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WATER BULLETIN NUMBER 15

Flow of the Rio Grande
and
Tributary Contributions

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

1945

WITH MAXIMUMS, MINIMUMS AND NORMALS

FLOOD FLOWS AND CORRECTED FLOWS

For Early Years From Eagle Pass to Rio Grande City

STORAGE CAPACITIES AND WATER IN STORAGE

SOURCES OF RIVER FLOW

DIVERSIONS

SILT, CHEMICAL AND SANITARY ASPECTS OF WATER QUALITY

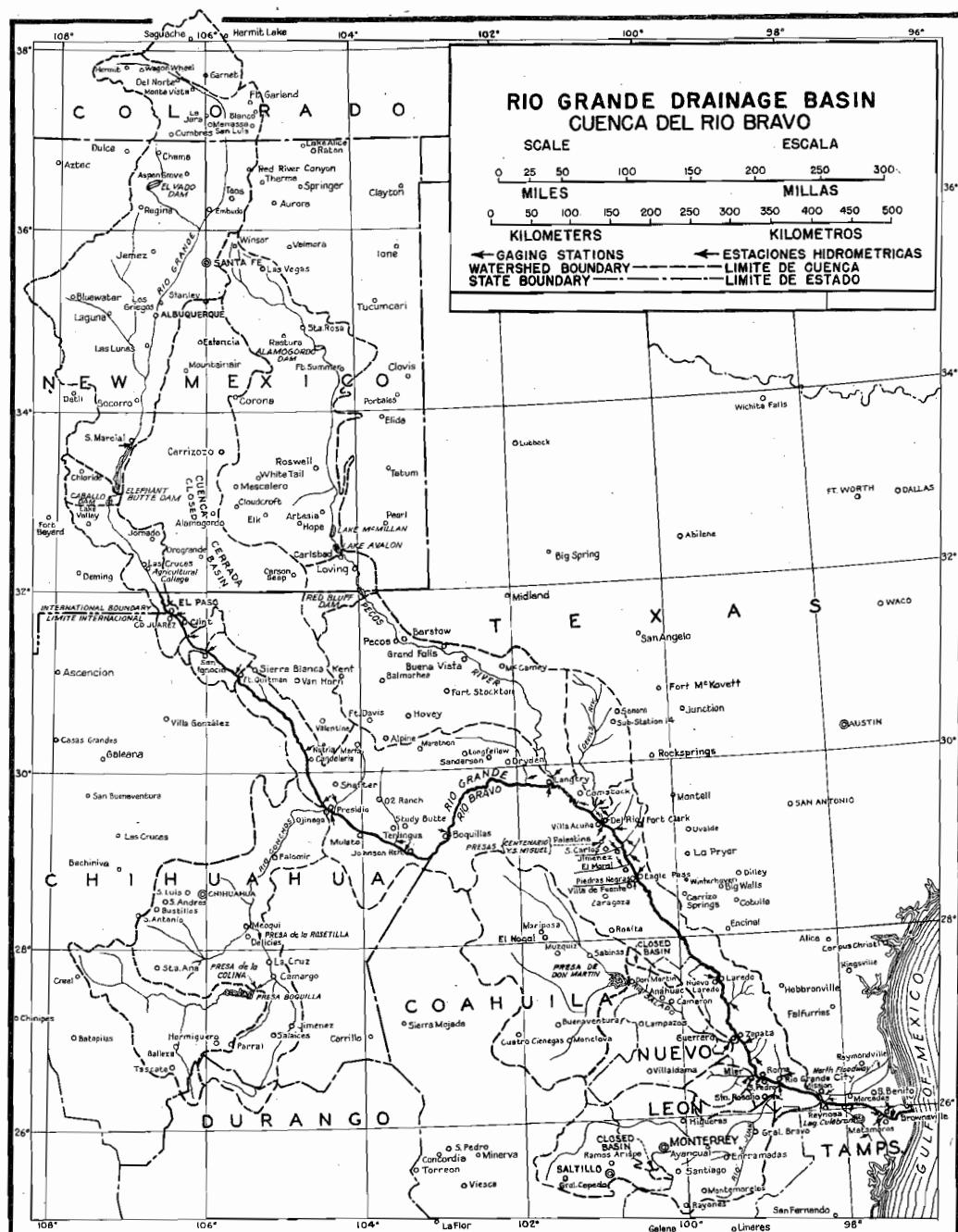
RAINFALL AND EVAPORATION

DRAINAGE BASIN AND IRRIGATED AREAS

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RIO GRANDE DRAINAGE BASIN
CUENCA DEL RIO BRAVO

FOREWORD

This compilation of stream discharges and related data is the fifteenth 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 and Water Commission and represent the results of stream flow measurements and related data from the Rio Grande and 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 1945 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, though separated, the two Commissions functioned as one. In January 1941, the two Mexican Commissions were again combined into one. Under the terms of the treaty of February 3, 1944, the name of the Commission was changed to International Boundary and Water Commission, United States and Mexico.

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 is necessary.

Of stream gaging stations on the Rio Grande, those at Juarez, Eagle Pass, Laredo, Roma, Las Palmas, and Matamoros were operated in 1945 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.

Of the 335,500 square miles of total area within the outer rim of the Rio Grande Basin, about 48.8% yield no run-off to the Rio Grande, leaving 171,887 square miles of productive watershed. Approximately 2,870,000 acre feet per year is the average virgin yield of the upper 61,600 square miles of watershed above Fort Quitman and Girvin (on the Pecos) where approximately 1,140,000 acres are irrigated and 3,574,000 acre feet of reservoir capacity regulates the flow. Above the regulating reservoirs on the Rio Conchos, Rio Salado and Rio San Juan, with an aggregate capacity of 3,665,000 acre feet, the watershed of 33,600 square miles has a virgin yield of about 3,630,000 acre feet per year which irrigates 502,000 acres of land. About 2,562,000 acre feet per year is the average virgin yield of the remaining lower 76,700 square miles of watershed in both countries where 799,000 acres are irrigated and only 290,000 acre feet of reservoir capacity regulates the flow. From the Rio Grande 3,750,000 acre feet per year, average, escapes to the Gulf of Mexico.

For finding all of the data for a particular stream measuring station or a particular subject, etc.; please refer to the index to all Water Bulletins in Water Bulletin No. 14.

A factual picture of Rio Grande hydrology along the international boundary, the various important aspects of the quantity and quality of its water, and the uses thereof, is more easily gained from the mass of essential detailed data in the Water Bulletins if the reader will look to the generalizations of the data which appear at the lower side and right hand side of the tabulations and also to the maps and graphs.

Acknowledgments

Some of the data published herein relative to drainage basin and irrigated areas, chemical and bacteriological analyses, 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, U. S. Soil Conservation Service, Rio Grande Compact Commission, Texas Agricultural and Mechanical College, Texas State Board of Health, El Paso City-County Health Unit, El Paso Department of Water and Sewerage, Laredo City Water Department, Red Bluff Water Power Control District, National Irrigation Commission of Mexico, Cia. Agrícola y de Fuerza Eléctrica del Rio Conchos, S. A., Mexican Department of Agriculture and Development, National Bank of Agricultural Credit of Mexico, Meteorological Service of Mexico, and private individuals and corporations. Specific acknowledgment is made where the data appear.

FOREWORD

General Hydrologic Conditions for 1945

Along and Adjacent to The International Portion of the Rio Grande

During 1945 the temperature and evaporation were in general a little above normal on both sides of the Rio Grande Basin, while rainfall was in general only about 85% of normal.

The average amount of water in storage during 1945 on the United States side was a little above normal with an above normal supply during the major part of the year and below normal in the late months. On the Mexican side the stored water supply was appreciably above normal all during the year except in September.

The yearly flow of the Rio Grande was, in volume, very much below normal from San Marcial to the Gulf of Mexico.

All measured tributaries from both sides of the Rio Grande flowed less than normal and averaged about 60% of normal with those on the United States side flowing 65% of normal and those on the Mexican side flowing 58% of normal. A notable drought occurred during the months May to September on both sides of the Rio Grande from the Pecos River to Eagle Pass, during which time many monthly minimum flows were established on measured tributaries. And Pinto Creek, from the United States side, flowed only 7.7% of normal which is its lowest recorded annual discharge.

Flood peaks in 1945 were not numerous or high. Above Del Rio no flood peak reached 50,000 second feet and below Del Rio only one flood peak exceeded that rate of discharge. This one flood reached a peak of 70,100 second feet at Rio Grande City on October 11. It originated partly above and partly below Del Rio. It did not cause overflow into the floodways on the United States side of the Lower Rio Grande Valley. Some of this flood water was diverted through floodways on the Mexican side. At Lower Brownsville Station the peak flow was 31,700 second feet.

There was a very great shortage of irrigation water in the Lower Rio Grande Valley. In the 120 days following June 3, 1945, there were 43 days on which there was no flow, a part or all day, in the Rio Grande at Lower Brownsville gaging station, and 28 of these days occurred from June 3 to July 10, inclusive.

On both sides of the basin the amount of water consumed in irrigation per acre of land was a little above normal, thus reflecting the slightly abnormal temperature and evaporation and the slightly subnormal rainfall. There was a small overall increase in the acreage irrigated on both sides within the basin; consequently, the total water diverted and consumed in irrigation was 4% or 5% above normal.

Municipal diversions from the Rio Grande were in general above normal.

The 1945 sanitary sampling and assaying of Rio Grande water extended from above El Paso to below Laredo.

The annual tonnage of salts, or total dissolved solids, carried by the Rio Grande in 1945 was considerably below normal at San Marcial, a little below normal from Caballo Dam to Upper Presidio and considerably below normal from Upper Presidio to the Gulf of Mexico. The total tonnage of salts leaving the El Paso-Juarez Valley at Fort Quitman was a little less than that entering the valley at El Paso. In fact the data since 1929 now indicates that salts are deposited in the valley in those years when the annual flow at Fort Quitman is less than about 255,000 acre feet and when the annual flow is more than that, then salts are removed from the valley.

The amount of suspended silt passing down the Rio Grande at all sampling points was considerably below normal in 1945.

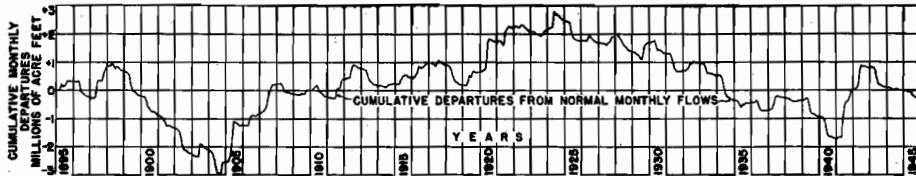
RIO GRANDE AT SAN MARCIAL STATION

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, and 177.1 miles above the American Dam at El Paso, Texas. The recorder is on the upstream end of the first bridge pier from the south abutment of the bridge and the zero of its gage is 4,455.38 feet, United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 117 meter measurements by wading and from cable about 1,000 feet above railroad bridge. Computations by shifting channel methods. 1945 records good. Records available: January 1895 to December 1945. Monthly records 1895-1943 will be found in Water Bulletin No. 13.

REMARKS: For gage history 1895 to 1934 will be found in Water Bulletin No. 13. 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: This trend line shows cumulative departures from normal monthly flows. Downward trends show subnormal flows, upward trends show plentitudes and horizontal trends show normal flows. Note the 4 million acre feet subnormal cumulation in the six years 1898 to 1904 and the 5 3/4 million acre feet above normal cumulation 1904 to 1924 followed by the 16-year cumulative subnormal flow, 1924 to 1940.



Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

		Current Year 1945				Period 1924-1945					
Month	Extreme Gage Feet		Extreme Second Feet		Average Second Foot	Total	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
Jan.	12.25	11.96	2	856	6	706	774	47,600	44,561	72,600	17,400
Feb.	12.58	12.00	8	1,180	5	705	857	47,600	47,756	77,100	29,600
Mar.	12.09	11.43	2	818	31	429	668	41,100	59,196	119,000	23,400
Apr.	13.08	11.17	26	3,400	11	289	1,170	69,700	128,092	432,000	16,850
May	14.00	12.20	10	9,620	2	1,900	6,190	380,000	292,638	994,000	4,450
June	12.37	9.94	2	4,790	30	184	1,640	97,300	164,558	609,000	228
July	10.84	9.78	18	595	16	74.6	260	16,000	58,618	246,000	0
Aug.	11.78	9.66	14	1,840	31	39.8	358	22,000	46,917	275,000	1,620
Sept.	10.43	9.37	5	446	1	9.0	123	7,350	52,508	308,000	2,920
Oct.	11.12	10.05	14	900	1	110	389	23,900	41,614	221,000	0
Nov.	11.05	10.34	13	797	19	98.5	355	21,100	34,134	171,000	2,550
Dec.	12.35	10.56	16	2,010	1	138	652	40,100	44,026	95,300	15,100
Yearly	14.00	9.37		9,620		9.0	1,120	813,750	1,014,618	2,832,100	244,489

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 1 mile below the 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 1,900 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. On April 25, 1942, the water-stage recorder was moved to a point 100 feet above the cable. Zero of this gage is 4,242.09 feet on the above-mentioned sea level datum. Elephant Butte Dam is 135.1 river miles above the American Dam at El Paso.

RECORDS: Based upon 43 meter measurements during the year and a stable rating curve. Records available: 1915 to 1945. 1945 records excellent. Records furnished by the El Paso Office of the United States Bureau of Reclamation. Monthly records 1915-1943 will be found in Water Bulletin No. 15.

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 in the immediate vicinity. 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 42.0 river miles downstream from the San Marcial gaging station at the upper end of Elephant Butte Reservoir. Beginning December 1940 hydro-electric power generation facilities for 27,000 K. V. A. began operating here.

COMPARATIVE FLOWS FROM RECORDS: Average Daily: Max., May 22, 1942, 8,200 sec. ft.; Min., varies according to power generation.

	Average Monthly	Max. May 1942	7,590 sec. ft.	Min. Jan. 1930	3.0 sec. ft.
	Average Yearly	Max. 1942	2,510 sec. ft.	Min. 1935	881 sec. ft.
Average of Two Successive Years:	Max. 1941-1942	1,930 sec. ft.	Min. 1918-1919	946 sec. ft.	
Average of Three Successive Years:	Max. 1941-1943	1,660 sec. ft.	Min. 1935-1937	985 sec. ft.	
Average of Four Successive Years:	Max. 1941-1944	1,550 sec. ft.	Min. 1934-1937	1,020 sec. ft.	
Average of Five Successive Years:	Max. 1941-1945	1,470 sec. ft.	Min. 1933-1937	1,040 sec. ft.	
Average of Ten Successive Years:	Max. 1916-1925	1,270 sec. ft.	Min. 1928-1937	1,060 sec. ft.	
Average of Thirty-one Years:	1915-1945	1,210 sec. ft.			

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,020	1,100	1,170	871	955	1,170	992	1,140	1,280	1,070	1,190	1,170
2	1,080	1,150	1,190	980	943	1,150	1,140	1,140	1,050	1,080	1,140	1,000
3	1,080	1,110	1,250	1,080	950	1,080	1,130	1,380	961	1,090	1,140	1,120
4	1,140	958	903	1,110	1,040	1,200	1,000	1,480	1,140	1,090	1,020	1,130
5	1,140	1,060	1,040	1,140	1,070	1,260	1,180	1,290	1,200	1,080	1,130	1,130
6	1,120	1,130	1,130	1,090	1,000	1,310	1,190	1,510	1,220	1,110	1,170	1,170
7	928	1,070	1,150	1,100	1,100	1,280	1,150	1,560	1,410	1,160	1,170	1,170
8	1,080	1,040	1,140	1,030	954	1,300	1,050	1,420	1,540	1,170	1,250	1,190
9	1,140	1,150	1,170	1,070	925	1,280	1,210	1,420	1,300	1,190	1,090	1,010
10	1,100	1,160	1,190	1,180	894	1,050	1,180	1,530	1,560	1,150	1,160	1,200
11	1,100	950	1,040	1,170	950	988	1,210	1,660	1,540	1,140	946	1,310
12	1,110	1,140	1,140	1,100	1,020	1,220	1,190	1,200	1,490	1,330	1,020	1,240
13	1,050	1,220	1,180	1,180	890	1,380	1,320	1,430	1,480	1,130	1,160	1,250
14	890	1,220	1,210	1,170	978	1,360	1,330	1,320	1,340	916	1,330	1,220
15	1,120	1,180	1,230	1,050	986	1,210	1,170	1,200	1,040	1,330	1,250	1,140
16	1,210	1,150	1,250	1,140	1,100	1,330	1,290	1,250	.960	1,250	1,220	1,020
17	1,230	1,140	1,210	1,220	1,050	1,210	1,470	1,500	1,060	1,200	1,060	1,150
18	1,230	974	988	1,160	1,120	1,360	1,380	1,410	1,140	1,260	1,010	1,240
19	1,140	1,090	1,120	1,090	1,030	1,370	1,360	1,250	1,110	1,220	1,100	1,260
20	1,190	1,120	1,150	1,100	937	1,270	1,270	1,400	1,150	1,110	1,010	801
21	1,030	1,150	1,180	1,110	1,040	1,270	1,220	1,570	1,080	.941	1,150	1,220
22	1,120	1,160	1,160	948	1,050	1,250	1,140	1,570	1,110	1,080	1,150	1,070
23	1,250	1,150	1,210	1,100	1,080	1,180	1,210	1,380	.885	1,170	1,170	739
24	1,100	1,100	1,200	1,090	1,070	1,080	1,430	1,300	.954	1,210	1,190	1,010
25	1,110	1,040	1,010	1,160	1,080	986	1,190	1,260	1,070	1,170	1,010	801
26	1,150	1,130	1,190	1,110	1,100	1,010	1,160	1,160	1,030	1,140	1,110	1,160
27	1,090	1,150	1,210	1,070	1,050	1,200	1,440	1,250	1,090	1,170	1,150	1,310
28	903	1,150	1,260	1,100	1,100	1,120	1,270	1,270	1,090	1,050	1,170	1,140
29	1,070	1,320	1,050	1,130	1,120	1,210	1,210	1,300	1,140	1,190	1,180	1,380
30	1,160	1,340	1,060	1,100	1,050	1,270	1,270	1,270	.867	1,040	1,140	1,010
31	1,160	1,250			1,090	1,450	1,270		1,040			1,090
Sum	31,142	32,829	36,044	42,700	35,087					34,336	35,580	
	34,241	36,141	31,762	38,202	35,287							

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
Jan.	23	1,250	14	890	1,100	67,900	19,248	86,500	184		
Feb.	13	1,220	11	950	1,110	61,800	34,076	76,300	969		
Mar.	30	1,340	4	903	1,170	71,700	61,292	88,700	1,520		
Apr.	17	1,220	1	871	1,090	65,100	107,468	162,000	57,200		
May	29	1,130	13	890	1,020	63,000	115,164	467,000	63,000		
June	13	1,380	25	986	1,200	71,500	123,495	363,000	64,400		
July	17	1,470	1	992	1,230	75,800	122,432	211,000	73,900		
Aug.	11	1,660	26	1,160	1,380	84,700	115,605	161,000	74,700		
Sept.	10	1,560	30	867	1,180	70,000	78,264	129,000	25,000		
Oct.	15	1,330	14	916	1,130	69,600	29,651	72,100	506		
Nov.	14	1,330	11	946	1,140	68,100	29,081	158,000	884		
Dec.	28	1,410	23	739	1,150	70,600	28,033	87,300	916		
Yearly			1,660	739	1,160	839,800	857,809	1,818,800	637,544		

* Mean daily

RIO GRANDE AT BELOW CABALLO DAM STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and winch located .80 river mile below Caballo Dam, and 106.8 river miles above American Dam at El Paso. Elevation of zero of the gage was 4,147.90 ± .2 feet from February 26, to October 7, 1938, when it was changed to 4,146.90 ± .2 feet. On October 13, 1938, it was again changed to 4,145.90 ± .2 feet. All elevations are on United States Coast and Geodetic Survey sea level datum.

RECORDS: Based upon 59 meter measurements during the year. Records available: February 26, 1938, to December 31, 1945. 1945 records excellent. Records furnished by the El Paso Office of the United States Bureau of Reclamation. Monthly records 1938-1945 will be found in Water Bulletin No. 13.

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. 1,600 acre feet of water, not accounted for in the tables below, were diverted in 1945 from Caballo Reservoir into a small irrigation canal (Bonito Lateral) just below the dam.

COMPARATIVE FLOWS FROM RECORDS:

Average	Daily	Max. May 20, 1942, 7,650 sec. ft.; Min. Dec. 12, 1940, 1.3 sec. ft.
Average	Monthly	Max. May 1942, 6,710 sec. ft.; Min. Dec. 1940, 1.4 sec. ft.
Average	Yearly	Max. 1942, 2,480 sec. ft.; Min. 1941, 972 sec. ft.
Average of Two Successive Years:	Max.	1942-1943, 1,870 sec. ft.; Min. 1940-1941, 990 sec. ft.
Average of Three Successive Years:	Max.	1942-1944, 1,640 sec. ft.; Min. 1939-1941, 1,020 sec. ft.
Average of Four Successive Years:	Max.	1942-1945, 1,540 sec. ft.; Min. 1938-1941, 1,040 sec. ft.
Average of Five Successive Years:	Max.	1941-1945, 1,420 sec. ft.; Min. 1940-1944, 1,320 sec. ft.
Average of Eight Years:		1938-1945, 1,290 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.0	29.4	695	2,120	1,820	1,760	2,370	2,400	2,100	1,020	4.3	4.5
2	5.1	29.7	626	2,130	1,880	1,880	2,110	2,360	2,390	918	545	4.5
3	5.2	31.2	924	2,290	1,870	2,080	1,600	2,280	2,370	678	899	4.5
4	5.3	410	1,060	2,380	1,790	2,070	1,950	2,270	2,320	306	899	4.5
5	5.5	898	1,040	2,180	2,060	2,020	2,080	2,270	2,210	72.4	834	172
6	5.7	732	944	2,040	2,180	1,950	1,950	2,270	2,090	27.0	623	590
7	6.1	594	838	2,290	2,170	1,910	2,180	2,200	1,960	7.6	451	584
8	6.2	514	682	2,460	2,080	1,900	2,420	2,150	2,130	6.1	264	584
9	6.5	433	666	2,440	1,960	2,030	2,390	2,150	2,190	4.9	132	799
10	7.0	250	867	2,290	1,700	2,140	2,290	2,140	2,200	4.9	38.4	1,100
11	7.4	141	920	2,180	1,600	2,130	2,190	2,300	2,200	4.9	6.8	1,090
12	7.7	141	877	2,230	1,710	2,010	2,080	2,410	2,010	4.9	5.2	1,090
13	8.0	214	1,020	2,310	1,780	1,910	1,950	2,410	1,730	4.9	5.2	1,020
14	8.5	289	1,060	2,470	1,780	1,870	2,060	2,380	1,540	4.9	5.2	891
15	9.0	289	1,060	2,440	1,750	1,770	2,120	2,160	1,410	449	5.3	758
16	9.2	289	1,350	2,300	1,600	1,930	2,130	2,000	1,410	610	4.9	542
17	9.4	228	1,620	2,190	1,440	2,110	2,130	2,010	1,410	438	4.9	283
18	9.7	299	1,550	2,350	1,330	2,110	2,240	2,070	1,410	438	4.9	33.9
19	10.3	446	1,680	2,180	1,560	2,110	2,370	2,180	1,300	376	4.9	5.5
20	10.5	393	1,640	1,960	1,780	2,110	2,580	2,200	1,260	108	4.9	4.9
21	10.7	334	1,640	2,210	1,790	1,980	2,520	2,200	1,260	47.3	4.9	4.9
22	10.8	318	1,550	2,220	1,700	1,880	2,600	2,080	1,260	4.8	4.9	4.4
23	11.3	245	1,710	2,290	1,690	2,060	2,560	1,900	1,270	4.8	4.9	4.9
24	13.2	655	2,150	2,200	1,690	2,230	2,560	1,870	1,270	3.1	4.7	4.9
25	14.9	840	2,040	2,000	1,630	2,300	2,560	2,000	1,270	4.2	4.6	4.9
26	16.6	913	2,020	1,830	1,790	2,350	2,550	2,030	1,220	4.2	4.5	4.7
27	18.0	816	2,250	1,800	1,970	2,270	2,600	2,050	1,120	4.1	4.5	4.7
28	20.0	804	2,250	1,820	2,070	2,180	2,680	2,000	1,120	4.0	4.5	4.3
29	22.1		2,130	1,820	2,150	2,100	2,600	1,970	1,090	4.3	4.5	4.1
30	24.6		1,940	1,840	2,080	2,290	2,580	1,900	1,020	4.3	4.5	4.1
31	28.1		2,080	1,950			2,510	1,810		4.3		3.3
Sum:			11,555.3	65,260	61,440			66,400		5,572.9		9,618.5
			337.6	42,977	56,350			71,310		49,540		4,788.4

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Period 1938-1945				
			High				Average	Maximum	Minimum		
	High	Low	Day	Day							
Jan.			31	28.1	1	5.0	10.9	670	1,772		
Feb.			26	913	1	29.4	413	22,900	25,245		
Mar.			27	2,250	2	626	1,390	85,200	95,100		
Apr.			14	2,470	27	1,800	2,180	129,000	132,888		
May			6	2,180	18	1,330	1,820	112,000	145,625		
June			26	2,350	1	1,760	2,050	122,000	150,575		
July			28	2,680	3	1,600	2,300	141,000	141,175		
Aug.			12	2,410	31	1,810	2,140	132,000	134,350		
Sept.			2	2,390	30	1,020	1,650	98,300	85,950		
Oct.			1	1,020	24	3.1	180	11,100	16,771		
Nov.			3	899	1	4.3	160	9,500	8,430		
Dec.			10	1,100	31	3.3	310	19,100	9,710		
Yearly				2,680		3.1	1,220	882,770	932,691		
								1,795,620	703,547		

* 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 United States Coast and Geodetic Survey mean sea level datum. Also water-stage recorder 1 mile further upstream with zero of its gage 3,722.30 feet on the same datum. This latter gage has been the official gage since August 3, 1938. For items of gage history see previous Water Bulletins.

RECORDS: Discharges in 1945 were computed by taking the sum of the flows in the American Canal and the flows at the Below American Dam Station. 1945 records good. Records available: 1889-1945. Monthly records 1889-1945 will be found in Water Bulletin No. 13.

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

COMPARATIVE FLOWS FROM RECORDS: This trend line shows cumulative departures from normal monthly flows. Downward trends show subnormal flows, upward trends show plenitudes and horizontal trends show normal flows. Note the 2 2/3 million acre feet subnormal cumulation in the six years 1898 to 1904 and the 4 1/2 million acre feet above normal cumulation, 1904 to 1912. Note the subnormal trend since 1918 when irrigation consumption and reservoir losses increased under Elephant Butte Reservoir.



Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	209	182	490	1,280	1,090	1,200	1,010	1,460	961	1,000	289	219
2	208	194	463	1,240	1,040	1,180	1,240	1,490	942	814	214	200
3	205	190	533	1,020	1,090	1,060	1,470	1,350	1,050	1,010	276	200
4	204	190	476	1,180	1,070	1,090	1,410	1,330	1,170	1,070	276	202
5	184	194	481	1,320	1,060	1,130	1,330	1,400	1,200	962	339	200
6	" 195	181	640	1,160	1,050	1,060	1,020	1,470	1,180	917	465	191
7	" 185	246	648	886	1,350	1,030	1,050	1,320	1,060	684	441	180
8	" 195	483	659	996	1,340	1,010	1,030	1,260	1,030	572	449	176
9	189	366	601	1,510	1,340	1,000	1,190	1,220	950	702	404	173
10	198	297	522	1,360	1,240	1,140	1,370	1,180	1,040	1,200	475	472
11	193	307	482	1,320	1,170	1,280	1,310	1,140	1,220	702	473	586
12	185	353	490	927	1,110	1,200	1,220	1,270	1,180	582	373	632
13	191	279	518	794	1,080	1,160	1,190	1,680	1,210	522	325	629
14	183	251	477	920	1,220	1,120	1,180	1,460	1,160	470	301	502
15	188	217	445	1,260	1,180	962	1,130	1,490	1,100	398	275	497
16	193	229	552	1,400	1,120	952	1,130	1,680	1,200	388	256	544
17	205	294	536	1,320	1,060	897	1,210	1,510	1,260	366	254	663
18	193	281	734	1,010	1,010	1,020	1,160	1,350	1,120	428	270	639
19	187	327	1,180	993	985	1,040	1,070	1,360	943	564	266	594
20	184	279	1,110	1,200	860	1,030	1,070	1,330	919	524	269	421
21	174	338	1,130	1,100	893	1,010	1,070	1,270	892	532	258	328
22	168	476	1,020	1,150	1,080	988	1,190	1,300	936	496	257	305
23	171	460	942	1,360	1,060	956	1,280	1,270	947	380	256	291
24	171	390	986	1,280	1,040	850	1,250	1,190	988	348	257	284
25	173	351	1,340	1,100	952	896	1,200	1,100	804	346	258	280
26	173	291	1,310	1,080	899	1,100	1,170	1,140	737	320	258	272
27	169	343	1,060	1,000	906	1,110	1,180	1,340	735	312	254	228
28	166	449	1,160	1,010	900	1,160	1,270	1,360	765	310	250	224
29	168	1,270	1,050	1,080	1,080	1,140	1,220	1,220	858	308	235	239
30	165	1,270	1,200	1,070	1,090	1,820	1,160	967	304	226	262	245
31	171	1,210	1,300	1,210	1,770	1,770	1,030	1,030	300	300	258	245
Sum	8,398	34,426	31,791	38,430	41,130	41,130	41,130	41,130	17,831	10,892		
	5,741	24,715	33,643	38,430	30,524	30,524	30,524	30,524	9,265			

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Normal	Maximum	Minimum
Jan.	3.87	3.62	2	212	27	163	185	11,400	11,273	17,500
Feb.	4.64	3.61	8	523	6	175	300	16,700	20,713	52,200
Mar.	6.05	4.22	25	1,690	2	408	797	49,000	41,115	62,500
Apr.	6.39	5.28	9	1,860	13	789	1,150	68,300	67,764	139,000
May	6.12	5.25	7	1,480	20	802	1,080	63,100	80,756	304,000
June	6.00	5.23	11	1,360	24	808	1,060	63,100	80,756	56,200
July	6.74	5.37	30	2,150	6	989	1,240	76,200	85,332	198,000
Aug.	6.36	5.34	16	1,740	31	975	1,330	81,600	89,233	158,000
Sept.	5.84	4.87	17	1,330	26	693	1,020	60,500	68,632	171,000
Oct.	5.95	3.94	10	1,670	31	296	575	35,400	27,860	57,900
Nov.	4.62	3.70	7	507	30	226	309	18,400	18,208	29,500
Dec.	4.94	3.70	18	758	9	170	351	21,600	17,221	27,700
Yearly	6.74	3.61		2,150		163	786	568,900	609,330	1,559,200
										453,900

^a Estimated

RIO GRANDE BELOW AMERICAN DAM STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located 3,200 feet below the American Dam and 1.5 miles above the International Dam, west of El Paso, Texas. The zero of the gage is 3,712.30 feet, United States Coast and Geodetic Survey sea level datum. The American Dam is 1,241.4 river miles above the Gulf of Mexico.

RECORDS: Based upon 36 meter measurements at normal and low stages during the year. Computations by shifting channel methods. 1945 records good. Records available: June 1, 1938, to December 31, 1945. Monthly records 1938-1943 will be found in Water Bulletin No. 15.

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.

COMPARATIVE FLOWS FROM RECORDS:

	Momentary	Peak:	Max. May 18, 1942, 6,770 sec. ft.; Min. Feb. 14, 1941, 1,03 sec. ft.
	Average	Daily:	Max. May 20, 1942, 6,040 sec. ft.; Min. Oct. 28-31, 1939, 1.2 sec. ft.
	Average	Monthly:	Max. 1942, 4,880 sec. ft.; Min. Dec. 1942, 2.0 sec. ft.
	Average	Yearly:	Max. 1942, 1,510 sec. ft.; Min. 1945, 106 sec. ft.
Average of Two Successive Years:	Max.	1941-1942, 846 sec. ft.; Min.	1944-1945, 121 sec. ft.
Average of Three Successive Years:	Max.	1940-1942, 608 sec. ft.; Min.	1943-1945, 122 sec. ft.
Average of Four Successive Years:	Max.	1939-1942, 490 sec. ft.; Min.	1942-1945, 469 sec. ft.
Average of Five Successive Years:	Max.	1939-1943, 417 sec. ft.; Min.	1941-1945, 412 sec. ft.
Average of Seven Years:	Max.	1939-1945, 333 sec. ft.	

