	.19
Yearly																																3.93	4.67

Roberts Dam, Texas — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January																																	
February																																	
March																																	
April	Record began June 1, 1940.																																
May																																	
June					.02							.10	.02									.50	.10	.20					.18			1.12	
July						.15												.20										.10		.10		.55	
August											.28		.23											.30								.81	
September																																	
October									.50			.25	.50	.08																		1.13	
November								.20											.10					.81								1.11	
December																									.04						.08	.12	
Yearly																																	

± Estimated

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Fabens, Texas — 1939

Standard 8 inch rain gage — Record by U. S. Bureau of Reclamation.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																												.23	.06			.29
April																							T						T	.04		.04
May	Record began April 5, 1939.																			T								.10				.10
June																																
July			.12				.08			T		.09		T	T				T	T					T	T						.29
August				.01	T						T			.04	.28	.04						.07										.44
September													T	.42	.08	1.24										T						1.74
October							.20	.72														.02				T						.94
November								.05	.04															.22					.23			.54
December																						.04			.05							.09
Yearly																																

Fabens, Texas — 1940

Standard 8 inch rain gage — Record by U. S. Bureau of Reclamation

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January					.23	T															.48											.71	
February	T	.42		.03																		T										.45	
March											T																					T	
April																							.03									.03	.16
May								.30											.43	T	T	T			T							.73	.38
June																						T	.07	.35				T	T			.42	.26
July						.04												.07			T					T	T	.05	.02		.49	.67	.48
August	.03											.04	T											.05	.20							.30	.37
September					T									T			.02	.07		T								T	T			.09	.92
October				T				.05		T	.05	.12	.46																			.68	.81
November						T	.27												.10									.33				.70	.62
December											T						T								.02					.08	.12	.22	.16
Yearly																																4.99	

Fabens - Guadalupe Bridge, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February	Record began April 1, 1940																															
March																						.03										.03
April									.10										.05	.44		.02	.01									.62
May								T			T	T	.03						T			.15	.08	.04						.06		.36
June				T																												
July †						.04													.07										.05	.02		.18
August					T						.14	.10	.04											.04	T	.11					T	.43
September					T													T	T									.02	.02	.01		.05
October	.02			.07				T	T			.06	.92	.57																		1.64
November							.01	.35	T										.11					.25	.02							.74
December											T					T	T								.06						.03	.09
Yearly																																

County Line Station — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January					.28															.01		.04										.33	.81
February	.04	.12			.04																											.20	.15
March																																0	.30
April																							.02									.02	.17
May								.04											‡.43	.02								.02				‡.51	.19
June				.15									.03								.03	.18	.06	.03					.04			.28	.65
July						.14											.46									.31	.21	.05		.45	.25	1.87	1.28
August				T				.04		.01	.05	.19											.52	.04	.37						.07	1.09	1.03
September	.01																												.14	.02		.17	1.13
October		.08	.12					.02		.20	.35	.19	.09	.02											.01							1.08	.64
November							.42	.02	.01									.08	.04				.35	.03								.95	.65
December											.01	.02													.06						.04	.13	.15
Yearly																																6.87	7.15

Fort Hancock Bridge, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February	Record began April 1, 1940																															
March																	T						T									T
April			T						.24										.03	.06		.34	.61	.01								1.28
May														.02								.10	.04									.37
June					.10																								.10			
July						.16												.68	T				.06				.05	.31			.65	1.21
August						.12			.04		.12	.18	.07	.18	.06						.30				.04	.03				T		.78
September	.05											.25	.18	.34																		.41
October	.06			.05																				.10								.88
November							.03	.42	.27										.03													.89
December											T	T	.03					T							.07					T		.10
Yearly																																

West Small, Texas — 1940

Standard 8 inch rain gage — Record by W. L. Novell

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March	Record began May 1, 1940.																															
April																					.10	.10										.28
May								.08											.04	.20	.10							.12				.49
June				.03																												
July				.08		.10							.53	.03			.08	.20							.10					1.40		1.88
August																									.18	2.00					.52	3.34
September	.44																															.44
October											.62	.08																				.70
November																																
December																									.05						.08	.13
Yearly																																

† Fabens, 5 miles north.

‡ Estimated.

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Finlay, Texas — 1940

Standard 8 inch rain gage. Record by J. R. McAvoy.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February	Record began May 1, 1940.																															
March																																
April																																
May												.12				.14			.13			.21	.10									.70
June				.06																		.03	.11					.21	.05			.46
July						.18												.32						.09			.14	.52	.04	.67	.11	1.87
August	.06			.40				.16			.30	.33					.34							.11	1.01					.06	.09	2.86
September	.07				.05						.04						.08													.07		.31
October			.53								.08	.50	.04																			1.15
November						.15	.17	.52																								.84
December											.37	.05					.18				.03				.07			.21	.05		.11	1.07
Yearly																																

Fort Quitman Station — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1937-1940
January					.35																	.04										.39	.64
February		.11																														.11	.17
March										.12													.07									.19	.20
April					.06																											.06	.40
May								.08								.06			.01	.02	.15	.02										.34	.29
June				.23									.02					.07	.02		.06	.04	.01						.13			.58	.36
July						.66											.80	.02									.12	.33	.10	.05	.49	2.57	1.61
August				.23	.01			.03		.02	.02	.75		.09			.04	.10							.25	.88	.58			.07	.03	3.10	1.48
September	.25		.01																													.26	1.03
October			.10							.03	.21	.34																				.68	.84
November						.01	.43	.36	.02														.01									.81	.44
December												.03													.14						.03	.20	.42
Yearly																																9.31	7.88

Candelaria, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1935-1940
January																					.44											.44	.46
February			.04																													.04	.09
March										.05													.07			.06						.18	.47
April																	.19															.19	.38
May						.20																.29							.32			.81	.58
June								.22			.04									.14		.95										1.35	1.18
July						.10										1.90						.17									.63	2.80	2.44
August					1.40							1.17	.52																			3.09	1.92
September	.13		1.65																			.15										1.93	2.23
October												.53																				.53	.45
November							.21		.44																					.05		.70	.53
December						.07							.13																			.20	.56
Yearly																																12.26	11.29

† Fort D. A. Russell, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1926-1940
January						.12	.01															.35										.48	.51
February		.02	.09		T										.01	.10	T															.22	.58
March										.07											.01		.10	T					T		.18	.21
April					T	T												T														T	.65
May					.11	.08	.11	.01	T						T	.11	T	T	.50		.24	.49					T			.20		1.85	.96
June				.77		.09		T			T	.09	.01	T						.25	.11	.27				.04			.76			2.39	1.70
July		.01									T	.06				1.97	T	.38				.02				.05	T	.09	T	T		2.57	3.37
August		.80				1.47		.61			.03	1.68	.06	.09				.03							.01		.19		T	T	T	4.97	5.00
September	T	.56			.02	T		T															.03									.61	2.09
October								T		.80	3.36	.48	.25																			4.89	1.07
November			T	T		.10	.25	.31	T				T																	T		.66	.58
December	.04					.06					.03			T											.07					T	.10	.30	.43
Yearly																																19.13	14.15

Crosson Ranch, Texas — 1940

Standard 8 inch rain gage Record by George F. Crosson

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1933-1940
January						.28															.53											.81	.42
February			.15												.10																	.25	.23
March																									.10							.10	.23
April																	.05															.05	.26
May					.82	.87		.12	.15								.12			.30								.25				2.63	1.41
June			.64															.15			.36											1.15	1.93
July												.58															1.10	.45		.59		2.66	2.72
August		.85				.95	.35					1.20	.96	.47															.12			4.90	2.45
September	.20																															.20	2.11
October												1.30	.84																			2.14	.73
November								.18	.63																							.81	.67
December	.05																								.08							.13	.44
Yearly																																15.83	13.60

Johnson Ranch, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1933-1940
January		.20	.10						.20										.30	.20												.80	.52
February		.10														.20	.40															.30	.20
March																																.60	.21
April																																0	.56
May					.32		.27					.52														.11						1.22	1.19
June											.22				.18											.13				.37		.90	.99
July			.11													.28														.40		.79	1.48
August													2.90																			2.90	.88
September																																0	1.17
October									.37	.18		.55	.41												.21							.97	.65
November																																.75	.28
December																																0	.54
Yearly																																9.03	8.47

† Recorded in previous Water Bulletins as Marfa, Texas.

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES
continued

Big Bend State Park — 1940

Standard 8 inch rain gage. Record by Park Custodian.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1936-1940
January					.01				.50									.01				.10										.12	.72
February										.01															.50							.50	.48
March																																.31	.22
April					.07																											.07	.15
May					.40	.60		1.00				.05					.05		.05	.05									.05			2.25	1.60
June			.05	.40				.40			.35										.40					.50	.30		.50			2.40	2.75
July		.05																										1.27	1.00			2.32	3.46
August		.05				.93	.02					1.35	.13												.80	.18		.15	.10		.02	3.73	2.36
September																																0	2.64
October										T	.15	3.45	.40	.20																		4.20	6.61
November				.07			.03	.51																								.51	1.00
December										.10	.54								T													.64	1.62
Yearly																																17.15	18.81

* Some months missing.

Sanderson, Texas — 1939

Standard 8 inch rain gage. Record by U. S. Weather Bureau.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February	Record began May 1, 1939																															
March																																
April																																
May				.22								1.46						.13														1.81
June		.14																														.14
July																			.46													.46
August							.72	.80	.82																							2.34
September																	.24	.04									.18					.46
October								.17															.47									.64
November									.15	1.10	.28				.35													.12	.45			2.45
December																									.68							.68
Yearly																																

Sanderson, Texas — 1940

Standard 8 inch rain gage. Record by U. S. Weather Bureau.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January																					.25											.29	
February	.25							.24							.45																	.94	
March																																.55	
April				.08	.50																		.40	.15								.58	
May						.13		1.25								.13				.37	1.67							.16				3.71	2.76
June								1.12					.05										.27	.10			.10		.34			1.98	1.69
July												.52																				.52	.49
August													1.20	1.15											.18							2.53	2.44
September						.20																										.20	.33
October										.20	.64	1.58		.32																		2.74	1.69
November							.30	.37	.60																							1.27	1.86
December																																0	.34
Yearly																																15.07	

Sanderson, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Record began October 3, 1940.																															
August																																
September																																
October							T				.25	1.00	1.25	.35										.10		T						2.95
November				.02			.35	.91					T										T	T								1.28
December						.06						.03	.03	.02	T			T	T						T							.14
Yearly																																

Dryden, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1931-1940
January					.10			.09								.84						.16										.35	.65
February	.02	.18			T				.02																							1.06	.50
March										.04	.09												.05	.08	.02	T	.04	T	T			.32	.38
April				T	.13												T									T						.13	.78
May						.01		1.86								.74				1.22	1.62								.41			5.84	2.48
June						T		.61	T					.02					.54			T		.25			T		.05			1.85	.90
July												T				.09									.27		T		.14	.02		.09	1.40
August					T	.01						T	.03	.82					.13													1.42	1.80
September	.01	.01				.01															T											.03	2.01
October																																	● .94
November	Record discontinued on October 2, 1940.																																● .59
December																																	● .77
Yearly																																	13.20

● 1931-1939 Average

Hodge Ranch, Texas — 1933

Standard 8 inch rain gage. Record by Hodge Ranch.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																0
February													.16														.15					.51
March																							.12					.05				.17
April																						.63		.26	.08							.97
May																								.35								.35
June													.28																			.28
July																		.22														.22
August																													.64	.36	.38	1.38
September																																0
October	.50									1.08		1.30	.83																			3.71
November																																.28
December																												.04	.04			.08
Yearly																																7.75

McDonald Observatory, Texas — 1940

Recording Gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 22, 1939.																															
Aug. 1939																																
Sept. 1939													.28	1.08													.12					1.48
Oct. 1939							.22	.18															.98									1.38
Nov. 1939									.20							.46	.07								.17	.06	.07	.25	.48			1.76
Dec. 1939																						.10	.18		.10	.14						.52
Jan. 1940						.05															.41											.46
Feb. 1940		.08									.08													.08								.28
Mar. 1940																																.16
Apr. 1940																																
May 1940																																
June 1940	Balance of year's record in U.S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

continued

H. K. Kountz Ranch, Texas — 1939 — 1940

Recording Gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 23, 1939.																															
Aug. 1939																																
Sept. 1939												.05															.10					.13
Oct. 1939							.50	.33															.17									.80
Nov. 1939									.14							.40									.54	.02		.22	.41			1.73
Dec. 1939																						.10		.02	.23							.35
Jan. 1940						.02															.25											.27
Feb. 1940		.17						.20								.31							.10	.07								.68
Mar. 1940																																.17
Apr. 1940					.52	.05																					.05					.60
May 1940																																
June 1940	Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

Popham Land & Cattle Co. Ranch, Texas — 1939 — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 16, 1939.																															
Aug. 1939																																
Sept. 1939												.62				.15											.15					.92
Oct. 1939							.07	.59															1.20									1.86
Nov. 1939									.15							.42									.52			.30	.35	.16		1.90
Dec. 1939																									.54							.54
Jan. 1940																					.50											.50
Feb. 1940			.12					.22								.20																.54
Mar. 1940						.32																										.32
Apr. 1940																																
May 1940																																
June 1940	Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

W. W. Childress Ranch, Texas — 1939 — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 15, 1939.																															
Aug. 1939																																
Sept. 1939														.44			.10															.54
Oct. 1939							.50	.60																	.10							1.20
Nov. 1939									.30							.30									.40	.25		.10	.25			1.60
Dec. 1939																									.20	.10	.10					.40
Jan. 1940																					.40											.40
Feb. 1940	.25	.26						.33								.02																.86
Mar. 1940																							.55									.55
Apr. 1940																																
May 1940																																
June 1940	Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

Balmorhea, Texas — 1939

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Gage installed August 14, 1939.																															
August																																
September													.04				.15										.03					.22
October							.37																.36									.73
November									.23							.57									.47			.14	.25			1.46
December																									.23							.23
Yearly																																

Balmorhea, Texas — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January						.04															.42											.46
February	.03	.02	.10					.17								.21																.53
March																							.15	.05								.20
April					.13	.14																						.02				.29
May						.05			.36										.05		.17	.36										.99
June			.33																.15	.55	.41	.10		2.50					.82			4.56
July				.03													.05									.02		.35				.43
August					3.35	.10						1.23		.10			.72														.15	5.65
September																																
October																																
November																																
December																																
Yearly																																

Saragosa, Texas — 1939 — 1940

Recording Gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 23, 1939.																															
Aug. 1939																																
Sept. 1939																	.23										.03					.26
Oct. 1939							.41	.24															.28									.93
Nov. 1939									.29							.40								.14	.26			.15	.22			1.46
Dec. 1939																						.09		.05	.16							.30
Jan. 1940						.06															.25											.31
Feb. 1940		.09						.04							.02	.19							.14									.34
Mar. 1940										.02																						.16
Apr. 1940					.20	.03																										.23
May 1940																																
June 1940	Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

W. E. Moore Ranch, Texas — 1939

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June																																
July	Gage installed August 15, 1939.																															
August																																0
September																																.45
October								.45																	.30				.37			1.04
November											.11					.26									.23							.23
December																																
Yearly																																

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

continued

W. E. Moore Ranch, Texas — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February		.10						.10								.26					.58											
March																																
April					.24																		1.41									
May						.56			.23										.05		.71	.09										
June				.40				.08					.07						.25	.27	.98			.36					1.27			
July																	.18															
August						1.27						.68																			.27	
September																																
October																																
November																																
December																																
Yearly																																

Month	Total
January	.58
February	.46
March	1.41
April	.24
May	1.64
June	3.68
July	.18
August	2.22
September	
October	
November	
December	
Yearly	

Sam Prewitt & Sons Ranch, Texas — 1939 — 1940

Standard 8 inch rain gage. U. S. Dept. of Agr., Soil Conservation Service.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1939	Gage installed August 16, 1939.																															
Aug. 1939																																
Sept. 1939													.09																			.09
Oct. 1939								.40																.15								.55
Nov. 1939									.18							.20									.33		.11	.19	.20			1.21
Dec. 1939																						.02			.23							.25
Jan. 1940																					.20											.20
Feb. 1940		.16														.15																.31
Mar. 1940																							.47	.03								.50
Apr. 1940																																
May 1940																																
June 1940	Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.																															
Yearly																																

Month	Total
July 1939	
Aug. 1939	
Sept. 1939	.09
Oct. 1939	.55
Nov. 1939	1.21
Dec. 1939	.25
Jan. 1940	.20
Feb. 1940	.31
Mar. 1940	.50
Apr. 1940	
May 1940	
June 1940	
Yearly	

Pecos River Station — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January						.50	.50																.40									1.40	1.52
February			.53	.03					.38						.12	.30											.03					1.39	.70
March										.13		T										T		.38	.06	.06	T	T	.20			.83	.30
April				.06	1.05	1.00											.03															2.19	1.05
May						.05	1.10		.90										1.40	.06		1.55					.08		.07			5.30	2.34
June									.04					.20					1.86		.04			2.40				1.50	.08			6.06	2.66
July		.65										.05	.96			.04																1.70	2.12
August						.50							1.80					.80											.29			3.39	2.23
September																																.0	.13
October												.57			.16									1.30							.02	1.85	.93
November				.42			.30	.20										T						.16	T		T					1.08	1.11
December					T	T	.03			.09	.40	.18			.10																	.80	.81
Yearly																																25.99	15.90

Comstock, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January					.02	.03																.13										.18	
February	.01	.22	.01		.05			.19	.03						.10	.31																.92	
March										.10														.47		.02		.03				.62	
April					3.00												.03															3.05	
May						.60		.47										.50			.01	.08						.66				2.72	2.70
June								.46					.06						.19					.71				.31				1.73	1.82
July															.04																	.04	.58
August				.76	.69			.03			2.15	.98						.15											.42			5.18	3.62
September																																0	.24
October					.03						.28	.04												.75								1.10	1.20
November				.20			.29	.04															.10									.63	1.28
December					.04					.42	.07	.09						.02														.64	1.10
Yearly																																16.81	

Devils Lake, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January						.10																.20										.30	
February	.04	.30							.35							.25																.94	
March				.10						.25														.52								.87	
April				.26	1.00	1.00																										2.86	
May							.35			.07									.46			.60					.12					1.60	1.60
June									1.50				.18					.10	.07	.27				.53					1.20			3.85	2.66
July													.37			.05																.42	.50
August						.65							2.57					.92														4.60	3.22
September																						.15										.15	.42
October						.02					.22			.05	T															.10		.39	+ 1.14
November					.04		.32	.03	.01									.10					.06	.02								.58	+ 1.10
December										.20	.25		.03	.04	.04																	.56	1.13
Yearly																																16.52	

◐ Partly estimated from surrounding stations.
* Partly estimated.

Fort Clark, Texas — 1937

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March					1.10	.24																							.08			1.42
April																		T			.01											.01
May													.14														T	.02		1.36	.12	1.64
June	.11			.70	.32		T																					.04				1.17
July					T				.75	.83	.24										.46											1.88
August						.12																						.23				.81
September				T								1.00							T							1.35						2.35
October												T	.44			.04	.40															.88
November			1.03	1.71					.33													.03										3.10
December	.03	.25	T		.11						T	T	.02	.24		.41	.54	.03				.82	.03			.01		.20	1.75	.31	.18	4.93
Yearly																																

Fort Clark, Texas — 1938

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January					.14	.12		.01	.01	.09	.03									.03		.61	.67									1.71
February				.03		.02					.03	.02		T		T	.01				.26							T				.37
March	T	T	.01						.09			T							T			T					.48	.05				.63
April																	1.44	.44	1.16					T	T		.14	.17				3.35
May			.02	.16				.83		.11			T	T					T			.01	T									1.13
June								T	.02	.01								T						.28	.05			.03				.39
July									.12													.27	2.52	3.87	.28				.69			7.75
August		T													.11		.01												.37	.56		.93
September																																.12
October																						T	.25									.25
November	T	T	.12										T			T																.12
December																							T	T	.18	.45						.63
Yearly																																17.58

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Fort Clark, Texas — 1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January			.01					.08	T		.02	1.40	T										T			T	.14	.05				1.70
February					T	.06											T	.05	.02					.01	T							.14
March							.16		T	T	T										T	T	T	T	.70							.86
April							T								T	.14											T	.16				.30
May					.03		T	T					.05	2.03	T			T	T										.02		.40	2.51
June			.50	.01	T													T	T	.02	.04	T										.57
July													2.40		T															.23		2.63
August			.23	T	.43	T	.36	T	.72			T										T	T	T								1.74
September											T	.30				.43	.02	.05	T								.57					1.17
October				T					.19	.22																.40	T					.81
November										.67	.25					T												T	.04			.96
December																						.19		.17	.83	.24						1.43
Yearly																																14.82

Fort Clark, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal♦ 1871-1940
January					.10	T			T									T				.48										.58	.91
February	.02	.03	.68		.09			T	.61					T	.01	.12										T						1.56	1.12
March					.03					.03	T												.32	.06	.35	.04	.01	T				.84	1.57
April	T				2.47	.18				T						.03	T							T	T		T		.02			2.70	1.85
May							.97	.01	1.04								.23		.95	.01		2.95					.02	.01				6.19	3.05
June									.12		T			.43	T			.09		T				.50					1.58			2.72	2.73
July		.77										.01		T	.38	.17													.19	.90		1.33	2.16
August					T	.03						.60	1.18	T				1.95														4.85	1.97
September			.85			.01																	.04									.90	2.92
October						.03	.11				.01	T	T	T										.37			T					.52	2.05
November				.12	.11																											.23	1.50
December	T										.37	.04	.01	.01	.11				T	T												.54	1.39
Yearly																																22.96	23.20

♦ Some years and months missing.

Chupadero Ranch, Texas -1934 - 1935

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
July 1934																																
Aug. 1934																																
Sept. 1934																																
Oct. 1934	Record began December 1, 1934.																															
Nov. 1934																																
Dec. 1934						.28	T																			1.00						1.28
Jan. 1935	.05																.05													.05	.10	0.25
Feb. 1935						.10				.25		.12																				.47
Mar. 1935																											T		.20	.85		1.05
Apr. 1935																																
May 1935	Record ended March 31, 1935.																															
June 1935																			Balance of years record in U. S. Hydrologic Network Bulletins, Region 7.													
Yearly																																

Zapata, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1932-1940
January																			.10			.26			.12							.48	.86
February					.12									.05		.02																.18	.59
March					.20														.23		.85			1.95	.14							3.37	1.23
April																																0	.82
May							.07												.40				.16					.40		.10		1.13	2.97
June										.10	1.26		.90	.11	.25			.27	.10					2.30	1.00				.24			6.53	1.87
July			.56	.01									.66		.14															1.66		1.37	1.01
August													.01						.84													2.53	1.60
September						.07	.15																									.22	3.37
October															1.03									1.36								2.39	1.11
November						.18	.50	.10																								.78	.45
December							.05							.28				.10		1.19												1.60	1.24
Yearly																																20.58	17.12

Rio Grande City, Texas — 1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																																
February																																
March																																
April																																
May																																
June	Record began June 19, 1939. No rainfall June 19 to 30, 1939.																															
July										.29	.05	.04																				.38
August	.46	2.08																														2.54
September								.18		.04	.50	.08																	.02	.19		1.01
October										.08	1.18																					1.26
November																												.09	.08			.17
December																									.03			.30		.02		.35
Yearly																																

Rio Grande City, Texas — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January																				.01		.08			.03							.12	
February						.03	.02						.02							T	.03											.08	
March ♦																				.02	1.46				1.28	.26	T					3.04	
April ♦						T																										T	
May ♦							T			.20							T	.23		.11				.91				T	.02			1.47	
June ♦										.03	.15	.30		.09		.04									1.81	.40		.30			.02		3.14	
July ♦				.11										.02	.28	.24			.02	.62											.19	.65	.92
August ♦								T	.01	T												.19	T	T	.01							.84	1.69
September♦							.25	.15	T											.17	.28						.10		.67			.60	.80
October						.27						.02			.13																	1.64	1.45
November			.02			.06	.08		.09	.08																						.33	.25
December							.04			.05				.09	.04			.06	.05	.92	2.56											3.61	1.98
Yearly																																15.52	

♦ Fort Ringgold 5 miles northwest.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES — 1940

The 1940 rainfall records shown below have not been published elsewhere. The source of each record and the type of rain gage used are shown below. The normals and averages for monthly and annual records are based on all available records published and corrected in these Water Bulletins.