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	" 3.0	182	18.6	72.3	195	173	160	183	172	93.2	" 2.0	" 2.0
2	" 3.0	153	29.7	108	212	162	165	168	176	" 3.5	" 2.0	" 2.0
3	" 3.0	27.2	33.1	110	217	168	162	160	175	" 3.5	" 2.0	" 2.0
4	" 3.0	24.0	29.3	98.0	219	175	166	161	166	" 3.5	" 2.0	" 2.0
5	" 101	24.0	25.4	97.4	224	172	167	161	161	" 3.5	" 2.0	" 2.0
6	" 195	17.7	27.6	100	226	172	171	156	164	8.3	" 2.0	" 2.0
7	" 185	12.1	31.0	99.3	231	172	167	160	161	" 3.5	" 2.0	" 2.0
8	" 195	9.6	31.8	105	227	170	167	162	160	" 3.5	" 2.0	" 2.0
9	189	7.1	26.0	134	227	169	166	162	147	11.1	" 2.0	" 2.0
10	198	6.1	23.4	101	223	163	164	169	158	282	" 2.0	" 2.0
11	193	4.8	22.6	94.7	221	161	164	167	170	" 3.5	" 2.0	" 2.0
12	185	4.2	24.2	91.9	220	166	160	169	181	" 3.5	" 2.0	" 2.0
13	191	3.2	24.7	89.2	220	167	168	173	168	" 3.5	" 2.0	" 2.0
14	183	" 3.0	24.8	93.1	225	163	170	171	162	" 3.5	" 2.0	" 2.0
15	188	" 3.0	25.4	96.1	223	162	170	178	164	" 3.5	" 2.0	" 2.0
16	193	" 3.0	31.2	130	215	162	172	174	171	" 3.5	" 2.0	" 2.0
17	203	" 3.0	31.9	105	206	159	168	172	174	" 3.5	" 2.0	" 2.0
18	193	" 3.0	35.7	105	207	162	164	166	170	" 3.5	" 2.0	" 2.0
19	187	" 3.0	38.4	104	208	159	164	165	159	" 3.5	" 2.0	" 2.0
20	184	" 3.0	29.9	111	182	157	162	163	159	" 3.5	" 2.0	" 2.0
21	174	" 3.0	29.2	118	195	154	159	160	158	" 3.5	" 2.0	" 2.0
22	168	" 3.0	25.0	127	207	150	161	160	168	" 3.5	" 2.0	" 2.0
23	171	" 3.0	28.7	122	206	150	163	161	169	" 3.5	" 2.0	" 2.0
24	171	" 3.0	29.7	118	212	154	159	163	165	" 3.5	" 2.0	" 2.0
25	173	" 3.0	33.9	118	226	159	166	167	161	" 3.5	" 2.0	" 2.0
26	173	" 3.0	32.9	120	225	161	174	170	162	" 3.5	" 2.0	" 2.0
27	169	" 3.0	32.1	133	224	158	183	168	164	" 3.5	" 2.0	62.5
28	166	" 3.0	35.4	137	219	155	187	164	159	" 3.5	" 2.0	223
29	168		38.6	137	218	158	225	160	157	" 3.5	" 2.0	238
30	165		34.8	135	216	159	528	157	161	" 3.5	" 2.0	261
31	171		31.0		217		457	157		" 3.5		244
Sum		520.0	3,310.0	4,872		5,127		489.1		1,080.5		
	4,844.0	916.0	6,693	5,879		4,942		460.0				

Current Year 1945 & Period 1938-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.	5.50	4.30	17	206	\$ 1	3.0	156	9,610	8,954	10,600
Feb.	5.48	4.28	2	198	\$ 14	3.0	18.6	1,030	6,890	32,800
Mar.	5.17	4.25	29	94.4	1	3.0	29.5	1,820	17,500	1,820
Apr.	5.88	4.66	9	260	1	28.5	110	6,570	17,311	74,500
May	5.95	5.33	29	252	1	152	216	13,300	54,200	300,000
June	5.81	5.60	1	212	23	140	162	9,660	43,339	250,000
July	6.60	5.65	30	94.5	3	156	190	11,700	32,012	155,000
Aug.	5.80	5.57	12	186	31	151	165	10,200	25,728	114,000
Sept.	5.83	5.64	16	190	9	141	165	9,800	28,205	124,000
Oct.	6.52	4.74	10	798	\$ 2	3.5	15.8	970	4,689	19,000
Nov.	4.86	4.80	\$ 1	2.0	\$ 1	2.0	2	119	3,156	8,700
Dec.	5.96	4.78	30	273	\$ 1	2.0	34.9	2,140	2,479	7,760
Yearly	6.60	4.25		945		2.0	106	76,919	231,762	1,093,553
										76,919

And other days Estimated The average, maximum and minimum discharges for January through May are for the period 1939-1945.

OUTFALLS FROM DEEP WELLS

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

Between the Below American Dam Station and the 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 Juarez, except some of the water from the El Paso Sewage Outfall, which is from the Rio Grande. During 1945, such outfalls contributed a total of 13,269 acre feet of water to the Rio Grande flow, which is equivalent to an average steady flow of 18.3 second feet during the year. Of this total flow, 18.0 second feet, or 13,052 acre feet, came from the United States side, while 0.3 second foot, or 217 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 1,431 acre feet flowed into the river in 1945. This corresponds to an average flow of 2.0 second feet.

Juarez Sewage Outfall

This outfall enters the river 4.7 miles below the American Dam. From several inspections, this outfall is estimated at 217 acre feet for 1945, which corresponds to an average flow of 0.3 second feet.

Peyton Packing Company Waste

This outfall enters the river 5.7 miles below the American Dam. From several inspections, it was found that the flow from this source was too small to be of account.

El Paso Sewage Outfall

This outfall enters the river 6.6 miles downstream from the American Dam. The 1945 record of total outfall consists of flows measured by a Parshall meter and estimates by the Department of Water and Sewerage of the City of El Paso, of amounts which by-passed the meter. The breakdown of this total into water from deep wells, or from the Rio Grande, is made in cooperation with the El Paso Water and Sewerage Department. Water for 37 acres of land was diverted from this outfall between the sewage plant and the Rio Grande.

Month	1945				Period 1936-1945		
	From Deep Wells [#]		From Rio Grande [#]		Diversions	To Rio Grande Acre Feet	Normal Acre Feet
	Mean Sec. Ft.	Acre Feet	Mean Sec. Ft.	Acre Feet	Acre Feet		
Jan.	14.6	898	0	0	0	898	631
Feb.	13.6	757	.3	17	0	774	602
Mar.	10.8	666	3.3	206	0	872	644
Apr.	10.4	619	4.4	259	30	848	675
May	13.1	803	3.2	199	29	973	718
June	13.6	810	4.0	238	29	1,019	754
July	14.0	861	4.1	255	33	1,083	800
Aug.	14.6	896	3.9	240	35	1,101	774
Sept.	14.5	863	3.7	218	26	1,055	727
Oct.	12.7	780	5.4	334	0	1,114	729
Nov.	11.6	690	4.9	289	0	979	689
Dec.	13.1	807	1.6	98	0	905	685
Annual	13.1	9,450	3.3	2,353	182	11,621	8,426

[#] Estimated

RIO GRANDE AT 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 Juarez, Chihuahua. This station is on the 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. On January 1, 1943, the zero of this gage was lowered 3.28 feet. The zero of the present gage is 3,683.98 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 178 meter measurements during the year, 157 by the Mexican and 21 by the United States Section. Computations by shifting channel methods. 1945 records good. Records available: April 1, 1938, to December 31, 1945. Monthly records 1938-1943 will be found in Water Bulletin No. 13.

REMARKS: Reservoirs, irrigation diversions, and drainage returns above this station modify the river flow. Comparative Flows from Records: Momentary Peak: Mar., May 18, 1942, 6,600 sec. ft. with a gage height of 11.15 feet.; Min., December 22, 1944, 15.2 sec. ft. with a gage height of 2.17 feet.

Average Daily:	Max. May 20, 1942, 6,460 sec. ft.;	Min. Dec. 21, 1944, 17.0 sec. ft.
Average Monthly:	Max. May 1942, 5,300 sec. ft.;	Min. Feb. 1941, 85.1 sec. ft.
Average Yearly:	Max. 1942, 1,820 sec. ft.;	Min. 1940, 371 sec. ft.
Average of Two Successive Years:	Max. 1942-1943, 1,180 sec. ft.;	Min. 1939-1940, 396 sec. ft.
Average of Three Successive Years:	Max. 1942-1944, 969 sec. ft.;	Min. 1939-1941, 415 sec. ft.
Average of Four Successive Years:	Max. 1942-1945, 849 sec. ft.;	Min. 1939-1942, 258 sec. ft.
Average of Five Successive Years:	Max. 1941-1945, 771 sec. ft.;	Min. 1939-1942, 766 sec. ft.
Average of Seven Years:	1939-1945, 663 sec. ft.	Min. 1939-1943, 720 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	220	186	226	943	477	735	554	900	501	604	63.2	232
2	214	186	207	837	477	738	713	968	526	565	71.0	224
3	210	178	253	622	544	561	879	907	565	756	249	197
4	213	187	236	816	477	557	879	883	660	784	258	203
5	194	145	252	907	452	636	826	957	675	777	288	217
6	205	106	371	812	455	579	562	886	653	1,030	459	199
7	206	113	396	579	710	519	597	794	561	777	441	191
8	195	336	385	636	766	533	646	773	523	745	441	208
9	195	188	364	1,100	749	501	706	724	463	727	441	167
10	195	121	290	939	692	703	872	678	512	1,490	491	232
11	195	99.9	231	939	569	745	784	646	671	758	544	340
12	196	155	256	610	509	709	735	724	646	618	357	385
13	196	101	245	491	551	671	738	1,030	667	558	143	424
14	196	67.5	225	572	600	653	713	907	657	540	83.3	352
15	196	198	200	855	614	494	653	897	611	326	59.0	547
16	187	159	276	1,080	568	484	622	1,090	689	303	57.9	600
17	195	117	310	939	523	438	696	989	696	272	70.6	639
18	195	108	396	675	491	550	706	844	622	234	610	279
19	195	143	964	667	463	600	597	883	473	420	297	643
20	195	130	869	841	357	544	590	798	448	519	286	312
21	186	137	844	766	388	530	583	752	417	516	266	110
22	194	267	759	816	526	526	738	787	448	516	269	103
23	194	334	660	918	516	466	731	752	484	381	237	103
24	185	204	696	834	505	449	717	674	551	347	234	115
25	177	95.7	992	657	406	374	675	636	385	348	178	264
26	185	71.0	1,013	632	341	586	650	685	337	336	56.1	287
27	185	103	731	572	427	622	613	844	332	305	79.8	261
28	177	168	748	632	360	692	738	907	351	252	57.6	254
29	186		848	650	551	615	840	742	424	140	59.7	242
30	186		879	685	678	615	1,230	689	509	131	75.6	229
31	194		844	756				1,100	583		88.6	208
Sum		6,042	15,966	16,498		22,713		16,057		6,891.8		
		4,404.1	23,022	17,385		25,329		16,143.6		9,103		

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	Day			Average	Maximum	Minimum
Jan.	3.15	2.76	4	255	5	144	11,980	11,770	13,270
Feb.	3.54	2.56	8	406	14	56.5	8,740	13,717	42,690
Mar.	4.40	2.79	25	1,350	3	149	31,670	29,064	45,790
Apr.	4.69	3.18	9	1,570	14	463	767	45,660	111,500
May	5.09	3.25	13	1,030	20	287	532	69,731	325,100
June	5.35	3.44	10	1,150 *	25	300	580	68,969	272,400
July	6.36	3.97	30	1,500	8	540	733	45,050	62,245
Aug.	5.87	3.97	5	1,240	31	509	817	50,240	162,500
Sept.	5.51	3.41	16	999	26	312	535	31,850	59,521
Oct.	5.51	2.62	10	2,240	31	61.8	521	32,020	127,300
Nov.	4.36	2.49	11	643	29	41.0	230	21,818	51,370
Dec.	4.33	2.66	17	706	24	76.3	294	13,670	45,390
Yearly	6.36	2.36		2,240		41.0	467	356,140	461,529
								1,315,890	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 63 meter measurements during the year, 58 by the United States and 11 by the Mexican Section. Computations by shifting channel methods. 1945 records good. Records available: August 17, 1938, to December 31, 1945. Monthly records 1938-1943 will be found in Water Bulletin No. 13.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., May 19, 1942, 6,490 sec. ft.; Min., sometimes dry.

Average Daily: Max. May 19, 1942, 6,140 sec. ft.; Min. sometimes dry.

Average Monthly: Max. May 1942, 4,880 sec. ft.; Min. Nov. 1940, .2 sec. ft.

Average Yearly: Max. 1942, 1,490 sec. ft.; Min. 1940, 60.6 sec. ft.

Average of Two Successive Years: Max. 1941-1942, 824 sec. ft.; Min. 1939-1940, 64.6 sec. ft.

Average of Three Successive Years: Max. 1941-1943, 601 sec. ft.; Min. 1939-1941, 95.2 sec. ft.

Average of Four Successive Years: Max. 1941-1944, 486 sec. ft.; Min. 1939-1942, 444 sec. ft.

Average of Five Successive Years: Max. 1941-1945, 410 sec. ft.; Min. 1939-1943, 386 sec. ft.

Average of Seven Years: 1939-1945, 312 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	206	140	19.6	583	17.0	19.6	35.0	107	11.3	503	75.4	168
2	208	135	21.4	224	16.0	17.2	52.0	115	11.0	614	86.6	176
3	196	139	23.1	71.1	28.2	16.7	93.0	91.0	11.9	780	207	28.8
4	186	137	24.0	74.3	14.5	15.5	170	145	12.7	988	192	23.1
5	178	145	23.4	120	12.5	15.6	130	168	14.8	877	83.3	22.2
6	171	109	26.0	158	12.6	15.2	73.8	374	16.1	1,020	36.6	13.9
7	163	73.2	32.7	43.2	33.4	13.9	59.7	148	16.0	675	38.0	23.3
8	163	165	27.8	29.8	89.1	13.0	65.0	21.7	16.1	404	34.6	194
9	156	175	26.1	225	20.2	12.6	55.6	18.6	16.7	401	43.3	164
10	156	67.0	25.2	234	18.5	13.0	59.7	16.8	16.7	1,110	170	17.6
11	155	35.9	22.6	278	15.6	44.4	192	16.2	19.8	515	471	15.2
12	152	30.1	56.3	151	13.3	34.9	125	12.6	22.0	415	358	27.9
13	152	24.5	35.3	19.6	13.3	18.5	105	116	22.6	478	151	70.1
14	155	23.3	30.1	14.7	57.7	16.9	162	324	47.9	432	126	92.3
15	154	22.9	27.3	26.4	61.0	15.2	548	11.2	41.2	304	118	357
16	157	23.3	25.7	273	27.6	13.7	119	117	30.2	261	99.2	246
17	161	22.0	32.2	159	22.9	15.1	36.6	94.0	103	280	148	108
18	177	22.3	26.5	64.8	20.0	15.3	29.5	30.8	81.8	249	183	152
19	175	21.9	146	15.2	17.6	15.5	25.5	11.7	26.1	437	39.4	131
20	176	23.1	106	12.5	16.2	16.9	26.5	63.8	18.2	515	35.6	88.3
21	173	21.4	48.7	32.2	14.9	15.4	23.4	26.1	16.8	423	29.5	36.7
22	168	21.3	28.4	16.8	15.3	15.2	25.4	28.5	16.2	198	18.2	167
23	169	21.1	17.1	81.0	15.8	14.4	40.5	26.2	16.4	90.2	24.4	153
24	172	20.2	38.5	62.3	24.1	13.2	29.5	23.0	18.4	63.3	209	145
25	164	17.4	149	31.8	16.5	72.4	23.8	20.0	61.2	37.6	227	225
26	163	17.3	218	19.5	15.3	24.2	22.2	16.8	16.4	49.0	130	224
27	166	19.3	75.8	14.4	13.8	24.0	21.5	16.2	14.2	254	94.4	206
28	159	18.9	25.1	13.0	14.3	21.6	21.5	84.9	12.9	257	103	193
29	158	23.8	14.0	13.5	24.0	18.4	83.0	12.4	149	73.9	183	
30	154	134	17.3	14.5	23.2	329	12.6	84.3	133	80.8	170	
31	146	292		22.2	301	11.7	111					157
Sum	1,691.4	3,078.9		606.3			2,351.4	13,023.1			3,978.4	
5,189	1,807.7		707.4		3,019.1		825.3		825.3		3,666.2	

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.	10.11	9.72	24	240	4	139	167	10,300	9,886	11,900
Feb.	10.19	9.00	8	277	26	12.9	60.4	3,350	9,610	37,000
Mar.	10.57	9.09	25	476	1	19.0	58.3	5,590	6,360	21,000
Apr.	11.65	8.98	1	1,790	20	11.9	103	6,110	14,883	70,500
May	9.88	8.89	8	155	6	10.2	22.8	1,400	46,933	299,800
June	10.48	8.94	25	432	10	11.1	20.2	1,200	39,333	241,000
July	10.68	9.06	14	1,060	29	17.5	97.4	6,000	25,376	118,500
Aug.	10.63	9.11	6	940	15	8.0	75.9	4,660	24,607	4,880
Sept.	10.26	9.15	30	309	2	10.4	27.5	1,040	27,658	119,200
Oct.	11.77	9.40	10	1,940	26	22.3	420	25,800	11,889	42,800
Nov.	10.37	9.19	11	491	23	9.9	122	7,270	2,601	7,270
Dec.	10.40	9.26	15	381	7	4.7	128	7,890	5,039	12,900
Yearly	11.77	8.89		1,940		4.7	109	79,210	224,095	1,079,340
										43,965.5

* The average, maximum and minimum discharges for January through August are for the period 1939-1945.

* Partly estimated.

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-Hidalgo 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 71 meter measurements during the year. 51 by the United States and 20 by the Mexican Section. Computations by shifting channel methods. 1945 records good. Records available: January 1, 1938, to December 31, 1945. Monthly records 1938-1943 will be found in Water Bulletin No. 15.

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

COMPARATIVE FLOWS FROM RECORDS:

	Momentary	Peak:	Max. May 19, 1942, 6,340 sec. ft.;	Min. Mar. 5, 1939, 44.3 sec. ft.
	Average	Daily:	Max. May 18, 1942, 6,180 sec. ft.;	Min. Mar. 4, 1939, 46.8 sec. ft.
	Average	Monthly:	Max. May 1942, 4,920 sec. ft.;	Min. Mar. 1939, 104 sec. ft.
	Average	Yearly:	Max. 1942, 1,720 sec. ft.;	Min. 1940, 179 sec. ft.
Average of Two Successive Years:		Max.	1941-1942, 1,050 sec. ft.;	Min. 1939-1940, 193 sec. ft.
Average of Three Successive Years:		Max.	1941-1943, 820 sec. ft.;	Min. 1938-1940, 244 sec. ft.
Average of Four Successive Years:		Max.	1941-1944, 704 sec. ft.;	Min. 1938-1941, 277 sec. ft.
Average of Five Successive Years:		Max.	1941-1945, 626 sec. ft.;	Min. 1938-1942, 566 sec. ft.
Average of Eight Years:		Max.	1938-1945, 483 sec. ft.	

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	307	282	132	1,010	256	205	160	462	254	682	313	307
2	306	278	168	571	194	201	156	371	233	702	350	291
3	330	273	155	294	192	233	202	335	237	724	443	171
4	336	274	253	267	196	235	332	332	204	1,160	422	228
5	366	278	237	329	203	190	363	356	199	1,100	294	230
6	351	261	191	435	236	197	269	393	213	1,240	290	274
7	320	241	239	330	249	176	217	326	191	980	313	314
8	309	293	235	318	290	187	205	295	184	608	268	363
9	307	338	228	519	264	180	269	291	198	800	246	300
10	295	331	253	524	301	185	249	292	218	1,240	368	241
11	307	310	244	454	324	207	379	282	223	881	657	309
12	300	274	155	415	309	239	396	277	283	664	514	430
13	294	292	135	242	336	285	296	297	296	776	366	500
14	274	244	155	183	384	256	346	355	298	655	303	493
15	279	230	144	303	363	211	446	315	312	560	307	735
16	242	190	120	495	386	215	346	298	476	472	298	561
17	213	136	121	562	344	213	284	334	388	487	284	427
18	242	107	130	400	295	217	284	308	332	464	331	620
19	293	119	227	328	292	209	277	294	306	531	231	612
20	273	150	324	296	284	225	204	313	308	673	262	599
21	268	195	293	348	244	222	207	306	310	617	231	467
22	288	165	279	319	186	228	211	299	302	386	266	412
23	291	186	209	368	199	222	260	311	318	402	340	350
24	302	163	282	383	209	238	229	314	341	336	441	315
25	289	112	341	386	202	235	199	383	336	376	402	
26	258	93.6	492	262	183	199	173	314	293	404	258	377
27	210	88.4	286	224	171	156	160	314	232	572	226	344
28	229	89.4	278	215	184	164	143	333	177	455	212	338
29	240		291	233	174	171	185	349	182	382	210	331
30	277		366	230	176	167	314	325	292	362	267	324
31	287		662	175			485	287		354		328
Sum		5,993.4		11,243		6,248		9,981		20,008		11,973
	8,883		7,625		7,801		8,246		8,136			9,687

Current Year 1945

Period 1938-1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	Day			Average	Maximum	Minimum
Jan.	3.37	2.86	6	682	8	150	287	17,600	16,038
Feb.	3.43	2.47	8	411	26	73.4	214	11,900	16,416
Mar.	4.06	2.53	31	1,070	1	105	246	15,100	15,722
Apr.	4.57	2.67	1	1,590	14	147	375	22,500	25,880
May	3.59	2.72	16	416	2	178	252	15,500	51,355
June	3.35	2.70	13	339	28	150	208	12,400	44,978
July	4.16	2.71	15	610	28	140	266	16,400	39,538
Aug.	4.00	3.11	1	614	12	268	322	19,800	140,000
Sept.	3.60	2.77	16	484	7	174	271	16,100	42,761
Oct.	5.06	2.88	10	1,940	22	245	645	39,700	26,450
Nov.	3.86	2.81	11	745	28	147	323	15,200	15,504
Dec.	3.94	2.77	15	821	3	152	386	23,700	17,971
Yearly	5.06	2.47		1,940		73.4	317	229,700	349,838
								1,247,500	129,680

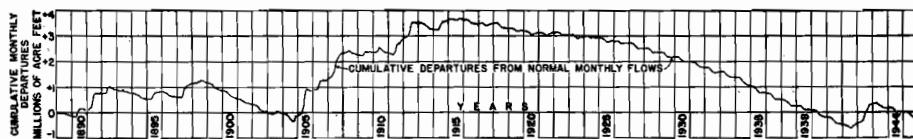
RIO GRANDE AT FORT QUITMAN STATION

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, United States Coast and Geodetic Survey datum. See Water Bulletin No. 7 for a gage history of this station.

RECORDS: Based upon 82 meter measurements during the year, 61 by the United States and 21 by the Mexican Section. Computations by shifting channel methods. 1945 records good except in January and February when the gage height-discharge relationship was not reliable. Discharges for these two months were determined from meter measurements and reference to related gaging stations. Records available: January 1923 to December 1945. Careful estimates covering all months in the period 1889-1923 are shown in Water Bulletin No. 12. Monthly records 1889-1943 will be found in Water Bulletin No. 13.

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

COMPARATIVE FLOWS FROM RECORDS: This trend line shows cumulative departures from normal monthly flows. Downward trends show subnormal flows, upward trends show plentitudes and horizontal trends show normal flows. Note the 1 1/2 million acre feet subnormal cumulation in the six years 1898 to 1904 and the 4 1/3 million acre feet above normal cumulation, 1904 to 1912. Note the subnormal trend since about 1818 when irrigation consumption and reservoir losses increased under Elephant Butte Reservoir.



Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1	304	*	280	121	1,190	148	47.6	41.1	257	87.8	288	353	355	
2	378	*	249	155	1,100	126	47.9	55.6	232	79.9	532	374	359	
3	356	*	223	172	227	99.0	80.5	48.9	169	57.3	905	395	316	
4	342	*	254	145	251	84.8	80.8	*	43.9	116	50.3	1,220	458	303
5	348	*	245	221	279	85.2	54.6	200	127	41.1	1,300	373	330	
6	378	*	241	277	365	111	*	45.4	150	145	39.2	2,920	328	344
7	359	*	216	179	305	159	48.8	100	198	40.6	1,320	344	333	
8	332	*	228	244	270	119	37.7	60.0	136	39.9	1,600	364	381	
9	321	*	284	261	296	154	30.9	50.0	110	39.1	3,110	366	372	
10	319	*	325	218	548	139	41.2	*	50.0	50.9	1,780	*	350	356
11	307	*	320	197	457	193	46.9	*	62.9	79.5	54.9	1,680	350	371
12	319	*	300	230	384	234	59.2	176	143	45.8	1,140	634	426	
13	312	*	265	122	293	264	72.0	196	102	63.5	1,070	509	480	
14	306	*	289	93.7	207	324	157	161	125	122	931	382	534	
15	286	*	261	83.1	178	320	87.0	340	188	148	788	*	352	699
16	291	242	76.0	315	328	68.0	223	92.9	194	655	361	666		
17	254	268	55.9	480	374	92.4	139	76.6	225	625	336	481		
18	225	272	47.1	350	371	90.1	80.7	86.2	250	586	351	614		
19	254	264	49.6	297	243	116	93.4	83.5	184	552	351	650		
20	305	249	119	147	261	101	88.0	100	140	737	384	637		
21	285	311	163	99.2	244	92.3	62.7	84.0	159	776	336	554		
22	280	259	80.0	229	192	81.1	56.7	136	200	608	349	472		
23	300	300	69.0	172	82.5	74.7	63.9	151	213	495	358	410		
24	303	330	60.6	253	86.6	90.6	61.8	133	241	544	373	380		
25	314	275	179	236	82.5	123	50.8	140	222	505	372	387		
26	301	232	355	229	62.3	74.0	40.4	250	255	477	348	426		
27	270	162	211	138	87.0	49.0	50.8	345	209	542	328	396		
28	222	119	141	97.5	82.1	45.0	63.9	230	131	518	347	409		
29	241	116	89.4	88.5	44.5	53.7	206	141	456	347	385			
30	252	165	146	67.3	43.9	63.6	160	217	428	346	382	358		
31	289	422	49.8				270	120	382					
Sum	* 7,263			9,628.1	2,126.1	4,618	29,470	13,566						
	9,353			5,028	5,259.6	3,197.8	3,941.3	11,219						

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Foot	Total	Acre Feet		
	High	Low	Day	Day	Low			Normal	Maximum	Minimum
Jan.	2	"	378	28	97.6	302	18,600	13,301	20,900	5,370
Feb.	3.00	2.00	21	557	28	*	14,400	14,374	50,100	3,510
Mar.	3.39	1.77	51	979	18	44.4	162	9,970	12,441	1,090
Apr.	3.93	1.88	2	1,860	28	58.7	321	19,100	16,028	77,000
May	2.85	1.57	16	506	31	44.1	170	10,400	29,199	309,000
June	2.31	1.40	14	190	9	27.9	70.9	4,220	26,561	240,000
July	3.11	1.48	15	721	1	36.9	103	6,340	26,011	140,000
Aug.	2.78	1.77	27	391	4	85.3	149	9,160	33,101	4,430
Sept.	2.87	1.53	18	274	5	32.7	131	7,820	37,323	147,000
Oct.	8.42	2.42	6	7,570	31	344	951	56,500	26,272	66,500
Nov.	3.26	2.15	12	814	6	218	374	23,300	16,446	24,500
Dec.	3.28	2.21	15	806	31	227	438	26,900	17,224	31,000
Yearly	8.42	1.40		7,570		27.9	287	207,710	268,281	1,270,400
	6 Mean daily	2 Estimated	*	Partly estimated						102,420

RIO GRANDE AT UPPER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located 7.8 river miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 285.7 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.

RECORDS: Based on 49 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: April 1900 to March 1914; September 1919 to March 1920; January 1927 to December 1945. Careful estimates covering all the months when dependable measured records were not available in the period 1889-1926 are shown in Water Bulletin No. 12. Monthly records 1889-1943 will be found in Water Bulletin No. 13.

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.

COMPARATIVE FLOWS FROM RECORDS: This trend line shows cumulative departures from normal monthly flows. Downward trends show subnormal flows, upward trends show plentitudes and horizontal trends show normal flows. Note the 1 1/2 million acre feet subnormal cumulation in the six years 1898 to 1904 and the 3 3/4 million acre feet above normal cumulation, 1904 to 1912. Note the subnormal trend since about 1918 when irrigation consumption and reservoir losses increased under Elephant Butte Reservoir.



Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	358	232	230	242	41.2	19.4	36.9	38.1	8.2	29.3	466	224
2	353	233	217	279	39.0	17.5	1,570	35.9	9.2	31.2	408	220
3	348	234	192	555	36.7	17.2	2,690	31.2	9.9	34.0	372	222
4	328	241	176	741	35.7	16.0	3,310	21.7	9.5	121	361	240
5	319	239	172	485	32.7	12.5	1,190	19.9	9.2	985	347	284
6	298	236	164	313	31.8	11.5	760	14.6	8.9	1,690	363	281
7	302	227	156	251	29.9	9.1	661	14.2	8.2	1,620	415	232
8	298	226	148	244	21.4	8.3	533	14.5	6.0	1,530	361	225
9	293	222	150	277	20.2	9.0	1,080	12.9	6.6	2,250	306	231
10	286	215	171	253	19.9	9.9	* 984	29.0	7.6	1,830	289	251
11	286	208	155	229	21.4	9.3	484	26.0	7.7	1,980	289	273
12	287	221	176	207	15.8	8.8	337	25.9	60.8	1,830	297	302
13	286	290	170	296	18.6	9.2	249	17.3	19.4	1,570	321	273
14	287	288	156	277	19.1	8.7	202	15.0	13.0	1,200	613	231
15	279	273	149	280	18.2	9.0	193	14.2	8.6	1,260	506	307
16	273	263	141	249	17.4	7.9	218	11.3	7.7	1,030	400	430
17	271	253	115	194	11.6	5.4	228	11.8	8.9	886	322	530
18	256	250	104	156	24.3	5.0	196	11.0	8.8	765	322	641
19	253	250	95.0	172	41.9	101	225	11.9	8.2	684	319	547
20	251	246	84.2	371	54.9	76.7	184	12.9	7.8	623	295	408
21	247	238	75.4	352	71.3	22.2	157	12.4	8.7	571	265	549
22	246	231	66.4	231	57.5	199	128	13.3	8.0	591	272	570
23	243	227	63.4	187	49.1	54.9	102	12.5	4.9	688	242	551
24	247	238	61.1	151	33.6	215	84.1	15.9	6.4	653	240	468
25	243	244	67.4	120	26.4	44.0	70.8	36.1	6.2	522	237	439
26	236	243	88.3	96.3	106	21.6	57.9	15.8	6.1	529	246	404
27	246	261	79.0	79.2	46.3	17.0	52.3	13.2	16.7	522	242	364
28	243	238	72.2	66.6	44.2	13.9	47.7	8.9	6.1	506	240	567
29	246	246	82.7	61.3	32.4	10.9	45.6	13.2	4.5	489	235	597
30	243	195	53.2	25.5	7.0	41.1	11.7	5.8	5.8	578	233	363
31	237	181	20.4	3,600	1	13.7	521	40.2	8.9	516	360	
Sum	6,767	7,468.6	976.9	551.2	28,113.5	11,184						
	8,589	4,151.1	1,064.4	16,157.6	303.6	9,824						

Current Year 1945 Period 1924-1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Foot	Total	Acre Feet			
	High	Low	Day	Day			Normal	Maximum	Minimum	
Jan.	.89	.32	1	360	31	229	277	17,000	12,592	24,400
Feb.	.64	.23	13	294	11	204	242	13,400	12,647	40,800
Mar.	.70	-.52	30	318	29	67.7	134	8,230	10,709	39,100
Apr.	2.25	-.69	4	792	30	41.0	249	14,800	9,237	41,600
May	-.12	-1.07	26	144	16	7.4	34.3	2,110	21,876	240,000
June	1.33	-1.14	24	480	17	5.0	32.6	1,940	21,141	216,000
July	8.74	-1.08	4	3,600	1	13.7	521	58,000	27,756	156,000
Aug.	-.42	-.96	10	60.4	31	7.6	17.8	1,090	36,504	133,000
Sept.	-.12	-1.14	12	120	22	3.4	10.1	602	39,822	* 151,000
Oct.	6.90	-.88	6	2,550	1	11.4	907	55,800	33,738	105,000
Nov.	1.82	-.47	14	644	30	228	327	19,500	16,473	34,500
Dec.	1.92	.39	18	676	2	211	361	22,200	15,782	30,900
Yearly	8.74	-1.14		3,600		3.4	261	188,672	258,277	1,176,700
										54,315

* Estimated * Partly estimated

RIO CONCHOS AT CUCHILLO PARADO STATION, CHIHUAHUA

DESCRIPTION: Water-stage recorder and cable with cable car. Located in Selineta Canyon, 3.1 miles north of the town of Cuchillo Parado, Chihuahua, and 28.6 air line miles westward from Ojinaga, Chihuahua, and 49.1 river miles above the confluence of the Rio Conchos with the Rio Grande which is 293.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is 2,914.23 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 166 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: January 1 to December 31, 1945.

REMARKS: Construction of this station was completed in January 1945 for the purpose of determining discharge at this point where a storage reservoir is under consideration. Gage readings began January 1, 1945, measurements began on January 26 and on January 28 a water-stage recorder was installed. The flow of the stream is strongly affected by the operation of La Rosetilla, La Colina and La Boquilla reservoirs situated 139, 199 and 206 river miles respectively, above this station. The hydroelectric plants at the reservoirs cited have the following power generation capacities: 5,150 k. w., 3,620 k. w. and 14,647 k. w. respectively. Diversions for irrigation upstream from this station also modify the flow.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 795	865	420	353	173	97.5	80.9	569	145	204	858	487
2	* 851	862	759	304	157	102	614	614	141	265	826	477
3	* 855	703	452	385	110	101	1,300	2,110	131	357	724	466
4	* 802	561	388	576	91.5	106	664	2,394	104	597	791	448
5	* 802	883	530	402	84.4	96.4	5,860	1,240	90.4	2,070	1,290	357
6	* 759	1,140	657	262	133	113	4,130	788	87.6	4,480	1,100	309
7	* 798	1,050	360	230	243	173	4,380	586	78.4	2,330	1,040	304
8	* 819	918	530	225	161	270	6,710	473	69.6	3,210	742	287
9	* 791	770	554	530	125	252	7,600	427	68.5	17,660	611	283
10	* 565	629	441	399	232	180	8,510	487	63.6	14,730	660	266
11	* 586	1,000	* 410	279	254	180	8,440	427	87.2	10,060	890	272
12	* 752	957	* 466	208	228	236	4,910	371	80.9	5,090	1,020	265
13	* 773	932	565	176	170	392	3,080	427	66.4	3,920	1,050	273
14	* 830	710	417	147	143	340	4,980	598	67.5	3,170	1,120	256
15	* 749	558	410	138	115	220	3,570	385	70.6	2,910	872	250
16	* 855	724	371	516	169	452	2,900	291	57.9	2,040	809	233
17	* 752	498	296	367	160	590	2,530	227	57.2	1,770	1,050	239
18	* 1,010	410	371	248	129	745	2,730	215	137	1,740	1,100	233
19	* 932	498	611	212	106	932	2,730	231	136	1,120	1,080	251
20	* 855	770	855	193	94.3	537	1,860	219	105	1,280	1,120	254
21	* 855	491	777	168	187	420	2,080	177	89.3	1,270	1,150	257
22	* 833	583	908	143	174	321	1,640	255	116	1,300	978	274
23	* 918	533	805	130	194	257	1,600	196	149	1,160	1,100	291
24	* 957	540	646	149	180	182	1,370	152	170	1,020	1,140	322
25	* 1,034	551	720	136	213	156	975	124	254	1,020	1,140	322
26	* 1,040	399	456	118	172	137	848	118	219	1,220	1,380	360
27	* 1,100	378	664	110	136	118	784	593	199	1,180	939	357
28	* 1,200	305	410	91.5	118	103	780	614	283	904	659	378
29	* 1,190	355	84.4	103	89.0	1,030	365	160	1,130	593	551	357
30	1,120	371	72.7	136	79.5	703	238	122	869	777	360	399
31	879	319	117			590	183					
Sum	19,218		7,352.6		7,977.4		16,052		90,853		9,887	
	27,057		16,274		4,808.2		89,978.9		3,606.1		28,343	

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Period			
	High	Low	Day	High	Low			Acre Feet	Normal	Maximum	Minimum
Jan.	5.38	3.81	28	#@ 1,200	10	# 565	*	873	* 53,670		
Feb.	5.22	3.81	6	1,590	28	248	686		38,120		
Mar.	4.53	3.18	22	1,270	17	260	525		32,280		
Apr.	3.94	3.15	10	689	30	72.7	486		14,580		
May	3.15	2.15	10	371	6	77.7	155		9,540		
June	5.51	3.15	19	1,750	30	79.5	266		15,820		
July	10.96	3.15	8	14,870	1	80.9	2,900		178,500		
Aug.	6.17	2.30	4	2,700	25	98.2	518		31,840		
Sept.	3.61	2.00	28	470	17	53.3	120		7,150		
Oct.	15.85	2.13	9	34,360	1	115	2,920		180,200		
Nov.	5.25	3.94	5	1,550	30	519	944		56,220		
Dec.	3.94	3.41	1	505	18	221	319		19,610		
Yearly	15.85	2.00		34,360		53.3	881	637,530			

" Estimated * Partly estimated @ Mean daily

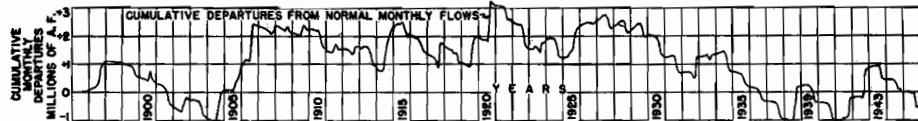
RIO CONCHOS NEAR OJINAGA, CHIHUAHUA

DESCRIPTION: The Rio Conchos enters the Rio Grande 3.7 miles above the International Highway Bridge between Presidio, Texas, and Ojinaga, Chihuahua, 2.0 miles above the Lower Presidio gaging station on the Rio Grande, 7.8 miles below the Upper Presidio gaging station on the Rio Grande, and 293.5 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. 1945 records good. Records available: May 1900 through 1913, and 1927 through 1945. Careful estimates covering all the months when dependable measured records were not available in the period 1896-1926 are shown in Water Bulletin No. 12. Monthly records 1896-1943 will be found in Water Bulletin No. 13.

REMARKS: The Boquilla storage reservoir (255.1 miles upstream), 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 and a maximum surface area of 1,160 acres, located about 7.5 miles downstream from Boquilla Dam, and the Rosettilla Reservoir, located about 60.2 miles further downstream, with a capacity of 15,400 acre feet and a maximum surface area of 840 acres, 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. Power generation facilities #: Boquilla 14,647 k. w., Colina, 3,620 k. w., Rosettilla, 5,150 k. w.

COMPARATIVE FLOWS FROM RECORDS: The trend line shows cumulative departures from normal monthly flow. Downward trends show subnormal flows, upward trends show plentitudes and horizontal trends show normal flows. Note the 2 1/4 million acre feet subnormal cumulation in the six years 1898 to 1904 and the 4 1/3 million acre feet above normal cumulation, 1904 to 1920. Note the subnormal trend since 1920 when irrigation consumption and reservoir losses increased under Boquilla Reservoir.



Current Year 1945						Period 1924-1945					
Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
Jan.			30	1,450	12	519	880	54,100	62,277	147,000	20,300
Feb.			6	1,290	28	392	733	40,700	51,786	87,700	29,100
Mar.			23	1,000	18	383	521	32,000	46,482	80,800	20,900
Apr.			10	429	30	117	241	14,400	35,102	79,700	5,000
May			1	284	8	91.0	137	8,420	42,271	148,000	3,950
June			19	923	30	78.0	223	13,300	47,297	91,900	8,720
July			9	13,500	1	75.0	3,230	198,000	99,791	502,000	15,800
Aug.			4	2,350	26	175	495	30,400	142,236	601,000	11,300
Sept.			29	230	19	38.0	114	6,770	296,353	1,173,000	6,770
Oct.			10	21,800	1	140	3,190	196,000	182,645	798,000	34,600
Nov.			6	1,450	30	631	1,020	60,700	65,014	110,000	29,000
Dec.			18	668	11	355	361	22,200	57,068	97,700	22,200
Yearly				21,800		38.0	935	676,990	1,128,322	2,431,850	509,600

RIO GRANDE AT DEL RIO STATION

The correction to the July 1925 discharge record at Del Rio set out below was found necessary because the original computations did not take account of large shifts in the rating curve indicated by 5 meter measurements applicable to that month.

July 1925													
Day	Sec.Ft.	Day	Sec.Ft.	Day	Sec.Ft.	Day	Sec.Ft.	Day	Sec.Ft.	Day	Sec.Ft.	Day	Sec.Ft.
High	Low	Day	High	Low	Day	High	Low	Day	High	Low	Day	High	Sec.Ft.
1	4,800	6	5,560	11	4,430	16	9,100	21	6,040	26	3,770	31	2,920
2	4,240	7	5,140	12	8,510	17	* 6,450	22	5,370	27	3,450		
3	4,680	8	4,650	13	10,100	18	* 6,490	23	4,820	28	3,140		
4	7,230	9	5,040	14	7,530	19	6,920	24	3,850	29	2,970		
5	6,380	10	5,080	15	8,840	20	7,350	25	4,100	30	2,560		
Sum													

Month	Extreme Gage Feet			Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low	Day			Day	Normal	Maximum	Minimum
July	5.4	3.0	13	11,500	30	2,560	5,530	340,000				
Yearly								4,425,000				

RIO GRANDE AT ZAPATA STATION

Due to an error in calculation the record for September 18-24, inclusive, 1941 as published in W. B. No. 11, page 37 is erroneous. The correct mean daily second feet are: 14,400, 17,500, 38,000, 52,900, 20,500, 14,900 and 12,900, respectively. The correct monthly total second foot days, mean second feet and total acre feet are: 424,190, 14,100 and 841,000, respectively. The correct extreme high gage height in feet and second feet for both the month of September and for the year 1941 are: * 233.56 and * 57,900. The correct yearly mean second feet and total acre feet are: 8,105 and 5,867,500, respectively. The normals published on page 28 herein include these corrections.

* Partly estimated # Data from June 1934 issue of "Irrigación en Mexico".

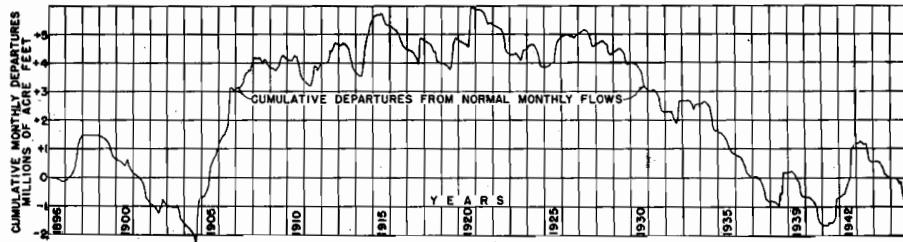
RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: See previous Water Bulletins.

RECORDS: Based on 51 meter measurements by the United States Section in 1945.

REMARKS: See previous Water Bulletins for fuller details of station description, records and remarks. This heading is abbreviated to make room for the following graphical representation of long-time trends in flow at this station.

COMPARATIVE FLOWS FROM RECORDS: This trend line shows cumulative departures from normal monthly flows. Downward trends show subnormal flows, upward trends show plentitudes and horizontal trends show normal flows. Note the $3\frac{3}{4}$ million acre feet subnormal cumulation in the six years, 1898 to 1904 and the 8 million acre feet above normal cumulation 1904 to 1915 when the functioning of Boquilla Reservoir on the Rio Conchos and Elephant Butte Reservoir on the Rio Grande began. Note the subnormal trend since 1920 when irrigation consumption and reservoir losses increased under the two big reservoirs.



Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,150	1,260	686	561	233	119	96.3	548	211	166	1,330	830
2	1,130	1,180	693	643	153	112	6,100	470	187	196	1,330	784
3	1,250	1,110	801	738	193	107	8,020	665	176	254	1,280	756
4	1,200	1,020	630	980	168	107	5,270	2,080	160	386	1,120	744
5	1,160	913	573	1,060	150	99.2	3,320	1,780	148	3,140	1,270	764
6	1,070	1,190	644	765	138	94.2	5,430	905	133	7,420	1,650	736
7	1,070	1,360	741	592	126	95.2	4,250	639	120	5,300	1,560	645
8	1,120	1,250	592	541	142	94.2	4,770	503	104	4,520	1,430	608
9	1,050	1,140	650	537	168	158	9,960	436	98.2	14,200	1,090	609
10	1,060	1,030	658	626	146	188	8,780	398	92.0	15,200	951	610
11	870	965	586	543	137	185	9,870	491	86.7	17,700	1,030	604
12	930	1,180	567	472	205	132	8,300	638	108	8,520	1,200	606
13	1,080	1,280	637	497	210	152	4,110	461	94.2	6,790	1,400	607
14	1,080	1,140	706	488	193	253	4,380	452	79.4	4,940	1,640	608
15	1,160	963	592	474	168	274	4,880	512	87.6	4,450	1,700	616
16	1,070	874	563	455	144	192	3,430	398	63.9	3,950	1,500	696
17	1,110	966	546	525	132	276	2,890	352	62.5	3,150	1,150	769
18	1,020	788	497	464	154	477	2,910	290	62.9	2,760	1,470	880
19	1,210	724	499	402	167	658	2,900	261	59.6	2,610	1,550	802
20	1,180	816	649	492	172	654	2,300	253	86.9	1,800	1,520	699
21	1,110	955	875	525	181	460	2,070	248	87.3	2,100	1,520	820
22	1,110	750	809	426	167	497	1,940	232	125	1,890	1,530	834
23	1,080	810	898	367	190	393	1,510	249	" 133	2,100	1,320	827
24	1,110	742	759	299	176	454	1,570	236	" 142	1,900	1,410	794
25	1,180	778	723	253	186	336	1,460	224	" 150	1,630	1,400	748
26	1,350	764	749	217	249	" 296	1,070	201	" 158	1,660	1,440	756
27	1,300	691	616	197	235	" 256	979	333	" 167	1,910	1,520	733
28	1,350	657	724	186	190	" 216	1,010	492	" 175	1,820	1,210	711
29	1,450	558	174	157	" 176	946	519	" 184	1,450	998	772	
30	1,460	563	168	137	" 136	940	351	192	1,800	925	727	
31	1,420	576	118				672	260		1,390	682	
Sum		27,296		14,667		7,646.8		15,857		127,082		22,377
		35,870		20,300		5,285		116,133.3		3,714.2		40,444

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Normal	Maximum	Minimum
Jan.	3.37	2.55	30	1,700	12	810	1,160	71,100	74,864	164,000
Feb.	3.25	2.37	13	1,500	28	642	975	54,100	64,423	99,700
Mar.	2.85	2.13	21	1,060	18	485	655	40,300	37,164	89,400
Apr.	2.87	1.71	5	1,150	30	168	489	29,100	43,685	84,100
May	2.01	1.37	1	342	8	111	170	10,500	63,807	270,000
June	3.01	1.41	19	1,230	30	89.3	255	15,200	68,116	267,000
July	8.84	1.41	9	14,800	1	89.3	3,750	230,000	126,595	564,000
Aug.	3.94	1.64	4	2,390	26	191	512	31,500	178,264	675,000
Sept.	1.83	1.25	29	232	19	57.7	124	7,370	336,176	1,324,000
Oct.	13.15	1.64	10	23,900	1	160	4,100	252,000	216,395	864,000
Nov.	3.70	2.78	15	1,910	30	863	1,350	80,200	81,500	141,000
Dec.	2.78	" 2.40	18	889	11	604	722	44,400	72,841	116,000
Yearly	13.15	1.25		23,900		57.7	1,200	865,770	1,383,830	3,466,700
										662,700

^a 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 306.9 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,541.2 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon four meter measurements during the year and a rating curve, the high points of which are determined by slope-area calculations, and the medium and low points of which are determined by meter measurements; also, upon numerous estimates by the hydrographer at low flow. Computations by shifting channel methods. 1945 records fair. Records available: January 1, 1932, to December 31, 1945.

REMARKS: The flow of this spring-fed creek is modified by a small irrigation reservoir (San Esteban) 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 Esteban Dam and 1,043 square miles below it. On October 2, 1932, backwater from the Rio Grande reached a gage height of 8.33 feet at this station. This is the highest recorded gage height.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. July 20, 1937, 9,670 sec. ft. with a gage height of 5.33 feet; Min. May 1932, .87 sec. ft.

Average	Daily:	Max. Oct. 24, 1941, 3,290	sec. ft.; Min. May 1-22, 1932, .87	sec. ft.
Average	Monthly:	Max. Sept. 1936, 329	sec. ft.; Min. Feb. 1935, 2.0	sec. ft.
Average	Yearly:	Max. 1941, .559	sec. ft.; Min. 1934, 8.8	sec. ft.
Average of Two Successive Years:	Max.	1935-1936, 49.7	sec. ft.; Min. 1933-1934, 9.5	sec. ft.
Average of Three Successive Years:	Max.	1935-1937, 40.8	sec. ft.; Min. 1938-1940, 17.5	sec. ft.
Average of Four Successive Years:	Max.	1935-1938, 35.0	sec. ft.; Min. 1937-1940, 18.9	sec. ft.
Average of Five Successive Years:	Max.	1932-1936, 32.5	sec. ft.; Min. 1939-1943, 23.5	sec. ft.
Average of Ten Successive Years:	Max.	1935-1944, 29.8	sec. ft.; Min. 1934-1943, 26.7	sec. ft.
Average of Fourteen Years:	Max.	1932-1945, 26.8	sec. ft.	

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	3.5	3.5	3.5	16.9	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2	3.5	3.5	3.5	3.5	3.5	3.5	659	3.5	3.5	3.5	3.5	3.5
3	3.5	3.5	3.5	3.5	3.5	3.5	451	3.5	3.5	3.5	3.5	3.5
4	3.5	3.5	3.5	3.5	3.5	3.5	125	3.5	3.5	3.5	3.5	3.5
5	3.5	3.5	3.5	3.5	3.5	3.5	476	3.5	3.5	3.5	3.5	3.5
6	3.5	3.5	3.5	3.5	3.5	3.5	278	3.5	3.5	564	3.5	3.5
7	3.5	3.5	3.5	3.5	3.5	3.5	146	3.5	3.5	106	3.5	3.5
8	3.5	3.5	3.5	3.5	3.5	3.5	102	3.5	3.5	66.0	3.5	3.5
9	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.5	3.5	195	3.5	3.5
10	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.5	3.5	120	3.5	3.5
11	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.5	3.5	83.0	3.5	3.5
12	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.5	3.5	8.0	3.5	3.5
13	3.5	3.5	3.5	3.5	3.5	3.5	5.0	3.5	3.5	5.0	3.5	3.5
14	3.5	3.5	3.5	3.5	3.5	3.5	15.0	3.5	3.5	5.0	3.5	3.5
15	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	73.8	3.5	3.5
16	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	" 10.0	3.5	3.5
17	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
18	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
19	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
20	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
21	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
22	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
23	3.5	3.5	3.5	3.5	3.5	6.2	3.5	3.5	3.5	3.5	3.5	3.5
24	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
25	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
26	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
27	5.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
28	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
29	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
30	3.5	3.5	3.5	6.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
31	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Sum	98.0	107.8	107.7	107.7	107.7	107.7	107.7	107.7	107.7	1,305.8	108.5	108.5
	108.5	108.5	121.9	2,340.0	" 466.5	105.0	105.0	105.0	105.0	105.0	105.0	105.0

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Foot	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Normal	Maximum	Minimum
Jan.	2.58	2.53	1	3.5	2.26	3.5	3.5	215	205	273
Feb.	2.54	2.53	1	3.5	2.46	3.5	3.5	194	188	234
Mar.	2.61	2.61	1	3.5	2.66	3.5	3.5	215	202	123
Apr.	3.99	2.61	30	210	1	3.5	3.6	214	249	743
May	3.96	2.89	1	205	1	3.5	3.9	242	1,666	184
June	3.33	2.75	23	26.5	2	3.5	3.6	214	2,147	6,360
July	5.98	2.78	3	7,400	1	3.5	75.5	4,640	3,159	6,650
Aug.	* 1.68	2.30	27	1,000	1	3.5	15.0	925	3,973	16,330
Sept.	2.42	2.31	1	3.5	1	3.5	3.5	208	4,535	19,600
Oct.	5.20	2.39	6	3,100	1	3.5	42.1	2,590	2,564	19,200
Nov.	3.22	3.19	1	3.5	1	3.5	3.5	208	271	807
Dec.	3.22	3.19	1	3.5	1	3.5	3.5	215	235	408
Yearly	5.98	2.30		7,400		3.5	13.9	10,080	19,392	40,444
										6,397

* Partly estimated " Estimated \$ And other days

TERLINGUA CREEK STATION NEAR TERLINGUA, TEXAS

DESCRIPTION: Water-stage recorder located about 12 miles south of Terlingua, Texas, 2.4 miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. Zero of gage is 2,192.01 ± .5 feet above mean sea level, United States Geological Survey datum. This creek enters the Rio Grande 371.6 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 38 meter measurements during the year at low flow, and the rating curve, the higher points of which were determined by slope-area calculations and the medium and low points of which were determined by meter measurements. Computations by shifting channel methods. 1945 records fair. Records available: January 1, 1932, to December 31, 1945.

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. On September 2, 1943, the "A" frame at this station on the east side of the creek was washed away and has not been replaced. The cable anchorage in the rock hill and the gage well on the west side were undamaged.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., May 24, 1945, 34,900 sec. ft. with a gage height of 17.59 feet.; Min., September 29-30, 1937, 0 sec. ft.

Average Daily:	Max. June 1, 1937, 17,200	sec.ft.; Min. Sept. 29-30, 1937, 0	sec.ft.
Average Monthly:	Max. June 1937, 921	sec.ft.; Min. Oct. 1934, .83	sec.ft.
Average Yearly:	Max. 1937, 146	sec.ft.; Min. 1943, 5.5	sec.ft.
Average of Two Successive Years:	Max. 1936-1937, 114	sec.ft.; Min. 1942-1943, 8.6	sec.ft.
Average of Three Successive Years:	Max. 1935-1937, 111	sec.ft.; Min. 1942-1944, 11.5	sec.ft.
Average of Four Successive Years:	Max. 1935-1938, 101	sec.ft.; Min. 1942-1945, 12.9	sec.ft.
Average of Five Successive Years:	Max. 1935-1939, 99.7	sec.ft.; Min. 1940-1944, 19.9	sec.ft.
Average of Ten Successive Years:	Max. 1932-1941, 66.5	sec.ft.; Min. 1936-1945, 51.0	sec.ft.
Average of Fourteen Years:	1932-1945, 51.2	sec.ft.	

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	" 3.0	" 3.0	" 3.0	3.0	2.7	* 1.6	* 2.4	* 3.2	3.1	" 10.0	3.4	2.9
2	" 5.0	" 5.0	" 5.0	5.0	2.8	1.7	* 138	* 3.1	2.9	3.0	3.4	2.9
3	" 3.0	" 3.0	" 3.0	3.0	2.8	1.8	* 322	* 2.8	2.8	3.0	3.4	2.9
4	" 3.0	" 3.0	" 3.0	3.0	2.8	1.9	* 495	* 2.6	2.6	3.0	3.3	2.9
5	" 3.0	" 3.0	" 3.0	3.0	2.8	2.0	* 179	* 2.4	2.4	" 600	3.3	2.9
6	" 3.0	" 3.0	" 3.0	3.0	2.9	2.1	* 188	* 2.4	2.2	" 50.0	3.2	2.8
7	" 3.0	" 3.0	" 3.0	3.0	2.9	2.1	* 133	* 2.4	2.2	" 10.0	3.2	2.8
8	" 3.0	" 3.0	" 3.0	3.2	2.9	2.3	* 304	* 2.4	2.3	" 60.0	3.2	2.8
9	" 3.0	" 3.0	" 3.0	3.4	3.0	2.3	* 26.9	* 2.4	2.4	* 679	3.1	2.8
10	" 3.0	" 3.0	" 3.0	3.6	3.0	2.2	* 162	* 2.4	2.4	* 112	3.1	2.8
11	" 3.0	" 3.0	" 3.0	3.8	3.0	2.2	* 367	* 2.4	2.4	* 32.5	3.1	2.8
12	" 3.0	" 3.0	" 3.0	4.0	3.0	2.2	* 68.0	* 97.7	2.5	* 20.0	3.0	2.8
13	" 3.0	" 3.0	" 3.0	4.3	3.0	2.2	* 8.6	* 40.0	2.5	17.4	3.0	2.8
14	" 3.0	" 3.0	" 3.0	4.5	2.9	2.1	* 7.7	* 10.0	2.5	15.5	2.9	2.8
15	" 3.0	" 3.0	" 3.0	8.1	2.9	2.1	* 6.7	* 2.7	2.6	13.7	2.9	2.8
16	" 3.0	" 3.0	" 3.0	11.7	2.8	2.1	* 5.8	* 2.7	2.6	11.8	2.9	2.8
17	" 3.0	" 3.0	" 3.0	15.3	2.8	2.1	* 4.8	* 2.7	2.6	10.0	2.8	2.7
18	" 3.0	" 3.0	" 3.0	18.9	2.8	2.1	* 3.9	* 2.7	2.6	8.1	2.8	2.7
19	" 3.0	" 3.0	" 3.0	22.5	2.9	2.1	* 3.9	* 2.7	2.6	6.2	2.7	2.7
20	" 3.0	" 3.0	" 3.0	26.1	3.0	2.1	* 3.8	* 2.7	2.6	4.4	2.7	2.7
21	" 3.0	" 3.0	" 3.0	22.8	3.1	24.8	* 3.8	* 2.7	2.6	4.3	2.7	2.7
22	" 3.0	" 3.0	" 3.0	19.4	3.2	14.8	* 3.8	* 15.0	2.6	4.2	2.7	2.7
23	" 3.0	" 3.0	" 3.0	16.1	3.2	6.0	* 3.7	* 8.0	2.6	4.1	2.8	2.8
24	" 3.0	" 3.0	" 3.0	12.7	3.3	5.4	* 3.7	* 2.6	" 100	4.0	2.8	2.8
25	" 3.0	" 3.0	" 3.0	9.4	3.4	4.8	* 3.7	* 2.6	" 10.0	4.0	2.8	2.8
26	" 3.0	" 3.0	" 3.0	6.1	3.1	4.2	* 3.6	* 2.6	" 3.0	3.9	2.8	2.8
27	" 3.0	" 3.0	" 3.0	2.7	2.9	3.6	* 3.6	* 50.0	" 3.0	3.8	2.8	2.9
28	" 3.0	" 3.0	" 3.0	2.7	2.6	3.0	* 3.6	* 100	* 138	3.7	2.9	2.9
29	" 3.0	" 3.0	" 3.0	2.7	2.4	21.7	* 3.6	* 30.0	* 298	3.6	2.9	2.9
30	" 3.0	" 3.0	" 3.0	2.7	2.1	10.0	* 3.5	* 10.0	54.2	3.5	3.0	3.0
31	" 3.0	" 3.0	" 3.0	1.8			* 3.5	* 3.3		3.5		3.0
Sum	" 84.0	" 93.0	247.7	139.7			* 419.2		* 1,712.2		87.4	
				88.8			* 2,470.6		* 664.8		89.5	

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
Jan.			\$ 1	3.0	\$ 1	3.0	3.0	184	184		
Feb.			\$ 1	3.0	\$ 1	3.0	167	127	223		
Mar.			\$ 1	3.0	\$ 1	3.0	184	173	189		
Apr.			20	26.1	427	2.7	8.3	1,382	15,500		
May			25	3.4	31	1.8	2.9	176	5,677		
June	3.05		29	470	1	1.6	4.7	277	8,288		
July	6.62		3	2,560	1	2.4	80.0	4,900	54,800		
Aug.			28	200	\$ 5	2.4	13.5	831	26,800		
Sept.	5.49		28	1,750	\$ 6	2.2	22.2	1,320	4,563		
Oct.	7.28		9	* 3,500	2	3.0	* 55.2	* 3,400	* 26,680		
Nov.			\$ 1	3.4	\$ 19	2.7	3.0	178	24,600		
Dec.			\$ 30	3.0	\$ 17	2.7	2.8	173	223		
Yearly								37,097	105,807		
									3,958.0		

* And other days " Estimated * Partly estimated

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 392.9 river miles below the American Dam at El Paso, Texas. Zero of the gage is 2,045.30 feet above mean sea level according to adjustment of 1943 in United States Geological Survey datum.

RECORDS: Based upon 40 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: April 1936, to December 1945.

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 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	"1,110	"1,320	"636	"530	160	131	165	909	390	1,400	1,560	979
2	"1,090	"1,220	"618	"544	164	104	3,650	794	326	1,210	1,370	907
3	"1,170	"1,150	"635	"565	179	92.0	13,200	709	267	1,280	1,380	858
4	"1,150	"1,110	"724	"671	187	85.0	13,700	664	243	1,160	1,320	814
5	"1,130	"989	"636	"883	155	78.3	6,600	1,280	223	3,150	1,220	774
6	"1,150	"943	"583	"953	156	75.4	9,070	1,750	210	8,090	1,170	776
7	"1,060	"943	"600	"777	150	72.0	6,900	1,240	175	14,900	1,490	777
8	"1,030	"1,220	"671	"600	144	73.4	6,860	958	159	6,780	1,490	737
9	"1,100	"1,240	"600	"560	135	67.6	6,060	774	147	14,800	1,460	669
10	"1,070	"1,170	"600	"495	118	64.8	8,480	652	135	15,700	1,250	662
11	"1,100	"1,080	"618	"476	110	54.7	9,080	568	124	13,300	1,040	670
12	"1,089	"953	"600	"562	124	42.5	8,070	547	118	13,900	1,020	670
13	"1,094	"1,020	"565	"527	128	52.4	5,950	608	106	7,430	1,160	663
14	"1,050	"1,140	"583	"466	113	88.1	3,860	614	108	5,790	1,260	663
15	"1,200	"1,180	"635	"461	121	90.1	4,320	451	103	4,620	1,510	655
16	"1,060	"1,060	"600	"465	153	81.6	4,120	409	101	4,280	1,700	618
17	"1,050	"971	"547	"464	163	129	5,170	462	112	5,660	1,480	663
18	"1,060	"953	"530	"446	146	178	2,690	406	100	3,130	1,260	750
19	"1,075	"791	"495	"480	136	* 431	2,530	365	91.1	2,810	1,340	824
20	"1,040	"717	"477	"668	138	* 527	2,570	311	87.1	2,680	1,540	884
21	"1,090	"667	"494	"573	119	"723	2,490	295	78.9	2,090	1,560	806
22	"1,060	"773	"742	"527	132	"614	2,150	360	78.5	2,110	1,520	796
23	"1,060	"738	"777	"535	146	* 409	2,030	336	143	2,040	1,520	880
24	"1,020	"724	"848	"463	136	417	1,590	302	292	2,120	1,410	879
25	"1,080	"706	"795	"406	130	325	1,600	348	161	2,000	1,370	868
26	"1,020	"727	"759	"350	135	302	1,480	298	283	1,800	1,440	808
27	"1,130	"727	"791	"277	135	269	1,110	502	199	1,720	1,400	798
28	"1,180	"671	"671	"257	136	180	1,030	678	265	1,890	1,550	773
29	"1,170	"706	"185	"163	136	136	1,020	576	3,630	1,810	1,300	738
30	"1,310	"565	"164	"181	474	970	484	1,630	1,590	1,080	770	787
31	"1,320-	"530	"158	"1,020	1,020	1,020	1,020	509	1,690			
Sum	"26,903	"15,310	"6,366.9	"19,159						150,850		23,896
	"33,848	"19,631	"4,451	"137,535						41,170		

Current Year 1945

Period 1936-1945 ♦

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	Day			Acre Feet	Average	Maximum
Jan.			31	"1,320 #	13	"904 #	"1,090	"67,100	67,856
Feb.			1	"1,320 #	21	"667 #	961	"53,400	60,256
Mar.			24	"848 #	20	"477 #	"633	"38,900	85,300
Apr.	2.85	1.03	20	1,100	30	149	* 510	* 30,400	28,769
May	1.12	.87	4	200	21	116	144	8,830	79,300
June	3.04	.63	30	1,200	12	40.5	212	12,600	251,000
July	9.65	.94	4	18,000	2	122	4,440	273,000	184,120
Aug.	3.05	1.07	6	1,890	27	257	618	38,000	174,720
Sept.	6.14	.62	29	8,110	21	68.6	336	20,000	485,000
Oct.	9.89	1.27	7	19,700	4	1,120	4,870	299,000	43,900
Nov.	2.80	2.01	1	1,850	11	996	1,370	81,700	1,400,000
Dec.	2.06	1.56	1	1,020	16	611	771	47,400	929,000
Yearly	9.89	.62		19,700		40.5	1,340	970,330	1,584,976
									63,461,400
									741,300

* Estimated # Mean daily * Partly estimated ♦ Beginning April 1, 1936

* The yearly maximums and minimums are for the period 1937 to 1945.