The Index to Precipitation Records on page 98 gives the latitude, longitude and elevation of each rainfall station below.

Juarez, Chih.

Standard 8 inch rain gage — Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1903-1940
January					.18	T														.08	.18											.44	.33
February	.10	.35						.02														.02										.49	.38
March									.02	.02	T												T									.04	.33
April																	T					T										T	.38
May								.12							T	T		.06			.10	.02						T				.30	.44
June					T								.02	T					T		.02	.01	.26	T					.63			.94	.71
July			T	.01							T			T		.01	.77	T				.10				.01			.04	.12	.20	1.26	1.18
August			.06	.01	.10			.45		.11	.01								.06					.10								.90	1.44
September				T	T											T	.01	.18	.10										.06	.02		.37	1.23
October	.12		.18					T	T	.10	.04	.69	T																			1.13	.93
November					T	.04	.06											.35					.68	.04								1.17	.65
December									T	.01	T					.05								.01						T	.08	.25	.44
Yearly																																7.19	8.46

Villa Gonzalez, Chih.

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1903-1940
January						T															T	.45										.45	.23
February	T			T	T	.98									T																	.98	.34
March										.51													.26									.77	.45
April					T																	T										T	.32
May												T						T			.35	.08										.43	.28
June				T																	.23	T								T		.23	.37
July					.31											T	.65	.26	T			.14							.55			1.89	2.00
August		.47			1.08						T	.79	.16				.23	T														2.75	2.10
September		T																	.61											.65		1.26	1.61
October	T		.47				T	T			.59																					1.06	.67
November						T	.71	T																								.71	.52
December									T				T	T										T	.35							.35	.36
Yearly																																10.86	9.43

Hormiguero, Chih.

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1924-1940
January																			T		.59							.06		.20		.85	.70
February	.12				T			T	.08						T	T																.20	.29
March								T										T						T		T						T	.06
April													T																			T	.10
May		T						.23	.02	.27	.49			T	.02						.22											2.25	.55
June													.26					T	T	.08	.08	1.57	T	.26	.20	T	.04					2.51	2.12
July	.43			T	.01	.18	.02									.28	.16	T	T		T	T	.04			T	T	T	.87	.79		2.78	5.58
August	.04		T		1.30	T		.04	T			.55	.02				T	.39	.20		.16					.26			.12	.58		3.45	5.48
September	1.34	.39	T																													1.73	4.26
October									.05			.06		.08	.47	.28	.26						T	.02								1.22	1.79
November				.08	.28	.12	.16	.02																			.12		T			.78	.53
December									.08	.12	T								.02	T										T	T	.22	.74
Yearly																																16.00	22.20

Delicias, Chih.

Standard 8 inch rain gage. — Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average# 1933-1940
January																	T				.51									T	.08	.59	.36
February	.02						.28							.02	.01																	.33	.17
March									T										T				.64									.64	.19
April					T																			T								T	.25
May								.04			.17	.14						T		.02	.02											.59	.27
June				.02			T	.02		.94		.01		.20	T				.35	.31	.02	.41	.63							.35		3.06	1.67
July			.01		T							T				.20	.04	.01			.31	.10				.02		.83	.18	.16	.10	1.96	2.70
August	T		.06		.02	.08	.06	.02			.33	.26		T			.47					.02	.02		T	.50		.20	.02	.06	.15	2.10	2.35
September	.14	.01				.12																										.27	2.07
October											.94	.33											.02	T								1.29	.61
November			.12	.02			.45	.51																						.04		.94	.52
December						.02				.02	.12																					.16	.31
Yearly																																11.93	11.47

Chihuahua, Chih.

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1900-1940
January																		T			.96										.02	.98	.27
February	T				T				.07					T	T	T																.07	.25
March									T	T									T	.19		T		.22	.06							.47	.28
April						.06																										.06	.20
May								T	.02		T	T	T	T	T	.52	T	T	.02	T	.35			T	.03	T						.96	.33
June				T	.05	.03		.35		T		T	T	T					T	.02	.06	.82	.04	.01		.14	T	T	.50			1.82	1.56
July				.07									T			.57	.20	.16			T	.18				.02	T	.19	.10	.02	.04	1.55	3.64
August	.14	T		.06	.10	.02		.74			T	.88	.08					T	.10			.16	T		.22				.10	.50	.10	3.00	3.57
September		.16			T	T	T											.04					.06									.26	3.26
October									T		.04		.57	T	T									.08								.69	.61
November			T	T			.07	.36																							.10	.73	.56
December						T	.02		T		T	T					.05													T		.07	.40
Yearly																																10.66	15.15

El Mulato, Chih.

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1926-1940
January					.20	.01	T	T	T												.39	T	T	T								.60	.34
February			T		.31			.13	T						.21	T																.65	.29
March																							.04	T								.04	.13
April																																0	.28
May						.47	T	.79	T									.02	T		.20	T						.17	.93	T		2.58	.75
June				.01	.05			.16	T											T	1.49	T	T	.04	T	.14	T					1.89	1.00
July				T												.04	.12										.20	.06	T	T		.44	1.03
August			T		.40	.12	T				.08	.39				.04	.02	.41							.12		.91	T	.08	.05	.04	2.66	1.42
September	.14	T																														.14	1.27
October										T	.20	.72	.60	.21	T	T	T						.02	.21	T							1.96	.99
November			.01	.01			.02	.79	.01	T																						.84	.42
December										T	T						T		.12													.12	.61
Yearly																																11.92	8.53

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Palestina, Coah. — 1939

Standard 8-inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January							.29			T	1.18	.04									T		T			.26	.04					1.81
February		.08															.06															.14
March			T															.19	T	.22		T	.20	.18								.79
April						.19									.06											.02	.04					.31
May												.37	.06											.06						.16		.65
June		.75																	.10	.04												.89
July											.53	1.88	.16																T	.33		2.30
August			.12	1.04		.16	1.50	.27			.45		T				T															3.52
September										.06		1.89				.10		.43									.32					2.80
October								.59	.16	T	.35														.83							1.93
November										1.10						.32	.04							T				.12	.37			1.95
December																					.12		.32	1.57								2.01
Yearly																																19.10

Palestina, Coah. — 1940

Standard 8-inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1931-1940
January					.12					T																						.12	.95
February	.04	.55						.35							.55	.23										T						1.70	.74
March										.18													.20	3.03	.04		T				3.45	1.08
April				.08	2.36				T	T														T								2.44	1.05
May						1.57	1.06								1.57				T	1.69		1.38							.08			7.35	2.84
June								1.50					.20					.28	.08	.12								.79				2.97	2.44
July		.51	T												.04	.23																.78	2.31
August								T				3.39	.61					1.81											2.83			8.64	2.09
September						.20																										.20	3.55
October										.04	.08	.16											.55						T	.04		.87	1.00
November				.17		.04	.51	T									T				T	T	T	.08								.80	.74
December									T	.33	.08	.16	.08						.06	.18				T	T				T			.89	1.53
Yearly																																30.21	20.32

Nueva Laredo, Tamps. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1909-1940
January		T			.10															.14												.24	.78
February					.04				T					.15												T						.19	.76
March													T						.02	.66			T	1.51	.18	T		.09	T			2.26	.86
April						T																						T		T		T	.96
May							.18		T							.67			.06				.03				1.78	.80				3.52	2.52
June								2.00			.72		.08					.30							.23			.80		T		4.13	1.62
July																.09																.09	1.10
August								.94					.16							T										.20		1.50	1.04
September						.24																	T									T	2.78
October					.83	T	.62	.15			T			.72										4.92	.18							6.06	1.27
November							T																	.06				.02				1.68	.89
December													.26	.81	T			.12	.99	.49	T											2.67	1.21
Yearly																																22.14	15.79

Muzquiz, Chih. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1923-1940
January																					T												.87
February		T																T														T	.48
March									T	.51	.39										.20	.39	1.20	.98	.87							4.34	1.25
April				.79	.39	T					.59	T							.47													2.24	1.07
May							.39			T				.45					1.18			.79	T									2.81	3.52
June						.20	2.22			T	.39	.59	.71		.20	.55						.79	.59		.39	.20			T			6.83	3.16
July																	T	.28	.20	.47	.55											1.50	2.26
August																						T	.71	.87	.55	.63	.28					3.04	2.74
September		.55	.47																T	.20												1.22	5.37
October						T				T	.47	.16		T									.28						T			.91	2.51
November			T	T	.47	.12	.23	.08	T																							.90	1.36
December										T	T	T	.20	.16	T				.28	.35	T											.99	1.35
Yearly																																24.78	26.04

Nueva Rosita, Coah. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1925-1940
January																			.12													.12	.91
February								T					T																			T	.41
March																								.79								.79	.55
April																	T															T	1.33
May								3.54									.72	3.15										.75				8.15	3.05
June								.28	1.46				.39														1.79					3.92	2.15
July																																0	1.97
August													1.10					1.26	.20										.20			2.76	1.57
September						.12													T													.12	1.69
October											.20			.61																		.81	1.52
November							.20		.67														T									.87	.78
December										.39																			T			.39	.93
Yearly																																17.95	16.86

San Buenaventura, Coah. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1926-1940
January																				.41	.10											.51	.70
February									.20				T																			.20	.47
March									T										T					.53	.01							.54	.27
April																							T									T	.42
May					.13			.60		.38									.91	.13									1.25			3.40	1.55
June				T	T			T		.24				1.31					.20				T				.08		1.11			2.94	1.54
July																						T					T					T	1.60
August							.13					.95	1.01						.44										.14	.20		2.87	1.65
September	.12	.13				.12	.14																									.51	2.00
October							T	T	T	T	T			1.26							.09											1.92	1.31
November			T	T	.65																		T	.57								.65	.56
December										.26			T	.20					1.00	1.62				T								3.08	.91
Yearly																																16.62	12.98

Monclova, Coah. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1897-1940
January																																0	.48
February					T				.16					.16		T																.32	.46
March										T									.16	.20				.55	.04							.95	.39
April					.16																					T						.16	.63
May						.08		.31								T			.87	T	.12	.08							.23			1.69	1.57
June						T		T			.12			.98					.16			.20	.28		.47			T	1.02			3.23	1.30
July																												.49				.49	1.77
August						T	.39		T			.23	1.95				1.06	T					.20						.16	.30	.10	4.39	1.55
September			.34			.28	.64																	1.97								1.26	2.87
October							.20				T	T		.98	T																	3.15	1.25
November										.08									.18	1.97	T											2.23	.56
December																																	.73
Yearly																																	13.56

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Don Martin, Coah. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal# 1927-1940
January																			.02		.06											.08	.84
February	T			T	.07				.06					.09	.03																	.25	.57
March																		.14	.02	.36			.03	.99	.13							1.67	.75
April					.35																		.02	.02								.39	1.31
May						.87		T	.70										.25			.07						.07				1.96	1.95
June						.26		2.12	.05	T	.08		.04	T									T	3.23					5.08			10.86	2.24
July				T																												T	1.46
August					.04	.15						T	.02						1.38										1.70	.01		3.30	1.82
September		.01			T	.06																										.07	2.78
October					T						.06	T		.14									.07	2.27	.01					.02		2.57	1.78
November					.30	.06	.15	T	T														T									.51	.73
December						.03								.10					.45	.44												1.00	1.11
Yearly																																22.66	17.34

Lag. de Salinillas, N. L. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January		.02			.01							T							.04		.02	T	T									.09
February	T			T	T				.12					.05	.03																	.21
March				.02															.04	.85			.43	1.42	.16	.01	T	T				2.93
April				.01																			T	.01				.01				.03
May	.01				.51		1.22	.20											.47		.02	.43					.35	.12				3.33
June					.16			1.02					.24											.09					.59			2.10
July																																0
August						T	.24					.08	.06						.67										2.01	.08		3.14
September							.37																T									.37
October							.18							.18										1.57	.02	T		T	.01	T		1.96
November					.39	.24	.20	.12						T										T								.95
December						T		T	T	.04		T	T	.18					.94	.31	.01			.01								1.49
Yearly																																16.60

Anahuac, N. L. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average# 1933-1940
January					.05	T		T	.01			.01						T	.06		.06	.09			T							.28	.82
February	T	T	T	T	.19				.08					.06	T	T																.33	.36
March				.02								.09								1.10				1.63	.17	.01	T					3.02	.93
April					T						T					T	T						.22	T	T			T	.01			.23	.86
May						.20		.02	.39	T								.01	.50			.49					.19	.15				1.75	2.84
June						.19			.41	.04	.24		.41	T										.03	.07				.21			1.60	.82
July												.03		.03																		.06	1.23
August								T				T	.18	T					T										3.25	.79		4.22	1.96
September							.20																									.20	2.64
October						.26				T				.20	.01									2.25	T					.02		2.74	1.21
November				T	.52	.35	.27	.19															T			T	.02	T				1.35	.55
December							T							T					.79	.55												1.34	1.39
Yearly																																17.12	15.61

Guerrero, Tamps. — 1936

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																										.08			.12			.20
February																																.28
March	.02						.02				.04	.06																				.14
April																.06					.87											.93
May									3.07														.12	.94	.28							4.41
June																																.20
July								.16				3.15	.18																			3.49
August																.43			.51									1.57	1.46	.63	.14	4.74
September							.28						.79			3.03			.06					.79					.20			5.15
October																										.08		.18	.12			.38
November		.12																														.12
December	.04		.16								.06	.23	.35	‡ Estimated from surrounding stations (Zapata).												.04						.88
Yearly																																20.92

Guerrero, Tamps. — 1937

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																													.23	.43		.66
February			.28	.04																						.08						.40
March		.08			.20			.08											.16	.14								.35				1.01
April												.04																				.04
May						.65							.79																	.26		1.68
June	.23																															.23
July			.04	.28	.16		.23	.35																								1.06
August																										.79						.79
September																.08																.08
October										1.26	.30			.04																		1.60
November		.12			.35																.10											.57
December				.55					.12	.12					.28				.28	.51	.28					.04		.79				2.97
Yearly																																11.09

Guerrero, Tamps. —1938

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January				.79	.12			.28													.45	.37						.55				1.56
February																																.98
March	.43							.04															.59									1.06
April																																‡ T
May									.12			.12			.22								.79									1.25
June																																‡ .83
July																																.33
August																											.59	2.83				3.42
September									.16		.08		.23																			.47
October																																‡ T
November																																‡ T
December													‡ No daily record. Taken from monthly record.										.39	1.57	.30				1.97			4.23
Yearly																																14.35

Guerrero, Tamps. — 1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
January																										.79	.23					1.02
February																																‡ T
March																	.18	.04														.22
April												.30																.91				1.21
May			.33	.39	.20								1.42											.79					2.36			5.49
June		.39					.20																	.33								.94
July																																.91
August	1.30										.08		.91		.79						.14											2.31
September							.12	.16		1.69		.12			.08	.51		.51	.73	.93												4.85
October										2.80		.04																.39				2.84
November										.22																						.61
December													‡ No daily record. Taken from monthly record.												.10	.14						.24
Yearly																																20.64

‡ Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Guerrero, Tamps. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1936-1940
January		T			T				T									T			.20	.08		.04	.08							.40	.77
February				.10	.20									.06		T	T															.36	.40
March				.16														T	.33	.50				1.46	.31							2.56	1.00
April																																0	.44
May						.08			T							T			.37		T	.28						.71	T			1.44	2.85
June								.10	.23		1.24		.53		.06				.06					1.69	.57							4.48	1.34
July			.25	.04									T	.61	.08																	.96	1.39
August																		.59			.08		T	T					2.09			2.76	2.80
September						.30			.37										.33													1.00	2.31
October											T			1.89	.12									1.38	T							3.39	1.64
November																																.78	.42
December	↓ Estimated from Zapata.												.47				.08		.53	1.20	.10											2.38	2.14
Yearly																																20.51	17.50

Rayones, N. L. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1926-1940
January			T																.01	.02		.02						.02				.07	.76
February	.35			.05							T		.01	.06																		.43	.60
March				T					T									T	.05	T		.03		.62	.29	.37						1.36	.34
April												.07																				.07	.45
May									.73	.04					.79	.57	.01		.08	.37	.03	.12						.03	.10	.01		2.88	1.43
June	.01					.01				.05	.02				.07									.52	.77	.11	.02			.21		1.79	2.42
July			.06	.02	.01								.01	.22																		1.37	1.35
August						1.62	.17			.32		.02	.24	.15				.52	.35	.07		.98	.02					.03		.26		3.70	3.26
September				.11		.23	.79	.72			.18									.29		T										2.32	3.13
October																								T								0	2.17
November																												T				0	.73
December												T		T					T	T	T											T	.32
Yearly																																14.01	16.96

San Pedro, N. L. — 1940

Recording gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January	# Unmeasured amount of precipitation fell on these days.																	.16		.35												.51	
February	● No record March 21 to 31, 1940.																		.04							.08	.06	.08				.26	
March																			.08	.08												●	
April																								.24	T							.24	
May	.51								1.02				.08		.16	T	T		.08			.08	T									1.95	
June						T				1.69				1.50					.31		.06			2.28	.16	.31	T		.16			6.47	
July				1.18									.65	T	T						.71											3.07	
August	T					T	.91		2.36		.43		T	.04				1.26	2.76	.12		.47	1.14						.16	.39		11.89	
September				.20	.31	.51	4.57	2.00			.12											.24								.75	1.65	7.95	
October						.47	.25						.47	.47										.09	T	T	T		.47	T		2.82	2.92
November		T			1.42	.24	T	T	T			.16												.08		T	.16	T	T			2.06	1.07
December	T	T					●			T			T	T	T				T	●	●											-	
Yearly																																	

Villa Allende, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January							.12	.11	.01											.13	.03	.08			.05	.05	.02					.60	.96
February																																0	0
March				.06	.05													.07	.18	.26				1.80	.43	.45						3.50	2.05
April											.05													.39	.07							.51	3.16
May	1.39								1.48						.04			.01	.61			.94	.03			.01					.01	4.52	3.40
June									.47	.65	.01		.06	1.22		.02	.02		.70	.01	T			1.73	.22	.51			.09			5.51	4.98
July			.05	2.33	.07								.83	2.13	.05							.09								.03	.02	5.58	3.62
August							T		.10		.05							1.22	1.53	.22	.25		.72	.08						.28	.26	4.71	5.89
September						.79	1.65	.75			.19									.25	T			T								3.63	4.26
October						1.35	.11								.43									T	.15				.54		T	2.58	3.11
November		.04			1.38	.14	.13																	.06			.04					1.83	1.20
December							.91			.06			.19	.18						1.77	.59											3.70	1.67
Yearly																																36.45	33.68

Montemorelos, N. L. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1904-1940
January					.04		.08	.11	.04										.04	T	.04	.03		.06	.02	.01		.06		.02		.55	.75
February				T																												T	.78
March				.04	.14														.06	.61				1.33	.64	.12						2.94	1.21
April										.18													T	.11	.06							.35	2.25
May	.14								.16						.11				1.44			.23	T	T				.95				5.01	2.70
June							T		.26	.27			.18	.73	T	T			.68					1.56	1.65							5.33	3.32
July			.06	.63										5.23					.26									1.17		.37	.05	7.77	2.51
August										.18	T		T		.28			1.93	1.88		1.28		.44							.11	1.09	7.19	3.68
September			.16		.26	1.17	1.37	1.23				T								.38												4.57	3.97
October						.52	.27								.15									.27	T				.24		.20	1.75	2.21
November					1.04	T	T	T															T			T	T					1.04	2.00
December						.78			.26				.21	.29			T		.30	3.01	.74											5.59	1.23
Yearly																																40.09	26.61

Villa de Santiago, N. L. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1923-1940
January					T		T	T								T				.16	T	.08			T	T				T	T	.24	.95
February				T																												T	1.04
March					T										T			.16	.12	.08		T	.53	1.14	.43	.10						2.56	1.11
April					T																			.14	T							.14	1.29
May	.73								1.54						.79	T			.22		.01	.04	.02					.04				3.19	3.48
June						T		T	T	.93	.03			.28		T			.26		.01	T	T	1.73	.06	.51	T	T	.37			5.96	5.07
July				1.12								.09	.08	.10	.01							.56						T	.02	.18	.01	2.37	3.48
August					.01	.10	.53	T	5.26		T	T	.35					4.31	1.73	.04	T			.21	T					.73	1.48	14.75	5.41
September					.20	.55	4.69	1.95			.12									T	.21											7.72	9.36
October					T	.56	.29					T		.26	.35										.08	T			.52			2.06	4.80
November		.04			1.11	.17	.08	.01	.03		T	.18	.12												.11		.16	.07				2.08	1.72
December	T						.08			T	T								.33	2.11	.39											2.91	1.33
Yearly																																41.78	39.34

Cadereyta, N. L. — 1939

Recording gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Averaged # 1904-1939
January											.03													.02		.43	.12					.60	.90
February																		.07		.54		.04										.65	1.10
March							.01	.02										.22			.21	.14	.02									.62	1.52
April				.05							.63	.66			T						.66							1.32	.08	.01		3.39	1.99
May				.58					.44			.05	.26		.05			.02	.01										.09		.90	2.38	2.33
June																									.05	.15	.06		T			.26	3.85
July									.16	.04																					.97	1.17	3.35
August		.06								T			.11	.08						.04	.01											.30	2.89
September										.66	.19		.10			.04	.47	.09	2.07	2.64												6.26	4.27
October										4.72	.12	.12		.01	.02	.69											.13	.10				5.87	2.84
November										.01																.77	.08	.12	.25	.01		1.24	1.69
December																																0	.76
Yearly																																22.74	27.49

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Cadereyta, N. L. — 1940

Recording gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1904-1940
January								.04	.09											.05	.06										.01	.25	.86
February													.02	.04						.04												.06	1.04
March																							.05	.93	.20	.04						1.26	1.51
April											1.81													.13	.01							1.95	1.99
May	.35							.67	.64				.05						.33		.02	.09							.67			2.80	2.95
June							.33	.30						3.11					.07		.22			1.29			.49					5.81	3.97
July			.22	.86									.04									.07										1.19	3.04
August						.01	.06		.07			.05	.02					.49	1.82	.14									.32	1.31	.26	4.35	2.99
September				.49		.16	1.85			.28										.02												2.80	4.18
October						.07	.12	.01			.02	.04		.37	.05									.11					.11			.90	2.73
November		.12			.81	.04		.23						.06										.12				.10	.13			1.61	1.68
December						.69							.08	.58					.11		.61			.79								3.86	.95
Yearly																																27.04	27.49

Las Enramadas, N. L. — 1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1926-1939
January											.05															1.08	.13					1.26	1.17
February																																0	.60
March																		.46														.40	.62
April											.14	.50															1.72	.17				2.33	1.25
May			1.89										.18												.04				.09		.35	2.55	3.77
June							.19	.40											.06		.47	.17								T		1.29	2.81
July										.49	.94	T							.09											.45	T	1.97	3.61
August	.59										.18	T						T		T												.77	3.38
September								.12		.12	2.09	.04				.59	T	.20	.67	1.22												5.05	5.41
October										4.37	.12	.12				.06									T							4.67	1.72
November																									.16	.39		.35	.03	T		.58	.90
December	This is a correction to 1939 in Water Bulletin No. 9.																								.09	.04		.09				.22	.91
Yearly																																21.49	26.15

Las Enramadas, N. L. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1926-1940
January									.06											.06	.01	T			.04			T				.17	1.10
February				T	.10									T		.15																.27	.58
March				.04																.07												1.44	.68
April																							.10									.10	1.17
May								.48	T							T		T	.44			.04						.61	.58			1.55	3.60
June								1.32		.23			.2.60					2.40					T	2.40	1.53	.22			.26			10.96	3.44
July														.03														.04		.04	.41	.52	3.37
August							.39					T		.19				.68	.67	3.06									.19	T		5.34	3.52
September				T	1.36	2.66	.16													.41												4.59	5.36
October						T								.43	1.48									.47	T					3.09		5.47	1.99
November		T			.21	T	T	.06	T													T		T								.27	.86
December							.33						T	.31		T		.30	T	1.78	.79											3.51	1.10
Yearly																																34.19	26.77