RIO GRANDE AT LANGTRY STATION, TEXAS

DESCRIPTION: Water-stage recorder, and cable with stand-up cable car and winch, located at Langtry, Texas, 79.5 miles above Villa Acuna, Coahuila, and 614.1 river miles below the American Dam at El Paso, Texas. Zero of the gage is 1,091.69 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 27 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: May 1900 to October 1914; December 1919 to March 1920; and January 1924 to December 1945.

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 about 3:00 P. M. June 17, 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 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,270	1,470	1,040	1,890	" 602	390	505	1,350	832	2,910	2,100	1,770
2	1,340	1,570	1,060	1,770	" 556	390	1,180	1,230	742	1,800	1,890	1,570
3	1,300	1,620	1,060	1,310	" 523	395	6,300	1,280	732	1,130	2,120	1,380
4	1,310	1,590	1,020	897	" 505	410	6,500	1,190	714	851	1,800	1,290
5	1,350	1,490	992	825	494	410	18,300	1,110	640	736	1,740	1,220
6	1,330	1,420	964	774	" 482	410	13,600	1,040	592	747	1,710	1,170
7	1,420	1,380	974	799	* 476	390	9,720	966	545	10,800	1,660	1,130
8	1,410	1,280	1,070	859	470	432	12,100	1,580	518	12,600	1,560	1,110
9	1,390	1,230	956	1,140	464	416	9,600	1,940	504	16,500	1,550	1,090
10	1,340	1,230	898	1,150	452	373	8,310	1,580	487	12,500	1,830	1,090
11	1,280	1,450	899	1,000	447	366	19,400	1,300	472	14,500	1,800	1,060
12	1,370	1,510	985	868	442	354	15,300	1,110	448	15,100	1,750	1,010
13	1,320	1,440	910	789	442	352	9,720	995	425	15,300	1,550	997
14	1,330	1,360	873	755	426	350	* 7,770	923	418	10,600	1,380	974
15	1,270	1,250	901	747	435	342	* 5,650	846	411	* 7,570	1,340	968
16	1,160	1,310	874	788	410	340	* 4,590	871	399	5,940	1,480	962
17	1,500	1,450	821	730	404	338	* 5,300	879	392	5,050	1,600	971
18	1,520	1,450	829	691	404	336	4,520	836	391	4,710	1,820	965
19	1,410	1,330	891	692	399	329	3,660	740	389	3,970	1,940	936
20	1,360	1,220	847	4,620	399	327	3,280	709	385	3,430	1,680	936
21	1,580	1,190	766	1,050	415	327	2,970	736	383	" 3,220	1,530	1,020
22	1,270	1,170	777	2,510	415	327	3,080	726	636	" 3,010	1,650	1,100
23	1,330	1,070	760	2,410	399	489	3,000	674	523	" 2,790	1,780	1,150
24	1,380	1,030	712	1,190	394	642	2,440	632	1,080	" 2,580	1,780	1,100
25	1,340	1,120	712	862	399	803	2,400	604	1,120	2,370	1,770	1,070
26	1,330	1,130	917	809	399	673	2,120	647	632	2,290	1,780	1,150
27	1,260	1,050	984	760	389	563	1,840	626	1,150	2,350	1,630	1,150
28	1,360	1,060	1,060	713	395	550	1,880	610	2,580	2,180	1,690	1,150
29	1,290	1,010	682	390	524	1,750	622	1,620	2,010	1,690	1,100	
30	1,390	964	630	385	474	1,470	586	1,760	2,100	2,190	1,090	1,070
31	1,420	1,060	385			1,360	772					
Sum	36,850	34,710	12,822	189,615	29,710				173,814	34,749		
	41,550	28,606	13,577	22,020	51,300							

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Normal	Maximum	Minimum
Jan.	1.85	1.35	18	1,660	16	1,140	1,340	82,400	98,481	* 245,000
Feb.	1.85	1.20	3	1,670	25	1,010	1,320	73,100	83,085	* 117,000
Mar.	1.62	.85	31	1,450	25	689	923	56,700	79,578	118,000
Apr.	9.73	.76	20	16,200	30	" 623	1,160	68,800	65,427	105,000
May	" .81	.35	1	" 660	31	380	438	26,900	106,212	271,000
June	1.08	.28	25	865	20	323	427	25,400	107,090	299,000
July	15.90	.57	11	31,600	1	480	6,120	376,000	171,510	719,000
Aug.	2.13	.57	8	2,130	31	553	958	58,900	219,886	* 730,000
Sept.	2.97	.32	28	3,260	22	379	734	43,700	401,276	1,410,000
Oct.	16.04	.78	7	31,900	6	668	5,610	345,000	275,910	1,063,000
Nov.	2.19	1.41	1	2,180	15	1,330	1,710	102,000	107,717	* 211,000
Dec.	1.91	1.02	1	1,820	20	928	1,120	68,900	94,461	135,000
Yearly	16.04	.28		31,900	323	1,830	1,327,800	1,810,633	3,851,500	879,000

* Estimated * Partly estimated

PECOS RIVER STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder, 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 638.2 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 19 meter measurements during the year. Water-stage recorder installed May 11, 1942. Computations by shifting channel methods. 1945 records good. Records available: March 17, 1898, to December 3, 1898, and May 1900 to December 31, 1945.

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. For dry weather losses and gains in the Pecos River channel from Sheffield to the Rio Grande, see page 47, Water Bulletin No. 11, and the last table on page 70, Water Bulletin No. 12.

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.

CORRECTION: The mean daily discharges published in Water Bulletin No. 10 for the period September 9 to September 16, 1940, inclusive, are in error. The correct daily amounts beginning with September 9, are 230, 219, 208, 205, 202, 199, 202 and 195 second feet respectively. Monthly mean second feet and total acre feet are 224 and 13,300 respectively. The annual total is 226,200 acre feet.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	290	268	247	261	216	155	170	224	213	224	347	265
2	289	271	247	252	215	158	166	217	214	241	347	265
3	297	270	243	265	211	155	2,360	215	209	241	335	257
4	296	270	236	245	207	159	267	212	207	247	324	251
5	296	270	239	230	207	154	1,620	211	204	247	324	249
6	296	267	235	226	206	154	1,820	208	203	247	323	247
7	287	263	235	234	209	159	1,560	209	201	6,560	324	242
8	280	263	233	259	206	159	1,890	217	196	1,820	314	242
9	280	262	234	262	205	156	2,900	211	197	6,030	310	241
10	280	266	230	262	208	154	1,020	207	198	2,250	306	237
11	280	266	235	258	205	170	1,260	201	200	799	307	237
12	280	292	239	258	201	164	1,020	212	201	619	307	237
13	281	300	741	257	204	156	754	213	199	548	308	246
14	281	287	321	257	196	154	597	200	198	522	303	246
15	277	279	281	251	190	148	504	198	201	502	294	240
16	277	276	290	247	184	146	468	197	200	477	290	240
17	281	268	283	247	180	146	415	192	194	465	300	240
18	324	260	273	247	177	154	390	190	193	447	300	246
19	296	260	259	244	177	159	365	191	196	435	301	239
20	288	260	245	275	176	162	342	192	198	423	290	236
21	284	260	243	407	176	154	323	203	198	412	283	245
22	280	252	240	306	174	151	312	217	219	395	277	255
23	276	251	239	275	165	151	301	222	218	390	280	257
24	276	248	232	260	162	151	287	216	210	383	278	258
25	276	255	223	248	162	151	272	210	199	378	276	250
26	276	255	218	241	161	148	258	206	196	371	274	247
27	276	255	241	236	158	144	247	204	196	365	272	249
28	275	254	240	235	155	178	243	208	319	360	266	250
29	271	235	231	155	184	243	209	272	359	269	251	
30	271	230	220	155	176	239	207	233	359	267	252	
31	271	236	155	155	232	206	353				254	
Sum	7,448		7,696		4,710			6,425		27,469		7,669
8,788		8,123		5,756			22,845		6,282		8,996	

Current Year 1945 Period 1924-1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
	High	Low	Day	Day	Acre Feet						
Jan.	1.98	1.75	18	362	31	268	283	17,400	26,107	78,200	12,900
Feb.	1.86	1.70	12	308	24	244	266	14,800	20,491	62,300	10,900
Mar.	3.69	1.60	13	2,280	26	215	262	16,100	19,273	40,700	11,100
Apr.	2.37	1.58	21	627	30	217	257	15,300	17,705	42,400	9,520
May	1.60	1.38	2	221	30	150	186	11,400	36,917	156,000	10,800
June	1.54	1.34	28	196	27	141	157	9,340	37,740	197,000	9,340
July	7.87	1.33	8	8,730	2	163	737	45,300	25,465	84,200	7,620
Aug.	1.73	1.36	8	231	18	190	207	12,700	20,960	50,400	7,620
Sept.	2.70	1.47	28	911	18	191	209	12,500	47,137	344,400	6,190
Oct.	15.27	1.58	7	27,700	1	221	886	54,500	56,321	486,000	9,520
Nov.	1.77	1.62	1	352	429	264	300	17,800	31,572	209,000	10,300
Dec.	1.64	1.57	1	270	20	231	247	15,200	25,756	91,800	12,200
Yearly	15.27	1.34		27,700	141	335	242,340	365,444	1,330,900	176,780	

* And other days

GOODENOUGH SPRING STATION NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder and light cable (winch operated, for carrying current meter and light weights only), located 4,000 feet above confluence with Rio Grande and 11.75 miles southwest of Comstock, Val Verde County, Texas. The stream from this spring enters the Rio Grande 664.9 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. 1945 records good. Records available: February 23, 1929, to December 1945. 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, the backwater from the Rio Grande reaches this gaging station. Backwater from the Rio Grande reached a gage height of 13.86 on September 4, 1935, and 17.30 on September 1, 1932.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., September 18, 1941, 846 sec. ft. with a gage height of 4.57 feet; Min., August 28, 1944, 75.7 sec. ft. with a gage height of 0.43 feet.

Average Daily: Max. October 1, 1932, " 455 sec. ft.; Min. Aug. 28, 1944, 77.2 sec. ft.

Average Monthly: Max. October 1932, * 421 sec. ft.; Min. Aug. 1944, 88.6 sec. ft.

Average Yearly: Max. 1933, 266 sec. ft.; Min. 1943-1944, 110 sec. ft.

Average of Two Successive Years: Max. 1932-1933, 252 sec. ft.; Min. 1943-1944, 110 sec. ft.

Average of Three Successive Years: Max. 1932-1934, 224 sec. ft.; Min. 1943-1945, 111 sec. ft.

Average of Four Successive Years: Max. 1932-1935, 207 sec. ft.; Min. 1942-1945, 116 sec. ft.

Average of Five Successive Years: Max. 1931-1935, 197 sec. ft.; Min. 1941-1945, 121 sec. ft.

Average of Seventeen Years: 1929-1945, 144 sec. ft.

CORRECTION: Estimates for September 1932 as published in Water Bulletin No. 2 are in error. It is now estimated that the mean daily flow did not exceed 455 second feet and that the total discharge for the month was 25,000 acre feet. The annual discharge for 1932 becomes 156,020 acre feet.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	109	99.9	104	142	93.2	93.6	84.8	122	120	132	133	135
2	110	100	104	147	93.4	93.0	106	123	121	131	133	135
3	107	100	104	134	92.3	92.9	154	123	121	129	130	133
4	106	101	104	127	93.2	93.5	149	123	121	130	129	131
5	106	99.2	105	123	94.1	92.7	141	124	121	130	130	134
6	107	102	102	120	94.5	92.5	140	124	121	128	130	133
7	104	99.8	102	118	94.5	91.7	155	124	120	129	131	132
8	103	101	102	117	94.0	92.3	160	124	119	130	131	132
9	101	102	103	113	95.0	92.7	157	124	118	139	130	131
10	101	101	104	109	96.7	92.0	151	125	117	123	131	129
11	101	101	105	104	98.9	91.9	147	125	118	123	131	130
12	100	106	104	104	100	89.7	145	126	118	124	131	131
13	99.1	103	110	102	99.0	89.8	141	125	118	125	132	131
14	99.5	103	109	100	98.9	90.0	138	124	118	125	130	130
15	97.5	105	107	100	97.7	88.0	136	124	118	125	131	130
16	99.8	105	106	98.4	95.6	87.5	134	123	118	125	134	130
17	101	103	107	97.7	95.5	86.9	133	124	118	127	134	130
18	100	104	104	94.9	95.4	86.3	132	124	118	127	134	130
19	98.8	105	102	95.1	95.2	85.8	131	123	116	127	135	125
20	100	106	100	93.3	96.1	85.2	127	123	115	128	136	125
21	99.4	105	101	90.3	95.0	84.7	121	123	114	128	134	127
22	97.7	104	101	90.6	93.7	84.1	125	123	116	128	132	126
23	98.0	104	102	92.0	94.3	89.9	138	120	114	129	132	126
24	99.4	105	103	93.2	94.6	89.4	135	120	114	128	134	125
25	99.7	106	102	93.4	94.5	88.8	129	120	114	129	135	124
26	99.0	105	102	92.1	93.9	89.1	126	121	114	129	134	125
27	100	104	102	92.3	93.8	89.2	124	121	131	129	133	122
28	98.6	103	102	92.6	93.6	88.6	125	121	135	129	134	120
29	98.9	102	91.4	93.5	87.4	124	121	134	130	136	121	
30	99.3	102	91.6	93.9	86.0	122	120	139	131	136	119	
31	98.6	112	93.8	93.8	122	120	132	132	132			118
Sum		2,883.9		3,158.9		2,685.0		3,807		3,979		3,968
		3,139.3		3,215		2,947.6		4,150.8		3,599		3,976

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Period 1924-1945				
	High		Low	Day	High			Acre Feet				
	High	Low	Day					Normal	Maximum	Minimum		
Jan.	.76	.52	17	112	15	95.5	101	6,230	8,578	6,130		
Feb.	.73	.49	12	117	11	99.1	103	5,720	7,648	5,350		
Mar.	.99	.45	31	136	20	99.1	104	6,380	8,097	5,900		
Apr.	1.21	.44	20	149	30	90.1	105	6,270	7,685	5,560		
May	.56	.45	12	101	3	91.6	95.1	5,850	8,340	5,850		
June	.58	.43	9	94.7	20	83.7	89.5	5,330	8,392	5,330		
July	1.78	.52	6	196	2	83.5	134	8,230	8,743	6,920		
Aug.	1.30	.91	22	153	51	119	123	7,550	8,484	5,450		
Sept.	1.73	.81	29	188	26	113	120	7,140	10,112	6,550		
Oct.	1.89	1.11	9	206	10	122	128	7,890	9,847	6,840		
Nov.	1.24	1.12	29	138	4	127	133	7,890	9,082	21,850		
Dec.	1.16	.90	1	137	31	117	128	7,870	8,917	20,470		
Yearly	1.89	.43		206		83.5	114	82,350	103,925	192,840	78,490	

♦ Maximum and minimum figures are for the period, 1929-1945

II Estimated * Partly estimated

DEVILS RIVER STATION NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder on main highway bridge, 12 miles northwest of Del Rio, Texas, and 4.5 miles above confluence with the Rio Grande. Devils River enters the Rio Grande 680.1 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 11 meter measurements during the year. 1945 records good. Records available: May 1900 to March 1914 at a point .8 mile above Southern Pacific Railroad Bridge; September 2, 1932, to December 31, 1945, 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, with a combined hydro-electric generating capacity of 3,100 K. V. A., the operation of which began in 1929.

EXTREME FLOWS: The highest recorded gage height was on September 1, 1932, when the extreme was 41.0 feet at the present station and the extreme flow was 557,000 second feet. (See Special Flood Report 1932 by the United States Section of this Commission.) This corresponds to a flow of 143 second feet per square mile of watershed. Better topographic maps now available show the Devils River watershed above this gaging station to be 4,185 square miles instead of 4,060 square miles as previously reckoned. 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.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	249	247	276	309	195	180	179	210	184	202	372	320
2	227	249	275	306	223	231	179	206	184	275	371	319
3	262	263	276	233	205	193	178	212	195	216	362	305
4	231	270	258	261	204	197	183	204	182	204	361	283
5	239	280	299	200	202	209	171	211	167	234	367	281
6	238	244	229	236	220	205	194	208	177	225	337	296
7	257	245	249	233	222	180	232	200	168	13,300	325	273
8	216	255	248	269	215	186	230	223	172	4,840	335	274
9	227	256	260	233	210	192	296	205	164	29,400	368	304
10	228	253	257	258	222	216	283	197	177	4,840	360	278
11	242	261	268	222	190	169	272	181	187	1,620	321	275
12	270	320	236	267	257	205	280	164	211	878	298	293
13	226	349	258	263	251	168	269	208	203	710	334	288
14	246	262	282	227	189	159	255	191	183	647	335	287
15	260	268	252	231	208	173	239	183	178	577	267	274
16	183	281	228	198	188	169	234	188	182	545	384	275
17	304	289	277	226	182	181	232	199	182	545	310	286
18	895	253	263	224	187	166	222	185	172	461	434	296
19	460	280	246	213	188	187	210	199	177	473	274	268
20	264	272	246	248	164	198	239	182	* 187	463	301	273
21	264	298	244	258	228	188	189	184	187	453	310	262
22	248	247	236	242	196	212	238	234	179	352	277	263
23	234	235	232	206	183	202	236	200	194	426	295	282
24	253	294	278	223	185	195	220	209	198	416	310	273
25	261	268	244	229	202	172	226	175	195	367	319	225
26	245	282	228	218	187	169	228	200	180	383	329	277
27	224	250	221	216	189	170	220	190	185	383	306	297
28	242	248	236	226	187	184	223	190	215	383	316	264
29	296	296	209	180	171	215	189	251	391	318	264	
30	251	218	218	195	170	215	180	213	416	301	269	
31	239	366	185				198	179		382		265
Sum		7,509		7,102		5,597		6,086		65,007		8,689
	8,481		7,982		6,219		6,985		* 5,627		2,897	

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Period 1924-1945				
	High	Low	Day	Day			Normal	Maximum	Minimum		
	High	Low	Day	Day	Acre Feet						
Jan.	2.01	.79	18	1,190	16	0	274	16,800	23,725	45,250	14,500
Feb.	1.62	1.12	13	530	* 7	167	268	14,900	21,177	36,880	13,300
Mar.	1.71	.81	31	619	6	77.3	257	15,800	22,179	39,420	14,000
Apr.	1.64	.97	1	540	20	96.0	237	14,100	24,477	67,800	11,100
May	1.50	.93	12	381	12	77.5	201	12,300	14,756	356,900	10,500
June	1.68	.78	10	552	10	33.9	187	11,100	39,150	285,000	11,100
July	1.62	1.17	20	460	19	129	225	13,900	44,045	377,000	13,900
Aug.	1.72	.85	6	533	6	57.0	196	12,100	24,870	51,000	12,100
Sept.	1.59	1.17	29	394	3	139	* 188	* 11,200	89,965	895,990	11,200
Oct.	10.79	.96	9	59,300	3	66.0	2,100	129,000	52,435	349,000	18,600
Nov.	1.66	.79	9	553	15	53.5	330	19,600	26,530	60,300	15,900
Dec.	1.62	1.11	9	504	25	146	280	17,200	24,499	49,520	15,900
Yearly	10.79	.78		59,300		0	398	288,000	437,808	1,284,080	237,400

* And other days

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 Acuna, Coahuila, and 1.8 miles upstream from the confluence with the Rio Grande just above Del Rio-Villa Acuna International Bridge. This confluence is 693.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is 884.15 feet, United States Coast and Geodetic Survey datum. Prior to September 7, 1939, a staff gage at the same location and on the same datum was used.

RECORDS: Based upon 117 meter measurements during the year, 114 by the Mexican and 3 by the United States Section. Computations by shifting channel methods. 1945 records good. Records available: Occasional estimates from June 1935 to March 20, 1938, after which the present record extends to December 31, 1945.

REMARKS: The low flow of this stream is spring-fed.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. Oct. 3, 1944, 25,640 sec. ft. with a gage height of 17.45 feet. Min. 0.7 sec. ft. on various days in November 1938 and on March 16, 1940, with a gage height of 0.98 ft.

Average Daily: Max. Oct. 3, 1944, 3,530 sec. ft.; Min. Nov. 1939 & Mar. 1940, 0.7 sec. ft.

Average Monthly: Max. Oct. 1944, 153 sec. ft.; Min. Jan. 1938, 1.1 sec. ft.

Average Yearly: Max. 1944, 25.8 sec. ft.; Min. 1938, 9.2 sec. ft.

Average of Two Successive Years: Max. 1943-1944, 25.4 sec. ft.; Min. 1938-1939, 8.1 sec. ft.

Average of Three Successive Years: Max. 1942-1944, 20.8 sec. ft.; Min. 1938-1940, 11.3 sec. ft.

Average of Four Successive Years: Max. 1941-1944, 19.4 sec. ft.; Min. 1938-1941, 12.4 sec. ft.

Average of Five Successive Years: Max. 1940-1944, 19.1 sec. ft.; Min. 1938-1942, 12.4 sec. ft.

Average of Eight Years: 1938-1945, 15.5 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.7	12.0	10.6	19.8	7.1	4.6	3.6	2.1	1.8	2.5	3.9	2.5
2	8.8	12.0	8.1	12.4	7.1	4.6	3.6	2.1	1.8	2.2	3.9	3.6
3	7.4	12.0	4.6	12.0	5.3	4.2	3.6	2.1	1.8	1.8	3.5	3.2
4	9.9	12.0	4.6	9.9	5.3	4.2	3.9	2.1	1.4	2.2	3.6	3.2
5	10.2	9.5	4.6	9.5	5.3	4.2	3.9	2.2	1.4	1.8	3.6	3.2
6	11.3	9.2	4.6	9.2	5.0	4.2	3.9	2.1	1.4	1.8	3.5	3.2
7	12.0	8.8	4.9	9.9	4.9	3.9	4.2	2.1	1.4	1.4	3.6	3.2
8	9.9	10.9	4.9	12.7	5.7	3.9	3.2	2.1	1.4	1.8	3.5	3.2
9	9.9	10.6	5.3	9.2	272	3.9	3.2	2.1	1.4	473	3.5	3.2
10	9.5	10.9	4.9	7.8	96.8	3.9	3.2	2.2	2.2	9.2	3.6	3.2
11	9.5	10.9	4.2	5.3	23.0	3.9	3.2	2.1	2.2	5.3	3.6	3.2
12	9.2	11.3	55.1	7.1	17.7	3.9	2.8	2.1	1.8	3.9	3.5	3.2
13	11.3	11.7	901	6.7	13.1	3.9	2.8	2.1	1.4	3.9	3.5	3.2
14	10.6	9.5	52.6	6.4	12.4	3.5	2.8	2.1	1.4	2.8	2.5	3.2
15	10.2	9.9	27.5	6.4	12.0	3.5	2.8	2.2	1.4	3.2	2.5	3.2
16	10.9	10.6	22.6	6.0	9.2	3.5	2.8	2.1	1.4	3.2	2.5	3.2
17	21.9	22.2	22.2	7.1	8.8	3.5	2.8	2.1	1.4	3.2	3.5	3.2
18	75.9	10.6	21.9	6.7	6.7	3.5	2.8	2.1	1.4	3.2	2.5	3.6
19	19.4	13.8	15.5	7.4	6.7	3.5	2.8	2.1	1.4	3.2	3.5	2.8
20	20.5	13.1	15.2	7.1	7.1	3.5	2.8	2.2	1.4	3.2	3.6	2.8
21	16.6	12.4	14.8	9.2	7.1	3.2	2.8	2.1	1.4	2.8	3.5	2.8
22	17.3	11.7	15.5	8.1	6.7	3.2	2.1	2.1	1.1	2.8	3.5	3.5
23	17.7	10.9	13.4	5.6	6.4	3.2	2.1	2.1	1.8	2.8	3.5	3.5
24	18.0	10.9	9.2	6.0	5.7	3.6	2.1	2.1	1.4	2.8	3.5	2.8
25	18.7	14.5	8.8	6.0	5.3	3.5	2.1	2.2	1.4	2.8	3.2	2.5
26	14.5	14.5	8.5	6.4	5.3	3.6	2.1	2.1	1.4	2.8	3.2	2.5
27	13.4	14.5	8.1	6.7	4.9	3.5	2.1	2.1	1.4	4.9	2.8	2.5
28	12.7	10.6	8.1	7.0	4.9	3.6	2.1	2.1	1.8	4.9	3.2	2.8
29	11.7	7.8	7.0	4.9	3.5	2.1	2.1	2.1	2.8	3.9	3.2	3.9
30	11.7	7.4	7.0	4.9	3.6	2.1	2.1	1.8	2.5	2.8	3.2	2.8
31	11.7	13.4	29	4.6	#	2.1	1.8	2.1	1.8	2.8	2.8	2.8
Sum			319.9	247.6	591.9	112.3	88.5	65.0	48.2	568.9	100.2	95.7
459.0			1,309.9									

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Acre Feet			
	High	Low	Day	High	Day			Acre Feet	Average	Maximum	Minimum
Jan.	2.69	1.35	18	284	1	6.7	14.8	910	433	910	79.4
Feb.	1.44	1.35	#	14.5	21	7.4	11.4	635	480	1,380	113
Mar.	6.89	1.18	13	5,540	11	4.2	12.3	2,600	1,061	2,600	181
Apr.	1.44	1.18	1	27.9	11	5.2	8.3	491	1,108	4,580	168
May	4.49	1.21	9	1,750	31	4.6	19.1	1,170	1,359	4,310	156
June	1.25	1.21	#	4.6	#	2.1	3.7	223	476	1,170	118
July	1.25	1.18	#	4.2	#	2.1	2.9	176	1,655	7,040	176
Aug.	1.18	1.15	#	2.1	29	1.4	2.1	129	813	1,650	129
Sept.	1.21	1.12	29	2.8	#	1.1	1.6	95.6	1,334	6,850	95.6
Oct.	4.82	.95	9	2,360	21	2.1	18.4	1,130	1,550	9,390	134
Nov.	1.05	.98	1	3.9	#	2.5	3.3	199	486	1,670	106
Dec.	1.12	1.02	29	3.9	24	1.8	3.1	190	390	704	132
Yearly	6.89	.95		5,540		1.1	11.0	7,948.6	11,145	18,808	5,130

* Estimated * Partly estimated # Various days of the month

RIO GRANDE AT DEL RIO STATION

DESCRIPTION: Water-stage recorder, located on the downstream side of a pier of the international highway bridge between Del Rio, Texas, and Villa Acuña, Coahuila, and 693.4 river miles below the American Dam at El Paso, Texas. Measurements from highway bridge. Zero of gage 863.80 feet above mean sea level, United States Coast and Geodetic Survey datum. Prior to February 20, 1942, the zero of this gage was one foot higher.

RECORDS: Based upon 29 meter measurements during the year, made jointly by the United States and Mexican Sections. Computations by shifting channel methods. 1945 records good. Records available: December 1923 to December 1945. 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 on June 15, 1945, when the extreme gage height was 0.19 feet and the extreme flow 863 second feet. Numerous records of extreme flows may be found in previous water bulletins.

CORRECTION: A revision of the July 1925 record will be found on page 18 of this Water Bulletin.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,990	2,070	1,760	2,160	* 1,250	1,010	1,160	1,930	1,340	2,260	3,220	2,610
2	1,980	2,120	1,760	2,440	* 1,200	1,010	1,160	1,930	1,470	3,410	3,130	2,680
3	2,040	2,220	1,760	2,340	* 1,170	1,030	8,250	1,830	1,400	2,380	2,940	2,470
4	2,070	2,270	1,740	1,980	* 1,180	996	4,220	1,850	1,370	1,850	3,030	2,260
5	2,030	2,220	1,730	1,690	1,180	1,010	12,300	1,810	1,360	1,610	2,800	2,160
6	2,120	2,120	1,680	1,560	1,180	1,010	18,700	1,710	1,300	1,520	2,730	2,100
7	2,050	2,030	1,620	1,510	1,200	998	14,400	1,700	1,260	16,300	2,680	2,060
8	2,170	1,990	1,640	1,500	1,180	986	11,900	1,680	1,230	18,800	2,620	2,000
9	2,110	1,920	1,720	1,610	1,420	993	14,900	2,090	1,220	49,700	2,560	1,990
10	2,100	1,870	1,670	1,790	1,320	1,040	10,600	2,490	1,190	23,500	2,500	1,980
11	2,070	1,840	1,640	1,820	1,190	968	10,800	2,180	1,170	17,300	2,720	1,970
12	2,050	2,220	1,620	1,690	1,140	957	24,000	1,920	1,160	17,400	2,720	1,960
13	2,100	2,250	3,010	1,630	1,150	934	13,200	1,760	1,120	17,500	2,680	1,950
14	2,060	2,150	2,000	1,560	1,140	923	10,600	1,700	1,090	15,000	2,460	1,910
15	2,040	2,000	1,730	1,480	1,110	920	8,990	1,600	1,080	9,930	2,200	1,870
16	1,950	1,680	1,420	1,070	925	6,910	1,550	1,080	8,320	2,330	1,840	
17	1,960	1,950	1,620	1,470	1,050	949	5,870	1,550	1,080	6,860	2,350	1,860
18	3,270	2,020	1,590	1,450	1,050	972	6,570	1,550	1,040	6,240	2,630	1,870
19	2,520	2,070	1,540	1,420	1,040	986	5,430	1,530	1,050	5,870	2,660	1,860
20	2,230	2,030	* 1,510	2,760	1,030	988	4,800	1,470	1,040	5,080	2,760	1,780
21	2,090	1,900	* 1,500	3,890	1,000	991	4,360	1,430	1,050	4,640	2,570	1,800
22	2,110	1,850	* 1,490	2,300	1,020	993	4,090	1,470	1,220	4,200	2,380	1,880
23	1,980	1,820	* 1,480	3,420	1,000	987	4,140	1,500	1,340	4,040	2,480	1,960
24	2,000	1,790	* 1,470	3,170	995	998	3,770	1,450	1,300	3,660	2,630	2,040
25	2,050	1,770	* 1,460	2,140	1,250	987	3,210	1,400	1,490	3,530	2,640	1,970
26	2,000	1,810	* 1,460	1,650	1,020	1,350	3,130	1,360	1,780	3,470	2,680	1,910
27	1,940	1,810	* 1,530	1,550	1,030	1,320	2,830	1,360	1,400	3,440	2,650	1,980
28	1,930	1,750	* 1,560	1,520	1,010	1,210	2,540	1,340	1,680	3,390	2,520	1,980
29	2,010	1,670	* 1,410	1,010	1,210	2,470	1,330	3,510	3,280	2,590	1,980	
30	1,970	1,680	* 1,310	1,020	1,210	2,280	1,330	3,170	3,200	2,580	1,960	
31	2,010	1,850	1,850	1,030	1,250	2,050	1,300	3,200	3,200	2,500	1,920	
Sum	55,810	57,640	31,124	51,100	270,850	62,560						
	65,000	52,170	34,372	229,630	41,170	79,470						

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	High	Low		Average	Maximum	
Jan.	3.05	1.17	18	5,160	16	1,860	2,100	129,000	169,990
Feb.	1.57	1.07	12	2,400	28	1,710	1,990	111,000	144,204
Mar.	4.15	.72	13	7,750	26	1,300	1,680	103,000	142,566
Apr.	5.25	.68	20	10,400	29	1,380	1,920	114,000	150,315
May	1.64	.24	9	2,760	29	945	1,110	68,200	212,193
June	.68	.19	27	1,410	15	863	1,040	61,700	212,397
July	9.59	.39	12	27,800	1	1,120	7,410	455,000	260,100
Aug.	1.50	.49	10	2,630	31	1,250	1,650	101,000	286,017
Sept.	2.75	.30	29	4,800	18	1,000	1,370	81,700	581,399
Oct.	17.05	.65	9	77,600	6	1,450	8,740	537,000	423,407
Nov.	2.05	1.30	1	3,290	15	2,050	2,650	158,000	190,441
Dec.	1.83	1.01	2	2,890	20	1,690	2,020	124,000	169,506
Yearly	17.05	.19		77,600		863	2,820	2,043,600	2,922,535
								6,041,720	1,639,000

* Partly estimated " Estimated

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 695.2 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 10 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: September 1, 1931, to December 31, 1945.

REMARKS: The flow of this spring-fed creek was greatly modified in 1945 by municipal diversions at Del Rio of 1,807.4 acre feet and by irrigation diversions above this station. Backwater from the Rio Grande reaches this station whenever the stage at Del Rio station reaches 15 feet or a flow of about 60,000 second feet.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max., June 14, 1935, 45,000 sec. ft. with a gage height of 23.20 feet; Min., December 19, 1934, 2.2 sec. ft.

Average Daily:	Max. June 14, 1935, 216,200 sec.ft.; Min. Nov. 30, 1934, 2,5 sec.ft.
Average Monthly:	Max. June 1935, 805 sec.ft.; Min. Feb. 1935, 8.8 sec.ft.
Average Yearly:	Max. 1935, 136 sec.ft.; Min. 1934, 30.7 sec.ft.
Average of Two Successive Years:	Max. 1935-1936, 107 sec.ft.; Min. 1944-1945, 45.9 sec.ft.
Average of Three Successive Years:	Max. 1935-1937, 86.1 sec.ft.; Min. 1937-1939, 49.7 sec.ft.
Average of Four Successive Years:	Max. 1932-1935, 79.1 sec.ft.; Min. 1937-1940, 51.0 sec.ft.
Average of Five Successive Years:	Max. 1932-1936, 78.9 sec.ft.; Min. 1937-1941, 49.9 sec.ft.
Average of Ten Successive Years:	Max. 1932-1941, 64.4 sec.ft.; Min. 1936-1945, 53.9 sec.ft.
Average of Fourteen Years:	1932-1945, 61.1 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	59.1	58.5	34.5	42.8	21.3	22.7	17.9	10.9	15.1	19.6	37.7	29.8
2	58.3	58.5	30.4	32.4	21.3	22.1	17.9	11.3	15.1	26.5	37.7	30.6
3	57.3	58.5	29.7	26.9	21.3	21.6	19.0	12.4	14.6	18.7	37.7	29.9
4	57.2	57.6	31.1	22.5	19.9	21.2	18.9	9.9	13.6	19.2	37.7	29.2
5	58.1	56.8	37.4	23.0	21.2	20.6	18.8	10.7	11.7	23.8	37.7	30.0
6	57.2	56.8	45.2	23.0	21.2	21.4	23.9	13.1	13.5	37.6	36.9	30.0
7	56.2	56.8	43.6	28.2	24.3	21.5	15.1	11.6	14.0	19.2	35.3	30.0
8	56.1	56.8	43.6	39.0	35.4	25.3	16.3	15.6	13.5	22.7	35.3	30.1
9	56.1	55.8	49.2	38.9	54.7	22.9	14.9	12.6	15.0	1,030	35.3	30.1
10	55.2	55.8	48.4	39.7	39.8	23.7	13.5	13.3	15.9	49.8	35.3	30.1
11	56.0	56.7	48.4	40.4	34.5	22.6	18.6	14.4	13.5	48.2	35.3	30.2
12	55.9	57.5	49.2	39.7	36.0	28.7	21.0	15.3	14.4	44.9	35.3	30.2
13	55.9	56.7	159	39.7	36.0	22.8	20.1	15.9	13.9	35.7	34.6	30.2
14	55.9	56.7	50.9	24.1	32.1	19.3	21.1	14.6	13.9	37.2	34.5	30.2
15	55.8	56.7	30.8	21.6	24.1	12.1	15.2	10.9	13.9	38.0	34.5	30.2
16	55.7	56.7	29.4	21.6	24.7	12.7	13.7	10.6	13.9	39.5	34.5	30.9
17	65.1	55.8	29.4	20.3	24.1	13.7	13.1	12.7	13.9	39.4	34.5	29.5
18	107	56.7	29.3	19.7	23.5	22.1	13.6	10.7	13.4	40.9	33.1	28.8
19	60.0	56.7	30.0	21.5	22.1	21.0	14.0	12.9	13.8	40.9	33.8	28.2
20	59.0	56.6	31.3	23.4	22.8	17.2	16.5	13.4	13.8	40.9	33.8	28.2
21	59.0	54.8	36.4	22.7	21.5	13.3	15.3	14.5	13.8	41.7	33.0	28.2
22	59.0	57.4	41.7	28.6	24.6	10.6	16.9	18.5	14.3	40.9	33.0	30.2
23	58.9	16.3	41.6	32.7	30.7	12.5	16.9	17.0	14.8	40.9	33.0	30.2
24	58.8	36.9	43.2	31.9	30.6	12.6	20.2	16.1	14.8	40.8	32.3	30.2
25	58.8	36.9	44.0	31.2	32.7	14.7	22.7	15.3	14.3	40.8	33.7	29.5
26	58.8	36.1	42.4	31.2	33.5	14.4	22.7	17.1	13.7	42.3	33.1	28.2
27	58.7	36.1	41.5	31.2	33.5	15.9	18.1	16.6	13.7	41.6	31.8	28.2
28	58.6	43.0	43.1	29.2	33.5	16.5	17.6	14.2	14.7	41.6	30.4	28.2
29	58.6	43.1	29.8	32.6	16.5	21.6	13.6	21.4	40.8	31.2	28.2	
30	58.6	43.1	25.7	32.6	16.4	19.5	13.1	23.6	40.1	29.8	28.2	
31	58.5	60.5	24.4			11.7	13.6			38.4		28.8
Sum	1,486.2	882.6	558.6	546.3	439.5					1,031.8		
	1,843.4	1,361.4	890.5	422.4	2,122.6					914.5		

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	Day	Low			Normal	Maximum	Minimum
Jan.	2.55	1.00	18	254	10	51.7	59.5	3,660	4,135	7,070
Feb.	1.13	.79	12	62.1	23	34.0	53.1	2,950	2,901	5,490
Mar.	5.16	.69	13	972	18	26.6	43.9	2,700	2,675	4,190
Apr.	1.29	.53	1	76.6	17	16.4	29.4	1,750	2,811	6,120
Mey.	3.03	.56	9	349	4	17.7	28.7	1,770	3,915	6,700
June	1.39	.28	12	87.2	21	6.6	18.6	1,110	6,343	* 47,900
July	2.12	.33	6	180	31	8.4	17.6	1,080	3,264	6,650
Aug.	.65	.26	22	26.2	9	6.5	13.6	838	3,056	5,590
Sept.	.97	.34	29	49.2	5	10.1	14.6	872	4,659	19,100
Oct.	10.50	.45	9	4,570	2	14.7	68.5	4,210	4,132	8,470
Nov.	.87	.66	5	40.7	28	25.8	34.4	2,050	3,121	5,560
Dec.	.75	.63	8	32.2	28	24.4	29.5	1,810	3,197	5,820
Yearly	10.50	.26		4,570	6.5	34.3	24,800	44,209	98,137	22,202

* The average maximum and minimum discharges for September, October, November and December are for the period, 1931 to 1945. * Partly estimated. † And other days. " Estimated.

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 miles below Del Rio-Eagle Pass Highway and 5.5 miles above confluence with the Rio Grande. This creek enters the Rio Grande 717.7 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 8 meter measurements during the year and stable rating curve. 1945 records good. Records available: November 1928 to December 31, 1945.

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

COMPARATIVE FLOWS FROM RECORDS: **Momentary Peak:** Max., Aug. 31, 1932, 54,650 sec. ft. with a gage height of 21.08 feet.; Min., sometimes dry.

	Average	Daily	Max. Aug. 31, 1932, 24,380	sec. ft.;	Min.	sometimes dry.
	Average	Monthly	Max. Aug.	1932, 792	sec. ft.;	Min.
	Average	Yearly	Max.	1932, 105	sec. ft.;	Min. 1945, 1.8 sec. ft.
Average of Two Successive Years:	Max.	1932-1933,	60.9	sec. ft.;	Min. 1944-1945, 5.4 sec. ft.	
Average of Three Successive Years:	Max.	1931-1933,	45.5	sec. ft.;	Min. 1943-1945, 8.1 sec. ft.	
Average of Four Successive Years:	Max.	1932-1935,	58.5	sec. ft.;	Min. 1942-1945, 7.0 sec. ft.	
Average of Five Successive Years:	Max.	1932-1936,	49.8	sec. ft.;	Min. 1941-1945, 9.3 sec. ft.	
Average of Ten Successive Years:	Max.	1929-1938,	34.1	sec. ft.;	Min. 1936-1945, 13.2 sec. ft.	
Average of Seventeen Years:	Max.	1929-1945,	23.7	sec. ft.		

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.6	3.0	3.7	6.3	0	0	0	0	0	0	0	0
2	2.6	3.0	4.1	5.8	0	0	0	0	0	0	0	0
3	* 2.6	3.0	4.2	4.5	0	0	0	0	0	0	0	0
4	2.6	3.0	4.2	4.0	0	0	0	0	0	0	0	0
5	2.6	3.0	4.5	3.6	0	0	0	0	0	0	0	0
6	2.6	3.0	4.4	3.5	0	0	0	0	0	0	0	0
7	2.6	3.0	4.1	3.5	0	0	0	0	0	0	0	0
8	* 2.6	2.8	4.0	3.4	0	0	0	0	0	0	0	0
9	* 2.6	2.8	4.0	3.4	20.7	0	0	0	0	125.0	0	0
10	2.4	2.8	4.0	3.3	12.5	0	0	0	0	16.1	0	0
11	2.2	2.8	4.4	3.0	5.2	0	0	0	0	4.8	0	0
12	2.4	5.0	6.8	2.3	4.0	14.1	0	0	0	1.8	0	0
13	2.3	4.6	27.6	2.3	2.8	1.0	0	0	0	0	0	0
14	2.2	3.2	7.2	2.2	1.7	0	0	0	0	0	0	0
15	2.2	2.9	6.9	2.0	0.5	0	0	0	0	0	0	0
16	2.4	3.0	6.8	1.6	0	0	0	0	0	0	0	0
17	4.3	3.0	6.7	1.3	0	0	0	0	0	0	0	0
18	5.7	3.1	6.8	0.9	0	19.6	0	0	0	0	0	0
19	4.5	3.1	6.4	0.9	0	0.7	0	0	0	0	0	0
20	4.2	3.5	4.9	1.7	0	0	0	0	0	0	0	0
21	4.0	3.6	4.8	2.5	0	0	0	0	0	0	0	0
22	4.0	3.6	4.8	2.4	0	0	0	0	0	0	0	0
23	4.2	3.7	5.1	2.1	0	0	0	0	0	0	0	0
24	4.2	3.7	5.0	0.6	0	0	0	0	0	0	0	0
25	4.2	3.5	4.9	0.4	0	0	0	0	0	0	0	0
26	3.0	3.6	4.9	0.3	0	0	0	0	0	0	0	0
27	3.1	3.9	4.6	0.2	0	0	0	0	0	0	0	0
28	3.2	4.0	4.5	0	0	0	0	0	0	0	0	0
29	3.0		4.4	0	0	0	0	0	0	0	0	0
30	3.0		4.4	0	0	0	0	0	0	0	0	0
31	2.8		6.4	0	0	0	0	0	0	0	0	0
Sum		93.2		68.0		35.4		0		147.7		0
		96.9		179.3		47.4		0		0		0

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Period 1929-1945		
	High	Low	Day	Day			Normal	Maximum	Minimum
	High	Low	Day	Day	Acres	Acres	Acres	Acres	Acres
Jan.	2.69	2.47	18	6.7	11	2.0	3.1	192	475
Feb.	2.53	2.47	12	5.1	2	2.8	3.3	185	456
Mar.	4.50	2.48	13	235	4.1	3.7	5.8	356	579
Apr.	2.53		1	6.4	428	0	2.3	135	819
May	4.64		9	304	4.1	0	1.5	94.0	2,403
June	4.59		18	275	4.1	0	1.2	70.2	2,255
July			4.1	0	4.1	0	0	3,193	30,000
Aug.			4.1	0	4.1	0	0	3,170	48,700
Sept.			4.1	0	4.1	0	0	2,045	30,000
Oct.	4.99		9	569	4.1	0	4.8	293	899
Nov.			4.1	0	4.1	0	0	0	4,000
Dec.			4.1	0	4.1	0	0	487	2,150
Yearly				569		0	1.8	1,325.2	17,177
							#	76,259.3	#1,325.2

Period, 1928-1945 * And other days # Estimated * Partly estimated
 # Partly estimated for the period, 1924-1945

RIO SAN DIEGO STATION AT JIMENEZ, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car. Masonry and concrete Cipoletti weir control for measuring discharges up to 700 second feet. The station is located 4.4 miles west of Jimenez, Coahuila, and 5.0 miles above the confluence with the Rio Grande. This stream enters the Rio Grande 722.4 river miles below the American Dam at El Paso, Texas. Zero of the gage is 828.90 feet United States Coast and Geodetic Survey mean sea level datum.

RECORDS: Based upon 2 meter measurements during the year and the weir discharge table. 1945 records good. Records available: 1924-1945. The records from 1922 to September 1932 are considered doubtful.

REMARKS: The weir control at this station was constructed in November 1932. 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 irrigating about 1,236 acres of land in the Jimenez Community.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max.; Sept. 18, 1941, about 75,200 sec. ft. with a gage height of 20.96 feet. According to local inhabitants, the water level at the present gage reached the same height in 1905 as on September 18, 1941, but because of channel conditions, it is thought that the maximum flow in 1905 was less than in 1941, even though the gage heights were the same. Min.; The river was dry on several occasions from April to June 1939.

Average Daily: Max. Sept. 18, 1941, 23,200 sec. ft.; Min. Dry several days April and May, 1939.

Average Monthly: Max. May 1935, 1,960 sec. ft.; Min. April 1939, 18.7 sec. ft.

Average Yearly: Max. 1935, 526 sec. ft.; Min. 1939, 37.8 sec. ft.

Average of Two Successive Years: Max. 1935-1936, 334 sec. ft.; Min. 1938-1939, 58.3 sec. ft.

Average of Three Successive Years: Max. 1933-1935, 288 sec. ft.; Min. 1937-1939, 54.0 sec. ft.

Average of Four Successive Years: Max. 1933-1936, 251 sec. ft.; Min. 1937-1940, 63.9 sec. ft.

Average of Five Successive Years: Max. 1933-1937, 210 sec. ft.; Min. 1936-1940, 79.1 sec. ft.

Average of Thirteen Years: 1933-1945, 155 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	175	129	63.2	74.9	52.3	42.0	32.9	32.8	32.9	42.0	143	74.9
2	159	129	52.3	74.9	52.3	42.0	32.9	32.8	32.9	42.0	143	74.9
3	143	129	52.3	74.9	63.2	42.0	24.0	32.8	32.9	42.0	129	74.9
4	143	114	63.2	65.2	65.2	42.0	24.0	32.8	42.0	42.0	129	74.9
5	129	114	63.2	63.2	63.2	42.0	24.0	42.0	42.0	60.4	87.2	74.9
6	114	114	74.9	63.2	63.2	32.8	32.9	42.0	42.0	42.0	114	87.2
7	114	87.2	74.9	63.2	74.9	42.0	24.0	42.0	42.0	42.0	100	87.2
8	114	87.2	74.9	63.2	87.2	42.0	32.8	42.0	42.0	52.3	100	74.9
9	114	87.2	74.9	63.2	138	42.0	32.9	42.0	42.0	1,430	100	74.9
10	114	87.2	63.2	63.2	242	42.0	32.8	42.0	42.0	805	100	74.9
11	100	87.2	63.2	74.9	159	42.0	42.0	42.0	42.0	611	87.2	74.9
12	100	100	63.2	74.9	143	52.3	32.9	42.0	42.0	484	87.2	74.9
13	87.2	100	63.2	87.2	159	52.3	42.0	32.8	42.0	434	87.2	74.9
14	87.2	100	74.9	74.9	129	52.3	42.0	32.8	32.9	413	87.2	74.9
15	100	87.2	74.9	63.2	129	63.2	32.9	42.0	42.0	367	74.9	74.9
16	87.2	87.2	74.9	63.2	114	52.3	32.8	42.0	42.0	346	63.2	87.2
17	87.2	87.2	63.2	52.3	129	52.3	32.9	42.0	32.8	325	63.2	87.2
18	114	87.2	63.2	52.3	114	42.0	32.8	32.8	32.8	304	63.2	74.9
19	129	74.9	63.2	42.0	100	52.3	32.9	24.0	32.8	304	74.9	87.2
20	114	74.9	63.2	42.0	100	52.3	32.8	24.0	32.9	265	74.9	87.2
21	114	63.2	63.2	52.3	87.2	52.3	32.9	32.8	32.9	246	74.9	87.2
22	114	52.3	63.2	87.2	74.9	52.3	32.8	32.8	32.8	246	74.9	87.2
23	114	63.2	63.2	63.2	63.2	42.0	32.9	42.0	32.8	246	74.9	87.2
24	114	63.2	63.2	52.3	63.2	42.0	42.0	42.0	32.8	227	74.9	87.2
25	114	63.2	63.2	42.0	52.3	42.0	32.8	42.0	32.8	209	74.9	100
26	114	63.2	63.2	42.0	52.3	42.0	32.9	52.3	32.9	192	74.9	100
27	114	63.2	63.2	42.0	52.3	42.0	32.8	52.3	42.0	175	74.9	100
28	129	63.2	63.2	42.0	42.0	42.0	32.8	52.3	32.9	175	74.9	100
29	129	63.2	52.3	32.8	42.0	42.0	52.3	32.9	159	87.2	100	
30	129	63.2	52.3	32.8	32.8	42.0	52.3	32.9	159	87.2	87.2	
31	129	63.2	52.3	42.0	42.0	42.0	42.0	42.0	143		87.2	
Sum	2,458.3		1,821.6		1,355.5		1,234.7		8,629.7		2,607.3	
	3,638.8		2,019.3		2,770.5		1,047.1		1,068.6		2,723.7	

Current Year 1945

Period 1933-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	Day	Low			Normal	Maximum	Minimum
Jan.	3.15	2.92	1	175	#	74.9	117	7,220	8,150	36,430
Feb.	3.08	2.85	#	143	#	52.3	87.8	4,880	5,488	25,760
Mar.	2.95	2.85	#	87.2	#	52.3	65.1	4,000	5,005	21,500
Apr.	2.99	2.82	#	100	#	42.0	60.7	3,610	5,422	16,820
May	3.74	2.79	9	558	#	32.8	89.4	5,500	15,338	120,000
June	2.89	2.79	#	63.2	#	32.8	45.2	2,690	9,833	62,240
July	2.85	2.76	#	52.3	#	24.0	33.8	2,080	7,293	21,550
Aug.	2.85	2.76	#	52.3	#	24.0	39.8	2,450	6,742	19,950
Sept.	2.82	2.76	#	42.0	#	24.0	35.6	2,120	18,243	84,620
Oct.	6.63	2.82	9	3,320	#	42.0	278	17,120	23,851	146,640
Nov.	3.08	2.85	#	143	16	52.3	90.8	5,400	8,290	8,290
Dec.	2.99	2.92	#	100	#	74.9	84.1	5,170	9,147	45,160
Yearly	6.63	2.76		3,320		24.0	86.0	62,240	128,802	381,720
	9	Period, 1932-1945	#	Various days of the month						27,460

RIO SAN RODRIGO STATION NEAR EL MORAL, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car. Reinforced concrete control weir for measuring the flow up to 177 second feet. This station is 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 879.95 feet above sea level, United States Coast and Geodetic Survey datum. This stream enters the Rio Grande 735.4 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 6 meter measurements during the year and the 1942 rating table, the lower portion of which conforms to the weir table. The upper portion of the rating table is based upon meter measurements. 1945 records good. Records available: 1922 to 1945. The records from 1922 to September 1932 are considered doubtful.

REMARKS: This station was constructed in October 1932 at a point 1,640 feet upstream from Paso de las Mulas. Zero of this gage was 884.22 ft. above mean sea level. In December 1938, the station was moved 3,300 feet downstream to the present site. The flow of this spring-fed river is modified by irrigation diversions above and below this station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. Sept. 7, 1932, 81,200 sec. ft. with a gage height of 16.08 feet at the first station location. Min. Frequently dry with a gage height of 0.0 feet.

Average Daily: Max. Sept. 7, 1932, 27,900 sec. ft.; Min. Frequently dry.

Average Monthly: Max. Sept. 1932, 4,270 sec. ft.; Min. Dry during July 1939.

Average Yearly: Max. 1932, 576 sec. ft.; Min. 1939, 10.2 sec. ft.

Average of Two Successive Years: Max. 1932-1933, 335 sec. ft.; Min. 1938-1939, 21.5 sec. ft.

Average of Three Successive Years: Max. 1932-1934, 235 sec. ft.; Min. 1937-1939, 20.1 sec. ft.

Average of Four Successive Years: Max. 1932-1935, 226 sec. ft.; Min. 1937-1940, 26.1 sec. ft.

Average of Five Successive Years: Max. 1932-1936, 195 sec. ft.; Min. 1936-1940, 33.2 sec. ft.

Average of Ten Successive Years: Max. 1932-1941, 121 sec. ft.; Min. 1934-1943, 64.6 sec. ft.

Average of Fourteen Years: 1932-1945, 108 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	113	87.6	64.3	71.7	37.4	31.4	16.3	8.1	8.1	16.2	79.5	79.4
2	113	87.6	64.3	57.2	37.4	31.4	16.2	8.1	8.1	16.2	79.5	79.4
3	113	79.5	57.2	57.2	37.4	31.4	16.3	5.0	8.1	16.2	79.5	79.4
4	113	79.5	57.2	57.2	31.4	31.4	16.2	4.9	8.1	21.2	79.5	79.4
5	113	71.7	57.2	50.2	31.4	26.1	16.3	5.0	8.1	16.2	79.5	71.7
6	104	71.7	57.2	43.8	31.4	26.1	16.2	4.9	8.1	12.0	87.6	71.7
7	105	71.7	57.2	43.8	31.4	26.1	16.3	5.0	8.1	12.0	87.6	71.7
8	105	71.7	57.2	37.4	31.4	57.2	16.2	4.9	8.1	12.0	87.6	71.7
9	105	71.7	57.2	37.4	37.4	37.4	16.3	5.0	8.1	5,900	87.6	71.7
10	104	71.7	57.2	37.4	37.4	37.4	12.0	4.9	8.1	2,980	87.6	71.7
11	105	71.7	57.2	37.4	* 57.2	31.4	12.0	4.9	8.1	1,330	87.6	71.7
12	105	87.6	57.2	37.4	* 184	21.2	16.3	5.0	8.1	925	87.6	71.7
13	105	79.5	57.2	37.4	* 79.5	21.2	12.0	4.9	5.0	586	87.6	71.7
14	104	71.7	57.2	37.4	57.2	21.2	12.0	5.0	8.1	424	87.6	71.7
15	96.1	71.7	57.2	37.4	50.2	21.2	12.0	4.9	5.0	333	87.6	71.7
16	96.1	79.5	50.1	31.4	43.8	21.2	12.0	4.9	4.9	280	87.6	71.7
17	123	71.7	43.8	31.4	43.8	21.2	12.0	5.0	5.0	216	87.6	71.7
18	113	79.5	50.1	31.4	43.8	21.2	12.0	4.9	4.9	163	87.6	71.7
19	105	79.5	43.8	31.4	43.8	21.2	12.0	5.0	5.0	113	87.6	64.3
20	96.1	79.5	43.8	46.3	43.8	21.2	12.0	4.9	4.9	87.6	87.6	64.3
21	96.1	71.7	43.8	71.7	43.8	21.2	12.0	5.0	5.0	79.5	79.5	64.3
22	96.1	71.7	43.8	50.2	37.4	21.2	12.0	5.0	4.9	71.7	79.5	64.3
23	87.6	71.7	43.8	43.8	37.4	21.2	12.0	5.0	5.0	71.7	87.6	64.3
24	87.6	71.7	43.8	43.8	37.4	21.2	12.0	8.1	4.9	64.3	87.6	64.3
25	87.6	71.7	43.8	37.4	37.4	21.2	12.0	8.1	5.0	64.3	79.5	57.2
26	87.6	64.3	43.8	37.4	37.4	16.2	12.0	8.1	5.0	64.3	79.5	64.3
27	87.6	64.3	37.4	31.4	31.4	16.2	12.0	8.1	5.0	71.7	79.5	57.2
28	87.6	64.3	43.8	37.4	31.4	16.2	12.0	8.1	5.0	71.7	79.5	57.2
29	87.6	43.8	37.4	31.4	31.4	16.2	12.0	8.1	5.0	71.7	79.5	57.2
30	87.6	43.8	37.4	31.4	16.2	12.0	8.1	8.1	79.5	79.5	57.2	
31	87.6	96.1	31.4	31.4	31.4	8.1	8.1	8.1	79.5	79.5	57.2	
Sum		2,087.7	1,304.1	745.1	185.0	14,249.5	2,114.7					
3,116.9		1,637.9	1,378.9	410.7	192.9	2,522.7						

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet				
	High	Low	Day	Day			Normal	Maximum	Minimum		
Jan.	.95	.49	17	218	#	79.5	101	6,180	3,713	14,850	171
Feb.	.52	.39	#	87.6	28	57.2	74.6	4,140	2,658	11,580	555
Mar.	.85	.30	31	184	#	37.4	52.8	3,250	2,483	9,900	576
Apr.	.56	.26	1	96.1	#	31.4	43.5	2,590	2,052	6,870	382
May	1.54	.26	#	480	#	31.4	44.5	2,740	5,338	42,330	58.0
June	.46	.16	8	71.7	#	16.2	24.8	1,480	5,047	37,630	30.0
July	.16	.10	#	16.2	#	8.1	13.2	815	3,541	12,170	0
Aug.	.10	.07	#	8.1	#	4.9	6.0	367	4,150	13,710	39.0
Sept.	.13	.07	3	12.0	#	4.9	6.4	383	26,745	* 253,960	383
Oct.	11.45	.13	9	12,780	#	12.0	460	28,260	12,324	81,360	815
Nov.	.52	.49	#	87.6	#	79.5	84.1	5,000	5,512	24,450	535
Dec.	.49	.39	#	79.5	#	57.2	68.2	4,190	4,526	19,060	131
Yearly	11.45	.07		12,780		4.9	82.0	59,395	78,069	414,310	7,436

* Partly estimated # Various days of the month

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 754.6 river miles below the American Dam at El Paso, Texas. Zero of the gage is 682.91 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 168 meter measurements, 157 by the Mexican and 11 by the United States Section during the year. Computations by shifting channel methods. 1945 records good. Records available; May 1900 to March 1914; August 1914 to April 1916; September 1916; September and October 1917; October 1918; September and October 1919; August and September 1920; June 1922; September, November and December 1923; January 1924 through December 1945; also flood peak discharges for June 1899 and April 1900.

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. In April 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 the United States Section of this Commission.) The lowest flow ever recorded was on June 25, 1945, when the extreme gage height was 1.31 feet and the extreme flow 597 second feet. Numerous records of extremes may be found in previous Water Bulletins.

CORRECTIONS: See pages 47 and 48 of this Water Bulletin for flood flows and corrected flows for the years 1899 to 1932.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,120	2,310	1,840	2,040	1,310	858	932	2,170	1,130	2,150	3,310	2,460
2	2,280	2,340	1,830	2,200	1,260	816	886	1,900	1,130	2,550	3,440	2,520
3	2,340	2,370	1,820	2,400	1,200	834	900	1,720	1,310	3,100	3,280	2,520
4	2,480	2,400	1,760	2,300	1,170	851	8,480	1,610	1,280	2,360	3,060	2,410
5	2,500	2,490	1,800	1,990	1,190	840	4,660	1,620	1,180	2,220	3,080	2,250
6	2,500	2,360	1,770	1,640	1,170	858	15,220	1,630	1,240	1,720	2,850	2,200
7	2,440	2,240	1,650	1,470	1,180	872	14,230	1,530	1,220	1,550	2,780	2,150
8	2,440	2,040	1,720	1,400	1,110	862	10,840	1,540	1,140	18,540	2,790	2,120
9	2,450	1,940	1,780	1,580	1,080	805	13,210	1,440	1,120	25,180	2,800	2,130
10	2,280	1,940	1,850	1,590	1,750	777	11,130	1,800	1,130	38,140	2,680	2,140
11	2,300	1,890	1,720	1,780	1,660	837	8,720	2,140	1,100	19,950	2,630	2,050
12	2,310	2,150	1,690	1,960	2,020	897	16,920	1,930	1,070	17,830	2,850	2,000
13	2,320	2,540	4,270	1,830	1,470	805	15,640	1,770	1,030	18,790	2,970	1,980
14	2,340	2,550	2,400	1,660	1,270	798	11,090	1,620	1,020	17,870	2,910	1,900
15	2,350	2,420	2,270	1,470	1,150	731	9,320	1,550	992	13,560	2,550	1,870
16	2,300	2,300	1,900	1,450	1,030	689	" 7,060	1,490	932	9,960	2,220	1,710
17	2,540	2,210	1,940	1,430	1,060	646	" 6,180	1,310	1,010	7,910	2,320	1,720
18	3,350	2,180	1,690	1,450	1,040	752	" 5,650	1,260	953	6,710	2,420	1,850
19	3,490	2,350	1,730	1,370	1,060	802	" 6,180	1,250	900	6,360	2,670	1,810
20	3,020	3,330	1,650	1,550	1,070	731	" 4,240	1,240	897	5,720	2,730	1,840
21	2,770	2,200	1,590	4,450	1,020	738	3,890	1,230	890	5,190	2,780	1,720
22	2,650	2,070	1,580	2,710	918	742	3,670	1,220	879	4,700	2,560	1,750
23	2,450	2,030	1,560	2,280	925	703	3,810	1,410	929	4,380	2,410	1,860
24	2,160	2,000	1,500	3,150	954	696	3,600	1,270	1,200	4,200	2,510	2,070
25	2,260	1,960	1,400	2,620	982	745	3,070	1,200	1,120	5,710	2,610	2,080
26	2,350	1,970	1,430	1,980	1,000	894	2,890	1,200	1,150	3,640	2,720	2,100
27	2,370	2,050	1,370	1,740	954	957	2,890	1,090	1,440	3,570	2,650	1,940
28	2,270	2,010	1,440	1,580	872	1,080	2,620	1,140	1,160	3,570	2,640	2,020
29	2,240	1,610	1,420	869	996	2,540	1,140	1,930	3,520	2,520	2,040	
30	2,300	1,660	1,400	837	946	2,600	1,100	2,770	3,210	2,510	2,070	
31	2,220	1,900	1,900	816	1,095	2,410	1,095	2,970	2,970	2,100		
Sum	61,620	57,880	24,558				45,595	264,830	82,250		63,360	
	76,190	56,100	35,397		205,478		35,252					

Month	Current Year 1945			Period 1924-1945							
	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet				
	High	Low	Day	High	Low	Acre Feet	Normal	Maximum	Minimum		
Jan.	4.00	2.62	18	4,980	1	2,010	2,460	151,100	185,864	365,000	104,400
Feb.	3.18	2.40	13	2,880	25	1,760	2,200	122,200	153,357	254,250	99,200
Mar.	4.82	1.94	15	6,820	27	1,150	1,810	111,500	150,571	247,440	95,900
Apr.	5.25	1.90	21	8,330	19	1,120	1,930	114,800	139,557	219,000	89,790
May	3.61	1.51	12	3,640	30	777	1,140	70,210	247,349	* 918,000	70,210
June	1.97	1.31	28	2,120	25	597	819	48,710	246,522	1,005,000	48,710
July	9.61	1.48	12	22,180	3	752	6,630	407,600	271,563	* 1,255,000	92,890
Aug.	2.82	1.71	11	2,380	27	989	1,470	90,440	296,845	947,000	90,440
Sept.	3.77	1.41	29	5,880	19	742	1,180	69,920	621,621	3,079,000	69,920
Oct.	15.88	2.03	10	46,260	7	1,320	8,540	525,300	465,400	1,680,300	121,000
Nov.	3.67	2.62	2	3,740	16	2,080	2,740	163,100	217,206	512,800	109,000
Dec.	3.18	2.30	2	2,890	#	1,590	2,040	125,700	186,066	369,760	105,620
Yearly	15.88	1.31		46,260		597	2,760	2,000,380	3,181,921	6,946,510	1,798,000

* Estimated * Partly estimated # Various days of the month

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 758.2 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 46 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: 1922-1945. The records from 1922 to September 1932 are considered doubtful.