El Cuchillo, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January					T			T	.01	T										.02	.04	.02		T	.02	T						.11	.66
February					T									.09		.01																.10	.07
March				.03	T							.02							.10	.12				.37	.19	T						.83	.66
April											T																					T	.95
May						.01			.23							T		T	.58		.01	.06					.09		.61			1.59	3.20
June									.51	.35			.93	.07										1.97	.58	.70	.03	T				5.14	3.70
July														.18																		.16	1.23
August																			1.17					T						.09		1.26	2.10
September				T		.47	.66	T												T												1.13	2.36
October							.73							.16	.30									2.03	T				.99			4.21	2.40
November		T			T	T	T	.04																								.04	.25
December							.14			T			T	.23			.04	.02	.33	1.33	.79											2.88	1.11
Yearly																																17.45	18.67

Gral. Bravo, N. L. —1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1906-1939
January										T															.14	T	.02					.16	.70
February																T				T		T										T	.39
March																T																T	.57
April			T							1.26	1.04									.75						.02						3.07	1.19
May												.24											.02					.08			.10	.44	3.24
June										.01							T															.01	2.88
July									T	.47	.55		T																			1.02	2.82
August														.87		.02	.02															.91	2.27
September								T	.04	T				T			1.02	2.32	.47											T		3.85	3.55
October									.29						T																	.29	1.10
November											T														T		T					T	.93
December																		T						T								T	.87
Yearly																																9.75	20.51

Gral. Bravo, N. L. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1906-1940
January							T											T		T												T	.67
February														T	T																	T	.37
March			T	.03							T				T			T					.09	.02								.14	.55
April																																0	1.13
May								.14										.02			T						T	.10				.26	3.09
June											1.02	1.54	T		.79				T				2.91	1.42	T	T	T					7.69	3.12
July			T								T						T				T											T	2.68
August				T														5.00				.20							.20			5.40	2.43
September					1.02	.65																										1.65	3.46
October						1.14					T			.47									.35	T				1.57				3.53	1.22
November					.02		T	T																								.02	.88
December						.47						T						1.54	.91	1.61												4.53	1.03
Yearly																																23.22	20.63

Gral.Cepeda, Coah. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1926-1940
January						T								T	T	T		.14	.20	.15	.21	T	T			T	T					.70	.47
February			.14	T								T		T	T	.33	.12															.59	.47
March			.12	T	.10				T							T																.22	.24
April																									T	.22	T					0	.20
May							T	.73	.10													.22	.15	T	.23	T	.13	.26	1.28			1.05	.93
June						T	.06	.10	T	T	.33						.14	T	.33													3.23	2.20
July			T	.21	T					T	.09	.12	T					T	.31	.94	.49	T			.14	.20	.43	.33	.15	.48		3.89	4.58
August	T	.82	T	.60	.33	.50	T	.33	T	.15	T	1.00	.21	.33	T				T	.13	.61	.32	.25	.53			T	.21	.85	1.11	.61	8.89	3.00
September	.21	.16	T	T	.15	.33		T	T		.13	.21	T																			1.19	3.18
October						T					T	.43	.81	.41	T												T	.96	.10	.07		1.65	1.28
November				.21	T	.14	T	T																								1.48	.57
December														T				T	.77	1.36	T	T										2.13	.76
Yearly																																25.02	18.18

Some months missing

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Saltillo, Coah. — 1940

Standard 8 inch rain gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1900-1940
January																			.08		.09							.09			.01	.27	.53
February				.33	.02									.02		.06																.43	.38
March																							.03	.03								.06	.39
April											.07	.10											.02									.19	.75
May								.01							.09				.22										.31			.63	.85
June				.02							.48								.07		.78	.06	.29	.08		.03	.05	.14	.24			2.24	1.67
July													.26	.18	.29					.14									.05	.23			1.15	2.79
August	.05											.16	.50	.14		.11			.02	.17		.31	.09	.95		.05				.39	1.59	4.51	2.22
September			T		.02	T	1.74																									1.76	2.29
October					T		.15				T		.30	.06	.10		T				.03			T								.64	1.01
November		.05		T	.04	.02		.05					.04														.62	.10				.90	1.02
December										.05				.04						1.54	.44											2.07	.71
Yearly																																14.85	14.61

Ramos Arizpe, Coah. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1907-1940
January																			.20	.08		.02						.02			.18	.50	.52
February						T								.12		T																.12	.37
March																								.01	T							.01	.35
April											T	.01											T									.01	.44
May					T									.12	T				.12		T	.12										.36	.83
June													T			T			T		.28		.25	.18			.33	.73	.20			1.95	1.20
July														T	.10				T	.01					T							.11	1.65
August	.39					.71	.28					.28	.55	.20					.43	T						.12			T	.31		3.27	1.52
September			.08		.08	.20	3.03	.08																								3.47	1.71
October							.12				.02		.08	.12	.04		T								T							.38	.61
November		.08		T	T				T				T	T											T		.43	.20	.01			.72	.50
December										T									T	1.26	.59											1.85	.69
Yearly																																12.75	10.35

Cuesta de los Fierros, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January																												.02	.01			.03	
February				.09	.03									.14			.10															.36	
March																								.55	.08							.63	
April											.14	.08																				.22	
May									.19												.26	.46										.91	
June											.87								.04				.46	.21	.11		.85	.02	.41			2.95	
July					.08										.04																	.12	
August							.19					.04	.22						3.19					.08						.05		3.77	
September		T			.06	.20	4.37	.02																	T							4.65	
October						T	.10			.02	T	T	.08	.45	.14																	.79	1.32
November		.07	T		.02	.02	.02	.04																			.43	.02				.62	.54
December							.08	T						.01					T	1.67	.71											2.47	1.28
Yearly																																17.52	

Monterrey, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1896-1940
January							.01	.10												.12	.01	.19	T	.02	.03	.04	.04	.02				.58	.72
February		.04		.06		.01								.07																		.18	.65
March				.01	.05														.01	.21			T	.96	.20	.02						1.46	.78
April											.17					.01								.06	.01							.25	1.18
May	.07								.31										.26			.08							.04	.65		1.41	1.59
June										.78	.29		.01	.07					.01					2.64	1.43	.01			2.26			7.50	2.74
July			.07	.27	.06																	.11					T	T		T		.51	2.42
August							.08	.12	T				.63					.55	1.29				.23						.04	.26	.18	3.33	3.02
September					.79	.16	2.78	1.34			.21								T													5.28	5.82
October							.12			T	T	T	T	.91	.20									.22					.11			1.56	3.20
November	.08				.59	.18	.04						T											T			T	T				.89	1.46
December							T			T	T		T					T	T	T												T	.84
Yearly																																23.00	24.42

Topo Chico, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January																				.16												.16	
February				.12										.04																		.16	
March																				.12				.83	.20							1.14	
April											.08													.12								.20	
May									.08										T				.16						.28			.51	
June										.67	.22			.41		.08	.10	.12	.12				.04	.08	.16	.08			.39			2.46	
July			.05	.39							.16																					.60	
August					.08	.24							.79					.16	.94										.63	.08		2.91	2.50
September					.43	.51	2.22	.25			.39																					3.79	3.56
October						.16							.63	.16										.24					.08			1.26	2.32
November					.55	.16						.31															.06					1.18	.96
December						.31				T			.39					T	2.36													3.07	1.54
Yearly																																17.44	

Cienega de Flores, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January				.02					.14	.02									.25		.07	.18	.02		.02	.05					.03	.76	1.14
February				.02																				T	T							.02	.08
March																				.03	T	T	.04	1.52	.07	.01	.02				T	1.69	.106
April																						.04	.22	.02								.28	.72
May						T		.18	.06	.01		.02							.57									.03	.89	.11		1.87	2.50
June								T	T		.21	T		.74			.11	T	.18	T					.67				T			1.91	1.08
July		T	T	T									.19		T	.07						.16										.42	1.94
August								T		T		.93	1.23				T	T	.12	T										1.36	.59	4.23	3.94
September				T			.67	2.04	.47										T													3.18	2.73
October				T	T		T				T			T										2.04	T				T			2.04	2.28
November		T		T	T	T	T					T														T	T	T	T			T	.21
December						T							.54				T		1.18													1.72	1.04
Yearly																																18.12	18.52

Santa Caterina, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average # 1937-1940
January																					.14							T		.03		.17	.50
February			.05		T	T							.06																			.11	.28
March					.04																		.13	.17								.34	.27
April										T																						T	.85
May								.04											.16			.22										.42	1.01
June									.55	1.26			.53									.05	1.36		.68		.06		.22			4.71	2.41
July		.13	.30	.21																	.06									T		.70	1.52
August					.26	.61			1.22				.23						1.77	.23				.04							.33	4.89	5.24
September				.04	.10	.20	3.57	.37																								4.28	3.42
October							.15				.02		T	.23	.26									.08					.02			.76	1.31
November		.13			.08	T							.02														.30	.04				.37	.44
December								.20					T	.06						1.30	2.34											4.30	1.96
Yearly																																21.05	19.21

Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

continued

Higueras, N. L. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal # 1906-1940
January							T	.16														.35				.16						.67	.86
February																									T							T	.55
March																								.41	.13							.54	.62
April																								.12								.12	1.26
May								.14											.18			.20						.10	.47			1.09	1.62
June									.47		.20		.65	.27	.75								.45		.96							3.75	2.80
July			1.04																			.35										1.39	2.52
August					.45					1.56									2.11	.20										.58	.65	5.55	3.27
September						.79	2.64	.28										.67														4.38	4.27
October							.39																	1.57					.33			2.29	1.82
November					.30	.10	.26	T	.14																							.80	1.04
December										.06			.06	.33			.04		.37	.51	.26											1.63	.91
Yearly																																22.21	21.54

La Tableta, N. L. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1939-1940
January					.02			.02	.03										.07			.06	.04									.24	
February														.12																		.12	
March				.18																.08				.52	.12							.90	
April																								.12								.12	
May									1.46									.49	.07			.01					.35	T	1.58			5.96	
June									T	.05			1.70	.01		.16								3.01	.01	.01	T					4.95	
July												.01	.06	.14								.04										.25	
August						.05	.33		.60									.22	.37	.05										.04		1.64	
September						.57	1.71	T			.04									.02												2.34	3.34
October						.79	.52								.55									.09					1.77			3.72	5.73
November		.02			.10	.01	T	.09																								.22	.30
December							.08						T	.10				.05	.30	1.26	.79											2.58	1.46
Yearly																																21.04	

Sta. Rosalia, Tamps. — 1938

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January ‡																																.96	
February ‡																				.07								T				2.76	
March	.06	.30	.07	.04	.04	.08	T	.16	.15	.04		.04		T								.87										1.85	
April																		1.80	.08		T				.44							2.32	
May								.12	.01	.09				T										.38	.09							.69	
June																	.59				.84		.01					.16				1.60	
July																															1.40	1.40	
August ‡	? T																												95.33			3.33	
September		T					.02	T	.05	.01	T	.02	T					.28	.01	.02	T					.67						1.08	
October	T										.08	T		T						T	.15			T								.23	
November															.16	T				T				.07						.09		.32	
December		T	T				.03					T									T				.50		T	.15	T	T		.68	
Yearly																																17.22	

Sta. Rosalia, Tamps. — 1939

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	
January			.07	.04						T		.09	T	.01	T	T							T	T			1.11	.09	.02			1.43	
February	T	.01			T			T										.03	.04		.01			T								.09	
March					T	.07								T		.02	T	.10	.16													.35	
April											T	.07	.30	.28								.02	T					1.06				1.75	
May				1.00	.56	.04			T	T				.94											.15	.14				.33	T	3.16	
June	.87		1.25					.51																								2.63	
July										.06		.01	.03																		.02	.12	
August	T	.21	.02																.07		.04											.34	
September									.40	.01	.20	.75			T	.58		.34	.10	.70	.84	.02	T	T	T			T				3.88	
October	.13										1.19			.03	T	T						T	T						.26			1.61	
November		T		T	T						T	.10							T							.05		.14	.11	.01		.41	
December	T			T	T		T				T					T				T						.10	T					.10	
Yearly																																15.85	

Sta. Rosalia, Tamps. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1924-1940
January		T	T	T		T	T						T						T	.05	.03	.09	.07	T	T	.07	T					.31	.96
February	T	T			T	.02							T		.15	.01	.01										T					.17	.70
March					.16								.04					T		.19	.65	T			3.63	.11						4.78	.95
April				T																					T							T	1.28
May										1.43							T			.37			.25	.02					.02			2.09	2.33
June										.01	.04			.53	T					.10					1.39	.39	.28	T	T			2.74	2.78
July															1.42																	1.42	2.43
August							T	.24					.08						.33	3.25				.26							.96	5.12	2.16
September						T		.28	T		T									.08												.36	3.49
October	T							.36	T							.17			T	T	T				3.12				T			3.65	1.75
November		T	T	T	T	.20	.15	.19							T									T	T							.54	.73
December					T	T		.32	T	T	T		T	.06	.14	T		T	.16	.65	.45	2.42	T									4.20	1.53
Yearly																																25.38	21.09

Comales, Tamps. — 1940

Recording Gage. Record by National Irrigation Commission.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Average 1938-1940
January					T					T									T	.05	.11	.04		.02		T						.20	.68
February				.02										.13		.01																.16	.10
March				.10								.02							.13	1.13				1.21	.30	T						2.86	1.46
April											T																					T	1.25
May						T			.62							T			.18	T	T	.23					T	T	.05			1.08	2.33
June								.01	.01	.57			.64	T						.60				.69	.29	1.04	T	.01				5.66	2.64
July			T	.29								.03	.04	.53	.06					.01			T									.76	1.36
August								T	.17	.72		.96						.52	3.45											.65		6.45	4.03
September					.16	.18	.19										T		.07	.01		.06										.67	1.60
October							.59							.34	.07									2.25					.27			3.52	1.49
November					.15	.11	.27	.05																T			T					.56	.51
December							.40						T	.15			.05	.07	.72	2.02	1.06									.14		4.59	1.97
Yearly																																24.34	19.22

Matamoros, Tamps. — 1940

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

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Normal 1912-1940
January																				.03	T	.30			.01	T					.01	.35	1.45
February	.03			.02		.03			T				T	.03	T	.10	T						.03									.04	.97
March											T		T						.72	1.58	.17		.01	.09	.48	.11	.02					3.18	1.13
April			T							T	.01	.04						.03	.04				T					.28				.05	1.69
May	T								2.16										.01			T	.01					T				2.53	3.14
June										T	.62				T	T			.10	.05		.13			.15	.08	T	T				1.13	3.40
July			.19	.20	T							.02	.20	.06	.41			.09	.18	.05	T		.12						.09			1.61	2.44
August						T	T					.03							.02	.85												.88	1.73
September	T				.03	1.36	.19	.02	.01		T					T			.11	.01				.04								1.77	5.27
October						.74							.16		1.71							.07	.11	.12	1.43	.06		T	.21	.04		4.65	2.99
November			T		.50	.03	.12	.30			T								.03		.30	.72	.03	.07			T					2.10	1.72
December					.01		.19						.22	.85	.16			.04	.69	.97	4.57	.12			.02							7.84	2.05
Yearly																																26.33	27.94

* 5.33 inches fell on August 28 and 29. ? Estimated from surrounding stations. ‡ Monthly Record Incomplete. ‡ No Daily Record. # Some months missing.

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED—INCHES — continued

Guerrero, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903					.13	2.17	1.89	6.42	3.53	1.85	.01	.43	
1904	.04				.02	4.44	2.71	3.54	8.88	3.50	.31	.35	
1905	.31	.85	1.59	.86	.04	1.52	2.26	4.97	3.87	2.02	2.61	.02	20.92
1906	.49	.92	.15	.63	.17	.81	5.91	6.22	2.52	.33	.82	.88	19.85
1907	.64	.10	T	T	.09	.08	6.03	6.62	1.93	1.84	4.38		
1908	.30	.67	.27	.30	.10	.09	3.20	4.75	1.13		.40	.46	
1909		T			0	2.68	5.81	5.16	1.38	.06	.01	2.42	
1910	.35	.18	.05	.04	T	.96	3.48		.45	.19			
1924	T	.87	.26	.20	.67	.54	9.12	4.02	3.44	.34	.31	.18	19.95
1925	0	.93	T	0	.53	6.14	5.16	6.13	2.22	2.22	.59	1.40	25.32
1926	.20	.20	.31	.83	T	.43	2.11	3.29	4.29	3.01	0	1.04	15.71
1927	.14	0	.39	0	.06	T	4.38	6.23	3.20	.83	.07	3.51	18.81
1928	1.03	T	.23	T	1.63	.92	3.86	5.44	.50	.83	.42	.33	15.21
1929	T	.15				.03	4.86	3.64	2.81	1.90	.20	.46	
1930	.28	.43	.04	.28	2.05	1.36	4.78	3.92	.19	1.28	1.28	.96	16.85
1931	.95	1.55	.14	.54	.27	1.50	4.53	3.80	5.29	.08	.81	.55	20.01
1932	.16	.61	.04	0	.14	.28	8.08	4.31	6.97	T	0	2.20	22.79
1933	1.12	.14	T	.28	0	2.74	2.09	6.22	5.46	.43	.16	0	18.64
1934	.14	T	.53	.33	.15	1.14	2.85	5.54	1.08	.11	.35	.17	12.39
1935	.61	.37	T	0	T	.45	3.67	3.67	2.43	.08	.59	1.22	13.09
1936	.03	0	.53	.23	.18	.50	3.33	3.37	3.71	.16	1.91	.18	14.13
1937	.47	.45	T	T	T	.98	1.87	7.33	6.22	.96	.06	1.11	19.45
1938	.35	.06	.14	T	T	5.14	6.59	3.37	5.14	.94	0	T	21.73
1939	.96	T	0	0	T	3.04	5.40	3.52	1.91	2.09	.73	.96	18.61
1940	1.75	.73	.08	T	.45	3.09	2.47	4.21	1.46	1.20	.86	.55	16.85
Normal ϕ	.45	.40	.23	.22	.28	1.64	4.26	4.82	3.20	1.09	.70	.84	18.13

Miñaca, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1922										.43	.31	.08	
1923	0	.37	.85	0	0	.15	4.61	7.15	2.15	1.02	.72	2.02	19.04
1924	.08	.22	.19	.44	.61	.11	7.81	4.40	2.00	.28	T		
Average ϕ	.04	.30	.52	.22	.30	.13	6.21	5.78	2.08	.58	.34	1.05	17.55

Cuauhtemoc, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1922												T	
1923						1.06	4.06	7.88	2.83	.75	1.30	1.65	
1924	.20	.67	0	.39	.75	.08	4.67	5.36	.94	.20	T	0	13.26
1925	0	.12	.91	0	.87	4.87	8.79	5.86	1.81	2.85	.37	.87	26.82
1926	T	.26	.18	1.08	.14	.98	6.62	5.55	5.26	3.03	0	.20	23.30
1927	0	T	.23	0	.53	.31	5.81	3.27	2.30	.75	.08	.39	14.17
1928	.59	.28	.48	0	.16	1.10	2.72	8.71	1.56	.16	.63	.30	16.69
1929	.12	.06			T								
Average ϕ	.15	.23	.36	.29	.41	1.40	5.44	6.02	2.45	1.29	.40	.56	19.00

La Junta, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1925	0	0	.26	0	.30	8.01	9.36	6.59	.59	1.08	.30	.53	27.02
1926	0	T	.10	.22	T	0	2.26	3.61	1.67	3.84	0	.33	12.03
1927	.10	0	T	0	T			3.25	.98	T	0	.74	
1928	.34	T	.15	0	1.50	.96	3.37	3.25	.73	.49	.54	.49	13.82
1929	T	.10	0	0	T	.24	5.22	4.98	2.76	1.50	0	.05	14.85
1936				T	T	1.18	4.12	3.82	2.52	T	1.54	.53	
1937	.94	1.34	T	T	.10	.40	5.05	6.12	3.21	.98	T	1.18	19.32
1938	.51	.41	.06	T	0	3.82	6.50	2.64	2.37	.26	0	T	16.57
1939	1.55	.19	T	0	.47	1.17	5.76	3.92	2.50	2.41	.76	1.20	19.93
1940	3.54	.81	.61	.43	1.65	1.44	4.05	7.11	2.78	1.67	.91	1.85	26.85
Normal ϕ	.78	.32	.13	.06	.40	1.91	5.08	4.73	2.01	1.22	.40	.69	17.73

Bustillos, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1927										.26	T	.67	
1928	.14	0	.41	0	.79	T	2.48	10.67	1.61	.18	0	0	16.28
1929	0	0		0	0	.18	2.40	3.84	2.28	2.32	.08	.33	
1930	T	0	0	0	1.14	.43	5.61	2.97	.20	2.58	2.76	.39	16.08
1931	2.13				.55	1.77							
Average ϕ	.57	0	.20	0	.62	.60	3.49	5.83	1.36	1.34	.71	.35	15.07

Creel, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1928								7.40	.14				
1929		0	T	.59	T	5.08	5.85	3.04	2.82	3.02	.07	1.16	
1930	1.87	.61	1.20	.51	2.26	5.68	4.77	5.98	.47	2.28	2.61	2.56	30.80
1932									2.05	0	0	4.90	
1933	4.16	1.32	.08	1.85									
Average ϕ	3.02	.64	.43	.98	1.13	5.38	5.31	5.47	1.37	1.77	.89	2.87	29.26

Tascate, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1923	.16	.13	.58	0	0	1.28	5.70	11.27	8.23	.31	3.69	4.01	35.36
1924	.36	.34	.49	.50	.30	.20	6.60	3.39	7.29	.36	.04	.57	20.44
1925	.00	T	.26	.00	.40	4.67	7.53	6.49	3.11	2.75	3.55	2.04	30.80
1926	1.00	.41	1.55	.34	.16	1.37	5.07	7.59	5.14	2.17	1.24	1.74	27.78
1927	.00	1.61	.56	.00	.42	1.06	4.05	6.39	3.96	1.06	.05	2.66	21.82
1928	.81	.18	.07	.13									
ϕ Average.	.39	.44	.58	.16	.26	1.72	5.79	7.03	5.55	1.33	1.71	2.20	27.16

La Boquilla, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1910						2.73	1.22	1.30	2.01	.25	.10	0	
1911	.24	.45	.72	.06	1.29	2.01	2.63	.96	2.65	2.28	1.47	.74	15.50
1912	.28	0	0	0	.11	.51	2.06	2.30	2.53	.85	.30	.26	9.20
1913	.35	.46	0	.37	.02	3.37	2.59	1.75	4.21	.18	1.61	.12	15.03
1914	0	.06	1.10	0	1.26	4.70	3.15	4.82	2.42	2.52	2.22	1.14	23.39
1915			.24		0			9.57					
1916	‡ 0	‡ .55	‡ 0	0	0	.52	3.81	4.82	4.06	.44	0	0	14.20
1917	.42	.04	0	0	.04	.13	5.07	1.37	6.56	.04	0	0	13.67
1918	.14	0	.19	0	.13	1.83	.99	5.59	1.00	.04	1.40	.04	11.35
1919	.38	0	0	.52	.13	2.00	9.80	2.75	2.89	1.29	.40	.25	20.41
1920	.52	.06	0	0	2.19	2.41	1.57	6.55	2.06	.29	0	0	15.65
1921	0	.54	.02	0	1.06	.39	3.88	1.82	3.09	0	.04	.09	10.93
1922	0	0	.04	.08	.11	2.41	.99	1.11	2.66	1.15	.10	0	8.65
1923	.28	.35	1.48	0	0	1.00	2.24	3.64	4.49	0	2.24	1.50	17.22
1924	.41	.36	0	.53	.10	0	2.52	3.48	4.57	0	.20	.50	12.67
1925	0	0	.10	0	2.80	3.05	2.46	5.21	2.47	3.70	0	1.80	21.59
1926	0	0	.11	.27	.01	.67	3.69	4.53	1.86	3.07	.30	0	14.51
1927	.20	0	.47	0	.07	.52	3.21	1.33	2.53	.13	0	0	8.46
1928	.40	0	1.22	.06	.20	.21	.66	1.81	2.97	.31	.86	0	8.70
1929	0	0	0	1.12	2.70	0	2.68	1.45	4.10	.46	.06	.18	12.75
1930	.08	.08	.22	.11	4.53	2.13	5.08	2.35	.52	3.78	1.17	1.18	21.23
1931	2.34	.56	.03	.10	.40	1.73	2.05	.73	.92	.62	.01	.30	9.79
1932	.08	.13	.17	0	.25	.18	2.10	3.88	8.58	2.48	0	.20	18.05
1933	.25	.04	.08	.10	0	4.51	1.76	1.87	2.09	.64	.06	0	11.40
1934	.02	0	0	1.20	.45	.28	2.71	.75	.08	.24	0	1.09	6.82
1935	.23	.48	0	0	.59	1.54	2.70	3.03	7.22	.14	.02	.36	16.31
1936	.04	0	.48	.53	.16	.07	2.36	2.72	3.28	.47	.55	.08	10.74
1937	0	.46	0	0	2.39	0	1.53	2.13	4.21	T	.02	1.30	12.04
1938	.72	.62	0	.42	0	4.81	4.48	.99	5.08	1.03	0	0	18.15
1939	1.45	0	0	.18	.06	.69	2.48	5.16	.35	1.32	1.40	1.37	14.46
1940	.36	.30	0	0	.71	3.95	.95	4.25	.67	.92	.19	.25	12.55
ϕ Normal.	.32	.19	.22	.19	.73	1.61	2.78	3.03	3.07	.95	.49	.42	14.00

Salaices, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1928											.26	.87	
1929	T						2.38	1.54	1.02	.18	.09	.04	
1930	.11	T	.32	T	1.01	2.44							
1931					.47	.81	1.38	.59	.39	.71	.28	0	
1932	.12	.16	0	T	.50	.26	2.58	2.70	8.71	.33	0	0	15.36
1933	0	.01	.03	T	.03			2.70					
1934						.14	2.59	1.44	.23	.51	0		
1935	.55	.76	.20	0	.04	2.33	3.09		7.43	.76	0		
Average ϕ	.16	.23	.14	T	.41	1.20	2.40	1.79	3.56	.50	.10	.23	10.72

ϕ All available records were used in computing these Normals and Averages.
‡ Estimated from surrounding stations.