REMARKS: This station was built in September 1932. The flow of this spring-fed stream is modified by irrigation diversions in the drainage basins of the San Antonio and the Escondido. When the flow of the Rio Grande at Eagle Pass reaches approximately 380,000 second feet, Rio Grande backwater reaches this station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. June 29, 1936, 24,000 sec. ft. with a gage height of 19.13 ft. On September 2, 1932, backwater from the Rio Grande reached a gage height of 9.91 ft. at this station. Min. Nov. 4, 1934, .35 sec. ft. with a gage height of .75 ft.

Average	Daily:	Max. June 29, 1936, 6,710 sec. ft.;	Min. Nov. 4, 1934, 0.7 sec. ft.
Average	Monthly:	Max. Oct. 1932, 646 sec. ft.;	Min. Sept. 1945, 1.1 sec. ft.
Average	Yearly:	Max. 1932, 174 sec. ft.;	Min. 1943, 11.0 sec. ft.
Average of Two Successive Years:	Max. 1932-1933, 123 sec. ft.;	Min. 1942-1943, 13.4 sec. ft.	
Average of Three Successive Years:	Max. 1932-1934, 96.8 sec. ft.;	Min. 1937-1939, 16.2 sec. ft.	
Average of Four Successive Years:	Max. 1932-1935, 95.2 sec. ft.;	Min. 1942-1945, 18.0 sec. ft.	
Average of Five Successive Years:	Max. 1932-1936, 88.6 sec. ft.;	Min. 1941-1945, 19.1 sec. ft.	
Average of Ten Successive Years:	Max. 1932-1941, 55.8 sec. ft.;	Min. 1936-1945, 25.4 sec. ft.	
Average of Fourteen Years:	1932-1945, 44.8 sec. ft.		

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	26.1	24.7	20.5	66.7	9.2	11.7	3.9	2.4	.7	3.2	5.7	9.2
2	25.8	24.7	23.0	39.6	9.5	5.7	3.9	2.5	.7	3.9	5.9	11.7
3	25.4	24.4	20.8	26.5	9.5	5.3	3.9	2.1	.7	3.9	3.5	14.1
4	25.1	24.4	21.2	20.1	9.5	4.9	4.2	2.1	.7	4.2	3.5	13.8
5	24.4	24.4	21.5	18.0	9.5	5.3	4.2	2.1	.7	12.4	4.6	13.8
6	24.0	24.0	21.5	18.4	9.9	5.3	4.2	2.1	.7	17.0	4.6	13.4
7	23.7	24.0	21.2	18.4	9.9	4.9	4.2	2.1	.7	10.6	4.6	13.1
8	23.3	23.7	21.2	23.3	10.2	4.9	4.6	2.1	.7	29.3	4.6	13.1
9	23.3	23.7	21.2	23.7	10.6	4.9	4.6	1.8	.7	1,543	4.6	12.7
10	23.3	25.8	23.3	23.0	10.9	4.9	4.6	1.4	.7	47.3	4.6	17.7
11	23.3	25.8	23.0	20.1	197	4.6	4.6	1.4	.7	31.8	4.6	14.8
12	23.3	25.8	23.0	19.4	646	4.6	3.9	1.1	.7	30.0	4.6	14.8
13	23.3	25.8	23.0	19.1	222	4.6	3.9	1.1	.7	30.4	4.6	12.4
14	23.3	26.1	23.0	15.2	73.5	4.6	3.9	1.1	.7	27.9	4.6	12.4
15	23.0	26.1	23.0	11.3	46.6	4.6	3.2	1.1	.7	28.6	4.6	12.4
16	23.0	21.5	20.8	11.0	38.8	4.6	3.2	1.1	.7	26.1	4.6	12.0
17	23.0	21.5	20.8	10.2	36.0	4.6	3.2	.7	.7	23.0	4.6	12.0
18	23.0	21.9	23.3	10.2	33.2	4.6	3.2	.7	.7	18.4	4.6	14.8
19	23.0	24.4	23.3	10.2	30.4	4.6	2.8	.7	.7	18.4	4.6	14.8
20	23.0	24.0	23.0	9.9	30.4	4.6	2.8	.7	.7	18.7	4.6	15.2
21	23.0	23.7	20.8	9.3	27.9	4.2	2.8	.7	.7	18.7	4.6	15.5
22	23.0	20.8	20.5	9.9	27.2	4.2	2.5	.7	.7	15.9	4.9	15.9
23	23.3	20.5	20.5	9.9	26.1	4.2	2.5	.7	.7	13.1	4.9	19.1
24	23.7	19.1	22.6	9.9	18.0	4.6	2.1	.7	.7	5.6	4.9	19.4
25	24.0	18.7	22.6	9.5	14.1	4.6	2.5	.7	.7	5.6	4.9	16.2
26	24.0	18.4	14.5	9.5	13.8	4.6	2.5	.7	.7	6.4	5.3	15.9
27	24.4	19.8	12.0	9.5	13.4	4.6	2.5	.7	.7	6.4	5.3	15.5
28	24.7	20.1	12.0	9.5	11.7	4.2	2.5	.7	.7	6.0	6.7	15.2
29	25.1	12.0	9.2	11.7	3.9	2.5	1.1	.8	5.8	5.7	8.5	14.8
30	25.1	12.0	9.2	11.7	3.9	2.5	1.4	.8	3.6	4.6	8.8	17.0
31	24.7	17.7			11.7		2.5	.7		4.6		14.1
Sum	647.8	510.3			1,639.9	146.8	39.2			2,020.7		446.8
	740.6	628.8			104.4		29.0			149.0		

Current Year 1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	Low			Normal	Maximum	Minimum
Jan.	2.66	2.66	1	26.1	#	23.0	23.9	1,470	2,961
Feb.	2.69	2.59	#	26.1	26	18.4	23.1	1,280	1,754
Mar.	2.76	2.40	31	29.0	#	12.0	20.3	1,250	1,538
Apr.	3.61	2.36	1	153	#	9.2	17.0	1,010	1,773
May	7.45	2.40	11	1,810	1	9.2	52.9	3,250	5,360
June	2.49	2.13	1	11.7	#	3.9	4.9	291	4,164
July	2.13	2.03	#	4.6	#	2.5	3.4	207	3,417
Aug.	2.16	1.97	29	3.9	#	.7	1.3	77.8	19,730
Sept.	2.66	1.97	29	18.0	#	.7	1.0	57.5	291
Oct.	10.47	2.07	9	5,050	1	3.2	65.2	4,010	2,023
Nov.	2.46	2.36	30	8.8	#	3.5	5.0	296	14,531
Dec.	2.62	2.46	10	22.6	1	9.2	14.4	886	39,790
Yearly	10.47	1.97		5,050		.7	19.5	14,085.3	32,463
									126,090
									7,969

Various days of the month

RIO GRANDE AT LAREDO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car. Until May 22, 1942, the water-stage recorder was attached to the north abutment of railroad bridge over the Rio Grande between the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas, 884.5 river miles below the American Dam at El Paso, Texas. On June 10, 1942, the water-stage recorder was installed on the downstream side of the first pier of the same bridge on the Mexican side. The elevation of the zero of the gage was not changed. Zero of the gage at the recorder is at elevation 351.50 feet. The cable is located 2 miles upstream from the railroad bridge. Zero of the gage at the cable is elevation 353.15 feet. All gage elevations are on United States Coast and Geodetic Survey sea-level datum.

RECORDS: Based upon 160 meter measurements during the year. 159 by the Mexican and 1 by the United States Section. Computations by shifting channel methods. 1945 records good. Records available: May 1900 through December 1913; May, June and October 1914; September 1916; September and October 1917; October 1918; September and October 1919; August and September 1920; June, November and December 1922; January 1923 through December 1945; also flood peak discharges for June 1899 and April 1900. Gage height records are available for January, February and March 1914.

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 335,000 second feet. On June 27, 1945, a minimum flow of 572 second feet was reached with a gage height of 3.54 feet. Numerous records of extreme flows may be found in previous Water Bulletins and on pages 49 and 50 of this bulletin.

CORRECTIONS: See pages 49 and 50 of this Water Bulletin for flood flows and corrected flows for the years 1899 to 1932.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,280	2,450	2,020	8,580	1,490	777	968	2,480	1,080	2,900	3,420	2,720
2	2,260	2,470	2,040	5,230	1,390	805	939	2,240	1,070	2,690	3,390	2,810
3	2,310	2,560	1,970	2,860	1,310	918	1,140	1,970	1,070	2,420	3,460	2,770
4	2,490	2,570	1,900	2,400	1,240	1,270	1,020	1,830	985	3,030	3,380	2,830
5	2,540	2,580	1,880	2,650	1,160	886	4,980	1,840	1,040	5,100	5,140	2,760
6	2,580	2,590	1,870	2,470	1,150	795	4,170	1,750	1,110	2,420	3,090	2,670
7	2,550	2,670	1,870	2,190	1,170	802	15,890	1,700	1,080	2,300	3,040	2,510
8	2,510	2,600	1,840	1,890	1,150	805	14,760	1,700	1,070	1,860	2,860	2,360
9	2,460	2,470	1,870	1,660	1,090	780	10,770	1,620	1,060	42,380	2,790	2,280
10	2,540	2,350	1,870	1,550	1,140	812	11,900	1,600	1,020	69,220	2,780	2,210
11	2,580	2,500	1,890	1,570	1,100	791	11,900	1,410	988	52,270	2,770	2,100
12	2,430	2,500	1,970	1,720	1,560	745	9,290	1,710	953	21,580	2,650	2,150
13	2,410	2,330	1,880	1,950	5,830	678	17,370	2,120	939	17,830	2,650	2,150
14	2,710	2,410	2,840	1,940	2,860	770	16,560	1,920	1,060	16,740	2,900	2,080
15	3,270	2,820	4,310	1,780	1,610	865	11,650	1,765	883	18,120	2,840	2,100
16	2,450	2,840	2,360	1,630	1,250	773	9,570	1,560	816	14,370	2,710	2,070
17	2,400	2,590	2,270	1,560	1,190	717	7,590	1,490	802	10,240	2,540	2,090
18	2,400	2,410	1,960	1,530	1,130	812	5,760	1,370	777	8,860	2,440	2,030
19	3,090	2,230	2,040	1,440	1,060	1,090	5,120	1,260	780	7,420	2,530	2,030
20	3,640	2,310	1,760	1,550	1,070	657	5,580	1,170	816	6,820	2,560	2,020
21	3,400	2,580	1,700	16,490	1,040	685	4,700	1,150	819	6,320	2,790	2,010
22	3,020	2,500	1,630	7,450	1,000	713	4,200	1,160	773	5,400	2,850	2,000
23	2,720	2,240	1,660	5,510	968	678	3,990	1,130	752	5,120	2,840	1,950
24	2,650	2,150	1,670	2,890	960	671	3,600	1,080	756	4,800	2,570	1,970
25	2,580	2,120	1,550	2,580	960	636	3,710	1,180	780	4,480	2,510	2,030
26	2,450	2,090	1,480	3,350	943	611	3,600	1,310	858	4,030	2,710	2,190
27	2,540	2,070	1,450	2,650	922	593	3,090	1,440	1,050	3,740	2,780	2,190
28	2,560	1,990	1,520	2,110	879	678	2,910	1,180	957	3,710	2,850	2,130
29	2,510	1,510	1,810	858	862	2,890	1,080	2,360	3,880	2,840	2,000	
30	2,430	1,550	1,600	837	943	2,660	996	4,697	3,920	2,760	2,100	2,090
31	2,350	2,500	794			2,500	1,050		3,600			
Sum:		67,790		94,510		23,618		47,261		355,570		69,380
	91,110		60,670		11,111		201,777		77,105		95,460	

Current Year 1945			Period 1924 - 1945						
Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total	Acre Feet		
	High	Low	Day	Day			Normal	Maximum	Minimum
Jan.	5.71	4.86	20	3,990	2	2,150	2,620	160,900	186,372
Feb.	5.28	4.72	15	2,960	28	1,940	2,420	134,500	153,269
Mar.	7.61	4.33	31	10,100	27	1,410	1,960	120,300	150,166
Apr.	10.37	4.33	21	26,900	19	1,390	3,150	187,500	146,401
May	6.86	3.74	13	7,450	31	766	1,330	81,540	276,754
June	4.63	3.54	19	1,680	27	572	787	46,850	856,000
July	10.24	3.81	15	25,200	5	848	6,610	406,200	1,357,000
Aug.	4.99	4.00	1	2,480	30	996	1,580	93,740	304,517
Sept.	7.02	3.67	30	8,050	22	720	1,110	65,840	638,306
Oct.	22.80	4.56	10	79,800	8	1,710	11,470	705,300	505,226
Nov.	5.51	4.95	1	3,500	18	2,370	2,850	169,400	1,951,000
Dec.	5.25	4.66	4	2,960	23	1,880	2,240	137,600	570,800
Yearly	22.80	3.54		79,800		572	3,190	2,309,670	3,347,355
								7,017,110	1,862,800

RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and two reinforced concrete Cipolletti weirs, with a combined capacity of 636 second feet. These weirs were constructed in December 1938. This station is 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 946.1 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 91 meter measurements during the year and the weir discharge records. Computations by shifting channel methods for flows greater than 636 second feet. 1945 records good. Records available: 1901-1912; 1923-1945.

REMARKS: This station was entirely rebuilt by the Mexican Section of this Commission in December 1932, and an automatic water-stage recorder was installed. Prior to 1932, 3 gage readings were made here daily. The flow of the Rio Salado was greatly modified by the Don Martin reservoir, which forms a part of the irrigation system of the Rio Salado, 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.

CORRECTION: See page 52 of this Water Bulletin for daily discharges for the year 1925. These supersede the monthly figures for 1925 in Water Bulletins 5 and 6.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	119	97.8	72.4	1,314	350	18.4	28.6	43.4	183	4,380	103	40.6
2	119	97.8	69.2	322	156	20.5	28.6	35.7	313	1,480	97.8	40.6
3	119	92.9	66.0	130	88.3	22.2	26.5	31.0	410	837	92.9	40.6
4	119	92.9	75.6	108	69.2	24.4	24.4	26.4	227	4,520	84.1	38.2
5	119	92.9	75.6	103	60.0	26.5	22.2	22.2	149	8,050	79.8	35.7
6	124	88.3	79.8	79.8	57.2	26.5	22.2	20.4	97.8	5,540	79.8	35.7
7	119	84.1	75.6	66.0	54.4	24.4	20.5	18.4	72.4	1,900	75.6	38.2
8	113	79.8	69.2	63.2	54.4	22.2	18.4	18.4	57.2	1,380	75.6	38.1
9	109	75.6	69.2	57.2	48.7	22.2	18.4	16.6	45.9	1,240	72.4	38.2
10	108	75.6	69.2	57.2	45.9	22.2	16.6	14.5	38.1	897	69.2	38.2
11	109	79.8	72.4	60.0	45.9	20.5	16.6	14.4	31.1	1,500	66.0	38.2
12	108	190	72.4	57.2	43.4	20.5	14.5	14.5	28.6	1,110	66.0	38.2
13	103	286	119	51.6	43.4	18.4	14.5	12.7	149	657	63.2	38.1
14	109	169	84.0	51.6	40.6	18.4	14.5	12.7	108	509	60.0	38.2
15	108	124	75.6	48.7	35.7	16.6	12.7	11.3	84.1	431	57.2	40.6
16	109	103	72.4	45.9	33.2	14.5	254	9.9	54.4	371	54.4	40.6
17	108	124	72.4	43.4	26.5	12.7	97.8	9.9	169	331	51.6	40.6
18	109	114	69.2	43.4	24.4	12.7	54.4	8.4	130	295	51.6	43.4
19	109	103	69.2	40.6	20.5	433	35.7	6.7	88.3	269	51.6	43.4
20	130	92.9	66.0	583	18.4	143	512	6.7	66.0	252	51.6	43.4
21	136	92.9	60.0	6,816	18.4	63.2	773	6.7	51.6	228	48.8	43.4
22	119	84.1	57.2	1,582	57.2	45.9	431	6.7	40.6	197	43.4	43.4
23	113	75.6	57.2	509	38.2	33.2	331	6.7	35.7	183	38.1	45.9
24	103	72.4	54.4	252	26.5	28.6	410	257	31.1	175	35.7	45.9
25	97.8	69.2	51.6	149	38.2	31.1	286	265	24.4	162	35.7	48.7
26	97.8	72.4	48.7	124	35.7	33.2	269	156	20.5	149	35.7	45.9
27	97.8	72.4	48.7	108	28.6	33.2	295	75.6	18.4	136	38.1	45.9
28	92.9	72.4	48.7	92.9	22.3	33.2	162	183	16.6	124	40.6	43.4
29	92.9	48.7	79.8	18.4	31.1	103	124	22.3	119	40.6	38.1	
30	92.9	48.7	403	16.6	31.1	75.6	97.8	1,716	119	40.6	40.6	
31	92.9	1,452	10.452	16.6	57.2	119	113					
Sum			2,874.8	13,441.5	1,612.8	1,283.6	1,651.7	37,954	1,268.1			
			3,406.0	3,470.3			4,445.9	4,479.1	1,800.7			

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	Day			Normal	Maximum	Minimum
Jan.	2.89	2.59	#	143	#	92.9	110	6,760	16,741
Feb.	3.61	2.40	13	313	#	69.2	103	5,700	11,748
Mar.	8.50	2.17	31	4,450	#	48.7	112	6,880	12,064
Apr.	11.29	2.07	21	10,100	#	40.6	448	26,660	12,996
May	4.53	1.67	1	611	30	14.5	52.0	3,200	43,663
June	4.66	1.61	19	671	18	11.3	42.8	2,550	38,388
July	6.56	1.31	20	2,150	15	0	143	8,820	20,457
Aug.	6.50	1.48	24	2,080	#	5.3	53.3	3,280	100,000
Sept.	8.46	1.71	30	5,010	28	16.6	149	8,880	27,635
Oct.	10.47	2.69	5	8,580	31	108	1,220	75,280	96,572
Nov.	2.69	2.00	1	108	#	35.7	60.0	3,570	673,070
Dec.	2.17	2.00	25	48.7	#	35.7	40.9	2,520	248,390
Yearly	11.29	1.31		10,100		0	213	154,100	399,702
								1,350,260	101,770

* Partly estimated # Various days of the month

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, 1.4 miles below the confluence of the Rio Salado with the Rio Grande, and 947.5 river miles below the American Dam at El Paso, Texas. Zero of the gage is at mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 57 meter measurements during the year, 45 by the United States and 12 by the Mexican Section. Computations by shifting channel methods. 1945 records good. Records available: January 1932 to December 31, 1945.

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 261,000 second feet. (See Special Flood Report 1932, by the United States Section of this Commission.) The lowest flow recorded was on June 29, 1945, when the extreme gage height was 219.28 feet and the extreme flow 639 second feet.

CORRECTION: Corrections to the September 1941 record will be found on page 18 of this Water Bulletin.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*2,480	2,450	2,090	5,700	2,060	838	1,000	2,560	1,430	8,470	3,720	2,780
2	2,420	2,460	2,110	8,250	1,730	812	1,110	2,500	1,500	4,900	3,620	2,750
3	2,380	2,470	2,080	4,480	1,560	1,050	1,020	2,320	1,670	3,700	3,600	2,830
4	2,410	2,540	2,000	3,000	1,500	1,040	1,260	2,100	1,430	7,570	3,590	2,750
5	2,570	2,610	1,980	2,600	1,370	1,160	1,140	1,970	1,270	10,800	3,460	2,800
6	2,640	2,660	1,990	2,790	1,310	1,090	4,710	1,930	1,230	9,170	3,260	2,800
7	2,750	2,690	1,920	2,590	1,280	860	7,190	1,800	1,300	4,400	3,280	2,680
8	2,770	2,710	1,970	2,360	1,240	856	17,300	1,690	1,270	3,460	3,210	2,650
9	2,720	2,620	1,930	2,050	1,200	893	14,600	1,710	1,190	19,600	3,040	2,530
10	2,680	2,640	1,910	1,790	1,180	876	10,900	1,650	1,190	67,400	3,030	2,530
11	2,700	2,660	1,820	1,650	1,210	879	13,200	1,580	1,130	62,100	2,940	2,350
12	2,760	3,220	1,800	1,650	1,200	882	10,400	1,520	1,070	42,100	2,860	*2,160
13	2,680	3,000	4,240	1,740	2,380	866	10,500	1,720	1,590	25,600	2,780	2,230
14	2,720	2,620	2,470	1,820	4,940	840	20,800	2,170	1,540	18,800	2,820	2,180
15	3,350	2,590	3,500	1,950	2,770	816	14,900	1,970	1,290	15,500	2,930	2,200
16	3,340	2,840	3,350	1,850	1,810	857	11,700	1,820	1,100	13,300	2,870	2,210
17	2,690	2,890	2,470	1,760	1,460	908	9,490	1,630	1,120	11,600	2,790	2,180
18	2,640	2,740	2,230	1,620	1,360	834	7,260	1,560	1,130	10,300	2,690	2,160
19	2,630	2,650	1,930	1,520	1,260	2,750	5,620	1,460	1,060	8,840	2,510	2,090
20	3,320	2,530	1,910	4,900	1,180	2,550	10,800	1,400	984	7,730	2,580	2,130
21	3,760	2,560	1,710	19,000	1,160	1,200	10,300	1,290	937	7,180	2,580	2,120
22	3,100	2,670	1,660	15,000	1,170	923	5,840	1,280	935	6,520	2,820	2,150
23	3,060	2,650	1,640	6,760	1,130	770	4,700	1,270	895	5,540	2,790	2,130
24	2,860	2,510	1,640	4,580	1,070	766	4,440	1,900	822	5,260	2,780	2,150
25	2,810	2,370	1,650	2,960	1,020	792	3,990	2,250	811	4,830	2,640	2,140
26	2,720	2,330	1,570	2,890	1,020	760	3,970	2,210	818	4,610	2,550	2,220
27	2,590	2,220	1,500	3,060	1,010	719	3,910	1,560	828	4,210	2,730	2,380
28	2,650	2,130	1,440	2,760	1,020	699	3,380	1,700	1,090	4,040	2,810	2,320
29	2,630	1,460	2,280	970	655	3,150	1,470	1,120	3,990	2,900	2,290	
30	2,570	1,470	2,120	906	781	3,020	1,360	4,760	3,850	2,880	2,220	
31	2,490	3,210		867		2,720	1,350		3,880		2,260	
Sum	73,030	64,650	117,460	45,343	29,722		54,680			407,250	89,020	73,370
	86,190				224,320		38,508					

Month	Current Year 1945			Period 1932-1945						
	Extreme Gage Feet		Day	Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low		High	Low			Normal	Maximum	Minimum
Jan.	221.32	220.70	21	4,000	3	2,340	2,780	171,000	204,555	* 484,450
Feb.	221.11	220.55	12	3,460	28	2,090	2,610	145,000	167,156	* 361,350
Mar.	221.92	220.14	13	6,050	28	1,400	2,090	128,000	174,291	292,000
Apr.	226.46	220.19	21	26,600	19	1,500	3,920	233,000	156,569	233,000
May	222.11	219.56	14	6,780	31	847	1,460	89,900	310,561	682,000
June	221.24	219.28	19	3,970	29	639	911	59,000	338,676	1,517,000
July	225.57	219.60	14	22,600	1	939	7,240	445,000	365,000	1,238,000
Aug.	221.87	219.90	24	5,920	25	1,250	1,760	108,000	328,599	* 721,000
Sept.	222.88	219.44	30	9,870	24	784	1,280	76,400	868,898	2,895,330
Oct.	235.73	221.02	10	72,100	9	3,200	13,100	808,000	666,053	2,396,440
Nov.	221.23	220.74	1	3,800	19	2,470	2,970	177,000	258,681	748,020
Dec.	220.95	220.51	5	2,900	25	2,060	2,370	146,000	213,511	591,380
Yearly	235.73	219.28		72,100		659	3,570	2,586,300	4,052,550	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 reinforced concrete weir for measurement of flows up to 177 second feet, located about 3.1 miles from the confluence of the Rio Alamo with the Rio Grande and .6 mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Contaró". This stream enters the Rio Grande 984.6 river miles below the American Dam near El Paso, Texas. Zero of gage is 187.00 feet above mean sea level, United States Coast and Geodetic Survey datum.

RECORDS: Based upon 7 meter measurements at high flows during the year and the weir discharge tables at low flows. High flow computations by shifting channel methods. 1945 records good. Records available: July 1, 1923, to December 1945.

REMARKS: The flow of this spring-fed stream is modified by small storage and irrigation diversions above this station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. September 7, 1933, 76,600 sec. ft. with a gage height of 26.90 ft.; Min. Sometimes dry.

Average	Daily	Max.	Sept. 7, 1933,	42,020 sec. ft.	Min.	Sometimes dry.
Average	Monthly	Max.	Sept. 1933,	3,200 sec. ft.	Min.	Sometimes dry.
Average	Yearly	Max.	1944,	505 sec. ft.	Min.	1929, 14.1 sec. ft.
Average of Two Successive Years:	Max.	1932-1933,	339 sec. ft.	Min.	1936-1937, 64.6 sec. ft.	
Average of Three Successive Years:	Max.	1926-1928,	270 sec. ft.	Min.	1935-1937, 72.0 sec. ft.	
Average of Four Successive Years:	Max.	1925-1928,	271 sec. ft.	Min.	1934-1937, 77.0 sec. ft.	
Average of Five Successive Years:	Max.	1924-1928,	268 sec. ft.	Min.	1934-1938, 81.6 sec. ft.	
Average of Ten Successive Years:	Max.	1924-1933,	233 sec. ft.	Min.	1934-1943, 112 sec. ft.	
Average of Twenty-two Years:	1924-1945,	183 sec. ft.				

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	71.3	43.8	51.2	254	47.3	10.6	4.2	583	343	59.0	27.9	27.9
2	67.1	47.3	51.2	126	51.2	10.6	16.6	40.6	47.3	40.6	27.9	27.9
3	51.2	43.8	54.8	51.2	37.1	10.6	13.1	13.1	15.9	512	27.9	27.9
4	47.3	47.3	51.2	40.6	31.4	10.6	6.0	6.0	8.1	7,451	27.9	27.9
5	47.3	47.3	47.3	33.9	31.4	10.6	6.0	4.2	4.2	2,726	27.9	27.9
6	51.2	47.3	47.3	33.9	31.4	8.1	6.0	2.5	4.2	798	27.9	27.9
7	54.8	43.8	43.8	33.9	27.9	8.1	6.0	2.5	2.5	352	27.9	33.9
8	47.4	43.8	40.6	33.9	27.9	6.0	4.2	2.5	1.1	183	27.9	33.9
9	40.6	40.6	40.6	33.9	27.9	6.0	2.5	2.5	0	244	27.9	33.9
10	40.6	43.8	40.6	33.9	31.4	6.0	2.5	2.5	4.2	115	27.9	33.9
11	40.6	43.8	43.8	31.4	59.0	4.2	2.5	2.5	1.1	89.7	27.9	33.9
12	40.6	104	40.6	31.4	795	4.2	2.5	1.1	0	71.3	27.9	33.9
13	40.6	94.3	219	31.4	148	4.3	1.1	1.1	2,673	63.2	27.9	33.9
14	45.8	63.2	54.8	27.9	51.2	4.2	1.1	0	335	51.2	27.9	33.9
15	47.4	51.2	51.2	27.9	37.1	4.2	1.1	0	43.8	43.8	27.9	33.9
16	43.8	47.3	47.3	27.9	31.4	4.3	0	0	18.7	37.1	24.7	33.9
17	43.8	47.3	47.3	27.9	27.9	2.5	0	0	10.6	33.9	24.7	33.9
18	40.6	47.3	47.3	27.9	27.9	2.5	0	0	6.0	37.1	24.7	33.9
19	40.6	51.2	51.2	27.9	24.7	2.5	0	0	4.2	37.1	24.7	33.9
20	37.1	54.8	43.8	33.9	21.5	155	51.2	0	2.5	33.9	27.9	33.9
21	40.6	54.8	37.1	1,268	21.5	56.5	102	0	1.1	33.9	27.9	33.9
22	40.6	54.8	37.1	678	21.5	31.4	67.1	0	1.1	31.4	24.7	31.4
23	40.6	54.8	37.1	159	18.7	13.1	47.3	0	1.1	31.4	24.7	31.4
24	40.6	51.2	40.6	59.0	15.9	8.1	297	28.6	1.1	31.4	24.7	31.4
25	40.6	51.2	37.1	40.6	15.9	6.0	143	58.3	1.1	31.4	24.7	31.4
26	37.1	47.3	33.9	33.9	15.9	6.0	18.7	31.4	1.1	31.4	24.7	31.4
27	40.6	47.3	33.9	31.4	15.9	4.3	8.1	21.5	0	31.4	27.9	31.4
28	40.6	51.2	33.9	31.4	13.1	4.2	4.2	8.1	0	31.4	27.9	27.9
29	40.6	33.9	31.4	10.6	4.2	4.2	4.2	4.2	6.0	31.4	31.4	27.9
30	40.6	37.1	104	13.1	4.3	2.5	16.6	99.2	31.4	31.4	27.9	27.9
31	43.8	282			10.6	2.5	371		31.4			27.9
Sum	1,465.8		3,407.4		413.2		1,203.8		13,326.8		975.9	
	1,384.0		1,758.6		1,741.3		823.2		3,637.2		815.2	

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Acre Feet			
	High	Low	Day	Day	Day			Normal	Maximum	Minimum	
Jan.	2.10	1.80	1	71.3	#	37.1	44.6	2,750	5,529	34,920 0	
Feb.	2.69	1.84	12	165	9	40.6	52.4	2,910	3,781	25,550 67.2	
Mar.	5.54	1.74	31	2,160	#	31.4	56.7	3,490	3,530	19,830 64.0	
Apr.	5.09	1.67	21	1,790	20	24.7	114	6,760	6,449	26,710 86.0	
May	5.18	1.51	12	1,820	31	10.6	56.2	3,450	16,585	* 137,000 209	
June	4.36	1.38	20	1,130	#	2.5	13.8	820	15,343	83,240 0	
July	3.44	2.4	519	#	0	26.6	1,630	9,290	37,590	255 0	
Aug.	4.82	1	1,570	#	0	38.8	2,390	16,469	194,200	* 135 0	
Sept.	7.84	1.31	5,260	#	0	121	7,210	30,928	190,520	* 135 0	
Oct.	12.24	1.71	4	11,800	31	27.9	430	26,430	15,922	51,620 0	
Nov.	1.74	1.67	#	31.4	#	24.7	27.2	1,620	4,446	21,940 0	
Dec.	1.80	1.67	#	37.1	#	24.7	31.5	1,940	4,516	* 15,000 124	
Yearly	12.24			11,800		0	84.8	61,400	132,788	366,826	11,908.7

* Partly estimated # Various days of month

RIO GRANDE AT ROMA STATION

DESCRIPTION: Water-stage recorder at international bridge between Roma, Texas, and San Pedro, Tamaulipas, and 992.0 river miles below the American Dam at El Paso, Texas, and 14.9 river miles above the confluence of the Rio San Juan from Mexico. Zero of gage is 145.93 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based upon 184 meter measurements, 176 by the Mexican and 8 by the United States Section, during the year from bridge. Computations by shifting channel methods. 1945 records good. Records available: May 1900 and September 1900 through December 1913; October 1914; September and October 1917; September and October 1919; August and September 1920; June 1922 and November 1922 through December 1945; also flood peak discharges for June 1899 and April 1900. Gage height records are available for January, February and March 1914.

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 begun 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. 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 the United States Section of this Commission.) The lowest flow ever recorded was on June 30, 1945, when the extreme flow has 618 second feet at a stage of -1.02 feet. Records of other extreme flows may be found in previous Water Bulletins.

CORRECTIONS: See pages 50 and 51 of this Water Bulletin for flood flows and corrected flows for the years 1899 through 1926.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,580	2,460	2,000	7,240	2,170	809	685	3,370	1,690	8,160	3,880	2,620
2	2,510	2,540	2,040	9,290	1,980	742	872	2,650	1,370	6,390	3,640	2,580
3	2,480	2,670	2,120	6,220	1,730	752	1,010	2,310	1,420	4,560	3,490	2,620
4	2,460	2,570	2,090	5,370	1,560	968	947	2,130	1,450	10,980	3,530	2,670
5	2,560	2,540	1,980	2,640	1,450	929	1,110	1,970	1,230	13,840	3,570	2,650
6	2,670	2,660	1,940	2,390	1,370	1,059	1,550	1,910	1,110	11,440	3,300	2,750
7	2,580	2,780	1,890	2,570	1,300	989	4,940	1,920	1,130	6,360	2,960	2,700
8	2,720	2,770	1,880	2,400	1,240	830	15,570	1,880	1,190	4,100	2,990	2,560
9	2,640	2,690	1,950	2,180	1,150	791	15,120	1,690	1,150	7,800	2,860	2,350
10	2,550	2,630	1,930	1,940	1,150	784	11,510	1,670	1,070	59,330	2,790	2,190
11	2,560	2,550	1,910	1,750	1,170	798	13,670	1,540	1,070	65,920	2,770	2,140
12	2,660	2,720	1,820	1,640	1,710	766	12,430	1,470	1,020	49,090	2,820	2,090
13	2,670	3,190	3,570	1,660	1,560	749	9,250	1,410	2,760	21,540	2,760	2,040
14	2,610	2,940	6,430	1,790	3,990	738	18,400	1,560	2,420	19,030	2,730	2,100
15	2,760	2,430	2,580	1,860	3,880	710	16,030	1,910	1,510	18,150	2,760	2,110
16	3,320	2,780	4,730	1,880	2,500	703	12,930	1,730	1,230	17,230	2,740	2,120
17	2,850	2,950	3,410	1,740	1,610	717	10,310	1,620	1,050	13,810	2,750	2,140
18	2,600	2,860	2,490	1,590	1,290	752	8,190	1,470	1,020	10,420	2,680	2,090
19	2,660	2,660	2,340	1,620	1,220	749	6,850	1,390	992	8,860	2,600	2,040
20	2,800	2,540	2,000	1,490	1,180	2,846	9,390	1,320	943	7,450	2,440	2,010
21	3,600	2,420	1,980	20,550	1,110	2,270	13,240	1,380	894	6,820	2,450	2,020
22	3,710	2,450	1,780	21,260	1,130	1,180	6,990	1,220	858	6,360	2,500	2,010
23	3,290	2,480	1,790	7,840	1,110	766	5,020	1,150	844	5,720	2,780	2,000
24	3,000	2,480	1,660	5,920	1,020	734	5,050	1,190	809	5,330	2,830	1,950
25	2,850	2,380	1,630	5,510	932	763	4,200	2,710	752	4,940	2,800	1,970
26	2,820	2,280	1,600	2,790	890	706	3,810	3,100	738	4,700	2,640	1,990
27	2,710	2,150	1,520	3,370	915	689	3,890	1,720	738	4,480	2,580	2,100
28	2,600	2,050	1,480	3,260	940	667	3,530	1,410	735	4,240	2,640	2,260
29	2,600	1,490	2,660	971	646	5,050	1,520	954	4,240	2,700	2,250	
30	2,580	1,450	2,250	932	618	2,950	1,330	1,100	4,100	2,730	2,190	
31	2,520	3,020	880	1,510	2,910	1,510	3,990	1,510	3,990	2,100		
Sum	72,600	130,680	46,040	27,220	55,160	417,380	69,410					
	85,620	70,500	225,384	35,247	86,810							

Current Year 1945

Period 1924-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Foot	Total	Acre Feet		
	High	Low	Day	High	Low			Acre Foot	Normal	Maximum
Jan.	1.94	.82	22	3,990	4	2,430	2,760	169,800	217,004	467,400
Feb.	1.54	.52	13	3,340	28	2,010	2,590	144,000	177,224	349,000
Mar.	4.79	-.07	13	9,710	29	1,410	2,270	139,800	179,854	325,500
Apr.	10.24	0	21	29,660	20	1,460	4,360	259,200	173,797	285,000
May	3.12	-.69	14	6,040	31	848	1,490	91,320	353,341	706,300
June	1.80	-1.02	20	3,990	30	618	.907	53,990	372,570	1,586,000
July	8.43	-1.02	14	22,180	1	646	7,270	447,000	346,906	1,217,000
Aug.	1.84	-.49	1	4,310	24	971	1,780	109,400	353,573	904,000
Sept.	2.72	-.92	13	5,690	28	735	1,170	69,900	773,870	3,048,000
Oct.	19.55	.36	11	67,450	1	2,210	13,460	827,900	614,652	2,372,000
Nov.	1.84	.69	1	3,990	21	2,370	2,890	172,200	259,721	736,000
Dec.	1.05	.33	6	2,790	25	1,940	2,240	137,700	218,587	565,100
Yearly	19.55	-1.02		67,450		618	3,620	2,622,210	4,041,099	8,098,000
										2,227,000

* Partly estimated

RIO SAN JUAN BELOW AZUCAR DAM

DESCRIPTION: Azucar Dam is located on the Rio San Juan 12.4 miles upstream from the confluence with the Rio Grande. This confluence being 1,007.4 miles along the Rio Grande below the American Dam at El Paso, Texas. The zero of the reservoir gage at Azucar Dam is 7.64 feet above sea level, United States Coast and Geodetic Survey datum. The flow below this dam consists of small seepage through the bank near the dam, which is measured by a weir; leakage and releases from openings in the spillway, which is measured by current meter about 1,000 feet downstream; and spills from the spillway, which are computed from the spillway discharge curves.

RECORDS: Based upon weir discharges, current meter measurements, and spillway discharge curves, all by the Mexican National Irrigation Commission. Also, upon records of flow by the International Boundary and Water Commission showing simultaneous differences of flow in the Rio Grande at Roma Station, just above the Rio San Juan confluence, and at Rio Grande City Station, just below this confluence. 1945 records good. Records available: March 10, 1943 (the date when the diversion tunnel through the dam was closed), to December 31, 1945.

REMARKS: During 1945, from January 1 to March 17, and from October 4 to November 17, water was passing over the spillway and on February 27 and 28, May 4 and 5, and from November 5 to December 31, water was released through openings in the spillway in order to lower the lake level sufficiently to permit a continuation of spillway construction. In order to alleviate a shortage of irrigation water on the United States side of the Lower Rio Grande Valley, water was released from Azucar Reservoir at intervals and in quantities as follows: April 16-26, 9,081 acre feet; May 21-23, 2,058 acre feet; May 31 to June 21, 18,053 acre feet; June 29 to July 6, 4,452 acre feet; August 22-27, 3,540 acre feet; September 25 to October 1, 4,971 acre feet, with a total for the year of 42,158 acre feet. All of the water referred to above and tabulated below, reached the Rio Grande.

CORRECTION: The period during which 19,457 acre feet of water was released from the reservoir for use on the United States side, as shown in Water Bulletin No. 14 is in error. The correct period is from August 12 to 21.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	625	650	227	4.2	4.9	505	360	3.9	3.9	267	636*	650
2	650	749	250	4.2	5.3	494	357	3.9	3.9	3.5	671*	650
3	650	745	250	4.2	4.9	491	352	3.9	3.9	3.5	752*	646
4	646	745	250	4.2	323	487	350	3.9	3.9	5,650	675*	646
5	720	745	250	4.2	350	480	336	3.9	4.2	17,940 *	706*	643
6	791	650	250	4.2	5.3	477	155	3.9	3.9	16,810 *	1,380	636
7	812	650	250	4.2	5.3	466	42	3.9	3.9	15,540 *	1,320	639
8	791	558	250	4.2	5.3	456	42	4.2	3.9	12,500 *	1,240	636
9	791	558	206	4.2	5.3	452	42	4.2	3.9	11,550	1,070	636
10	742	558	157	4.2	5.3	445	42	4.2	4.2	8,830 *	957	636
11	721	558	133	4.2	5.3	438	42	4.2	3.9	6,710 *	922	632
12	650	558	133	4.2	5.3	434	42	4.2	3.9	7,770	886	632
13	650	434	133	4.2	5.3	427	42	3.9	3.9	6,750	812	625
14	721	406	125	4.2	5.3	424	42	3.9	3.9	3,920 *	742	625
15	745	406	87.9	4.2	4.9	410	42	3.9	4.2	3,740 *	742	629
16	816	406	48.0	120	4.9	406	3.9	3.9	3.9	4,520	703	622
17	957	406	16.2	280	4.9	392	4.2	3.9	3.9	3,780	738	622
18	992	406	4.6	278	4.9	392	3.9	3.9	3.9	3,460	703	618
19	957	339	4.2	276	4.9	385	4.2	3.9	3.9	3,110	696	618
20	886	339	4.2	273	4.9	381	3.9	3.9	4.2	2,790	692	618
21	816	339	4.2	406	182	164	4.2	3.9	3.9	2,580	692	614
22	816	272	4.2	639	533	4.6	3.9	3.9	3.9	2,400	689	614
23	791	249	4.2	646	336	4.6	4.2	3.9	3.9	2,020	685	614
24	745	227	4.2	646	4.9	4.6	3.9	3.9	3.9	1,910	675	611
25	745	205	4.2	639	4.9	4.6	4.2	3.9	3.9	1,060 *	675	607
26	720	227	4.2	424	4.9	4.6	3.9	3.9	3.9	706 *	667	607
27	720	260	4.2	4.2	4.9	4.2	4.2	4.2	4.2	777 *	660	611
28	720	237	4.2	4.2	5.3	4.6	3.9	3.9	3.9	812 *	660	604
29	650	4.2	4.2	4.2	4.9	73.1	3.9	3.9	3.9	417	742 *	653
30	650	4.2	4.2	4.2	4.9	295	3.9	3.9	4.13	706 *	653	600
31	579				179		3.9	3.9	600 *		597	
Sum		12,882		4,706.8		9,405.9		1,906.0		149,957		19,338
23,265		3,075.3		2,029.9		2,012.0		2,362.8		23,752		

Current Year 1945

Month	Extreme Gage Feet **			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High		Low	High	Low			Average	Maximum	Minimum
	High	Low	Day	Day	Day			Average	Maximum	Minimum
Jan.	230.61	230.35	18	992	31	579	750	16,150	23,202	46,150
Feb.	230.45	230.05	2	749	25	205	460	25,550	12,902	25,550
Mar.	230.12	229.66	#	250	#	4.2	99.2	6,100	2,126	6,100
Apr.	231.13	229.46	#	646	#	4.2	157	9,340	3,198	9,340
May	230.97	230.15	22	533	#	4.9	65.5	4,030	2,593	4,030
June	230.12	228.25	1	505	#	4.6	314	18,660	20,017	* 41,390
July	228.18	227.46	1	360	#	3.9	64.9	3,990	25,130	* 66,820
Aug.	228.74	227.72	23	360	#	3.9	61.5	3,780	187,243	* 557,800
Sept.	229.46	228.67	#	1424	#	3.9	78.8	4,690	219,867	* 653,300
Oct.	238.65	228.54	5	* 17,940	#	3.5	4,840	297,400	215,033	* 333,900
Nov.	233.99	232.81	6	1,380	1	636	792	47,110	32,775	* 50,270
Dec.	232.77	231.76	#	650	31	597	624	38,360	16,227	* 38,360
Yearly	238.65	227.46		17,940		3.5	698	505,160	760,313	* 1,717,159
										505,160

Various days of the month \$ Mean daily ♦ Period 1944-1945

* Deduced from Roma and Rio Grande City discharges ** Water surface elevation in Azucar Reservoir

RIO GRANDE AT RIO GRANDE CITY STATION

DESCRIPTION: Water-stage recorder, and cable with stand-up cable car and winch, located about 4 miles by river below Rio Grande City, Texas, 3.7 miles northeast of Camargo, Tamaulipas, 7.9 miles below the confluence of the Rio San Juan with the Rio Grande, and 1,015.3 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 98 meter measurements during the year, 87 by the United States and 11 by the Mexican Section. Computations by shifting channel methods. 1945 records good. Records available: May, June, and October 1914; September 1916, September and October 1917; October 1918; September and October 1919; August and September 1920; June 1922; September 1923; January 1924 through December 1945.

REMARKS: When the water at this station rises above a gage height of about 149.20 feet, water overflows the left river bank beyond the station cable, but such water is measured. The river flow here is greatly modified by many irrigation diversions, drainage returns, and large reservoirs in the United States and Mexico.

CORRECTIONS: See pages 51 and 52 of this Water Bulletin for flood flows and corrected flows for the years 1914 to 1926.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,240	3,390	2,580	6,720	2,240	984	865	2,950	1,700	3,650	4,680	3,710
2	3,180	3,400	2,550	7,960	2,240	1,250	1,050	2,980	1,700	7,550	4,510	3,640
3	3,160	3,460	2,510	8,330	1,950	1,230	1,330	2,640	1,440	6,510	4,350	3,550
4	3,130	3,490	2,610	4,890	1,730	1,250	1,280	2,510	1,550	10,500	4,310	3,570
5	3,230	3,530	2,550	3,320	1,940	1,430	1,280	2,280	1,440	27,000	4,380	3,470
6	3,430	3,490	2,410	2,820	1,780	1,350	1,370	2,090	1,340	33,000	4,480	3,330
7	3,440	3,560	2,350	2,750	1,460	1,560	4,030	2,020	1,240	26,700	4,520	3,150
8	3,420	3,580	2,330	2,680	1,390	1,300	9,040	2,910	1,270	19,700	4,420	3,090
9	3,380	3,580	2,350	2,490	1,390	1,170	15,200	1,910	1,280	17,300	4,380	3,210
10	3,270	3,460	2,310	2,240	1,270	1,170	12,800	1,780	1,210	49,000	4,180	3,170
11	3,220	3,320	2,270	1,950	1,220	1,180	11,600	1,690	1,180	67,500	4,030	3,140
12	*3,240	*3,270	2,190	1,890	1,270	1,150	15,100	1,610	1,160	65,800	3,950	3,100
13	*3,290	*3,610	2,200	1,770	2,020	1,140	9,420	1,550	2,280	35,400	3,890	3,000
14	*3,340	*3,610	6,800	1,760	1,900	1,120	15,400	1,520	3,990	22,300	3,800	2,960
15	*3,380	3,260	5,230	1,780	4,450	1,090	17,700	1,900	2,100	22,000	3,730	2,920
16	3,980	3,170	3,610	1,810	3,170	1,050	15,700	1,880	1,320	22,100	3,780	2,860
17	4,400	3,430	4,110	1,990	2,180	1,030	11,100	1,750	1,220	19,300	3,720	2,820
18	3,940	3,490	2,930	2,040	1,560	1,070	9,100	1,640	1,080	14,300	3,620	2,830
19	3,830	3,400	2,500	1,900	1,370	1,070	7,000	1,560	1,080	12,100	3,490	2,790
20	3,750	3,280	2,290	1,740	1,260	1,870	7,270	1,480	1,020	10,300	3,440	2,760
21	4,190	3,140	2,100	15,400	1,150	3,870	13,600	1,430	944	9,080	3,300	2,740
22	4,720	2,880	2,050	2,500	1,410	2,170	8,820	1,370	874	8,490	3,160	2,760
23	4,420	2,870	1,840	12,500	1,630	1,570	5,660	1,380	901	7,950	3,400	2,760
24	4,070	2,770	1,830	7,530	1,390	1,050	5,180	1,510	856	6,990	3,480	2,740
25	3,820	2,740	1,720	5,900	1,100	870	4,830	2,090	790	6,140	3,550	2,700
26	3,670	2,690	1,760	4,190	997	796	4,270	3,460	805	5,690	3,490	2,720
27	3,590	2,660	1,730	3,310	939	715	4,050	2,810	1,000	5,610	3,460	2,780
28	3,460	2,660	1,680	3,590	955	678	3,850	1,780	1,000	5,420	3,570	2,920
29	*3,380	1,530	3,060	906	652	3,340	1,610	1,020	5,080	3,680	2,960	
30	*3,440	1,460	2,510	884	706	3,010	1,570	1,250	4,930	3,730	2,940	
31	3,440	1,670	819				2,950	1,470	4,760			2,890
Sum	91,190	145,320	49,870	37,541	221,175	61,130	40,040	562,150	116,480	93,980		
	111,450	78,030										

Current Year 1945**Period 1924-1945**

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	High	Low			Normal	Maximum	Minimum
Jan.	126.16	124.89	22	4,790	4	3,110	3,600	221,000	258,366	521,000
Feb.	125.38	124.14	13	3,830	28	2,590	3,260	181,000	203,863	* 368,690
Mar.	127.97	125.18	14	7,670	30	1,430	2,520	155,000	203,580	401,000
Apr.	134.00	125.41	22	26,900	13	1,740	4,840	288,000	194,299	340,000
May	126.35	122.45	15	4,790	31	790	1,610	98,900	412,635	833,000
June	126.24	122.05	21	4,680	29	646	1,250	74,500	497,696	1,737,000
July	132.63	122.26	15	19,400	1	815	7,130	439,000	438,568	1,240,000
Aug.	125.38	122.91	8	3,590	23	1,320	1,970	121,000	431,044	1,280,000
Sept.	126.04	122.12	14	4,780	26	726	1,330	79,400	1,040,122	3,723,800
Oct.	144.79	123.05	11	70,100	1	1,240	18,100	1,115,000	798,235	2,852,270
Nov.	126.90	125.30	1	4,730	22	3,120	3,880	231,000	318,660	829,260
Dec.	125.56	124.55	1	3,740	25	2,680	3,030	186,000	264,866	625,260
Yearly	144.79	122.05		70,100		646	4,410	3,189,800	5,061,927	9,554,530
										2,643,000

* Estimated * Partly estimated

RIO GRANDE AT HIDALGO STATION

DESCRIPTION: Water-stage recorder on the downstream side of the United States end of the Hidalgo-Reynosa international bridge near Hidalgo, Texas, and Reynosa, Tamaulipas, 1,084.8 river miles below the American Dam at El Paso, Texas, and 156.6 river miles from the Gulf of Mexico. Zero of the gage is United States Coast and Geodetic Survey mean sea level 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 1940 through 1945.

REMARKS: On July 28, 1941, the zero of the gage was changed to United States Coast and Geodetic Survey mean sea level datum. At this time, it was found that the elevation previously reported (79.28 feet) in these Water Bulletins as the elevation of the zero of the gage was in error, the correct figure being 79.03 feet. All previously reported gage heights should be corrected accordingly. Another gage (Weather Bureau) at this bridge has a zero elevation of 79.03 feet. When the river at this station reaches stage of about 100.5 feet, or a flow of about 60,000 second feet, 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.

EXTREME FLOWS: The highest recorded stage was in 1909 when 106.92 feet on the present gage was reached. In 1910, 103.85 was reached. These were before the present river bridge and highway embankments were constructed at this point. In 1932 the peak stage was 104.88 and the peak flow was 83,870 second feet. See previous Water Bulletins and Special Flood Report, 1932, by the United States Section of this Commission.

Mean Daily Gage Height in Feet — 1945

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	82.98	83.28	81.84	81.24	82.57	79.02	79.51	81.54	80.57	78.80	84.40	82.95
2	82.93	83.12	81.49	80.02	82.32	80.13	78.30	81.41	80.88	81.59	84.30	83.42
3	82.96	83.22	81.58	86.05	82.00	80.37	77.98	81.56	81.12	85.25	84.16	83.01
4	82.85	83.25	81.99	86.32	* 81.64	79.05	78.80	81.38	80.63	85.24	84.35	82.80
5	83.02	83.23	81.48	84.90	* 81.38	78.94	79.30	81.70	80.30	88.80	83.96	82.69
6	83.23	83.24	81.13	83.39	* 81.28	78.98	80.21	81.02	80.01	93.00	83.67	82.68
7	83.36	83.25	81.01	82.58	* 81.38	79.16	80.59	80.37	80.00	92.50	83.73	82.71
8	83.44	83.25	80.99	82.48	80.88	79.59	81.57	80.56	80.04	91.50	83.98	82.71
9	83.12	83.20	80.91	82.13	80.42	80.82	87.00	81.46	80.06	89.67	83.79	82.91
10	83.24	83.04	80.92	81.72	80.12	80.27	88.86	81.06	79.67	92.12	83.73	82.67
11	83.37	83.14	81.42	81.23	80.15	78.67	87.89	80.58	78.95	97.61	84.07	82.76
12	83.20	83.05	81.12	80.80	80.37	78.32	88.15	89.80	78.94	99.19	83.62	82.92
13	83.15	82.97	80.58	80.47	80.72	78.36	88.00	80.26	79.80	99.68	83.30	82.69
14	83.37	83.06	80.68	80.39	80.33	78.54	86.88	79.71	80.45	97.22	83.17	82.52
15	83.43	83.38	83.68	80.68	80.26	79.98	89.83	79.29	82.02	93.94	82.97	82.68
16	83.40	83.17	83.94	80.24	82.01	80.33	89.53	79.55	82.00	92.86	82.78	82.81
17	83.64	82.98	82.54	80.22	82.32	80.19	88.19	79.93	80.45	92.24	82.94	82.39
18	84.11	83.07	83.07	80.36	81.39	78.55	87.19	79.90	79.25	90.75	83.24	82.01
19	83.90	83.19	82.58	80.42	80.67	77.95	86.20	80.14	78.84	89.46	83.00	82.02
20	83.54	83.07	82.34	81.19	81.10	77.97	85.32	79.51	78.80	88.80	82.66	82.51
21	83.48	82.59	81.26	81.84	80.17	78.21	86.47	79.44	78.77	88.17	82.43	82.57
22	83.71	82.52	80.55	80.34	80.22	81.51	88.36	79.43	79.36	87.57	82.63	82.48
23	84.08	82.46	80.45	91.09	80.50	81.53	86.17	78.74	79.71	87.19	82.71	82.64
24	84.14	82.57	80.31	87.56	80.49	81.42	84.82	78.62	78.80	86.73	83.02	82.68
25	83.97	82.74	80.51	86.24	80.42	80.60	84.21	79.67	77.84	86.31	83.54	82.52
26	83.50	82.32	80.03	85.35	80.23	78.10	83.72	80.77	77.25	85.92	83.34	82.35
27	83.38	81.85	79.78	84.24	80.26	* 77.03	83.15	82.25	77.14	85.67	82.75	81.97
28	83.37	81.90	79.74	83.46	79.38	* 77.09	82.86	82.43	79.31	85.71	82.52	81.92
29	83.28		79.66	83.41	79.25	79.22	83.18	81.54	79.93	85.08	82.54	82.30
30	83.18		79.62	83.19	79.10	79.63	82.35	80.76	79.85	84.61	82.65	82.46
31	83.26		80.63		78.86		81.71	80.76		84.53		

Sum

Current Year 1945

Period

Month	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	High	Low	Day	Day			Normal	Maximum	Minimum
April	92.04		23	22,000	31				
May		78.78			14				
June		78.16			27				
July		76.68			3				
July		77.67							
July	88.94		10	13,200					
July	90.44		15	16,300					
July	88.82		22	12,500					
Sept.		76.75			27				
Oct.	93.77		7	29,000					
Oct.	99.80		13	49,300					
Yearly	99.80	76.68		49,300					

* Partly estimated

RIO GRANDE AT LAS PALMAS STATION

DESCRIPTION: Water-stage recorder and cable with cable car located 1,640 feet below the Retamal Canal intake, 24.2 river miles below Hidalgo, Texas, and Reynosa, Tamaulipas, and 1,109.0 river miles below the American Dam at El Paso, Texas. Zero of the gage is .85 foot above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based upon 27 meter measurements during the year by the Mexican Section. 1945 records good. Computations by shifting channel methods. Records available: gage heights from January 13 to October 31, 1945, and daily discharges from November 1 to December 31, 1945.

REMARKS: This station was constructed by the National Irrigation Commission of Mexico and is operated by the Mexican Section of the International Boundary and Water Commission. This station replaces the station at Buenos Aires which was destroyed by the flood of September 1, 1944. Gage readings were begun January 13, 1945. The recorder was installed October 4, 1945, and measurements began November 1, 1945.

Mean Daily Gage Height in Feet												Mean Daily		
1945												Second Feet		
Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1		67.49	66.23	65.39	67.26	63.48	64.73	66.47	65.81	65.09	3,810	2,400		
2		67.39	65.98	66.44	66.96	64.34	64.07	66.31	65.88	65.09	3,780	2,690		
3		67.36	65.85	68.96	66.70	65.19	62.99	66.34	66.11	65.81	3,710	2,870		
4		67.36	66.08	69.82	66.47	64.60	62.63	66.27	65.98	69.36	3,780	2,520		
5		67.42	66.04	69.16	66.27	23.78	63.71	66.44	65.49	71.78	3,670	2,360		
6		67.39	65.55	67.91	66.14	63.65	64.60	66.31	65.22	76.74	3,250	2,370		
7		67.42	65.42	66.99	66.21	63.81	65.29	65.55	65.06	78.21	3,030	2,370		
8		67.42	65.35	66.57	66.88	63.91	65.65	65.19	64.96	76.05	3,300	2,360		
9		67.36	65.29	66.44	65.49	64.99	68.77	65.72	64.83	73.98	3,460	2,500		
10		67.26	65.19	66.01	65.19	65.55	71.62	66.11	64.83	74.47	3,270	2,540		
11		67.29	65.49	65.68	64.99	64.63	71.26	65.55	64.40	79.53	3,260	2,600		
12		67.22	65.68	65.35	65.16	63.29	71.00	65.62	64.04	80.91	3,120	2,760		
13	67.29	67.16	65.19	64.96	65.49	62.93	71.26	65.58	64.30	81.63	2,840	2,650		
14	67.32	67.13	64.83	64.76	65.49	63.22	70.47	64.83	64.96	81.17	2,750	2,430		
15	67.59	67.36	66.27	64.83	65.22	64.11	72.31	64.40	66.04	78.58	2,510	2,520		
16	67.52	67.39	67.98	65.06	65.58	65.12	72.87	64.27	66.99	77.03	2,360	2,690		
17	67.59	67.26	67.13	64.63	66.83	65.16	* 71.72	64.63	66.37	76.34	2,370	2,700		
18	67.98	67.19	67.13	64.76	66.44	64.57	70.77	64.73	64.93	75.30	2,610	2,290		
19	68.01	67.32	66.90	64.73	65.72	63.29	70.08	64.83	64.24	73.95	2,650	2,010		
20	67.72	67.22	66.08	65.16	65.35	62.66	69.36	64.76	63.84	73.10	2,420	2,390		
21	67.55	66.99	65.32	65.91	65.12	62.60	69.68	64.30	63.65	72.44	2,300	2,560		
22	67.65	66.80	64.96	" 71.78	64.99	63.94	71.75	64.60	63.91	71.88	2,290	2,530		
23	67.95	66.63	64.76	" 74.08	65.22	66.34	70.44	64.14	64.89	71.42	2,420	2,500		
24	68.11	66.67	64.70	* 71.78	65.22	66.34	69.23	63.71	64.40	71.00	2,550	2,720		
25	68.04	66.76	64.73	70.18	65.22	66.04	68.73	64.04	65.48	70.51	2,980	2,630		
26	67.78	66.67	64.70	69.59	65.06	64.80	68.37	65.26	62.96	70.14	3,150	2,220		
27	67.52	66.27	64.17	68.83	65.06	63.25	67.91	66.34	62.83	69.85	2,710	1,940		
28	67.78	66.24	64.14	68.11	64.76	62.76	67.52	67.03	63.22	69.82	2,370	2,000		
29	67.49		64.01	67.78	64.14	62.99	67.62	66.73	64.76	69.55	2,240	2,120		
30	67.36		64.04	67.75	64.01	64.57	67.45	66.14	65.09	69.06	2,250	2,400		
31	67.42		64.34		63.81			66.76	65.88	68.86		2,540		
Sum													76,180 87,200	

Month	Current Year 1945						Period				
	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet			
			High	Low	Day			Normal	Maximum	Minimum	
Jan.	67.49	66.17									
Feb.	68.04	63.91									
Mar.	" 74.31	64.53									
Apr.	67.55	63.71									
May	66.47	62.57									
June	" 72.97	62.50									
July	67.09	62.58									
Aug.	67.06	62.80									
Sept.	61.69	65.09									
Oct.	68.77	66.76	1	3,850	29	2,250	2,910	173,000			
Nov.	67.55	65.98	3	2,950	27	1,840	2,460	151,100			
Dec.											
Yearly											

* Estimated * Partly estimated

RIO GRANDE FLOODWAY DISCHARGES IN THE LOWER RIO GRANDE VALLEY**On the United States Side — 1945**

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. There was no flow through any of these floodways in 1945.

North Floodway Near Sebastian, Texas — 1945

The channel of the North Floodway in the vicinity of Sebastian, Texas, serves as a drainage channel as well as a floodway. During 1945 an average of two measurements per month was made of the flow at this point. From these measurements and rainfall records, the following table of estimated drainage flow was prepared. The salt burden carried by this drainage flow will be found elsewhere in this bulletin under the heading, "Chemical Analyses of Water Samples".

Mean Daily Second Feet — 1945				Total 1945	Acre Feet		
Month	Average	Maximum	Minimum		Period 1940—1945	Average	Maximum
January	35.4	47.9	28.5	2,180	3,144	7,450	1,400
February	41.9	165	34.4	2,330	2,842	6,010	1,610
March	37.2	41.0	34.7	2,290	3,524	5,380	1,880
April	59.5	160	42.1	3,540	3,292	5,900	2,210
May	37.6	50.1	30.9	2,310	7,480	24,200	2,310
June	15.8	55.0	7.4	942	4,922	9,090	942
July	19.4	90.0	3.3	1,190	3,026	7,170	1,060
August	42.3	360	17.2	2,600	1,809	2,600	605
September	23.6	65.0	18.1	1,400	27,172	125,700	1,400
October	61.9	125	25.3	3,810	2,431	3,990	136
November	40.9	46.0	36.5	2,440	1,924	2,920	861
December	55.0	62.1	48.7	3,380	2,958	4,480	1,830
Yearly	39.2	360	3.3	28,412	64,524	158,550	28,412

Record began October 1940. \$ Period 1941-1945

On the Mexican Side — 1945

There are several regular floodways on the Mexican side which divert excess flood water to the Gulf of Mexico. For the year 1945, the information set out below is known concerning such flood flows.

During the middle part of October the river levee was cut near Rio Rico in order to impound additional flood waters in Culebron Lake and supplementary reservoirs. There is no information available as to the maximum rate or volume of flow through this cut in the levee.

Retamal Canal

Full information on the flows through this canal are shown elsewhere in this bulletin under the heading "Diversions from the Rio Grande into the Retamal Canal".

Floodway No. 3

This floodway was opened at 6:00 P. M. on October 13. No information as to volume or duration of flow is available.

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 57.6 miles upstream from the Gulf of Mexico, and 1,183.8 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 174 meter measurements during the year, 168 by the Mexican and 6 by the United States Section. The river bottom shifts greatly at this station. Computations by shifting channel methods. 1945 records good. Records available: 1901 to 1913; 1923 to December 1945.

REMARKS: In May 1924 a recorder was established 0.6 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. 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 117.4 miles above this station.