Parral, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903			T	T	.67	3.82	2.26	2.77	3.42	.47	.01	.04	
1904	.08	0	0	.02	.55	1.22	2.50	1.95	6.28	2.55	1.66	T	16.81
1905	.02	1.08	.91	.01	.25	.60	5.84	3.03	6.06	1.15	1.83	1.43	22.21
1906	.50	1.45	0	.29	.44	1.91	8.95	5.36	1.27	.45	.27	.94	21.83
1907	.13	.02	0	T	T	.23	3.90	2.50	2.74	1.67	3.87	.22	15.28
1908	0	.05	0	0	.09	0	3.09	5.79	2.08	0	.04	T	11.14
1909	.35	.23	0	0	T	1.87	6.86	1.98	.82	.02	0	.14	12.27
1910	0	0	.11	0	0	5.50	.58	2.17	2.40	.78	0	.05	11.59
1911	.26	.27	.73	.23	2.23	2.79	3.30	3.81		.81	.74	.39	
1912	.10	.09	0	0	.05	.87	1.73	3.90	3.85	1.30	1.07	.09	13.05
1921												.07	
1922				T	.01	1.64	5.05	2.36	3.87	1.44	.06	0	
1923	.14	.43	.71	T	T	1.46	5.99	7.60	14.89	.57	2.70	1.81	36.30
1924	.49	.20	0	T	T	.02	3.48	3.72	7.56	.20	T	.59	16.26
1925	0	T	.06	0	.26	6.14	5.63	6.34	3.27	3.43	T	2.19	27.32
1926	.12	.08	.35	.31	.08	1.46	4.37	8.90	.15	3.82	.55	2.19	22.38
1927	T	.45	.04	T	.31	1.22	4.57	4.08	3.74	.51	.30	.39	15.61
1928	.53	T	.16	.20	1.36	.20	5.26	3.70	4.14	.47	.59	.26	16.87
1929	0	0	T	.04	.77	.16	4.85	2.48	3.39	.83	.26	.16	12.94
1930	.26	.08	.23	.08	.20	3.46	4.92	2.09	.37	4.35	2.38	1.64	20.06
Normal ϕ	.18	.26	.18	.06	.38	1.81	4.38	3.92	3.91	1.31	.86	.63	17.88

Camargo, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903					1.06	2.64	1.90	1.01		.30	.05	.18	
1904	.02	0	0		.77	2.13	2.04	1.35	4.80	1.20	.20	.02	
1905	0	.59	1.93	.47	.63	4.31	2.54			.30	2.18	1.06	
1906	.43	1.47	.21	.40	.09	.33	3.54	5.09	.47	.43	.12	.61	13.19
1907		.37				2.96	1.18	1.12					
1908		.72	0	.21		.74	.65	2.20	.96			.27	
1909	.14					.93	1.61	2.37	.27	.01			
1910			.30		.14		.94	1.25			.12	0	
1911	.28	.02	.95	.35				1.79	.98	1.72	1.10	.75	
1923						.93	2.75	5.73	3.78	.20	1.54	1.59	
1924	.41	.43	0	.59	.12	.31	2.17	.71	3.29	.28	.20	.98	9.49
1925	0	0	T	0	.12	3.13	4.61	3.21	.94	3.50	.31	1.85	17.67
1926	.16	.08	T	0	.57	.81	3.95	5.44	2.44	1.36	.39	.43	15.63
1927	0	.12	.16	0	T	.41	1.97	1.18	1.87	.35	T	.65	6.71
1928	1.10	T	T	T	.66	.37	1.38	.49	2.56	1.14	1.28	.47	9.35
1929	0	0	0	.10	.51	0	3.74	1.30	1.75	0	.51	.71	8.62
1930	T	T	1.38	.18	.58	2.36	5.58	2.03	.63	3.94	1.46	.96	19.10
1931	2.46	.67	T	.08	.53	.85	3.21	.91	1.56	.04	.06	.30	10.67
1932			.14	T	T	.18	1.99	2.32	2.56	.81	0	.08	
1933	.35	.04	T	.04	T	1.40							
Normal ϕ	.38	.28	.32	.17	.39	1.38	2.54	2.19	1.92	.97	.59	.64	11.77

Meoquí, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926											.24	.31	
1927	.05	T	.12	T	T	1.76	2.95	5.40	2.15	T	0	1.56	13.99
1928	.77	.08	.51	.16	.69	.39	2.93	3.05	2.60	.14	.63	.41	12.36
1929	T	0	0	0	.93	.02	1.16	.63	1.42	1.16	.16	.61	6.09
1930	T	.08	.12	.16	.43	2.34	4.10	1.04	.08	2.38	1.50	1.08	13.31
1931	2.46	.41	.08	T	.27	.57							
Average ϕ	.66	.11	.17	.06	.48	1.02	2.78	2.53	1.56	.92	.51	.79	11.59

San Luis, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1935	T	.22	T	T	.13	.66	.89	4.15	1.83	.02	.61	.83	9.34
1936	T	T	.19	.95	T	1.35	1.56	.67	2.38	.31	2.05	.49	9.95
1937	.98	.81	.01		.02								
1938	1.09	.19											
1939	.39	0	0	.25	T	T	1.31						
Normal ϕ	.46	.37	.06	.32	.21	.96	2.09	3.27	1.57	.81	.38	.54	11.03

Maclovio Herrera (Falomir), Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1924	T	.39	T	T	.43	T	1.65		1.65	0	0	T	
1925	T	T	T	0	.98	.49	1.77	1.61					
1926							2.06	18.79	21.85	1.28	0	1.65	
1927	0	0	2.19	1.46	0	4.37	8.46	9.25	15.67	T	T	3.77	45.17
1928	1.39	.80	.34	.41	3.44	6.85	12.14			T	.59	7.31	
1929	T	T	T	T	1.02	T	.77						
Average ϕ	.28	.24	.51	.37	1.17	2.34	4.48	9.88	13.06	.32	.15	3.18	35.98

Hda. el Burro, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1925						.16	2.71	.23	1.07	.85	0	1.28	
1926	.36	T	T	.48	.01	.86	1.48	1.86	.20	T	T	T	5.25
1927	0	T	T	T	T	1.31	1.55	.89	.35	.31	T	.15	4.56
1928	.93	.53	.18	T	.75	.30	2.20	.08	2.23	T	T	T	7.20
1929	0	0	T	T	.15	T	.83	T	1.02	.52	.57	1.04	4.13
1930	T	T	T	.14	1.21	.54	.32	T	T	2.40	1.26	1.06	6.93
1931	.96	.44	0	1.40	1.15	1.02	2.76	.04	.01	T	0	.23	8.01
1932	.22	.06	.18	T	T	.16	.59	1.34	.41	0	0	0	2.96
1933	T	T	0	0	.67	.89	1.32	.85	1.04	0	0	0	4.77
1934	0	0	0			0		.04	.08	.08	0	.16	
1935	.67	0	0	0	1.10	1.81	1.73	1.50	4.22	0	0	.39	11.42
1936	0	0	.12	1.10	.20	0	1.10	.37	2.09				
Normal ϕ	.28	.09	.04	.31	.52	.59	1.51	.64	1.06	.38	.17	.39	5.98

Palestina, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1931	‡4.55	1.03	1.22	2.41	4.13	4.80	3.45	.57	0	.16	.75	2.46	25.53
1932	.22	1.40	.74	.30	1.90	T	2.80	4.27	11.51	.20	1.42	.59	25.35
1933	‡ .52	1.14	.13	‡ .10	.68	1.89	0	.63	.18	1.54	.26	.14	7.21
1934	.82	.28	.73	.70	1.97	T	3.17	.20	3.24	.49	.12	.94	12.66
1935	.46	1.02	.20	1.85	5.89	8.33	1.61	.87	9.53	1.02	.49	2.15	33.42
1936	T	.06	2.80	1.02	3.80	4.53	1.89	1.48	6.21	1.69	.51	.43	24.42
1937	.10	.20	.69	T	1.28	.59	1.34	T	1.18	2.03	1.08	4.83	13.32
1938	.87	.41	.06	1.36	.79	.35	5.75	.69	.67	.08	T	.83	11.86
ϕ Normal.	.95	.74	1.08	1.05	2.84	2.44	2.31	2.09	3.55	1.00	.74	1.53	20.32

La Mariposa, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1896	.27	1.70	0	.30	.37	1.00	5.55	.77	13.32	10.58	1.04	.43	35.33
1897	.37	0	0	1.04	2.98	3.68	.52	9.64	4.06	.66	0	1.46	24.41
1898	0	.63	1.65	1.25	.63	7.82	1.36	1.13	2.06	1.05	2.34	1.24	21.16
1899	0	.11	0	1.06	1.85	4.92	.87	0	1.55	1.80	.54	.50	13.20
ϕ Normal.	.54	.45	.80	1.12	2.46	3.27	2.90	2.46	5.22	2.15	1.11	.60	23.08

Presa El Cuije, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1936	T	0	0	2.54	.35	T	1.40	1.54	2.09	.55	.43	.47	9.37
1937	T	0	T	T	.79	.39	.35	1.02	2.20	.12	0	1.89	6.76
1938	.16	0	T	.35	.16	1.06	2.71	.61	.28	.10	T	.31	5.74
1939	.14	0	.13	0	.25	.30	.02	3.58	1.26	5.14	T	.69	11.51
Average ϕ	.08	0	.03	.72	.39	.44	1.12	1.69	1.46	1.48	.11	.84	8.36

San Buenaventura, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926												.22	
1927	.17	.37	T	.24	.72	3.78	3.48	1.58	.77	.69	.05	.69	12.54
1928	.56	2.09	.45	.35	.62	.39	.35	.80	4.01	T	.50	.57	10.69
1929	.39	.29	.15	.14	1.03	.06	1.64	2.87	3.33	1.10	.77	T	11.77
1930	.39	.38	.33	.42	2.03	1.16	1.00	.22	.43	5.81	2.62	.81	15.60
1931	3.62	.64	.49	.76	2.59	1.25	1.44	.72	.37	T	T	1.68	13.56
1932	.22	.11	.27	T	1.20	2.57	.33	2.20	6.02	2.41	.64	.28	16.25
1933	T	1.25	.06	T	.43	1.97	2.54	2.68	4.18	1.33	.25	0	14.69
1934	.48	T	.12	.72	.44	.56	1.22	.64	1.42	T	0	.54	6.14
1935	1.17	.35	.53	.24	1.48	5.44	2.10	1.28	1.84	.34	.23	1.67	16.67
1936	.09	.17	.47	.18	2.93	.67	2.23	.98	2.38	1.02	1.68	.68	13.48
1937	.06	.26	.21	0	1.56	T	.88	.59	1.60	.50	0	2.08	7.74
1938	.77	.41	0	1.43	.61	.66	4.86	3.52	.22	.16	0	.51	13.15
1939	1.38	0	.14	1.41	2.72	.12	.26	2.18	.98	3.12	.46	.89	13.66
1940	.51	.20	.54	T	3.40	2.94	T	2.87	.51	1.92	.65	3.08	16.62
ϕ Normal.	.70	.47	.27	.42	1.55	1.54	1.60	1.65	2.00	1.31	.56	.91	12.98

RAINFALL ON MEXICAN SIDE OF RIO GRANDE WATERSHED — INCHES — continued

Sabinas, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1922					2.44	3.16	.09	.64	6.11	.74	.86	0	
1925	.18	4.06	2.02	2.43	1.15	2.25	.31	1.04	10.63	1.06	2.59	0	27.72
1926	2.83	T			7.72	5.43	3.20	1.81	.47			3.29	
Average ♦	1.50	2.05	2.02	2.43	3.77	3.61	1.87	1.16	5.74	.90	1.72	1.10	27.85

El Barrio, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926						3.34	1.98	3.23	2.20	6.52	.43	.98	
1927	0	0	T	2.74	3.39	10.26	3.56	T	2.99	2.13	.01	2.17	27.25
1928	1.77	2.32	T	.28	6.85	.31	.63	.87	5.36	4.33	2.40	2.95	28.07
1929	T	0	1.18	.59	T	.79	2.24	.31	1.02	1.30	.91	1.57	9.91
1930	T	.23	.39	.50	5.18	3.09	1.17	.61	2.27	5.17	3.74	.14	22.49
1931	4.94		1.46										
Average ♦	1.34	.64	.61	1.03	3.86	3.56	1.91	1.00	2.77	3.89	1.50	1.56	23.67

Sierra Mojada, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1897			0	0	.79	1.38	.20	3.74	.67				
1907			0	.66					0	1.77	1.89	.13	
1908	.05	.31	.21	.37	.11	2.33	3.36	4.50	1.50	.05	.02	.05	12.86
1909	.17	.09	0	.07	0	2.81	6.71	2.38	1.87	0	0	.73	14.83
1910	0	0	.25	0	.22	3.09	.31	1.24	2.66	1.15	.05	0	8.97
1911	.25	.81	3.19		.60	3.01	1.75	.85	1.80	1.38		.16	
1912	0						6.75	3.80	1.61	1.93	3.03		
1913	.09												
1924					.10	0	2.99	1.24	.51	.05	0	.08	
1925	0	0	.71	.21	1.57	.18	8.00	5.04	5.47	3.67	T	2.17	27.02
1926	1.02	T	.46	1.65	1.40	.66	3.13	5.16	2.38	1.44	1.20	.37	18.87
1927	0	1.18	0	0	1.22	2.75	1.28	3.27	3.70	.35	0	1.29	15.04
1928	.71	.38	.30	0	1.05	.94	4.08	2.87	7.69	T	.20	T	18.22
1929	0	0	T	T	.65	.14	1.24	.39	3.84	.47	T	.35	7.08
1930	.14	0	.80	.34	.94	6.63	4.47	1.85	.91	3.97	2.69	.98	23.72
1931	4.61	.49	.87	T	1.48	1.06	2.44	1.12	.37	.27	.09	.47	13.27
1932	.14	.19	.42	.25	.33	.65	3.02	4.35	7.50	.37	0	T	17.22
1933	.12	.35	T	T	.65	2.91	.67	2.36	1.85	1.75	.08	0	10.74
1934	.10	T	0	.47	.93	.18	3.31	2.34	.65	.18	T	.14	8.30
1935	.65	1.40	.06	.08	.50	5.86	3.15	1.63	4.62	1.08	0	.83	19.86
1936	.52	0	.30	.37	3.25	T	3.17	3.13	3.28	.83	1.44	.72	17.01
1937	T	.26	.08	.08	2.89	1.26	.93	.57	2.25	.52	.23	3.24	12.31
1938	.53	T	.02	.43	.06	5.20	4.66	1.38	5.08	.57	0	T	17.93
1939	1.22	0	.18	.59	.74	1.97	1.95	5.53	1.59	6.40	1.14	2.17	23.48
1940	1.30	.18	.35	T	2.09	6.34	2.24	5.04	1.14	2.24	.87	.43	22.22
Normal ♦	.53	.28	.37	.27	.98	2.24	3.04	2.77	2.62	1.32	.59	.65	15.66

Cuatro Ciénegas, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1907					0	.51				2.07	1.02	0	
1908		T	.06	.98	.73	.93	3.12	1.28	0	0			
1909				.39	.20	.28	4.43	2.13	0	0	0	.39	
1910	0	0	.39	0	0	0	.0	.98	1.68	0	0	.20	3.25
1911	0	.60	1.54	.97	1.02	.79	.49	3.69	1.15	.24	1.07	.09	11.65
1912	.11	.45	.04	.16	.06	.43	.29	.35	2.17	.20		1.50	
1913	.41												
1923						.31	.20	.70	2.37	.59	1.61	2.59	
1924	.12	.16	0	.07	1.50	.70	.87	0	.53	0	0	.51	4.46
1925	T	0	.20	.02	.22	T	2.05	.31	.21	1.55	T	.55	5.11
1926	.31	T	T	.15	1.06	1.30	.24	1.05	0	.44	.34	.31	5.20
1927	0	.65	T	.08	.49	2.16	T	T	T	T	.10	.20	3.68
1928	.34	.98	T	0	.10	.10	0	1.67	1.67	T	T	.23	5.09
1929	0	0	0	0	.79	.39	1.18	.23	.47	.59	.30	T	3.95
1930	0	.20	T	.18	.89	1.08	T	T	0	3.44	.89	1.08	7.76
1931	1.87	.39	0	.33	2.26	.23	.10	T	0	.22	0	1.67	7.07
1932	.59	.10	0	0	.10	T	.16	.74	1.38	T	.24	T	3.11
1933	T	T	T	0	.10	.83	1.08	1.04	1.18	T	0	T	4.23
1934	T	T	0	.34	T	T	.49						
Normal ♦	.24	.24	.15	.23	.56	.56	.86	.89	.80	.55	.37	.58	6.03

Castaños, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1932										.93	T	T	
1933	.09	1.83	.08	.51	.39	2.35	3.22	2.91	6.28	1.81	.31	0	19.78
1934	.39	.63	.39	.49	.51	.08	1.69	.55	3.23	.12	0	.35	8.43
1935	2.56	.23	.31	.23	.83	5.48	1.57	.08	3.86	T	T	1.42	16.57
1936	.08	T	.55	.47	3.11		1.54	2.36	2.36	0	.16	.55	
Average ♦	.78	.67	.33	.42	1.21	2.64	2.00	1.48	3.93	.57	.09	.46	14.58

Camarón, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1928		2.45	.59	.52	6.22	T	.19	.54	6.35	.36	1.12	1.30	
1929	.43	.30	.91	1.83	1.81	1.26	1.22	.14	3.19	.20	.94	.28	12.55
1930	0	.94	.47	1.63	5.49	4.27	.50	.10	.28	4.77	3.07	.08	21.60
1931	5.36	1.38	1.42	1.97	6.77	2.32	2.36	4.53	0	.43	T	2.17	28.71
1932	.83	.39	.83	1.10	3.62	.47	.03	.98	7.33	.37	.09	.09	16.13
1933	.40	.92	.14	.49	0								
Average ♦	1.40	1.06	.73	1.26	3.98	1.66	.86	1.26	3.43	1.23	1.04	.78	18.69

Lampazos, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903					.24			.93	1.44	T			
1904			0	T	.69	.94	1.63	.27	9.04	2.06	2.42	.31	
1905	.30	.86	1.18	1.06	3.35	2.27	.31	1.34	1.83	2.79	2.52	2.23	20.04
1906	0	2.84	.19	1.25	.20	.05	6.70	1.67	1.69	.27	.87	.80	16.53
1907	.23	.65	.26	.69	1.28	1.04	1.43	0	1.78	2.42	2.08	.11	11.97
1908	T	0	.62	.14	.21	0	.54	.03	.98	1.10	.98	.23	4.83
1909	0	.23	.16	1.29	.83	.87	1.97						
1910					.04	.35	.39				0	.59	
1911	.12	1.10	3.58	2.09		0	.83		0				
1912			.04	1.38				0		6.66	11.15	2.83	
1913	3.54	0											
1921					0	3.17							
1923									10.96	2.01	1.73		
1924	.36	.77	T	.29	2.24	.02	2.08	T	13.24	T	T	.50	19.50
1925	.02	0	.11	.29	.74	.08	.58	1.66	4.10	4.50	.30	2.18	14.56
1926	1.70	0	.71	3.37	.49	.82	4.33	.34	4.75	4.14	.32	.74	21.71
1927	.37	.14	.13	.99	1.33	4.06	1.00	.43	1.44	1.97	T	.57	12.43
1928	1.25	1.55	.28	.66	1.61	T	.59	2.20	4.84	.48	1.35	1.12	15.93
1929	.13	.42	.39	.37	.38	.05	.30	.11	3.30	1.68	1.09	T	8.22
1930	T	.08	.70	1.65	6.44	1.02	.69	.06	1.24	5.05	1.91	.16	19.00
1934						T	.59	T			.06	.45	
1935	1.77	.57	.83	.35	3.35	2.87	4.31	T	5.10	3.19	.65	2.77	25.76
Normal ♦	.65	.61	.63	.99	1.38	.98	1.66	.56	4.11	2.40	1.61	.97	16.55

Villa Aldama, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1923										1.40	3.22		
1924							.98	.12	3.56	T	T	.55	
1925	T	0	1.46	1.14	.37	1.71	3.05	.93	4.39	1.20	.63	1.30	16.18
1926	.91	T	.55	1.85	.49	2.62	3.89	1.87	2.00	.99	.88	.60	16.65
1927	.35	T	T						.66	.80	.01	.08	
1928	2.69	1.57	.08	0	0	0	0	.61	7.58	.35	2.19	.45	15.52
1929	.26	.28	1.02	.51	.06	.53	3.74	1.48	5.79	1.34	.79	.04	15.84
1930	.24	0	.30	.63	4.41	3.05	.89	2.36	.22	5.74	2.04	.27	20.15
1931	3.30	.73	.40	.63	2.80	1.11	3.41	2.61	.15	.04	.03	.13	15.34
1932	.03	.31	.51	.94	.53								
Average ♦	.97	.36	.54	.81	1.24	1.50	2.28	1.43	3.04	1.32	1.09	.43	15.01

El Milagro, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926	.63	0	.75	1.40	.83	3.30	1.57	0		1.07	.31	.04	
1927	.06	.26	T	.04	.16	2.66	.35	1.44	.22	.11	.06	.65	6.01
1928	1.54	1.04	.28	.13	1.61	.45	.14	1.21	2.53	.43	.27	1.10	10.73
1929	.01	T	.07	0	.49	.27	T	0	1.95	.16	1.50	0	4.45
1930	.22	.17	.04	.12	2.09	1.15	.25	.30	2.09	3.08	1.81	.79	12.11
1931	2.37	1.13											
Average ♦	.80	.43	.23	.34	1.04	1.57	.46	.59	1.70	.97	.79	.52	9.44

♦ All available records were used in computing these Normals and Averages.
† Estimated from surrounding stations.

Hda. La Joya, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1927						.99	.71		.73	.74	.59	.85	
1928	.74	.43	.23	T	1.38	.13	2.11	.31	2.28	.26	.04	T	7.91
1929	0	0		T	.46	.03	1.00	.47	1.59	.44	.82	.39	
1930	T	.38	0	.29	.94	1.28	1.83	.33	.22	3.59	2.02	1.40	12.28
1931	1.06	.57	0	.47	1.28	.81	.80	1.57	.39	T	T	.21	7.16
1932	.16	.02	.33	T	T	.03	1.48	1.69	2.52	2.76	T	T	8.99
1933	T	.30	T	T	0	1.50	1.42	.83	1.73	0	0	0	5.78
1934	0	.18	0	.02	1.71	T	2.59	.31	3.19	.23	.08	.08	8.39
1935	2.72	.16	T	T	.20	4.61	1.19	.98	7.01	.46	.48	.31	18.12
Average ♦	.58	.26	.08	.10	.75	1.04	1.46	.81	2.18	.94	.43	.36	8.99

Gral Cepeda, Coah.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1926								2.90	1.08	.31	T	T	
1927	T	.16	T	.51	.39	3.15	5.87	2.95	3.74	.28	.20	1.14	18.39
1928	.87	.43	.59	T	1.06	.51	4.10	2.40	3.15	.63	.47	1.30	15.51
1929	.08	0	T	T	.91	.12	3.84	.81	1.57	.43	1.46	.30	9.52
1930	.49	.49	.08	.37	1.50	2.36	5.34	1.86	.47	4.69	2.18	1.16	20.99
1931	1.94	1.45	.16	.43	1.40	2.31	13.36	2.59	.76	.49	T	1.48	26.37
1932	T	.84	.31	T	T	2.35	1.89	3.04	6.63	T	.77	0	15.83
1933	0	1.14	.14	.37	T	3.25	1.72	3.89	6.86	3.19	.26	0	20.82
1934	.30	.10	0	.35	.35	2.26	3.08	2.53	2.56	1.18	0	.22	12.93
1935	.74	.98	.20	0	.50	4.85	4.01	.63	7.61	.83	0	.65	21.00
1936	.06	0	.18	.31	2.19	0	4.69	2.31	1.55	.40	.84	.67	13.20
1937	.53	.43	.10	0	1.24	2.91	2.74	1.79	3.58	.51	T	.69	14.52
1938	T	T	.22	.14	.93	4.35	5.51	4.24	1.74	T	.91	.95	18.99
1939	.88	T	1.12	.26	1.44	3.42	4.15	4.17	5.23	4.61	T	.69	25.97
♦ Normal.	.47	.47	.24	.20	.93	2.50	4.58	3.00	3.18	1.28	.57	.76	18.18

Carrillo, Chih.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1923	.18	.92	1.64	0	.13	5.54	1.87	4.84	4.19	.48	.83	2.88	23.50
1924	.70	.32	0	0	0	0		0	3.08	0	0	.46	
1925	0	0	.56	0	.90	.98	2.89	3.37	2.41	1.48	.10	1.57	14.26
1926	.37	0	.12	.85	0	3.21	2.13	1.57	2.46	.81	.32	.29	12.13
1927	0	.24	T	0	.27	2.02	1.37	2.21	3.31	.08	0	1.44	10.94
1928	.27	T	.54	0	.24	T	2.57	1.32	3.26	.20	.19	T	8.59
1929	0	0	T	T	.15	T	1.37	2.13	1.47	T	T	0	5.12
1930	0	0	.37	.24	.39	.86	1.97						
Average ♦	.19	.18	.40	.14	.26	1.58	2.02	2.21	2.88	.44	.21	.95	11.46

Sta. Rosalia, Tamps.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1933	.09	.77	.50	1.35	2.74	2.23	3.58	7.85	†7.22	1.16	2.39	.22	†30.10
1934	3.21	3.81	.07	1.76	1.34	1.33	2.86	.51	.88	1.35	0	.66	17.78
1935	†.28	.64	.13	.53	3.24	4.12	1.03	T	4.54	1.58	1.52	1.86	19.47
1936	.18	.68	.39	.72	1.27	0	4.11	3.06	.73	.69	.09	1.71	13.63
1937	.76	.55	.80	.06	†2.90	T	1.91	T	2.33	†1.42	0	2.20	12.93
♦ Normal.	.96	.70	.95	1.28	2.33	2.78	2.43	2.16	3.49	1.75	.73	1.53	21.09

Camargo, Tamps.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1921	.30	.25	.39	1.11	.09	1.48	2.11	.26	2.95	2.54	1.23	.51	13.22
1922	.38	.34	.85	.77	3.61	4.59	.51	.41	14.60	1.67	3.13	.11	30.97
1923	0	6.09	.46	.20	.08	.53	.83	.20	5.07	1.65	.64	2.14	17.89
1924	1.33	.55	T	.10	2.71	3.05	.84	T	1.13	.71	0	1.85	12.27
1925	0	0	1.73	T	0	.51	0	1.95	12.09	1.65	.20	9.65	27.78
1926	.30	0	2.28	1.54	2.28	1.81	3.94	.73	.23	1.57	1.38	2.68	18.74
1927	1.18	T	T	.79	.71	12.50	1.27	.12	.79	.98	T	.67	19.01
1928	4.53	4.80	.59	1.77	5.31	.48	T	.60	4.33	T	T	4.53	26.94
1929	1.65	T	2.17	.49	.23	4.92	6.79	4.33	.59	.39	.60	.43	22.59
1930	T	.31	4.72	1.10	9.13	3.39	T	.39	3.43	11.54	9.96	T	43.97
♦ Normal.	.97	1.23	1.32	.79	2.42	3.33	1.63	.90	4.52	2.27	1.71	2.26	23.35

Galeana, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1904										1.87	2.64		
1905	T	1.36	1.49	.70	1.04	1.95	2.14	1.32	2.51	4.87	3.28	2.62	23.28
1906	.29	2.89	.95	1.99	1.20	2.12		4.74	2.37	1.69	.14	1.08	19.46
1907	0	.98	0	.82	1.11	.57	3.44	1.38	1.26	1.71	.90	.92	13.09
1908	.06	T	.75	1.69	1.01	4.06	3.56	1.27	2.65	.84	.20	0	16.09
1909	.59	0	T	.93	1.96	1.63	2.83	11.10	1.22	.45	.35	.39	21.45
1910	.10	0	2.17					1.21					
1912	1.54	.13	.07	3.49	0	2.79	.33	1.36	5.10	2.86	.71	.35	18.73
1913	1.18	1.18	.35	.98	0	1.30							
1923									6.51	1.37	2.80	.21	
1924	2.18		0	.63	3.41	1.25	1.81	2.02	6.56	.70	0		
1925	0	.18	.87	.32	2.45	2.78	.99	1.81	3.32	1.62	1.33	3.97	19.64
1926	1.62	T	1.26	1.93	1.79	2.56	3.01	.81	2.83	2.70	T	.09	18.60
1927	T	.11	T	.16	2.61	9.84	1.76	.95	.49	1.03	.91	.20	18.06
1928	.20	1.22	.41	T	2.15	.51	1.62	1.96	7.57	.36		.24	
1929	.26	0	T	.24	1.16	2.03	2.54	.59	3.98	2.76	1.82	.39	17.77
1930	.79	.45	.19	.28	1.83	2.52	2.21	1.48	1.67	5.61	2.49	.39	19.91
1931	4.01	3.59	.33	.15	3.91	2.20	2.95	.79	1.70	.24	0	.30	20.17
1932	0	.55	.30	.10	1.36	2.31	1.83	3.05	3.23	.91	T	T	13.64
1933	T	.79											
Normal ♦	.71	.79	.54	.90	1.69	2.53	2.22	2.24	3.44	1.86	1.10	.74	18.76

Linares, N. L.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1900	.95	.83	3.46	3.86	8.27	4.10	6.89	.75	3.62	1.46	1.10	.91	36.20
1901	1.85	.23	T	1.34	4.25	8.63	1.38	1.97	14.18	3.39	2.72		
1902		1.65	T	3.33	3.94	.71			6.50	2.72		.94	
1904	0		.16	6.03	8.31	3.27	5.16	1.34	6.30	.83	4.37	.93	
1905	.28	1.42	2.99	1.30	.51	3.03	2.24	.23	3.11	2.80	3.27	2.40	23.58
1906	.47	3.90											
1910										1.49	.31		
1911	1.20	1.56	3.61		2.46			.80	.19	3.02	4.27		
1912	1.57	.72	.90	5.57	.18	8.47	2.10	.51	4.41	2.34	1.63	.35	28.75
1913	.74	1.13	.61	2.97	2.71	6.47	.63	1.32					
1921					0	3.17							
1923										3.57	1.24	1.32	
1924	.70	.71	.12	.92	3.63	2.57	1.01	T	6.69	3.79	2.05	2.27	24.46
1925	T	.08	.65	3.89	2.41	6.53	.62	1.71	11.58	4.88	.97	2.80	36.12
1926	.63	T	2.06	4.02	5.57	8.05	4.44	1.70	2.10	1.68	.56	.33	31.14
1927	.09	.32	T	2.57	1.05	10.69	3.57	.30	1.75	3.02	.13	1.30	24.79
1928	1.59	1.02	.86	.15	5.65	.48	3.36	.50	7.64	2.26	2.37	.75	27.76
1929	.24	.71	.70	.65	1.58	2.63	1.74	3.11	7.94	1.42	.93	1.13	22.78
1930	.72	.12	.26	2.11	7.64	2.26	3.17	2.29	1.05	9.93	1.54	.31	31.40
1931	5.19	1.39	.72	1.04	5.43	1.64	6.89	4.61	3.56	1.09	.40	.47	32.43
1932	1.08	.44	.35	.19	2.05	1.31	1.98	2.78	8.47	2.53	.43	.56	22.17
1933	.57	.63	1.89	.10	1.32	3.27	9.59	9.26	18.88	3.63	1.00	.45	50.59
1934	2.19	1.50	.26	6.71	2.32	.09	7.22	2.36	4.67	.71	.14	.72	28.89
1935	1.03	.39	1.30	2.26	5.07	7.63	3.32	.51	14.73	1.59	4.00	3.42	45.25
1936	.42	.14	1.05	4.18	4.78	1.58	8.34	7.86	5.34	.61	1.93	.33	36.56
1937	1.87	1.67	1.43	.60	2.08	1.97	7.08	.51	5.63	1.97	1.69	2.94	29.44
1938	.59	1.24	.59	2.01	3.52	4.80	.69	13.54	2.47	.52	.33	.28	30.58
1939	1.27	.18	.50	3.78	2.56	.53	1.19	2.07	3.59	3.19	.23	.28	19.37
1940	.46	.04	2.83	.59	3.07	4.81	1.02	6.45	4.85	3.93	.35	2.85	31.25
Normal ♦	1.03	.88	1.09	2.51	3.48	3.95	3.64	2.77	6.22	2.67	1.52	1.23	30.99

Matamoros, Tamps.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1912				.76	.26	13.44	.29	.16	2.68	7.87	3.07	1.38	
1913	1.97	.53	1.89	0									
1924	3.78	.78	.07	.08	3.07	†7.00	.61	.22	7.50	4.23	.02	3.26	30.62
1934	2.38	.94	1.69	3.29	.91	.19	4.34	.75	7.79	.25	.63	1.26	24.42
1939	1.42	.19	.22	3.97	5.39	5.22	1.31	1.95	3.89	.94	.25	.43	25.18
1940	.35	.24	3.18	.05	2.53	1.13	1.61	.88	1.77	4.65	2.10	7.84	26.33
♦ Normal.	1.45	.97	1.13	1.63	3.14	3.40	2.44	1.72	5.27	2.96	1.72	2.05	27.88

INDEX TO PRECIPITATION RECORDS

The lists and map which follow give reference to the location of all known precipitation stations ever kept in the Rio Grande Basin south of the New Mexico-Texas state line and several stations adjacent to the basin, as well as the publication or files in which the precipitation records may be found, and each year within which some record is available. Recording rain gages are indicated. Latitudes, longitudes, and elevations are the best available data.

In 1940 from May to October, 35 rain gages were operated on Guayuco Arroyo watershed, the records of which are in the files of this Commission to be reported upon later. Three of these gages are stations 27, 28 and 29 in the following United States list.

The letters and numbers in the body of the tables have the following meanings:
t = Climatic Conditions in Texas, U. S. War Department, publication 1891.
s = Climatological Summary, U. S. Weather Bureau publication.
c = Climatological Data, monthly, U. S. Weather Bureau publication.
1 to 9 = Water Bulletins Nos. 1 to 9.
x = Water Bulletin No. 10.
f = Files of the International Boundary Commission.
h = Hydrologic Network Region 6, U. S. Weather Bureau publication.
r = Hydrologic Network Region 7, U. S. Weather Bureau publication.
• = A recording rain gage was used.

UNITED STATES PRECIPITATION RECORDS

No.	Name of Station	Latitude	Longitude	Elevation	YEARS WITHIN WHICH SOME RECORD IS AVAILABLE									
					1850	1860	1870	1880	1890	1900	1910	1920	1930	1940
8	Alamogordo	32°55'	105°57'	4,340					sssss s	ssss sssss	sssss sssss	sssss sssss	scccc ccccc	c
9	Alamogordo	32°53'	105°57'	4,320										r
90	Alpine	30°22'	103°40'	4,480						s	ssss sss	s	scccc ccccc	r
14	American Dam	31°47'	106°32'	3,730									89	ẋ
103	Bakersfield	30°51'	102°24'	2,600										r
85	Balmorhea	30°29'	103°44'	3,220								ss sssss	scccc ccccc	c
86	Balmorhea	31°00'	103°41'	3,000									x	ḟ
75	Barstow	31°27'	103°24'	2,570						s ssss	sssss sssss			
53	Big Bend Park	29°16'	103°18'	5,150									9989	x
106	Big Lake	31°12'	101°28'	2,690										ḣ
55	Boquillas	29°11'	102°57'	1,870										r
124	Brackettville	29°18'	100°25'	1,250									ccccc	h
35	Brite Ranch	30°19'	104°32'	4,620										ḟ
151	Brownsville	25°54'	97°30'	60	ttttt tttt	t t	tssss sssss	sssss sssss	sssss sssss	sssss sssss	sssss sssss	ssṡṡṡ ṡṡṡṡṡ	ṡċċċċ ċċċċċ	ḣ
152	Brownsville Airport	25°51'	97°28'	40										h
98	Buena Vista	31°12'	102°39'	2,420							sss sssss	sssss sssss	s	ḟ
37	Bunton, Lucius	29°56'	104°21'	4,550										x
2	Cambray	32°14'	107°20'	4,220					s	sssss sssss	sssss sssss	sssss sssss	sc cccc	r
36	Candelaria	30°08'	104°41'	2,850									66789	x
127	Carizzo Springs	28°32'	99°52'	650							sss sss	ss	scccc ccccc	h
66	Carlsbad	32°18'	104°12'	3,120				s	s s sssss	sssss sssss	sssss sssss	sssss sssss	scccc ccccc	ḟ
67	Carlsbad Caverns	32°10'	104°26'	4,250									cccc ccccc	c
10	Carson Seep	32°07'	104°43'	6,500							s sssss	sssss sssss	scccc ccccc	r
92	Chancellor	30°42'	103°11'	3,400										ḟ
84	Childress Ranch	31°00'	104°02'	4,000									x	x
128	Chupadero Ranch	28°11'	100°04'	640									x x	
104	Coats Ranch	30°32'	102°15'	3,000									cccc	
108	Comstock	29°41'	101°11'	1,530	ss	ss			sss	s s s s	s		9	x
11	Cornudas	31°44'	105°15'	4,000										r
24	County Line	31°23'	105°59'	3,550									8̇9̇	ẋ
96	Crane	31°25'	102°22'	2,690									c	r
46	Crosson Ranch	30°03'	103°41'	4,760									88 88889	x
45	Davis Ranch	30°07'	103°44'	5,000										r
139	Delmita	26°40'	98°09'	90										ḣ
121	Del Rio	29°20'	100°53'	940						ṡṡṡṡṡ	ṡṡṡṡṡ ṡṡṡṡṡ	ṡṡṡṡṡ ṡṡṡṡṡ	ṡċċċċ ċċċċċ	ḣ
1	Deming	32°16'	107°45'	4,330		s	ssss	ssss sssss	sssss sssss	sssss sssss	sssss sssss	sssss sssss	scccc ccccc	r
120	Devils Lake	29°34'	100°59'	1,080									9	x
130	Dolores	27°41'	99°43'	470										ḣ
61	Dryden	30°03'	102°07'	2,140									6666 66789	x
126	Eagle Pass	28°42'	100°29'	740	ttttt ttttt	tt	ssss sssss	ssss s	sssss sssss	sssss sssss	sssss sssss	sssss sssss	scccc ccccc	h
143	Edinburg	26°17'	98°10'	100									fff fffff	f
110	Eldorado	30°52'	100°36'	2,420										ḣ
15	El Paso	31°46'	106°29'	3,780	ss s sssss	ss sssss	sssss ss ss	sssss sssss	sssss sssss	sssss ṡṡṡṡṡ	ṡṡṡṡṡ ṡṡṡṡṡ	ṡṡṡṡṡ ṡṡṡṡṡ	ṡċċċċ ċċċċċ	ḟ
12	El Paso Air Port	31°48'	106°25'	3,910										ḟ
129	Encinal	28°02'	99°22'	560						sss	sssss sssss	sssss sssss	scccc ccccc	h
23	Fabens-Guadalupe Bridge	31°26'	106°08'	3,610										r
22	Fabens, (Reclamation)	31°30'	106°09'	3,610									x	x
21	Fabens, (S.C.S.)	31°32'	106°04'	3,880										r
29	Finlay	31°16'	105°37'	3,960										x
43	Fletcher, Turner Ranch	30°10'	104°12'	4,850										ḟ
13	Fort Bliss	31°49'	106°25'	3,890								6 66666	66666 66789	x
125	Fort Clark	29°18'	100°25'	1,050	ttt ttttt	tt t	tssss sssss	ssss s ss	sssss sssss	sssss sssss	sssss sssss	sssss sssss	s	x
40	Fort D. A. Russell	30°19'	104°01'	4,670								66	66666 66789	x
79	Fort Davis	30°35'	103°53'	4,800	sssss	st s	sssss sssss	sssss sssss	ss	sss sss	ssss sssss	sssss ssss	scccc ccccc	r
25	Fort Hancock	31°18'	105°50'	3,520				s	sssss s					
26	Fort Hancock Bridge	31°16'	105°51'	3,500										x
131	Fort McIntosh	27°30'	99°31'	460	ttttt ttttt	t	tssss sssss	ssst sss	sssss sssss	sssss sssss	sssss sssss	sssss sssss	s	x
113	Fort McKavett	30°50'	100°06'	2,150	sss sssss		s sss sssss	ssss s	sssss sssss	sssss ss	s sssss	sssss sssss	sccc	
137	Fort Ringgold	26°23'	98°48'	170	ttttt tttt	t	tssss sssss	sssss sssss	sssss sssss	sssss ss	sss sssss	sssss sssss	scccc ccccc	c
102	Fort Stockton	30°54'	102°53'	3,050	s	s	sssss sssss	sssss ss	s sssss	sssss sssss	sssss sssss	sssss sssss	scccc ccccc	r
30	Fort Quitman	31°06'	105°36'	3,430	s	ss	ssss							
31	Fort Quitman	31°06'	105°37'	3,450									789	ḟ
100	Girvin	31°05'	102°24'	2,300										r
94	Grand Falls	31°21'	102°57'	2,300						s	ssss sssss	sss sssss	scccc cccc	r
70	Guadalupe Pass	31°52'	104°50'	5,500										ḟ
148	Harlingen	26°11'	97°43'	40							ssss ss s	sssss sssss	scccc ccccc	h
134	Hebbronville	27°18'	98°40'	550						ssss	sssss sssss	sssss sssss	scccc ccccc	h
141	Hidalgo	26°06'	98°16'	100									ccc ccccc	h
62	Bodge Ranch	29°49'	101°42'	1,750									x	
54	Hot Springs	29°10'	103°00'	1,900										ḟ
91	Hovey	30°36'	103°22'	3,520								ss sssss	sc	
33	Indian Hot Springs	30°49'	105°19'	3,380										r
95	Imperial	31°16'	102°42'	2,450										r
18	Island	31°32'	106°14'	3,630									9	ḟ
52	Johnson Ranch	29°01'	103°23'	2,050									66 66789	x
77	Kent	31°05'	104°12'	4,210					ssss sssss	sssss sss		s	s	
81	Kingston Ranch	30°52'	103°49'	3,700										r
112	Knickerbocker	31°16'	100°38'	2,050						s sssss	sssss sssss	sssss sssss	scc	
82	Kountz Ranch	30°52'	103°46'	3,800										ḟ
3	Lanark	31°58'	106°49'	4,160					s	sssss sssss	sssss sssss	ssss		
63	Langtry	29°48'	101°34'	1,390									cccc ccccc	ḟ
132	Laredo	27°32'	99°31'	420					s ss		sss sssss	sssss sssss	scccc ccccc	c
133	Laredo (Airport)	27°32'	99°26'	450										h
60	Longfellow	30°10'	102°38'	3,400									cc	
56	Marathon	30°12'	103°14'	4,040				s	sss ssss	s	sssss s			r
41	Marfa	30°19'	104°01'	4,670						sss	sssss s			ḟ
101	McCamey	31°08'	102°13'	2,450									ccc ccccc	r
80	McDonald Observatory	30°40'	104°00'	6,500									ẋ	ḟ
114	Menard	30°56'	99°48'	1,190									cccc ccccc	h
145	Mercedes	26°09'	97°55'	70							s sssss	sssss sssss	scccc ccccc	h
146	Mercedes Pump	26°04'	97°54'	60									fff fffff	f
78	Merrill, R. K. Ranch	30°36'	104°00'	5,180										r
73	Midland	32°00'	102°04'	2,780				ssss	s sssss	s s	sssss sssss	sssss sssss	scccc cccc	h
34	Miller, C. E. Ranch	30°37'	104°38'	4,240									ccc	r
140	Mission	26°13'	98°19'	140							sssss sss s	sssss sssss	scccc ccccc	h
42	Mitchell, Clay, Ranch	30°13'	104°05'	4,660										r
47	Mitchell, Crawford T.	30°09'	103°53'	4,780										x
44	Mitchell, Tom C.	30°12'	103°55'	4,680										r
48	Mitchell, W.B.-Escondido	30°01'	103°46'	5,100										r
74	Monahans	31°36'	102°55'	2,610									cc	
122	Montell	29°32'	100°00'	1,300							sss sssss	sssss sssss	scccc ccccc	h
88	Moore, W.E. Ranch	31°07'	103°44'	2,900									x	x
119	Myers Ranch	29°49'	100°47'	1,700										ḣ
5	Newman	32°00'	106°19'	3,990						s	sssss sssss	sssss sssss	sccc	
4	New Mexico Agr. College	32°17'	106°45'	3,860	ssss sssss	ss sssss	sssss sssss	sss ssss	s sss sssss	sssss sssss	sssss sssss	sssss sssss	scccc ccccc	ḟ
49	02 Ranch	29°51'	103°50'	3,780							s sssss	sssss ssss		
7	Orogrande	32°22'	106°06'	4,170						ss s	sssss sssss	sssss sssss	scccc ccccc	ḟ
117	Ozona	30°31'	101°10'	2,350										ḣ
76	Pecos	31°26'	103°30'	2,580									ccccc	r
107	Pecos River Station	29°45'	101°21'	1,060									89	x
69	Pine Springs	31°54'	104°49'	5,800									c	r
83	Popham Ranch	30°53'	103°33'	3,300									x	x
153	Port Isabel	26°04'	97°13'	20					ssss	s		ss	scccc ccccc	h
38	Presidio	29°34'	104°23'	2,560				tt					cccc ccccc	c
89	Prewit Ranch	31°16'	103°30'	2,700									x	x

INDEX TO PRECIPITATION RECORDS–continued

UNITED STATES PRECIPITATION RECORDS — continued

No.	Name of Station	Latitude	Longitude	Elevation	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940
					YEARS WITHIN WHICH SOME RECORD IS AVAILABLE									
147	Raymondville	26°29'	97°46'	30							aaaaa aaaaa	aaaaa aaaaa	accccc cccccc	h
68	Red Bluff Dam	31°54'	103°55'	2,820										r
93	Reed Ranch	31°15'	103°07'	2,660										r
111	Reiley Ranch	30°37'	101°15'	2,130										r
138	Rio Grande City	26°22'	98°48'	150										h
19	Roberts Dam	31°35'	106°06'	3,930										x
118	Rock Springs	30°02'	100°13'	2,400					a aaaaa				cc cc	h
64	Roswell	33°24'	104°36'	3,560			aa	aaaaa aaaaa	aaaaa aaaaa	aaaaa aaaaa	aaaaa aaaaa	aaaaa aaaaa	aaccc ccccc	c
65	Roswell	33°23'	104°36'	3,550										c
109	San Angelo	31°27'	100°26'	1,850										r
149	San Benito	26°08'	97°38'	40			aaa	aaaaa aaaaa	aa		aa	aaaaa aaaaa	aaaaa aaaaa	accccc cccccc	h
150	San Benito Pump	26°03'	97°45'	50								aaaaa aaaaa	accccc cccccc	h
59	Sanderson	30°08'	102°23'	2,780									ff fffff	f
58	Sanderson (Army)	30°08'	102°23'	2,810										r
57	Sanderson (Weather Bur.)	30°08'	102°23'	2,780										x
20	San Felipe	31°33'	106°05'	3,840					a aaaa	aaaa			aa accccc	x
87	Saragosa	31°03'	103°39'	2,950										r
142	Sharyland	26°13'	98°17'	120										x
105	Sheffield	30°41'	101°50'	2,190										fff
27	Sierra Blanca	31°10'	105°21'	4,510										r
39	Smith Bros.	30°29'	104°06'	3,230					aaaaa aaa					
17	Socorro (Clint)	31°36'	106°17'	3,660										x
115	Sonora	30°34'	100°37'	2,200								aa	aaaaa aaaaa	accccc cccccc	r
50	Study Butte	29°19'	103°33'	2,600						aaa aaaaa	aaaaa aa			
116	Substation 14	30°15'	100°34'	2,600									aa aaaaa a	
51	Terlingua	29°19'	103°37'	2,900									aaa aaaaa	accccc cccccc	c
71	Tinnin Ranch	31°31'	104°08'	3,580									99	r
99	Upland	31°23'	101°53'	2,670										r
123	Uvalde(Record began 1849)	29°13'	99°48'	940	aaaaa a	a aa		aaa aaaa			aaaaa	aaaaa aaaaa	aaaaa aaaaa	accccc cccccc	h
32	Van Horn	31°02'	104°50'	4,040										r
144	Weslaco	26°10'	97°59'	80							aa	aaaaa aa		f fffff	f
28	West Small	31°16'	105°33'	4,070										x
6	White Sands	32°46'	106°10'	4,010										c
72	Wink	31°47'	103°13'	2,820										c
16	Valeta	31°42'	106°19'	3,650										x
133	Zapata	26°53'	99°19'	290										h
136	Zapata	26°53'	99°19'	270									666 66789	
97	Zitler Ranch	31°16'	102°54'	2,460										r

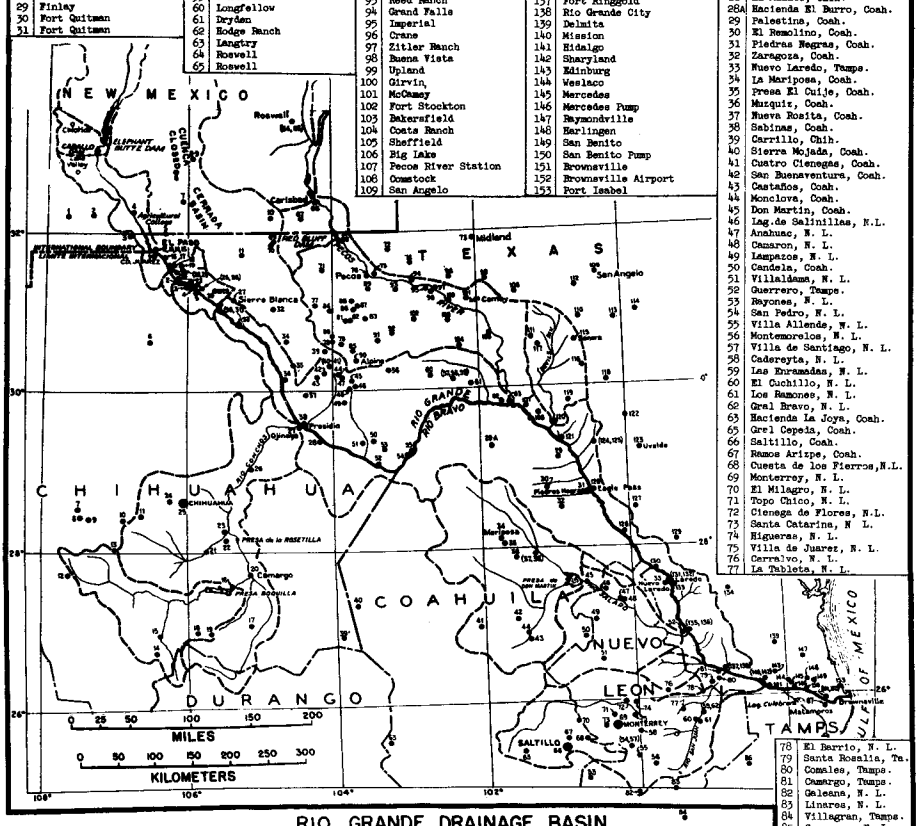
MEXICAN PRECIPITATION RECORDS

No.	Name of Station	Latitude	Longitude	Elevation	1890	1900	1910	1920	1930	1940
					YEARS WITHIN WHICH SOME RECORD IS AVAILABLE					
47	Anahuac, N. L.	27°15'	100°07'	650					99 99989	
15	Balleza, Chih	26°57'	106°21'	5,870				ff	f	
11	Bustillos, Chih.	28°28'	106°39'	6,690				xxx	xx	
58	Cadereyta, N. L.	25°36'	99°59'	1,180		9999	9999	9999	99 99x	x
20	Camargo, Chih	27°42	105°10'	4,000		xx xxxxx	xx	xx xxxxx	xxxx	
31	Camargo, Tamps.	26°20	98°50'	220				xxxx	xxxxx xxxxx	x
43	Camaron, N. L.	27°16'	100°04'	590				xx	xxxx	
50	Candela, Coah.	26°50'	100°40'	940					f	
39	Carrillo, Chih.	26°53'	103°55'	3,620				xx xxxxx	x	
43	Castaños, Coah.	26°48'	101°25'	2,440					xxx xx	
76	Cerralvo, N. L.	26°06'	99°37'	1,130					99	
72	Chihuahua, Chih.	28°38'	106°04'	4,690		99999 99999	9999 9999	99999 99999	99 9989	x
12	Cienega de Flores,N.L.	25°58'	100°10'	1,760					99	x
80	Comales, Tamps.	26°14'	98°56'	270					99	x
12	Creel, Chih.	27°48'	107°38'	7,780					xx x xx	
47	Cuatro Cienegas, Coah.	26°59'	102°04'	2,430		xxx	xxxx	xx xxxxx	xxxxx	
10	Cusuhtemoc, Chih.	28°25'	106°52'	6,720				xxx	xxxxx	
62	Cuesta de los Fierros,N.L.	25°32'	100°42'	6,890					9	x
22	Delicias, Chih.	26°11'	105°31'	3,710					99 99989	x
45	Don Martin, Coah.	27°30'	100°36'	790				777	77777 77789	x
78	El Barrio, N. L.	26°04'	99°09'	1,310				xxxx	xx	
28A	El Burro,Hacienda, Coah.	29°17'	101°52'	3,640				xxxxx	xxxxx xx	
60	El Cuchillo, N. L.	25°43'	99°16'	590					99	x
70	El Milagro, N. L.	25°45'	100°49'	3,220			xxxx	xx		
26	El Mulato, Chih.	29°23'	104°10'	5,530				9999	99999 99989	x
30	El Remolino, Coah.	28°44'	101°07'	1,540					ff	
4	Esperanza, Chih.	31°20'	105°57'	3,720					ff	
82	Galeana, N. L.	24°50'	100°03'	5,430		x xxxxx	x xx	xx xxxxx	xxxx	
62	Gral Bravo, N. L.	25°48'	99°09'	390		9999	9999	7777	77777 77779	x
65	Gral Cepeda, Coah.	25°24'	101°29'	4,920				xxxx	xxxxx xxxxx	x
2	Guadalupe, Chih.	31°23'	106°06'	3,610					ff	
7	Guerrero, Chih.	28°33'	107°30'	6,560		xx xxxxx	x	x xxxxx	xxxxx xxxxx	x
52	Guerrero, Tamps.	26°47'	99°20'	310					xxxx	x
74	Higueras, N. L.	25°59'	100°01'	1,640		9999	9999	7777	77777 77789	
18	Hormiguero, Chih.	27°02'	105°42'	5,580					8	x
1	Juarez, Cd., Chih.	31°44'	106°29'	3,750		99 99999	9 99	999 99999	99999 99989	x
16	La Boquilla, Chih.	27°32'	105°25'	4,320			xxxxx xxxxx	xxxxx xxxxx	xxxxx xxxxx	x
63	La Joya, Hacienda, Coah.	25°32'	103°19'	3,680				xxx	xxxxx x	
9	La Junta, Chih.	28°26'	107°20'	6,730				xxxxx	xxxx x	
34	La Mariposa, Coah.	28°09'	101°44'	2,010	xxxx	99999 99999	99999 99999	97777 77777	77777 7778	
77	La Tablela, N. L.	25°51'	99°26'	820					9	x
46	Lag de Saltillas, N.L.	27°26'	100°22'	750						x
40	Lampacos, N. L.	27°02'	100°31'	1,040		xx xxxxx	xxxx	x xx xxxxx	x x x	
83	Linares, N. L.	24°52'	99°34'	1,180		xxx x xx	xxxx	x xx xxxxx	xxxxx xxxxx	x
59	Las Enramadas, N. L.	25°48'	99°16'	730				7777	77777 7778x	x
61	Los Ramones, N. L.	25°42'	99°33'	270					9	
26	Maclovio Herrera(Palomir)	29°03'	105°08'	3,580				x xxxxx		
87	Matamoros, Tamps.	25°52'	97°30'	40			xx7 7777	7777x 77777	7777x 7778x	x
86	Mendez, Tamps.	25°07'	98°35'	420					9	
23	Mesqui, Chih.	28°15'	105°28'	3,790				xxxx	xx	
8	Mifneca, Chih.	26°27'	107°28'	6,520				xxx		
44	Monclova, Coah.	26°54'	101°25'	1,920	99	999	9999	7777 77777	77777 77789	x
56	Montemorelos, N. L.	25°12'	99°50'	1,420		9 99999	9999	9999	9 989	x
69	Monterrey, N. L.	25°40'	100°18'	1,730	7777	77777 77777	77777 77777	77777 77777	77777 77789	x
36	Muzquiz, Coah.	27°52'	101°31'	1,650				77	77777 77777	x
37	Nueva Rosita, Coah.	27°55'	101°17'	1,410					77777 77777 77789	x
33	Nuevo Laredo, Tamps.	27°29'	99°31'	420		9	99	99999 99999	99999 99989	x
27	Ojinaga. Chih.	29°34'	104°25'	2,620		9999	99	999 99999	9	
13	Ojos Azules, Chih.	28°04'	106°58'	7,150				ff	f	
29	Palentina, Coah.	29°08'	100°57'	1,080					xxxx xxxxx	x
19	Parral, Chih.	26°56'	105°39'	5,740		xx xxxxx	xxx	xxxx xxxxx	x	
31	Piedras Negras, Coah.	28°42'	100°31'	720		999	9999	999 99999	99999 99	
5	Porvenir, Chih.	31°15'	105°50'	3,710					ff	
35	Presa El Cuije, Coah.	28°04'	101°39'	1,640					xxxx	
67	Ramos Arizpe, Coah.	25°32'	100°58'	4,590		999	9999	7777	77777 77789	x
53	Rayones, N. L.	25°01'	100°41'	1,970				7777	777 789	x
38	Sabinas, Coah.	27°54'	101°17'	1,430				xx x		
17	Salaices, Chih.	27°04'	105°13'	4,690				xx	xxxxx x	
66	Saltillo, Coah.	25°26'	101°00'	5,280		99999 99999	99999 99999	99999 99999	99999 99999	x
42	San Buenaventura, Coah.	27°05'	101°33'	2,300				xxxx	xxxxx xxxxx	x
3	San Ignacio, Chih.	31°22'	106°00'	3,600					ff	
24	San Luis, Chih.	28°46'	106°18'	5,520				77	77777 77xxx	
54	San Pedro, N. L.	25°24'	100°07'	3,280					9	x
73	Santa Catarina, N. L.	25°41'	100°26'	1,970					999	x
79	Santa Rosalia, Tamps.	26°10'	98°50'	860				9 99999	99xxx xxxxx	x
40	Sierra Mojada, Coah.	27°17'	103°42'	4,120	x	xxx	xxxx	x xxxxx	xxxxx xxxxx	x
14	Tascate, Chih.	26°42'	106°28'	7,220				xx xxxx		
71	Topo Chico, N. L.	25°49'	100°20'	1,640					9	x
55	Villa Allende, N. L.	25°17'	100°01'	2,210					99	x
75	Villa de Juarez, N. L.	25°58'	100°03'	980					fff	
57	Villa de Santiago, N. L.	25°25'	100°07'	1,460				99 99999	999 989	x
84	Villagran, Tamps.	24°29'	99°29'	1,260					9	
6	Villa Gonzales, Chih.	30°38'	106°31'	3,950		99 99999	999	99999 99999	99999 99999	x
21	Villalba, Chih.	28°01'	105°46'	3,940						f
51	Villa Aldama, N. L.	26°29'	100°28'	1,540				xx xxxxx	xxx	
32	Zaragoza, Coah.	28°28'	100°54'	1,150					ff f	
85	Zaragoza, N. L.	23°59'	99°45'	4,920					8	

LOCATION OF PRECIPITATION STATIONS IN UNITED STATES AND MEXICO

No.	Name of Station In United States
1	Deming
2	Cambrey
3	Lanark
4	N.M. Agr. College
5	Newman
6	White Sands
7	Orogrande
8	Alamogordo
9	Alamogordo
10	Carson Seep
11	Cornudas
12	El Paso Air Port
13	Fort Bliss
14	American Dam
15	El Paso
16	Toleta
17	Socorro (Clint)
18	Island
19	Roberts Dam
20	San Felipe
21	Fabens, (S.C.S.)
22	Fabens, (Reclamation)
23	Fabens-Guadalupe Bridge
24	County Line
25	Fort Hancock
26	Fort Hancock Bridge
27	Sierra Blanca
28	West Small
29	Finlay
30	Fort Quitman
31	Fort Quitman
32	Van Horn
33	Indian Hot Springs
34	C. E. Miller Ranch
35	Brite Ranch
36	Candelaria
37	Lucius Bunton
38	Presidio
39	Smith Bros.
40	Fort D. A. Russell
41	Marfa
42	Clay Mitchell Ranch
43	Turner Fletcher Ranch
44	Tom C. Mitchell
45	Davis Ranch
46	Crosson Ranch
47	Crawford T. Mitchell
48	W.S.Mitchell-Escondido
49	OZ Ranch
50	Study Butte
51	Terlingua
52	Johnson Ranch
53	Big Bend Park
54	Hot Springs
55	Boquillas
56	Marathon
57	Sanderson(Weather Bur.)
58	Sanderson (Army)
59	Sanderson
60	Longfellow
61	Dryden
62	Hodge Ranch
63	Langtry
64	Roswell
65	Roswell
66	Carlsbad
67	Carlsbad Caverns
68	Red Bluff Dam
69	Pine Springs
70	Guadalupe Pass
71	Tinnin Ranch
72	Wink
73	Midland
74	Monahans
75	Barstow
76	Pecos
77	Kent
78	R.K. Merrill Ranch
79	Fort Davis
80	McDonald Observatory
81	Kingston Ranch
82	Kountz Ranch
83	Popham Ranch
84	Childress Ranch
85	Balmorhea
86	Balmorhea
87	Saragosa
88	W. E. Moore Ranch
89	Prewit Ranch
90	Alpine
91	Rovey
92	Chancellor
93	Reed Ranch
94	Grand Falls
95	Imperial
96	Crane
97	Zitler Ranch
98	Buena Vista
99	Upland
100	Girvin
101	McCamey
102	Fort Stockton
103	Bakersfield
104	Coats Ranch
105	Sheffield
106	Big Lake
107	Pecos River Station
108	Comstock
109	San Angelo
110	Eldorado
111	Reilley Ranch
112	Knickerbocker
113	Fort McKavett
114	Menard
115	Sonora
116	Substation 14
117	Ozona
118	Rock Springs
119	Myers Ranch
120	Devils Lake
121	Del Rio
122	Montell
123	Uvalde(Record began 1849)
124	Brackettville
125	Fort Clark
126	Eagle Pass
127	Carrizo Springs
128	Chupadero Ranch
129	Encinal
130	Dolores
131	Fort McIntosh
132	Laredo
133	Laredo (Airport)
134	Hebbronville
135	Zapata
136	Zapata
137	Fort Ringgold
138	Rio Grande City
139	Delmita
140	Mission
141	Hidalgo
142	Sharyland
143	Edinburg
144	Weslaco
145	Mercedes
146	Mercedes Pump
147	Raymondville
148	Harlingen
149	San Benito
150	San Benito Pump
151	Brownsville
152	Brownsville Airport
153	Fort Isabel

No.	Name of Station In Mexico
1	Cd. Juarez, Chih.
2	Guadalupe, Chih.
3	San Ignacio, Chih.
4	Esperanza, Chih.
5	Porvenir, Chih.
6	Villa Gonzalez, Chih.
7	Guerrero, Chih.
8	Miñaca, Chih.
9	La Junta, Chih.
10	Cuauhtemoc, Chih.
11	Bustillos, Chih.
12	Cresl, Chih.
13	Ojos Azules, Chih.
14	Tascate, Chih.
15	Balleza, Chih.
16	La Boquilla, Chih.
17	Salaices, Chih.
18	Horniguero, Chih.
19	Parral, Chih.
20	Camargo, Chih.
21	Villalba, Chih.
22	Delicias, Chih.
23	Meoqui, Chih.
24	San Luis, Chih.
25	Chihuahua, Chih.
26	Maclovio Herrera(Falcmir)
27	Ojinaga, Chih.
28	El Mulato, Chih.
28A	Hacienda El Burro, Coah.
29	Palestina, Coah.
30	El Remolino, Coah.
31	Piedras Negras, Coah.
32	Zaragoza, Coah.
33	Nuevo Laredo, Tamps.
34	La Mariposa, Coah.
35	Presa El Cuije, Coah.
36	Muzquiz, Coah.
37	Nueva Rosita, Coah.
38	Sabinas, Coah.
39	Carrillo, Chih.
40	Sierra Mojada, Coah.
41	Cuatro Cienegas, Coah.
42	San Buenaventura, Coah.
43	Castaños, Coah.
44	Monclova, Coah.
45	Don Martin, Coah.
46	Lag.de Salinillas, N.L.
47	Anahuac, N. L.
48	Camaron, N. L.
49	Lampazos, N. L.
50	Candela, Coah.
51	Villaldama, N. L.
52	Guerrero, Tamps.
53	Bayones, N. L.
54	San Pedro, N. L.
55	Villa Allende, N. L.
56	Montemorelos, N. L.
57	Villa de Santiago, N. L.
58	Cadereyta, N. L.
59	Las Enramadas, N. L.
60	El Cuchillo, N. L.
61	Los Ramones, N. L.
62	Gral Bravo, N. L.
63	Hacienda La Joya, Coah.
65	Grel Cepeda, Coah.
66	Saltillo, Coah.
67	Ramos Arizpe, Coah.
68	Cuesta de los Fierros,N.L.
69	Monterrey, N. L.
70	El Milagro, N. L.
71	Topo Chico, N. L.
72	Cienega de Flores, N.L.
73	Santa Catarina, N L.
74	Higueras, N. L.
75	Villa de Juarez, N. L.
76	Carralvo, N. L.
77	La Tableta, N. L.
78	El Barrio, N. L.
79	Santa Rosalia, Ta.
80	Comales, Tamps.
81	Camargo, Tamps.
82	Galeana, N. L.
83	Linares, N. L.
84	Villagran, Tamps.
85	Zaragoza, N. L.
86	Mendez, Tamps.
87	Matamoros, Tamps.



RIO GRANDE DRAINAGE BASIN
CUENCA DEL RIO BRAVO

EVAPORATION IN THE RIO GRANDE BASIN

INCHES

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

1. Circular land pan 4 feet in diameter and 10 inches deep, made of 22 gage galvanized iron, set on wooden platform on top of ground. Water in pan kept at about 7 to 8 inches depth. Measurements by micrometer hook gage. This type of pan was used at Elephant Butte, State College, Alamogordo Dam, Red Bluff Dam, Balmorhea (Weather Bureau) Grand Falls, Fort Stockton, Dilley and all Mexican stations.

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

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

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

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

The United States Weather Bureau furnished the records for Elephant Butte, Jornada, State College, Dilley and Balmorhea. From Texas A. & M. College came records for Balmorhea, Winterhaven and Weslaco.

In The United States

Month	Elephant Butte Dam, N. M.		Jornada, N. M.		State College, N. M.		Ysleta, Texas *I. B. C.*		Alamogordo Dam, N. M.	
	1940	Normal 1924-1940	1940	Normal 1929-1940	1940	Normal 1924-1940	1940	Average 1939-1940	1940	Average 1939-1940
Jan.	2.73	2.86	2.61	2.88	2.43	2.99	2.67	3.58	1.15	2.74
Feb.	4.92	4.37	4.38	4.15	4.29	4.44	4.69	4.54	4.60	4.11
Mar.	8.78	7.81	8.00	7.52	7.88	7.63	8.83	8.21	9.20	8.38
Apr.	11.04	10.40	10.06	9.98	9.64	9.66	11.79	11.66	9.92	10.26
May	13.59	12.71	12.02	12.48	10.54	11.38	12.52	12.81	11.90	12.10
June	14.35	14.60	13.01	13.45	11.33	12.54	11.08	13.96	12.33	14.22
July	13.55	12.62	12.69	11.85	11.79	11.49	13.27	13.13	15.22	14.22
Aug.	11.13	11.10	11.45	10.39	10.12	10.03	11.17	10.82	11.24	11.98
Sept.	8.46	8.72	8.62	8.68	8.45	8.06	9.98	9.14	10.32	10.29
Oct.	7.53	6.94	6.36	6.49	5.93	6.04	6.12	6.02	8.26	8.22
Nov.	4.29	4.24	3.43	3.87	2.98	3.79	2.82	2.97	4.30	3.82
Dec.	3.18	2.69	2.52	2.49	2.59	2.64	2.29	2.60	3.03	3.18
Total	103.55	99.06	95.15	94.23	87.97	90.69	97.23	99.44	101.47	103.52

Month	Red Bluff Dam, Texas		Balmorhea, Texas *Texas A. & M. College*		Balmorhea, Texas *U. S. Weather Bureau*		Grand Falls, Texas		Fort Stockton, Texas	Johnson Ranch, Texas
	1940	Average 1939-1940	1940	Normal 1926-1940	1940		1940		1940	1940
Jan.	2.42		1.56	2.52			2.40			
Feb.	5.50		3.02	3.46			4.67			
Mar.	9.98		5.28	5.32			7.98			9.42
Apr.	11.89		6.78	6.46	8.83		13.42			15.32
May	13.10		6.82	7.46	8.57		11.00		11.39	15.29
June	12.75		6.11	8.02	8.19		10.63		9.77	16.88
July	15.09		7.26	7.70	9.22		12.89		11.74	21.30
Aug.	11.38		6.00	6.89	7.49		11.40		9.35	17.76
Sept.	12.00		5.94	5.46	7.84		10.24		9.71	17.35
Oct.	7.70		4.30	4.26	5.81		8.43		7.29	10.56
Nov.	3.58	3.54	2.12	2.90	2.62		3.97		4.10	4.42
Dec.	3.34	3.62	1.54	2.05	2.19		3.20		3.47	3.23
Total	108.73		56.73	62.50			100.23			

Month	Devils River Bridge, Texas		Winterhaven, Texas		Dilley, Texas		Rio Grande City, Texas		Weslaco, Texas	
	1940		1940	Normal 1931-1940	1940	Normal 1928-1940	1940	Average 1939-1940	1940	Average 1932-1940
Jan.			1.90	1.90	2.25	2.61	4.77		2.35	2.43
Feb.			2.74	2.69	3.39	3.51	11.26		3.52	3.05
Mar.	12.64		4.22	4.77	5.56	5.93	10.68		3.97	4.40
Apr.	11.61		4.70	5.66	6.40	7.21	8.53		5.22	5.40
May	15.78		5.42	6.39	8.03	8.05	12.74		6.14	6.00
June	15.54		6.03	7.87	6.38	9.35	11.99		6.15	6.76
July	22.55		7.46	8.40	8.60	10.42	14.02		6.51	6.76
Aug.	16.75		7.32	8.22	10.48	10.43	17.78	16.20	7.93	6.92
Sept.	13.88		6.44	6.21	8.36	7.55	13.12	12.30	5.62	4.64
Oct.	11.26		4.28	4.69	5.80	5.94	8.44	8.92	4.59	4.66
Nov.	4.96		2.40	2.98	2.66	3.47	5.43	5.70	3.34	3.33
Dec.	5.45		2.00	1.86	2.52	2.54	4.89	5.58	2.53	2.41
Total			54.91	61.64	70.43	77.01	123.65		57.87	56.74

EVAPORATION IN THE RIO GRANDE BASIN

INCHES

Records are from the Meteorological Service of Mexico for San Buenaventura, La Junta, Linares, and Santa Rosalia. Records are from the National Irrigation Commission for Villalba, Delicias, Palestina, Don Martin, Lag. De Salinillas, Anahuac, Monterrey, El Cuchillo and Comales.

In Mexico

Month	San Buenaventura, Chih.		La Junta, Chih.		Villalba, Chih.		Cd. Delicias, Chih.	
	1940	Normal 1928-1940	1940	Average 1936-1940	1940		1940	
Jan.	2.95	3.73	2.71	3.08				
Feb.	4.71	4.71	3.18	3.86				
Mar.	6.86	7.26	4.22	6.46				
Apr.	8.84	9.11	7.01	9.21				
May	9.98	10.68	7.15	10.58				
June	10.01	11.03	8.24	10.15			10.51	
July	9.95	8.98	8.85	7.35			10.35	
Aug.	7.72	7.54	6.68	6.44			7.85	
Sept.	7.23	6.91	6.57	5.27			8.02	
Oct.	5.52	5.96	4.97	4.97	7.99		6.63	
Nov.	3.44	4.06	2.96	3.40	5.37		4.40	
Dec.	2.35	3.00	2.83	2.63	5.00		3.52	
Total	79.56	82.97	65.37	73.40				

Month	Palestina, Coah.		Don Martin, Coah.		Lag. De Salinillas, N. L.		Cd. Anahuac, N. L.		Linares, N. L.	
	1940	Normal 1931-1940	1940	Normal 1927-1940	1940		1940	Average 1933-1940	1940	Normal 1931-1940
Jan.	4.19	5.41	3.25	3.65	3.44		2.36	2.56	1.96	2.99
Feb.	4.60	4.86	4.69	4.78	6.07		4.53	3.73	4.27	3.85
Mar.	6.28	7.67	6.53	8.11	9.21		7.17	6.41	5.51	5.77
Apr.	6.16	9.11	7.57	9.77	11.02		7.26	7.87	7.42	6.12
May	8.87	10.27	8.97	11.13	10.69		8.74	8.94	6.47	6.57
June	9.21	11.34	9.23	12.92	11.47		9.43	10.85	6.99	7.80
July	9.91	12.20	10.52	13.26	12.86		12.66	11.40	8.74	7.79
Aug.	10.92	12.36	9.34	12.74	11.72		11.66	10.93	8.38	7.76
Sept.	8.62	9.37	7.64	9.16	9.21		8.97	7.56	5.60	5.60
Oct.	7.92	8.59	5.35	6.87	7.31		6.35	5.65	4.28	4.65
Nov.	5.99	7.13	2.50	4.43	4.33		2.92	3.43	2.88	3.32
Dec.	5.59	5.72	2.58	3.26	4.19		2.46	2.38	3.07	2.76
Total	88.26	104.03	78.17	100.08	101.52		84.51	81.71	65.57	64.98

Month	Monterrey, N. L.					El Cuchillo, N. L.	Santa Rosalia, Tamps.				Comales, Tamps.
	1921	1922	1923	1940	1921–1935 and 1940 Av.	1940	1938	1939	1940	Normal 1924-1940	1940
Jan.	7.75	6.30	4.45	2.33	4.01	3.44	3.55	3.87	2.93	3.45	3.32
Feb.	8.68	7.62	2.50	5.22	4.81	6.94		5.62	5.18	4.66	7.26
Mar.	11.71	10.26	5.89	6.86	6.58	8.23	6.05	8.36	7.19	7.64	8.25
Apr.	16.09	14.12	6.42		7.47	10.70	7.26	10.82	8.77	8.91	10.44
May	14.29	13.14	9.14		8.48	11.26	6.92	9.38	10.05	10.14	11.89
June	14.15	11.84	10.20		9.22	11.17	13.40	10.01	10.13	11.62	11.77
July	9.26	16.36	12.00		9.75	14.21	14.92	14.62	12.20	12.67	13.88
Aug.	14.02	14.36	11.06		9.16	13.92		12.38	12.84	12.45	13.68
Sept.	8.21	7.05			5.19	10.15	7.76	9.21	9.10	8.40	9.87
Oct.	6.18	7.11	3.89		4.53	7.55	7.67	7.05	7.45	7.05	7.84
Nov.	5.99	3.01	1.73		3.59	4.95	7.19	4.56	4.63	4.75	5.08
Dec.	7.10	4.53	1.79		3.43	4.47	4.49	4.06	3.84	3.40	4.46
Total	123.43	115.70			76.22	106.99		99.94	94.31	95.14	107.74

DRAINAGE BASIN AND IRRIGATED AREAS

Along the Rio Grande and Tributaries — 1940

The drainage basin areas tabulated below are taken from the best available sources including topographic maps. The total area within the outer rim of the Rio Grande Basin is about 335,500 square miles. But, in many places, and particularly along the southwestern side of the basin large areas yield no run-off to the Rio Grande. Such non-yielding areas constitute about 48.8% of the total area encompassed by the outer rim of the basin leaving 171,643 square miles of productive watershed. Only the productive watershed areas are listed below.

The irrigated acreages listed below include only areas below San Marcial gaging station on the Rio Grande and below Girven on the Pecos River. These figures are from the most reliable sources and are the best figures available. On the United States side below Rio Grande City the figures are for cultivated acreages all of which has irrigation facilities, but a small part of which is farmed without irrigation in favorable seasons.

For drainage basin and irrigated areas in previous years see the heading of each gaging station in Water Bulletins Nos. 1 to 8, and see table in Water Bulletin No. 9, page 90.

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres			
	In		Total	In			Total
	United States	Mexico		United States	Mexico		
					Primary	Secondary	
Above San Marcial Station	24,717	0	24,717				
San Marcial to Elephant Butte Dam	1,747	0	1,747		0	0	0
Above Elephant Butte Dam	26,464	0	26,464				
Elephant Butte Dam to Caballo Dam	1,290	0	1,290	73	0	0	73
Above Caballo Dam	27,754	0	27,754	73	0	0	73
Caballo Dam to El Paso	1,513	0	1,513	90,768	0	0	90,768
Above El Paso Station	29,267	0	29,267	90,841	0	0	90,841
El Paso to American Dam	4	0	4	0	0	0	0
Above American Dam	29,271	0	29,271	90,841	0	0	90,841
American Dam to Juarez	41	47	88				
Above Juarez Station	29,312	47	29,359				
Juarez to Island	146	472	618				
Above Island Station	29,458	519	29,977				
Island to County Line	485	186	671				
Above County Line Station	29,943	705	30,648				
Guayuco Arroyo, above U. S. 80 Highway Bridge	162	0	162				
County Line to Ft. Quitman, excluding Guayuco Arroyo	501	679	1,180				
County Line to Ft. Quitman, including Guayuco Arroyo	663	679	1,342				
El Paso Station to Ft. Quitman Station, total	1,339	1,384	2,723	67,050	47,939	0	114,989
Above Ft. Quitman Station	30,606	1,384	31,990	157,891	47,939	0	205,830
Quitman Arroyo (I.B.C. name) above measuring point near its mouth	36	0	36				
Quitman Arroyo (I.B.C. name) above rocky canyon	18	0	18				
Red Light Arroyo (I.B.C. name) (Quitman Arroyo on U.S.G.S.Maps) above measuring point near its mouth	260	0	260				
Van Horn Creek, above measuring point near its mouth	117	0	117				
Ft. Quitman to La Nutria, excluding Quitman Arroyo, Red Light Arroyo, and Van Horn Creek	628	886	1,514				
Ft. Quitman to La Nutria, total	1,041	886	1,927	1,545	6,425	0	7,970
Above La Nutria Station	31,647	2,270	33,917	159,436	54,364	0	213,800
Capote Creek, above measuring point near its mouth	93	0	93				
La Nutria to Upper Presidio, total	580	503	1,083	3,520	6,919	0	10,439
Above Upper Presidio Station	32,227	2,773	35,000	162,956	61,283	0	224,239
Rio Conchos, above Boquilla Dam	0	7,322	7,322				
Rio Conchos, below Boquilla Dam, excluding area above Boquilla Dam	0	17,419	17,419				
Rio Conchos, total	0	24,741	24,741	0	160,374	12,108	172,482
Upper to Lower Presidio, excluding Rio Conchos	21	5	26	1,679	0	0	1,679
Upper Presidio to Lower Presidio, total	21	24,746	24,767	1,679	160,374	12,108	174,161
Above Lower Presidio Station	32,248	27,519	59,767	164,635	221,657	12,108	398,400
Alamito Creek, above gaging station	1,504	0	1,504	805	0	0	805
Terlingua Creek, above gaging station	1,070	0	1,070	288	0	0	288
Lower Presidio to Johnson Ranch, excluding Alamito and Terlingua	1,439	2,671	4,110	3,518	1,730	0	5,248
Lower Presidio to Johnson Ranch, total	4,013	2,671	6,684	4,611	1,730		6,341
Above Johnson Ranch Station	36,261	30,190	66,451	169,246	223,387	12,108	404,741
Johnson Ranch to Boquillas	471	3,735	4,206	290	0	0	290
Above Boquillas Station	36,732	33,925	70,657	169,536	223,387	12,108	405,031
Maravillas Creek, above proposed gaging station	2,192	0	2,192	0	0	0	0
Lozier Creek, above gaging station	1,728	0	1,728	0	0	0	0
Boquillas to Langtry, excluding Maravillas and Lozier	2,125	2,595	4,720	0	0	0	0
Boquillas to Langtry, total	6,045	2,595	8,640	0	0	0	0
Johnson Ranch to Langtry, excluding Maravillas and Lozier	2,596	6,330	8,926				
Johnson Ranch to Langtry, total	6,516	6,330	12,846	290	0	0	290
Above Langtry Station	42,777	36,520	79,297	169,536	223,387	12,108	405,031

DRAINAGE BASIN AND IRRIGATED AREAS

—continued —

Along the Rio Grande and Tributaries — 1940

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres			
	In		Total	In			Total
	United States	Mexico		United States	Mexico Primary	Mexico Secondary	
Pecos River, above Girvin	29,562	0	29,562				
Pecos River, Girvin to I.B.C. gaging station	5,681	0	5,281	370	0	0	370
Pecos River, above I.B.C. gaging station	35,243	0	35,243	370	0	0	370
Goodenough Spring, above gaging station	1	0	1	0	0	0	0
Devils River, above Juno gaging station	2,733	0	2,733	0	0	0	0
Devils River, below gaging station near Juno to I.B.C. gaging station	1,327	0	1,327	8	0	0	8
Devils River, above I.B.C. gaging station	4,060	0	4,060	8	0	0	8
Cienegas Creek, above gaging station	18	0	18	302	0	0	302
Langtry to Del Rio, excluding above tributaries	398	2,495	2,893	21	0	0	21
Langtry to Del Rio, total	39,720	2,495	42,215	701	0	0	701
Above Del Rio Station	82,497	39,015	121,512	170,237	223,387	12,108	405,732
Las Vacas Arroyo, above gaging station	0	146	146	0	0	0	0
San Felipe Creek, above gaging station	62	0	62	1,037	0	0	1,037
Sycamore Creek, above gaging station	524	0	524	66	0	0	66
Pinto Creek, above gaging station	229	0	229	100	0	0	100
Rio San Diego, above gaging station	0	931	931	0	21,004	0	21,004
Las Moras Creek, above gaging station	162	0	162	719	0	0	719
Rio San Rodrigo, above gaging station	0	586	586	0	3,212	3,212	6,424
Del Rio to Eagle Pass, excluding above tributaries	527	581	1,108	14,739	7,660	0	22,399
Del Rio to Eagle Pass, total	1,504	2,244	3,748	16,661	31,876	3,212	51,749
Above Eagle Pass Station	84,001	41,259	125,260	186,898	255,263	15,320	457,481
Rio Escondido, above gaging station	0	1,130	1,130	0	6,178	8,649	14,827
Arroyo Amole, total	0	482	482	0	0	0	0
Eagle Pass to El Jardin, excluding above tributaries	736	1,191	1,927	1,696	247	0	1,943
Eagle Pass to El Jardin, total	736	2,803	3,539	1,696	6,425	8,649	16,770
Above El Jardin Dam Site	84,737	44,062	128,799	188,594	261,688	23,969	474,251
Santa Isabella Arroyo, above river road	350	0	350	0	0	0	0
El Jardin to Laredo, excluding Santa Isabella	387	1,079	1,466	4,186	1,236	0	5,422
El Jardin to Laredo, total	737	1,079	1,816	4,186	1,236	0	5,422
Eagle Pass to Laredo, excluding above tributaries	1,123	2,270	3,393	5,882	7,661	8,649	22,192
Eagle Pass to Laredo, total	1,473	3,882	5,355	5,882	7,661	8,649	22,192
Above Laredo Station	85,474	45,141	130,615	192,780	262,924	23,969	479,673
Dolores Creek, above gaging station	606	0	606	0	0	0	0
Rio Salado, above Don Martin Dam	0	13,819	13,819	0	54,364	8,896	63,260
Rio Salado, below Don Martin Dam	0	7,709	7,709	0	35,584	10,132	45,716
Rio Salado, above gaging station	0	21,528	21,528	0	89,948	19,027	108,975
Laredo to Zapata, excluding above tributaries	491	942	1,433	6,008	1,236	0	7,244
Laredo to Zapata, including Dolores and excluding Salado	1,097	942	2,039	6,008	1,236	0	7,244
Laredo to Zapata, total	1,097	22,470	23,567	6,008	91,184	19,027	116,219
Above Zapata Station	86,571	67,611	154,182	198,788	354,108	42,996	595,892
El Tigre Arroyo, above gaging station	261	0	261	0	0	0	0
Rio Alamo, above gaging station	0	1,675	1,675	0	4,942	5,436	10,378
Zapata to Roma, excluding above tributaries	771	315	1,086	1,102	0	0	1,102
Zapata to Roma, including El Tigre and excluding Alamo	1,032	315	1,347	1,102	0	0	1,102
Zapata to Roma, total	1,032	1,990	3,022	1,102	4,942	5,436	11,480
Above Roma Station	87,603	69,601	157,204	199,890	359,050	48,432	607,372
Rio San Juan, above gaging station at Santa Rosalia	0	12,013	12,013	0	102,551	67,214	169,765
Los Olmos Creek, above gaging station	535	0	535	0	0	0	0
Roma to Rio Grande City, excluding above tributaries	143	847	990	114	0	0	114
Roma to Rio Grande City, including Los Olmos and excluding San Juan	678	847	1,525	114	0	0	114
Roma to Rio Grande City, total	678	12,860	13,538	114	102,551	67,214	169,879
Above Rio Grande City Station	88,281	82,461	170,742	200,004	461,601	115,646	777,251
Rio Grande City to Hidalgo	415	430	845				
Above Hidalgo Station	88,696	82,891	171,587				
Hidalgo to Mercedes Bridge Station	15	15	30				
Above Mercedes Bridge Station	88,711	82,906	171,617				
Mercedes Bridge to Matamoros Station	11	11	22				
Above Matamoros Station	88,722	82,917	171,639				
Matamoros to Lower Brownsville Station	2	2	4				
Rio Grande City to Lower Brownsville Station	443	458	901	*504,910	12,356	0	
Above Lower Brownsville Station	88,724	82,919	171,643	704,914	473,957	115,646	1,294,517

* Cultivated acres, see heading on preceding page.

AUTHENTICATED DISCHARGE RECORDS

The tabulation below shows the publications in which may be found discharge records that have been authenticated by this Commission for gaging stations on the Rio Grande from San Marcial, New Mexico, to the Gulf of Mexico, and on tributaries near their confluence with the Rio Grande below San Marcial, as well as on floodways leading from the Rio Grande. The table covers all of the years of record for San Marcial and El Paso gaging stations. For stations below El Paso the table covers only the years of record within the two periods 1900 to 1913 and 1924 to 1940.

AUTHENTICATED DISCHARGE RECORDS

Name of Gaging Station	Records Within The Period	Where Published
San Marcial	1895 - 1923	W.B. 7; W.S.P. 358, 388, 408, 438, 458, 478, 508, 528, 628
	1924 - 1930	W.B. 6; W.S.P. 628, 688, 703, 718
	1931, 1932* -1940	W.B. 1 thru 6* thru 10
Below Elephant Butte Dam	1915 and 1916	W. B. 10
	1938 - 1940	W. B. 8, 9, 10
Below Caballo Dam	1938 - 1940	W. B. 8, 9, 10
El Paso	1889 - 1923	W.B. 7; W.S.P. 358, 388, 408, 568, 588
	1924 - 1928* -1930	W.B. 6*; W.S.P.588, 608, 628, 648, 668e 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Below American Dam	June 1938 - 1940	W. B. 8, 9, 10
El Paso Sewage Outfall	1936 - 1940	W. B. 8, 9, 10
Cd. Juarez	Apr. 1938 - 1940	W. B. 8, 9, 10
Island	Aug. 1938 - 1940	W. B. 8, 9, 10
Tornillo Bridge	1924 - 1930	W. B. 5, 6; W.S.P. 668, 688, 703, 718
	1931 - 1937	W. B. 1 thru 7
County Line	1938 - 1940	W. B. 8, 9, 10
Ft. Quitman	1924 - 1930	W.B. 6; W.S.P. 588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
La Nutria	June 1935 - 1940	W. B. 5 thru 10
Upper Presidio	1900 * 1913	W. B. 7*
	1924 - 1926*-1930	W. B. 3, 4*, 6; W.S.P.588, 608, 628
	1927* and 1932*	W. B. 9*
	1931 - 1933* -1939* - 1940	W. B. 1 thru 4 thru 9, 10*
Rio Conchos	1900 - 1913	W. B. 7
	1924 * 1932	W. B. 6, 7*
	1933 - 1940	W. B. 5 thru 10
Lower Presidio	1900 * 1913	W. B. 7*
	1924 * 1932	W. B. 6*, 7*
	1933 - 1937	W. B. 3 thru 7
	1938*,1939*, 1940	W. B. 8, 9, 10*
Alamito Creek	1932 - 1940	W. B. 2 thru 10
Terlingua Creek	1932 - 1936	W. B. 2 thru 6
	1937*	W. B. 7, 8*
	1938*,1939* & 1940	W. B. 8, 9, 10*
Johnson Ranch	Apr. 1936 - 1940	W. B. 6 thru 10
Boquillas	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 6; W.S.P.688, 703, 718
	1931 - Apr. 1936	W. B. 1 thru 6
Lozier Creek	1932 - 1935	W. B. 2 thru 6
Langtry	1900 * 1913	W. B. 7*
	1904* and 1906*	W. B. 9
	1924* - 1927	W. B. 4*, 6
	1928 - 1930	W. B. 6; W.S.P.668, 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Pecos River	1900 - 1913	W. B. 7
	1924 - 1930	W. B. 6; W.S.P.588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Goodenough Springs	1924 - 1929	W. B. 5, 6
	Feb. 1929 - 1930	W. B. 6; W.S.P.688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Devils River	1900 - 1913	W. B. 7
	1924 - 1930	W. B. 6; W.S.P.588, 608, 628, 648, 668, 688, 703, 718
	1931 - 1932*	W. B. 1, 2, 5*, 6
	1933* - 1934*	W. B. 3, 4, 5*, 6
	1935 – 1936* - 1940	W. B. 5 thru 10 *

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

AUTHENTICATED DISCHARGE RECORDS —continued

Name of Gaging Station	Records Within The Period	Where Published
Cienegas Creek	Sept. 1931 - June 1935	W. B. 1 thru 6
Del Rio	1900 * 1913	W. B. 7*
	1924*	W. B. 4*, 6; W.S.P. 588, 608
	1925 - 1930	W.B. 6; W.S.P. 608, 628, 648, 668,. 688 703, 718
	1931 - 1940	W. B. 1 thru 10
Arroyo Las Vacas	Partial Records June 1935 - Mar. 1938	W. B. 6, 7, 8
	Apr.1938-Dec.1940	W. B. 8, 9, 10
San Felipe	Sept. 1931-1935* -1940	W. B. 1 thru 10*
Sycamore Creek	1932 - May 1935	W. B. 2 thru 6
Pinto Creek	Nov. 1928 - 1930	W.B. 6; W.S.P. 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Rio San Diego	Oct. 1932 - 1940	W. B. 2 thru 10
Las Moras Creek	1932 - 1934*	W. B. 2 thru 5*, 6
	1935	W. B. 5, 6
Rio San Rodrigo	1932 - 1940	W. B. 2 thru 10
Eagle Pass	1900 * 1913	W. B. 7*
	1924* - 1926	W. B. 4*, 6
	1927 - 1930	W. B. 6; W.S.P.648, 668, 688, 703, 718
	1931 - 1940	W. B. 1 thru 10
Rio Escondido	1932 - 1940	W. B. 2 thru 10
Laredo	1900 * 1913	W. B. 7*
	1924 - 1925*	W. B. 4*, 6
	1926*	W. B. 4, 5*, 6
	1927 - 1928	W. B. 4, 6
	1929 - 1930	W. B. 3, 6
	Sept. 1934*	W. B. 9*
	1931 - 1940	W. B. 1 thru 10
Dolores Creek	1932 - May 1936	W. B. 2 thru 6
Rio Salado	1900 - 1913	W. B. 7
	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1940	W. B. 1 thru 10
Zapata	1932 -1938*- 1940	W. B. 2 thru 10 *
El Tigre Creek	1932 - Apr. 1936	W. B. 2 thru 6
Rio Alamo	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1940	W. B. 1 thru 10
Roma	1900 * 1913	W. B. 7*
	1924 - 1929	W. B. 5, 6
	Mar. 1929 - 1930	W.B.6; W.S.P. 688, 703, 718
	1931	W. B. 1, 6
	1932*	W. B. 2, 3*, 6
	1933 - 1940	W. B. 3 thru 10
Rio San Juan	Oct. 1900 - 1913	W. B. 7
	1924 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931, 1932* - 1940	W. B. 1 thru 8*,9,10
Los Olmos Creek	1932 - Mar. 1936	W. B. 2 thru 6
Rio Grande City	1924 - 1931	W. B. 5, 6
	1932* - 1940	W. B. 2 thru 8*,9,10*
N. Floodway	1932 - 1939	W. B. 2, 3, 5, 8
S. Floodway	1932 - 1939	W. B. 2, 3, 5, 8
Hidalgo	July 1928 - 1930	W.B. 6; W.S.P. 668, 688, 703, 718
	1931	W. B. 1, 6
	Partial Records 1932 - 1936	W. B. 2 thru 6
	May 1938 - Nov. 1939	W. B. 8, 9
	Partial Record 1940	W. B. 10
Retamal ⊕	1939 and 1940	W. B. 9, 10
Mercedes Bridge	Sept. 1932 - Oct. 1932	W. B. 2
	Partial Records 1935 - 1936	W. B. 5, 6
	Nov. 1937 - Dec. 1937	W. B. 7
	Partial Records 1938 - 1940	W. B. 8, 9, 10
Rancho Viejo Floodway	1935 - 1940	W. B. 5, 6, 8, 9,10
Matamoros	1900 - 1913	W. B. 7
	1924 - Sept. 1926	W.B. 6; W.S.P. 588, 608, 628
	Oct. 1926 - 1928	W. B. 5, 6
	1929 - 1930	W. B. 3, 6
	1931 - 1940	W. B. 1 thru 10
Lower Brownsville	1934 - 1940	W. B. 4 thru 10

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

INDEX

By means of the following index, the two preceding pages of tables, and the Index to Precipitation Records on pages 97 and 98, reference is given to the data in all Water Bulletins published by this Commission. The reference numbers below refer first to the Water Bulletin number and next to page numbers in that bulletin.

Examples: 8,55; 9,43; 10,43,70 refers to Water Bulletin No. 8, page 55, Water Bulletin No. 9, page 43, and Water Bulletin No. 10, pages 43 and 70.

A

Accretions to river channel in dry weather 8,48
Acequia Madre (canal), diversions into, areas irrigated, precipitation, duty of water.. 8,55; 9,57; 10,57
Alamito Creek Station, discharge at 10,22,104
Alamo; see Rio Alamo
Alamogordo Dam, New Mexico, evaporation at; see Evaporation
Alamogordo Reservoir, stored water in, normal capacity of; see Stored water
Alkali, Alkalinity, pH; see Chemical analyses
American Canal, diversions into; see Diversions
Dam; see Below American Dam Station; see Evaporation; see Precipitation index
Anahuac, Nuevo Leon, evaporation at; see Evaporation; see Precipitation index
Analyses of Water Samples; see Chemical analyses; see Sanitary assays; see Silt
Annual discharges; see each gaging station; see Sources of river flow
Areas irrigated in the Rio Grande Basin; see each gaging station, 8, a table of 9,90; 10,102
for some additional detail - see references under Diversions
Areas of watersheds or drainage basins; see each gaging station, 1 through 8, a table of .. 9,90; 10,102
Authenticated Discharge Records 10,104
Avalon and McMillan Reservoirs, stored water in, normal capacity of; see Stored water
Average discharges, monthly and yearly, 5,64; see each gaging station;
see Sources of river flow
Precipitation, 5,57; 9,48; evaporation, 5,58; salt burden, etc.; see that subject
Unused run-off of drainage basin sub-divisions, 9,48; see Sources of river flow
Watershed yield of drainage basin sub-divisions, 9,48; see Sources of river flow

B

B. Coli in samples of river flow; see Sanitary assays
Bacteria in samples of river flow; see Sanitary assays
Balmorhea, Texas, evaporation at; see Evaporation; see Precipitation index
Below American Dam Station discharge at 10,12,104
Boquilla Reservoir, stored water in, normal capacity of; see Stored water
Boquillas Station, suspended silt at; see Silt; discharge at 10,104
Summation curve of flow at 5,60
Boron in water samples; see Chemical analyses
Box Canyon, floods at, since 1828 8,71
Brownsville Station, Lower; see Lower Brownsville Station

C

Caballo Dam, discharge below 10,10,104
Reservoir, stored water in, normal capacity of; see Stored water
Calcium in water samples; see Chemical analyses
Cameron, Hidalgo and Willacy Counties,
diversions, duty of water, irrigated area and average rainfall 7,75; 8,57; 9,59; 10,60
See also Rainfall in Lower Rio Grande Valley 1871 to 1940 10,78
Capacities of all large reservoirs in the Rio Grande Basin; see Stored water
Carrillo, Chih., evaporation at; see Evaporation
Centenario and San Miguel Reservoirs, stored water in, normal capacity of; see Stored water
Chemical analyses of water samples, also total dissolved solids:
When available detailed electrical conductance data and a graph showing
Rio Grande Salt Burden are shown on pages following the references given below.
From the Rio Grande at:
Boquillas Station 1,31
Below Caballo Dam Station 9,66; 10,68
County Line Station 8,66
Del Rio Station 1,32
Eagle Pass Station 1,32; 8,65; 9,68; 10,70
El Paso Station 1,26; 2,46; 3,41; 4,42; 5,47; 6,71; 7,64; 8,63; 9,67; 10,69
Fabens Station 1,27; 2,47; 3,41
Fort Quitman Station 1,30; 2,48; 3,42; 4,43; 5,47; 6,72; 7,64; 8,63; 9,67; 10,69
Hidalgo Station 9,71
Langtry Station 1,31
La Nutria Station 6,73; 7,66; 8,64; 9,67; 10,69
Leasburg Dam 9,66; 10,68
Lower Brownsville Station 4,43; 5,48; 6,72; 7,65; 9,69
Lower Presidio Station 5,49; 9,68
Nuevo Laredo 2,49; 3,44; 4,44; 5,51; 6,78; 7,70; 8,70; 9,74; 10,76
Rio Grande City 3,42; 4,43; 5,48; 6,72; 7,65; 8,65; 9,69; 10,71
Roma 2,49; 3,42
San Marcial 1,25; 2,46; 3,41; 4,42; 5,47; 6,71; 7,64; 8,63; 9,66; 10,68
Upper Presidio 1,31; 5,48; 6,73; 7,65; 8,64; 9,67; 10,69

INDEX — continued

C

Chemical analyses of water samples, continued:
On United States tributaries:
Alamito Creek Station 5,49; 6,73
Devils River Station 1,32; 5,50; 6,74
Springs 3,42
Goodenough Spring 3,42
Pecos River Station 1,32; 5,49; 6,74; 7,66; 8,64; 9,68; 10,70
Springs 2,48; 3,42
San Felipe Springs 3,43
Springs on the Rio Grande near Shumla Bend 2,48
and wells in region 61 river miles below Eagle Pass 6,75
Terlingua Creek Station 5,49
On Mexican tributaries:
Rio Conchos near Ojinaga 5,49; 6,73; 7,66; 8,64; 9,68; 10,70
Rio Salado Station 5,50; 6,74; 7,66; 8,65; 9,68; 10,70
Rio San Diego Station 5,50; 6,74
Rio San Rodrigo Station 5,50; 6,74
Rio San Juan Station 5,50; 6,74; 7,66; 8,65; 9,69; 10,71
Springs in region west of Piedras Negras 3,43
also wells in region 61 river miles below Piedras Negras 6,75
Chloride; see Chemical analyses
Cienegas Creek station, discharge at 10,105
Coahuila, Mexico, water analyses of springs in; see Chemical analyses
Conchos, Rio; see Rio Conchos
Conductance of water samples; see Chemical analyses
Consumption of water in the Rio Grande Basin, 9,48; see also Diversions
Correlation of rainfall and run-off on Devils River watershed 9,48
County Line Station, discharge at, 10, 16,104; see precipitation index
Cross section of Rio Grande at Hidalgo Bridge 3,38

D

Daily discharge; see each gaging station
Dams; see Stored water
Deep spring flow, estimated 6,64; 7,53; 8,52; 9,48; 9,53
Del Rio Station, discharge at, 10, 29,104; duration curve of flow at 5,61
summation curve flow at 5,60; 7,57
Devils River Station; discharge at, 10, 28,104; floods at, frequency 9,75
magnitude and duration of flows and of droughts for the past 100 years 9,50
duration curve of flow at, 5,63; summation curve of flow at 5,59; 7,57
Dilley, Texas, evaporation at; see Evaporation
Discharge Records; see each gaging station; Table of Authenticated discharge records 10,104
Dissolved Oxygen in river flow; see Chemical analyses
Dissolved Solids; see Chemical analyses
Diversions of water in the United States and Mexico. With some of the following references data will be found showing areas irrigated, duty of water and average rainfall.
United States side:
American Canal, El Paso 8,54; 9,55; 10,56
Between American Dam and International Dam 10,56
El Paso Valley 8,56; 9,56; 10,58
Hidalgo, Cameron and Willacy Counties 7,75; 8,57; 9,59; 10,60
Maverick Irrigation District Canal 9,58; 10,59
Municipal water uses 10,62
Presidio Valley 2,40; 3,40; 4,41
Mexican side:
Acequia Madre (Mexican Canal, Juarez) 8,55; 9,57; 10,57
Retamal Canal 9,60; 10,61
Dolores Creek Station, discharge at 10,105
Don Martin, N. L., evaporation at, see Evaporation; see Precipitation index
Don Martin Reservoir, stored water in, normal capacity of; see Stored water
Drainage basins, areas of, a table of 9,90;10,102
Droughts, frequency - magnitude - duration graph for Devils River 9,50
Droughts in Lower Rio Grande Valley 10,78
Dry Weather Losses and Gains in River Channel, a table and graph 8,48
Duration Curves, for Rio Grande and tributaries 5,61
Duration - frequency magnitude graphs of flows and droughts on Devils River 9,50
Duty of Water, see Diversions

E

Eagle Pass Station, discharge at, 10,35,105; suspended silt at; see Silt
summation curve of flow at, 5,60; 7,57; duration curve of flow at 5,61
El Nogal, Coah., evaporation at; see Evaporation
El Paso Electric Co. Santa Fe Street Plant cooling water waste 10,13
El Paso, outfalls from deep wells near, 10,13; sewage outfall at, ... 8,46; 9,45; 10,13
River polution near; see Sanitary assays
El Paso Station, discharge at, ... 10,11,104
El Paso Valley, diversions in, see Diversions
El Tigre Creek Station, discharge at 10,105
El Vado Reservoir, stored water in, normal capacity of, see Stored water
Electrical conductance of water samples, see Chemical analyses
Elephant Butte Dam, New Mexico, discharge below, 10,9,104; Evaporation at, see Evaporation
Elephant Butte Reservoir, stored water in, normal capacity of; see Stored water, silt in 7,63
Erosion in river channel at Hidalgo Station 3,38
Escondido, Rio; see Rio Escondido Station
Evaporation and transpiration losses on the watershed 9,48

INDEX — continued

E

Evaporation in and adjacent to the Rio Grande Basin, a map showing 5,58
United States side:
American Dam 8,80
Alamogordo Dam 10,100
Balmorhea 3,48; 4,49; 6,95; 7,74; 8,80; 9,88; 10,100
Devils River 10,100
Dilly 3,48; 4,49; 6,95; 7,74; 8,80; 9,88; 10,100
Elephant Butte 3,48; 4,49; 6,95; 7,74; 8,80; 9,88; 10,100
Fort Stockton 10,100
Grand Falls 10,100
Johnson Ranch 10,100
Jornada, New Mexico 6,96; 7,74; 8,80; 9,88; 10,100
Red Bluff Dam 10,100
Rio Grande City 9,88; 10,100
Santa Fe, New Mexico 3,47
State College or Mesilla Park, New Mexico 3,48; 4,49; 6,95; 7,74; 8,80; 9,88; 10,100
Weslaco 3,49; 4,49; 6,96; 7,74; 8,80; 9,88; 10,100
Winterhaven 3,48; 4,49; 6,95; 7,74; 8,80; 9,88; 10,100
Ysleta 9,88; 10,100
Mexican side:
Carillo 9,89
Cd. Anahuac 6,96; 7,74; 8,80; 9,89; 10,101
Cd. Delicias 10,101
Comales 10,101
Don Martin 3,49; 4,49; 6,95; 7,74; 8,80; 9,89; 10,101
El Cuchillo 10,101
El Nogal 6,95; 7,74
Hda. Minerva 9,89
Lag. De Salinillas 10,101
Las Cruces 9,89
La Junta 9,89; 10,101
Linares 6,96; 7,74; 8,80; 10,101
Monterrey 3,49; 4,49; 6,95; 10,101
Palestina 6,95; 7,74; 8,80; 9,89; 10,101
Saltillo 3,49; 4,49; 6,95; 9,89
San Buenaventura 6,96; 7,74; 8,80; 9,89; 10,101
Santa Rosalia 7,74; 10,101
Villalba 10,101
Zaragoza 9,89

F

Flood duration - magnitude - frequency curves 9,50
Flood, rates of travel, graphs 6,82
Flood peaks, flattening of 6,93
Flood peak discharges, 2,42; see each gaging station; magnitudes and frequencies of floods on the Rio Grande at:
Box Canyon 8,71
El Paso 6,79; 10,77
Fort Quitman 8,71
Langtry 9,75
La Nutria 8,71
Lower Presidio 8,71
San Marcial 6,79
Upper Presidio 8,71
Tributaries to the Rio Grande:
Devils River 9,50; 9,75
Lozier Creek 9,75
Pecos River 9,75
Rio Conchos 8,71
Sycamore Creek 5,24
Van Horn Arroyo 8,71
Floodways, record of flow in 10,46,105
Flow, magnitude - frequency - duration graph for Devils River since 1830 9,50
Fort Quitman Station, discharge at,,10,17,104; see Precipitation index
summation curve of flow at, 5,60; duration curve of flow at 5,61
magnitude and frequency of floods at; see Flood peaks
Frequency, magnitude and duration of flows and of droughts on the Devils River since 1830 9,50
Frequency of monthly rainfalls of various magnitudes in the Lower Rio Grande Valley 10,78

G

Gaging Stations, list of; see table of Authenticated Discharge Records 10,104
Gains and losses to river channel in dry weather, a table and graph 8,48
General hydrologic conditions 7,4; 8,4; 9,4; 10,5
Goodenough Spring Station, discharge at, 10,27,104, summation curve of flow at 5,59

H

Hidalgo, Cameron, and Willacy Counties, diversions in, area irrigated in Valley, average rainfall in the Valley, average duty of water in the Valley; see Rainfall in the Lower Rio Grande Valley 1871 to 1940; see Diversions
Hidalgo Station, discharges and gage heights at, 10,44,104; cross section at and erosion at 3,38
Hydrologic balance sheet 9,48
Hydrologic conditions, general 7,4; 8,4; 9,4; 10,5

INDEX — continued

I

Index to precipitation records, United States and Mexico and map 10,97,98,99
Irrigated Areas in Rio Grande Basin; see Diversions; see each gaging station, a table of... 9,90; 10,102
Irrigation Consumption in Rio Grande Basin 6,63; 7,52; 8,51; 9,48,52; 10,55
Island Station, discharge at 10,15,104
Isohyetal lines, Rio Grande Basin, map showing 5,57
Isothymal lines, Rio Grande Basin, map showing 5,58

J

Johnson Ranch Station, discharge at, 10,24,104; see Precipitation index
Jornada, N.M., evaporation at; see Evaporation
Juarez, Cd., Station, discharge at 10,14,104

L

La Junta, Chih., evaporation at, see Evaporation
La Nutria Station, discharge at, 10,18,104; floods at; see Flood peaks
Lago Toronto; see Boquilla Reservoir; see Stored water
Langtry Station, discharge at, 10,25,104; floods at, see Flood peaks
duration curve of flow at, 5,61; summation curves of flow at 5,60; 5,57
Laredo Station, discharge at, 10,37,105;
duration of flow at, 5,62; summation curves of flow at 5,60; 7,57
Laredo, Nuevo; see Nuevo Laredo
Las Cruces, Chih., evaporation at; see Evaporation
Las Moras Creek Station, discharge at 10,105
Las Vacas Arroyo Station, discharge at 10,30,105
Linares, N. L., evaporation at; see Evaporation
Los Olmos Creek Station, discharge at 10,105
Losses and Gains to River Channel in dry weather, a table and graph 8,48
Lower Brownsville Station, discharge at 10,48,105
Lower Presidio Station, discharge at, 10,21,104; floods at; see Flood peaks
duration curve of flow at, 5,61; summation curve of flow at 7,57
Lozier Creek Station, discharge at, 10,104; floods at; see Flood peaks

M

Magnesium in water samples; see Chemical analyses
Map of Rio Grande Basin; see front part of Water Bulletins
showing average annual evaporation in the Rio Grande Basin 5,58
showing average annual precipitation in the Rio Grande Basin 5,57
showing average annual run-offs and watershed yields 6,63; 7,52; 8,51; 9,52; 10,55
showing location of precipitation stations in United States and Mexico 10,99
Matamoros Station, discharge at; 10,47,105; summation curve of flow at..... 7,57
Maverick Canal, discharge, area irrigated, rainfall and duty of water; see Diversions
Maverick County Wells, water sample analyses; see Chemical analyses
McMillan and Avalon Reservoirs, stored water in, normal capacity of; see Stored water
Mercedes Bridge Station, discharge at; gage heights at 10,45,105
Mileages along the Rio Grande, see each gaging station
Milligram equivalents, see Chemical analyses
Monterrey, N. L., evaporation at, see Evaporation; see Precipitation index
Monthly normal discharges; see each gaging station; 9,92; graphs of 5,64
Municipal Water Uses 10,62

N

Normal discharges; see average discharges
North Floodway, flow in 10,46,105
Nuevo Laredo, Tamps., see Sanitary assays
discharge at; see Precipitation index

O

Occurrence of floods, magnitude and frequency of; see Flood peaks,
magnitude - frequency - duration curves 9,50
Oxygen, dissolved in river flow; see Sanitary assays

P

Palestina, Coah., evaporation at; see Evaporation
Pecos River Station, discharge at, 10,26,104; floods at; see Flood peaks;
see Precipitation index,
duration curve of flow at, 5,63; summation curves of flow at 5,59; 7,57
Piedras Negras, Coah., discharge at; see Eagle Pass Station; see Precipitation index
Pinto Creek Station, discharge at 10,32,105
Precipitation, average, Rio Grande Basin, map showing 5,57
As related to total basin run-off and consumption 9,48
Correlation of rainfall and run-off on Devils River 9,48
Frequency and magnitude, droughts and plentitudes, in Lower Rio Grande Valley 10,78
Index to United States and Mexican records 10,97,98
On irrigated areas; see Diversions
Periods of plenty and drought in Lower Rio Grande Valley 10,78
Stations in United States and Mexico, map showing locations 10,99

Q

Quality of water; see Chemical analyses; see Sanitary assays; see Silt

INDEX — continued

R

Rainfall; see Precipitation index; rainfall in the Lower Rio Grande Valley,
frequency and magnitude, periods of drought and plenty 10,78
Rainfall and its relation to consumption, evaporation, transpiration and run-off 9,48
Rainfall - run-off correlation on Devils River 9,48
Rancho Viejo Floodway, flow in 10,46
Records, authenticated discharge, 10,104; precipitation, 10,97; evaporation; see Evaporation
Red Bluff Reservoir, stored water in, normal capacity of, see Stored water
Reservoirs, stored water in, capacities of; see Stored water
Retamal Canal, diversions into; see Diversions
Rio Alamo Station, discharge at 10,40,105
duration curve of flow at, 5,63; summation curve of flow at 5,59
Rio Conchos, discharge of 10,20,105
floods in, 8,71; duration curve of flow of, 5,63; summation curve of flow 5,59; 7,57
Rio Escondido Station, discharge at 10,36,105
Rio Grande, discharges; see each gaging station; see Sources of River Flow,
see Authenticated discharge records
dry Weather Losses and Gains to River Channel, a table and graph 8,48
Rio Grande City, evaporation at; see Evaporation
Rio Grande City Station, discharge at 10,43,105
summation curve of flow at, 5,60; duration curve of flow at 5,62
Rio Salado Station, discharge at 10,38,105
duration curve of flow at, 5,63: summation curves of flow at 5959; 7,57
Rio San Diego Station, discharge at 10,33,105
Rio San Juan Station, discharge at, 10,42,105; suspended silt at; see Silt
summation curves of flow at, 5,59; 7,57; duration curve of flow at 5,63
Rio San Rodrigo Station, discharge at 10,34,105
River mileages; see each gaging station
Riverside heading, bacteria in river at; see Sanitary analyses
Roma Station, discharge at, 10,41,105; Suspended silt at; see Silt
duration curve of flow at, 5,62; summation curves of flow at 5,60; 7,57

S

Salado, Rio; see Rio Salado Station
Saltillo, Coah., evaporation at; see Evaporation; see Precipitation index
Salts (salt burden), see Chemical analyses
Sanitary assays of Rio Grande water at:
El Paso and vicinity 6,77; 7,69; 8,69; 9,73; 10,75
Nuevo Laredo 2,49; 3,44; 4,44; 5,51; 6,78; 7,70; 8,70; 9,74; 10,76
San Buenaventura, Chih., evaporation at; see Evaporation
San Diego, Rio; see Rio San Diego Station
San Felipe Creek Station, discharge at 10,31,105
San Juan; see Rio San Juan Station
San Marcial Station, discharge at, 10,8,104; water sample analyses; see Chemical Analyses
suspended silt at, see Silt; summation curve of flow at, 5,60; floods at, ... 6,79
San Miguel and Centenario Reservoirs, stored water in, normal capacity of; see Stored water
San Rodrigo, Rio; see Rio San Rodrigo Station
Santa Fe, New Mexico, evaporation at; see Evaporation
Santa Rosalia, Tamps., evaporation at, see Evaporation; see Precipitation index
Second Feet, daily, monthly, and annual averages; see each gaging station
Sewage Outfall, El Paso, Texas, discharge of 8,46; 9,45; 10,13
Silt in Elephant Butte Reservoir 7,63
Silt in Lower Rio Grande, generalized 6,70; 7,63
Silt, suspended, as shown by sampling at the following stream gaging stations:
Boquilla 1,33
Eagle Pass 4,46; 5,53; 6,67; 7,60; 8,59; 9,62; 10,64
El Paso 1,36; 2,51
Fort Quitman 1,36; 2,52
Laredo 1,37
Lower Presidio 1,37
Matamoros 1,38
Rio Alamo at Mier 4,48; 5,55; 6,68; 7,61; 8,60; 9,63; 10,65
Rio San Juan at Santa Rosalia 4,48; 5,55; 6,68; 7,61; 8,62; 9,65; 10,67
Roma 1,33; 2,53; 3,46; 4,47; 5,54; 6,69; 7,62; 8,61; 9,64; 10,66
San Marcial 2,50; 3,45; 4,45; 5,52; 6,66; 7,59; 8,58; 9,61; 10,63
Upper Presidio 1,36
Shumla Bend, Springs near, water sample analyses of; see Chemical analyses
Sodium in water samples; see Chemical analyses
Sources of Rio Grande flow, maps, diagrams 6,63; 7,52; 8,51; 9,52; 10,54
South Floodway, flow in 10,105
Springs, chemical analyses of water samples from; see Chemical analyses
Springs, deep springs in the Rio Grande Basin, estimated yield of 6,64; 7,53; 8,52; 9,48; 9,53
State College, New Mexico, sometimes called Mesilla Park; evaporation at, see Evaporation

INDEX — continued

S

Stored water in large reservoirs of the Rio Grande Basin and their capacities:
In the entire Rio Grande Basin 7,42; 9,47; 10,53
On the United States side, records for the following reservoirs:
Alamogordo 7,41; 8,50; 9,47; 10,52
All large reservoirs 5,56; 7,42; 9,47; 10,51
Caballo 8,50; 9,47; 10,52
Continental 10,51
Costilla 10,51
Elephant Butte 2,54; 3,47; 4,49; 5,56; 6,45; 7,41; 8,50; 9,47; 10,52
McMillan and Avalon 2,54; 3,47; 4,49; 5,56; 6,45; 7,41; 8,50; 9,47; 10,52
Red Bluff 6,45; 7,41; 8,50; 9,47; 10,52
Rio Grande 10,51
Sanchez 10,51
Terrace 10,51
On the Mexican side, records for the following reservoirs:
All large reservoirs 9,47; 10,53
Boquilla 2,54; 3,47; 4,49; 5,56; 6,45; 7,41; 8,50; 9,47; 10,52
Centenario and San Miguel 6,45; 7,41; 10,52
Don Martin 2,54; 3,47; 4,49; 5,56; 6,45; 7,41; 8,50; 9,47; 10,52
Summation curves of river and tributary flows 5,59; 7,57
Sycamore Creek Station, discharge at, 10,105; floods in 5,24

T

Terlingua Creek Station, discharge at 10,23,104
Tornillo Bridge Station, discharge at 10,104
Transpiration and evaporation losses on Rio Grande watershed 9,48
Tributaries, measured; see each gaging station; see General hydrologic conditions

U

Unmeasured increments and decrements, of salt burden, 10,74; see Chemical analyses;
of river flow; see Sources of river flow 10,54
Upper Presidio Station, discharge at, 10,19,104; summation curves of flow at 5,60; 7,57
floods at; see Floods; suspended silt at; see Silt; duration curve of flow at 5,61

V

Val Verde County wells, water analyses, see Chemical analyses
Van Horn Arroyo, flood flow 8,71

W

Water duty, see references under Diversions
Water in storage in reservoirs; see Stored water
Water received on and disbursed from the watershed 9,48
Water sample analyses; see Chemical analyses
Watershed, sub-divisions, yield of, map showing; see Sources of river flow
evaporation and transpiration losses on 9,48
Wells, chemical analyses of water from; see Chemical analyses
Weslaco, Texas, evaporation at; see Evaporation
Willacy, Hidalgo and Cameron Counties, diversions in, areas irrigated in the Valley,
average rainfall in the Valley, average duty of water in the Valley; see Diversions
Winterhaven, Texas, evaporation at; see Evaporation

Y

Ysleta, Texas; see Sanitary assays; evaporation at; see Evaporation

Z

Zapata Station, discharge at, 10,39,104; see Precipitation index
Zaragoza, Chih.; see Sanitary assays
Zaragoza, Coah., evaporation at; see Evaporation