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 greatest flow since 1923 was on September 16, 1942, when 32,300 second feet passed this station with a gage height of 22.51 feet. The highest gage reading was on October 2, 1936, when a reading of 22.57 feet, present gage, was reached, with a discharge of 29,600 second feet. In 1930 the river at this station was dry for a few days in March and April. On August 9, 1944, the minimum flow was 2.8 second feet with a stage of - .16 foot. The lowest recorded gage reading was on April 30, 1944, when a gage height of - 1.12 was reached.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,880	3,270	1,510	32.5	2,930	24.0	17.0	1,220	957	9.9	3,600	1,480
2	2,660	3,330	1,370	111	2,370	20.5	18.7	818	784	180	3,530	1,640
3	2,390	3,320	1,310	643	1,890	33.9	18.4	667	713	357	3,270	1,840
4	2,140	3,160	1,330	2,370	1,420	61.1	19.4	653	756	1,750	3,360	1,960
5	2,130	3,210	1,400	3,990	1,000	200	15.5	795	826	4,450	3,490	1,950
6	2,510	2,750	1,310	3,570	862	87.2	10.2	975	749	14,660	3,160	1,790
7	2,840	2,930	907	2,720	872	39.6	9.2	1,030	678	24,930	2,000	1,680
8	2,960	3,010	667	1,820	731	19.4	10.2	915	551	24,900	2,660	1,610
9	2,860	2,960	611	1,350	512	13.2	10.2	533	357	18,430	2,610	1,600
10	2,780	3,000	491	1,050	406	14.1	1,460	250	290	14,410	2,640	1,640
11	2,650	2,940	367	795	304	12.4	7,980	480	226	22,530	2,620	1,460
12	2,670	2,960	272	448	192	71.7	6,640	604	320	28,960	2,710	1,580
13	2,580	2,700	357	271	110	93.9	7,030	491	251	30,090	2,590	1,780
14	2,680	2,730	371	143	76.6	34.3	7,170	244	114	28,290	2,200	1,800
15	2,900	2,910	274	85.5	90.8	17.0	6,500	167	74.2	27,930	1,900	1,700
16	3,050	2,950	230	63.6	122	13.4	11,650	126	351	24,330	1,770	2,280
17	3,080	3,140	1,330	51.2	123	19.8	10,030	84.4	1,440	20,980	1,690	2,470
18	3,180	2,980	1,780	48.7	75.9	29.0	8,470	60.4	1,530	18,720	1,630	2,020
19	3,470	2,940	1,310	27.5	285	20.1	6,500	54.7	893	14,440	1,770	1,500
20	3,670	2,820	1,260	19.8	258	17.3	4,980	59.7	357	11,830	1,750	1,270
21	3,640	2,850	1,150	85.8	205	23.3	4,100	55.8	84.1	10,700	1,610	1,710
22	3,470	2,450	664	1,300	385	19.8	5,400	45.6	42.7	9,570	1,510	1,940
23	3,230	1,980	265	13,630	327	16.2	8,620	53.3	19.1	8,230	1,360	2,200
24	3,330	2,120	191	14,660	364	13.8	5,900	57.2	8.1	7,060	1,330	2,210
25	3,600	2,200	137	8,090	547	14.5	3,710	60.0	8.8	6,740	1,650	2,420
26	3,570	2,400	92.5	5,470	442	78.0	2,730	317	8.1	6,290	2,070	2,670
27	3,150	2,060	75.6	4,730	159	206	2,250	348	6.7	5,760	2,210	1,940
28	2,810	1,730	67.8	4,100	155	46.3	1,840	1,080	5.0	5,260	2,000	1,210
29	2,770	—	53.7	3,530	146	20.1	1,550	1,525	6.0	5,120	1,670	1,210
30	2,890	—	40.6	3,260	60.7	18.0	1,370	1,580	7.4	4,410	1,380	1,390
31	2,970	—	37.4	—	37.1	—	1,380	1,360	—	3,850	—	1,720
Sum		77,800	78,465.6		1,299.9		16,739.1		405,146.9		55,670	
		91,510	21,231.6		17,457.1		117,388.8		12,473.2		67,740	

Current Year 1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Foot	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low			Normal	Maximum	Minimum	
Jan.	6.50	4.66	#	3,670	4	2,070	2,950	181,500	220,920	490,800	
Feb.	6.04	3.67	#	3,420	28	1,620	2,780	154,300	152,789	328,300	
Mar.	3.97	-.07	18	1,890	31	34.6	685	42,110	119,933	240,800	
Apr.	13.98	-.13	24	16,170	1	32.5	2,620	155,600	116,774	317,800	
May	6.10	.49	1	3,050	31	30.4	563	34,630	286,919	721,100	
June	1.51	.13	5	271	4	11.7	43.3	2,580	379,393	1,180,500	
July	11.58	.13	16	12,850	7	9.2	3,790	232,800	332,110	756,600	
Aug.	3.94	.43	30	1,650	22	38.5	540	33,200	296,582	833,700	
Sept.	3.90	-.16	18	1,590	28	4.6	416	24,740	642,149	1,363,200	
Oct.	20.70	.07	13	31,570	1	7.4	13,070	803,600	611,146	1,408,500	
Nov.	6.82	3.38	1	3,710	30	1,310	2,260	134,400	284,931	827,500	
Dec.	5.18	2.95	26	2,750	28	1,070	1,800	110,400	218,533	594,200	
Yearly	20.70	-.16		31,570		4.6	2,640	1,909,860	3,662,179	6,579,500	1,680,360

Various days of the month

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 6.6 river miles below Brownsville, Texas, and Matamoros, Tamaulipas, 50.4 miles upstream from the Gulf of Mexico, and 1,191.0 river miles below the American Dam at El Paso, Texas. Zero of gage is on United States Coast and Geodetic Survey mean sea level datum. An auxiliary water-stage recorder located at the El Jardín pumping plant is used during periods of low flow.

RECORDS: Based upon 64 current meter measurements, 56 by the United States and 8 by the Mexican Section made during the year. Computations by shifting channel methods. 1945 records good. Records available: January 1934 to December 1945.

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 124.6 miles above this station.

EXTREME FLOWS: On September 14, 1942, a peak discharge of 31,000 second feet was reached with a gage height of 33.24 feet. Additional data concerning peaks may be found in previous Water Bulletins. The river was dry at this station a few days in 1930; March 25-28, 1935; June 16-19, 1938; several days in 1940; several days in 1943; several days in 1944 and several days in 1945.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,380	2,780	1,350	2.8	2,600	41.2	6.2	1,020	907	199	2,940	1,040
2	2,300	2,920	1,260	20.3	2,170	25.4	9.7	713	668	559	2,860	1,220
3	2,220	2,920	1,180	419	1,690	9.7	3.1	555	690	844	2,620	1,450
4	2,020	2,810	1,170	1,470	1,380	2.6	5.5	564	626	1,810	2,690	1,560
5	1,990	2,810	1,240	2,940	988	55.8	3.7	625	691	4,210	2,870	1,580
6	2,260	2,750	1,190	3,260	789	84.1	4.4	806	596	12,300	2,640	1,480
7	2,610	2,710	886	2,550	753	14.7	5.6	867	533	25,800	2,340	1,410
8	2,780	2,770	581	1,780	729	3.2	5.3	774	438	30,800	2,220	1,430
9	2,730	2,760	494	1,280	1,488	5.1	5.8	436	262	16,900	2,210	1,460
10	2,670	2,780	478	997	293	7.7	648	284	221	13,500	2,270	1,540
11	2,510	2,740	446	727	200	5.4	5,410	282	156	19,000	2,270	1,410
12	2,410	2,730	377	407	169	38.4	6,310	474	227	25,700	2,350	1,430
13	2,390	2,510	421	209	* 105	99.5	6,440	416	203	26,700	2,280	1,610
14	2,500	2,400	485	53.5	* 60.2	23.0	7,020	230	90.0	26,400	1,930	1,650
15	2,740	2,510	354	50.1	* 44.9	5.2	5,750	139	60.0	25,400	1,650	1,550
16	2,830	2,590	309	34.9	* 61.8	15.4	9,160	111	271	22,600	1,540	1,900
17	2,800	2,750	978	15.9	* 70.2	8.3	10,200	78.0	976	18,800	1,500	2,100
18	2,790	2,730	1,620	8.3	* 54.8	16.7	7,890	25.5	1,380	16,800	1,440	1,880
19	2,940	2,670	1,230	18.3	* 154	12.5	5,970	3.9	995	13,800	1,590	1,460
20	3,120	2,990	1,060	44.0	* 190	7.7	4,440	4.5	415	10,800	1,660	1,110
21	3,170	2,510	1,010	135	110	3.9	3,440	26.0	170	9,470	1,430	1,270
22	3,060	2,310	984	627	* 247	10.7	3,870	8.0	49.5	8,260	1,190	1,580
23	2,860	2,010	264	9,350	231	5.3	7,320	5.5	55.5	9,070	987	1,840
24	2,910	1,970	136	14,100	230	4.3	5,580	0	6.5	8,290	838	1,940
25	3,200	2,000	59.3	8,010	384	6.1	3,550	74.7	3.1	6,540	980	2,010
26	3,210	2,130	38.5	5,200	329	28.1	2,490	258	11.2	5,840	1,420	2,220
27	2,960	1,860	28.4	4,340	173	93.0	1,940	247	6.2	5,520	1,630	1,470
28	2,700	1,530	25.7	3,640	132	55.8	1,600	592	2.9	5,260	1,640	1,180
29	2,680		19.3	3,150	128	4.2	1,280	1,160	5.4	4,480	1,350	962
30	2,670		10.5	2,850	88.7	2.8	1,140	1,340	9.9	3,880	1,150	1,080
31	2,580		11.3		49.6		1,110	1,230		3,280		1,330
Sum	70,550		67,689.1		693.8			13,349.1		382,812		47,152
	82,990		19,696.0		15,092.2			102,607.3		10,715.2		56,465

Current Year 1945

Period 1934-45

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total	Acre Feet			
	High	Low	Day	High	Low			Acres	Feet	Normal	
Jan.	17.25	15.25	25	3,270	5	1,980	2,680	165,000	192,433	299,000	
Feb.	16.78	14.28	2	2,950	28	1,450	2,520	140,000	133,508	237,000	
Mar.	14.45	9.55	18	1,650	31	1.0	635	39,100	108,058	193,000	
Apr.	25.21	9.53	24	15,500	2	1.0	2,260	134,000	99,783	242,000	
May	16.70	* 10.78	1	2,740	18	43.7	487	29,900	284,108	717,000	
June	11.87		27	142	30	0	23.1	1,380	358,448	* 1,163,000	
July	22.75		17	10,800	1	0	3,310	204,000	336,100	759,000	
Aug.	14.36		30	1,360	23	0	431	26,500	254,083	679,000	
Sept.	14.31		18	1,420	23	0	357	21,300	623,275	1,337,000	
Oct.	31.48		8	31,700	1	0	12,300	739,000	564,833	* 1,427,000	
Nov.	17.95	13.86	1	3,120	24	790	1,880	112,000	216,767	614,000	
Dec.	15.97	13.51	26	2,250	29	934	1,520	93,500	172,383	341,000	
Yearly	31.48			31,700		0	2,380	1,725,680	3,343,779	6,526,000	1,662,700

* Estimated * Partly estimated † And other days

FLOOD FLOWS AND CORRECTED FLOWS for Early Years from Eagle Pass to Rio Grande City

Immediately following will be found computed mean daily and peak flows during floods of the Rio Grande at four principal gaging stations below Del Rio covering the years prior to 1924 when sufficient records of river stage and discharge are available to support sound computations of discharge. These computed discharges supplement and revise those previously published and authenticated in the Water Bulletins. Some revisions of records of discharges at these stations after 1923 are also given here.

For Eagle Pass there are shown all peak discharges equaling or exceeding 100,000 second feet for 1899 and 1900, and equaling or exceeding 65,200 second feet from 1901 to 1923, inclusive. There are also shown mean daily discharges for all months involved in floods with peak discharges equaling or exceeding 65,200 second feet from May 1900 to December 1923, inclusive. Some revisions of discharges after 1923 are also given.

For Laredo there are shown all peak discharges equaling or exceeding 100,000 second feet for 1899 and 1900, and equaling or exceeding 64,000 second feet from 1901 to 1923, inclusive. There are also shown mean daily discharges for all months involved in floods with peak discharges equaling or exceeding 64,000 second feet from May 1900 to December 1923, inclusive. Some revisions of discharges after 1923 are also given.

For Roma there are shown all peak discharges equaling or exceeding 100,000 second feet for 1899 and 1900, and equaling or exceeding 75,900 second feet from 1901 to 1923, inclusive. There are also shown mean daily discharges for all floods in which the volume of discharge in excess of 79,300 acre feet per day exceeded 52,000 acre feet. Some revisions of discharges for 1909 and for some periods after 1923 are also given.

For Rio Grande City there are shown for the period 1914 to 1923, inclusive, mean daily and peak discharges for the same floods as are given for the above mentioned stations. A revision of discharges for April 1926 is also given.

In making the computations for the results set out below mean daily and peak discharges were computed for some floods a little below the limits mentioned above and these results are included in the tabulations.

The tabulations below are the result of exhaustive research. In the calculations and compilations leading to these results, use has been made of all known pertinent records of river stages, river discharges, rainfall records, rates of flood travel and rates of flattening of flood peaks, as well as newspaper accounts of floods.

For the Rio Salado there are shown a complete set of mean daily discharges for 1925 computed from the original gage height record. These new figures supersede the monthly values published in Water Bulletin No. 5, page 78, and Water Bulletin No. 6, page 56.

RIO GRANDE AT EAGLE PASS STATION
Mean Daily Discharge in Second Feet and Summary

Day	1900		1903		1904		1905		1906		1910		1912		1914			
	May	Sept.	June	Sept.	June	July	Aug.	Sept.	Sept.	June	* May	* June						
1	5,720	11,600	2,950	2,560	" 9,200	" 47,400	16,800	" 38,000	2,950	5,370	5,720	9,030						
2	5,250	6,760	3,590	2,640	" 9,100	" 38,200	15,600	" 34,050	2,560	5,340	2,340	10,800						
3	4,950	8,480	3,590	2,720	" 9,100	" 22,700	15,900	" 30,000	2,260	5,220	2,160	14,500						
4	4,650	6,760	4,130	3,360	" 8,900	" 17,800	13,800	" 25,000	2,110	5,070	1,220	13,700						
5	4,360	8,280	3,130	3,280	" 8,700	" 14,500	16,600	" 24,300	2,110	5,250	1,400	13,000						
6	4,220	17,200	3,040	3,120	" 8,600	" 13,000	20,500	" 21,500	2,040	5,210	1,110	11,900						
7	6,760	12,300	2,990	16,900	" 9,300	" 12,000	24,900	18,900	47,000	5,320	1,000	11,200						
8	5,100	7,500	4,610	16,500	" 10,000	" 11,300	26,000	19,700	14,900	5,350	1,000	16,800						
9	4,220	6,400	3,470	26,200	" 12,000	" 10,800	29,000	18,000	8,950	5,120	1,110	29,500						
10	4,650	5,720	5,340	20,200	" 12,900	10,200	33,600	17,000	8,190	5,520	1,110	24,700						
11	5,100	5,400	4,750	21,300	" 12,700	8,900	38,000	16,000	6,980	6,320	1,110	21,200						
12	5,100	6,400	6,240	36,700	" 13,500	8,280	61,800	14,400	4,860	8,700	1,110	15,700						
13	5,100	7,120	41,400	58,300	" 15,000	7,970	100,000	13,000	5,690	8,950	1,110	10,400						
14	26,600	9,120	53,500	99,400	" 16,000	7,240	76,200	11,600	6,080	10,500	1,400	9,380						
15	43,900	8,900	21,800	146,000	" 17,500	6,480	40,500	10,700	6,690	11,800	1,590	8,680						
16	20,800	8,280	12,500	153,000	" 18,200	5,770	30,500	10,200	5,700	11,800	1,590	10,100						
17	10,000	8,080	9,350	77,500	" 18,800	7,210	27,200	9,560	4,860	13,700	2,520	11,900						
18	7,880	7,690	8,490	31,900	" 19,000	7,150	27,800	9,560	4,600	60,700	17,400	20,800						
19	7,880	6,760	7,520	27,600	" 19,500	6,900	22,600	9,340	4,400	24,000	27,600	49,700						
20	7,500	6,940	6,840	29,100	" 20,200	10,200	19,100	9,560	4,300	15,600	18,600	14,800						
21	7,500	6,400	7,120	30,000	" 20,200	11,100	17,100	9,780	4,200	12,300	20,100	21,800						
22	12,500	18,600	7,410	38,500	" 20,000	9,790	16,000	10,200	4,100	12,000	27,100	15,400						
23	11,400	52,500	7,700	35,200	" 19,700	12,600	17,400	12,600	4,010	10,900	46,800	17,100						
24	11,200	53,700	7,800	27,000	" 19,500	9,010	" 22,200	10,000	3,900	10,600	58,900	27,500						
25	10,700	41,000	7,310	23,000	" 19,500	10,800	" 25,000	8,480	6,470	10,100	26,100	25,300						
26	8,900	18,700	7,400	18,400	" 19,000	20,400	" 24,700	9,560	5,920	8,770	19,000	21,800						
27	7,310	13,000	7,310	21,800	" 18,500	14,900	" 25,000	10,000	5,360	7,040	13,700	20,100						
28	6,400	10,400	7,400	19,500	" 18,000	11,800	" 28,300	10,200	5,030	6,660	10,400	17,400						
29	6,230	9,340	7,450	17,000	95,900	13,100	" 30,000	9,560	4,690	4,980	9,380	15,700						
30	6,060	11,800	7,270	13,600	173,000	16,000	" 30,100	8,680	4,520	5,280	8,360	12,700						
31	6,060					17,600	" 34,300											
Sum	401,130		1,022,280		*	421,100		*	459,380		313,470	*	550,490					
	283,800		283,390		"	689,500		*	326,500		195,430	*	341,400					
Month and Year	Gage		Discharge		Average Second Foot	Total	Month and Year	Gage		Discharge		Average Second Foot	Total	Month and Year	Gage		Discharge	
	Extreme High		Extreme High					Extreme High		Extreme High					Extreme High			
	Feet	Day	Feet	Day	Feet	Day		Feet	Day	Feet	Day	Feet	Day		Feet	Day	Feet	Day
June 1899	33.6	14	250,000				July 1905	15.0	1	* 56,600	13,600	835,000						
April 1900	30.0	6	209,000				Aug. 1906	22.0	13	129,000	29,900	1,838,000						
May 1900	12.8	15	63,200				Sept. 1906	11.5	1	50,000	15,300	911,000						
Sept. 1900	14.6	24	79,100				Sept. 1910	* 13.2	7	* 71,000	6,510	388,000						
June 1903	14.4	14	73,200				June 1912	* 15.7	18	* 91,400	10,400	622,000						
Sept. 1904	24.0	15	158,000				May 1914	13.9	24	65,200	11,000	677,000						
June 1905	34.6	29	262,000				June 1914	12.9	20	56,200	18,300	1,092,000						

" Estimated * Partly estimated

FLOOD FLOWS AND CORRECTED FLOWS

RIO GRANDE AT EAGLE PASS STATION

Mean Daily Discharge in Second Feet and Summary

Day	1914		1916		1917		1918		1919		1920		1922		
	Oct.	Sept.	* Sept.	* Oct.	* Oct.		* Oct.		* Sept.	* Oct.	Aug.	* Sept.	* June		
1 ^u	13,300	*	5,120	3,970	30,800	1,400	22,400	40,000	"	8,800	53,700	1,590			
2 ^u	11,900	*	19,300	4,890	25,300	1,970	28,200	33,400	"	8,780	58,800	1,970			
3 ^u	11,800	*	68,600	4,340	21,200	1,970	32,700	31,400	"	8,600	59,700	3,080			
4 ^u	11,800	*	13,300	4,520	17,400	1,220	36,700	40,000	"	8,350	49,600	3,760			
5 ^u	11,300	*	8,680	4,340	15,400	1,110	37,400	30,200	"	8,500	46,400	13,500			
6 ^u	10,500	*	7,120	4,520	13,700	770	34,000	24,700	"	8,250	56,200	3,300			
7 ^u	10,100	*	6,840	4,160	12,700	660	28,200	21,200	"	8,100	58,800	3,300			
8 ^u	9,200	*	6,280	3,970	11,600	660	16,800	19,600	"	8,000	61,600	2,340			
9 ^u	8,100	*	6,000	4,340	10,800	660	13,400	18,500	"	7,900	65,200	2,340			
10 ^u	7,400	*	6,280	4,520	10,100	770	9,380	18,500	"	7,800	68,200	2,340			
11 ^u	7,700	*	8,680	4,340	9,380	1,590	9,750	20,100	"	7,800	60,600	2,700			
12 ^u	6,800	*	11,600	4,520	9,030	4,220	6,280	19,000	"	8,000	49,600	5,040			
13 ^u	6,200	*	16,300	5,300	8,680	12,700	8,050	16,300	"	9,000	43,100	43,400			
14 ^u	6,200	*	9,730	4,890	8,360	11,700	8,680	15,400	"	13,700	37,400	69,800			
15 ^u	5,800	*	9,030	4,520	8,050	4,820	11,200	14,500	"	14,200	40,700	33,500			
16 ^u	5,800	*	6,280	4,340	7,740	2,890	53,300	13,700	"	13,500	36,700	12,000			
17 ^u	6,200	*	5,720	4,520	7,150	2,160	216,000	14,100	"	13,000	28,900	14,600			
18 ^u	5,900	*	5,120	2,760	7,120	2,160	74,000	15,400	"	14,000	28,900	131,000			
19 ^u	5,700	*	4,520	8,560	6,840	2,340	21,200	15,400	"	23,000	28,900	288,000			
20 ^u	5,500	*	4,220	8,840	6,840	2,700	17,400	16,300	"	23,000	27,600	150,000			
21 ^u	24,200	*	3,760	9,740	6,840	9,120	23,800	14,500	"	28,900	25,900	69,700			
22 ^u	172,000	*	4,820	10,700	6,560	57,300	105,000	12,700	"	27,500	23,000	36,600			
23 ^u	79,000	*	12,500	13,400	6,560	15,700	183,000	11,200	*	55,500	20,100	13,800			
24 ^u	22,800	*	15,200	16,900	6,280	9,030	138,000	10,800	*	42,000	27,900	9,070			
25 ^u	35,200	*	14,900	31,300	6,280	4,220	59,800	10,400	*	34,000	16,300	7,250			
26 ^u	27,500	*	14,300	68,200	6,000	3,300	36,700	10,100	"	32,600	15,400	5,120			
27 ^u	17,900	*	13,500	106,000	6,000	2,520	31,400	9,380	"	34,000	13,700	3,080			
28 ^u	10,900	*	12,500	136,000	5,720	1,590	34,700	8,680	*	36,700	11,900	3,530			
29 ^u	8,680	*	8,500	98,000	5,720	1,220	42,300	8,360	*	39,400	10,400	5,120			
30 ^u	7,500	*	5,350	45,000	5,420	1,220	47,200	8,360	*	42,300	8,680	4,820			
81 ^u	7,500	*			5,420	1,220			*	51,300					
Sum	* 580,280	*	334,050	* 634,400	*	315,270	*	164,910	*	1,386,920	*	550,540	*	647,480	
												*	1,119,880	*	945,750
Day	1923		1925					1928		1932					
	Sept.		May	July	* Aug.	Sept.		* Oct.		* Sept.	Aug.	Sept.	Oct.		
1 * ^u	13,100	*	3,070	4,440	2,960	*	10,700	5,610	*	5,840	1,780	72,600	67,900		
2 * ^u	9,220	*	3,080	5,500	6,240	*	10,700	5,360	*	6,420	1,850	365,000	35,000		
3 * ^u	8,840	*	2,870	6,060	7,880	*	11,800	5,130	*	7,010	2,120	131,000	34,500		
4 * ^u	7,560	*	2,680	6,350	6,620	*	11,800	5,190	*	5,840	2,020	37,700	38,000		
5 * ^u	6,640	*	2,490	6,350	6,350	*	11,800	5,420	*	5,420	1,890	22,700	44,800		
6 * ^u	5,230	*	2,500	6,060	5,230	*	13,800	4,740	*	4,280	1,780	23,200	67,800		
7 * ^u	8,540	*	2,510	6,060	7,960	*	26,700	4,800	*	5,280	1,900	33,900	74,600		
8 * ^u	5,500	*	2,490	5,780	15,900	*	32,100	4,510	*	4,880	2,070	92,000	53,000		
9 * ^u	4,190	*	2,300	5,500	16,900	*	35,500	4,480	*	5,020	1,940	75,900	17,400		
10 * ^u	5,250	*	2,470	5,500	15,600	*	37,100	4,450	*	22,600	2,120	68,700	36,100		
11 * ^u	8,210	*	3,510	5,230	21,000	*	32,800	6,830	*	5,560	53,500	29,500			
12 * ^u	8,210	*	2,830	6,350	28,000	*	30,100	10,900	*	6,920	35,200	25,600			
13 * ^u	8,540	*	3,960	11,400	30,200	*	27,400	9,470	*	4,880	26,600	23,000			
14 * ^u	11,000	*	3,400	8,950	31,300	*	24,600	8,800	*	4,260	8,530	30,700	21,200		
15 * ^u	19,300	*	3,000	7,650	29,100	*	19,400	12,400	*	3,690	8,220	38,900	20,200		
16 * ^u	39,000	*	2,800	8,710	24,600	*	14,700	17,800	*	3,480	8,560	50,300	20,000		
17 * ^u	46,500	*	2,600	11,300	23,700	*	14,100	9,200	*	3,380	7,580	50,900	19,800		
18 * ^u	56,600	*	2,400	5,820	22,200	*	11,700	7,530	*	3,270	6,790	30,500	19,100		
19 * ^u	49,000	*	2,350	6,180	20,400	*	11,200	7,220	*	3,060	5,910	22,900	17,600		
20 * ^u	40,800	*	2,400	8,240	20,000	*	9,550	7,240	*	2,870	4,980	18,100	15,300		
21 * ^u	37,600	*	2,500	7,950	18,400	*	7,990	8,600	*	3,300	4,430	15,300	13,800		
22 * ^u	36,500	*	2,410	7,000	16,200	*	7,870	10,700	*	4,240	14,300	12,900			
23 * ^u	24,000	*	2,410	6,090	14,200	*	8,080	10,300	*	4,140	26,500	12,200			
24 * ^u	16,500	*	2,220	5,530	11,400	*	7,800	9,560	*	3,630	34,800	11,900			
25 * ^u	13,000	*	2,220	5,010	10,800	*	7,510	8,510	*	3,310	35,600	11,600			
26 ^u	11,000	*	2,220	4,230	10,700	*	6,900	8,150	*	8,830	3,200	16,700	11,000		
27 ^u	11,000	*	2,410	4,290	9,790	*	7,970	7,450	*	3,070	12,500	10,700			
28 ^u	11,500	*	83,400	3,810	11,100	*	6,680	7,130	*	6,120	15,300	10,800			
29 ^u	10,500	*	85,300	3,590	10,700	*	6,110	6,480	*	5,420	2,670	10,500			
30 ^u	10,000	*	166,000	3,580	10,700	*	5,850	6,160	*	2,770	74,900	10,300			
31 ^u	55,900	*	3,160	10,700			5,840	5,840	*	39,700	9,960				
Sum	* 542,510	*	191,450	* 477,460	*	470,310	*	235,500	*	210,320	162,180		836,060		

Month and Year	Gage Discharge			Average Second Foot	Total Acre Foot	Month and Year	Gage Discharge			Average Second Foot	Total Acre Foot
	Extreme High	Extreme Low	Sec. Ft.	Foot	Day		Extreme High	Extreme Low	Sec. Ft.	Foot	
Oct. 1914	30.0	22	209,000	18,700	1,151,000	May 1925	33.7	30	252,000	14,900	918,000
Sept. 1916	16.3	3	89,100	11,100	663,000	July 1925	6.2	13	12,200	6,180	380,000
Sept. 1917	23.6	28	143,000	21,100	1,258,000	Aug. 1925	10.0	15	31,900	15,400	947,000
Oct. 1917	10.2	1	35,300	10,200	625,000	Sept. 1925	11.0	10	38,200	15,700	933,000
Oct. 1918	14.6	22	72,500	5,320	527,000	Oct. 1925	7.8	16	20,100	7,600	467,000
Sept. 1919	38.5	17	285,000	46,200	2,751,000	Sept. 1926	14.51	10	50,800	7,010	417,000
Sept. 1919	32.6	23	216,000	18,700	1,092,000	Oct. 1930	18.55	7	66,800	10,600	654,000
Oct. 1919	12.6	4	53,700	17,800	1,284,000	Aug. 1932	18.83	31	80,600	5,230	322,000
Aug. 1920	13.8	23	64,300	20,900	1,284,000	Sept. 1932	49.00	8	569,000	51,700	3,079,000
Sept. 1920	14.4	10	70,200	37,500	2,221,000	Sept. 1932	21.95	8	110,000		
June 1922	15.0	14	76,400	31,500	1,876,000	Sept. 1932	21.10	30	97,800		
June 1922	45.6	19	408,000	18,100	1,076,000	Oct. 1932	21.00	1	96,700	27,000	1,658,000
Sept. 1923	14.0	18	63,000			Oct. 1932	19.62	7	87,300		

* Estimated * Partly estimated

FLOOD FLOWS AND CORRECTED FLOWS

RIO GRANDE AT LAREDO STATION

Mean Daily Discharge in Second Feet and Summary

Day	1900		1903	1904		1905	1906		1910	1912
	May	Sept.		June	Sept.		June	July		
1	14,600	8,370		4,400	2,410	11	9,800	109,000	23,800	36,000
2	8,560	11,800		4,600	2,790	11	9,400	25,200	16,700	3,960
3	6,780	9,320		8,000	2,720	11	9,200	23,100	16,100	3,320
4	5,790	8,190		4,800	2,650	11	9,200	20,700	14,700	32,800
5	5,630	8,370		4,500	3,710	11	9,100	18,900	15,700	2,920
6	5,480	8,930		4,400	3,630	11	8,900	14,700	16,400	2,340
7	5,020	16,800		4,400	3,860	11	8,700	13,500	18,000	3,530
8	4,580	13,500		3,100	23,500	11	9,500	12,600	21,800	6,250
9	5,950	9,700		4,200	21,900	11	9,900	11,700	19,200	5,060
10	5,020	7,650		5,800	27,600	11	11,300	11,000	25,900	4,800
11	4,870	6,970		8,400	21,200	11	11,300	10,100	29,100	6,040
12	5,790	6,280		15,000	34,400	11	11,300	9,500	35,200	14,300
13	5,480	6,780		34,000	68,400	11	12,500	8,900	67,600	4,020
14	5,630	7,290		46,000	71,700	11	14,100	8,500	98,900	12,400
15	48,000	8,560		50,000	106,000	11	15,000	8,500	43,800	11,200
16	52,900	9,320	31,000	131,000	16,700	11	7,300	30,600	10,500	9,740
17	18,300	9,320	18,000	136,000	17,100	11	7,900	28,500	10,100	8,500
18	11,100	8,930	13,000	89,800	17,900	11	7,400	23,800	9,470	8,200
19	8,550	8,560	13,000	26,800	17,800	11	7,400	24,500	9,100	9,000
20	11,900	8,000	11,000	21,200	17,700	11	7,150	21,600	9,860	7,700
21	10,500	7,470	10,000	27,900	19,200	11	10,700	20,000	10,900	7,300
22	9,320	7,820	9,500	32,100	19,300	11	11,800	18,000	11,400	6,900
23	11,900	41,200	9,700	10,200	18,700	11	11,000	17,000	12,100	6,600
24	16,600	57,800	9,800	36,000	18,200	10	10,500	19,000	14,400	6,500
25	12,400	60,400	10,000	28,300	17,500	10	10,800	24,800	10,300	6,400
26	10,300	25,700	10,500	25,200	20,000	11	11,400	26,600	10,700	7,300
27	9,900	15,400	10,000	22,900	17,300	11	16,400	26,400	11,400	7,700
28	8,930	13,100	9,800	21,300	17,000	11	12,000	26,600	12,300	7,400
29	8,560	11,800	9,800	20,100	18,600	11	12,200	30,600	13,000	6,250
30	7,120	10,100	9,700	15,300	80,000	11	12,600	30,600	12,600	6,900
31	7,120					11	15,300	33,000		4,580
Sum		433,410			1,070,570			* 477,550		489,330
		352,960			386,400			*		212,160
										412,180

Day	1914			1916	1917			1918	1919			1920
	* May	June	Oct.		Sept.	* Oct.	Oct.		* Sept.	* Oct.	Aug.	
1	5,970	* 19,800	11,300	* 11,700	6,650	41,700	11	2,240	27,500	45,200	8,900	
2	3,160	* 22,200	13,500	* 11,200	4,340	51,900	11	2,520	29,500	45,700	8,900	
3	3,160	* 28,300	12,100	* 22,100	4,670	27,700	11	2,600	31,100	44,500	8,900	
4	3,160	* 23,900	12,000	* 54,100	5,010	24,200	11	2,530	33,200	46,100	8,700	
5	3,160	* 21,600	12,000	* 24,700	5,010	20,900	11	2,280	35,200	47,400	8,700	
6	3,160	* 19,800	11,500	* 17,200	5,340	17,000	11	1,720	35,600	44,300	8,500	
7	3,160	* 18,500	10,500	* 13,200	5,010	15,200	11	1,600	32,300	37,700	8,500	
8	3,670	* 19,100	10,200	* 12,200	5,340	13,200	11	1,500	29,900	36,000	8,500	
9	3,670	* 24,400	9,270	* 11,200	4,340	12,000	11	1,500	27,900	35,600	8,400	
10	3,920	* 36,300	8,150	* 10,800	4,340	11,400	11	1,510	26,200	34,400	8,400	
11	3,160	* 30,700	14,300	* 11,700	3,970	10,900	11	2,020	25,800	36,000	8,000	
12	3,670	* 27,900	23,000	* 23,200	4,340	10,300	11	1,890	25,000	34,000	7,980	
13	5,240	* 21,600	13,200	* 40,700	5,010	9,740	11	10,800	23,900	30,700	8,350	
14	3,160	* 17,900	13,200	* 28,300	5,010	9,200	11	13,900	27,200	27,500	12,000	
15	3,160	* 14,300	11,700	* 21,600	4,670	8,910	11	10,500	39,600	28,300	18,000	
16	3,160	* 11,700	9,560	* 17,200	4,670	8,490	11	1,650	29,200	26,200	18,500	
17	3,670	* 15,400	9,560	* 14,900	4,840	8,060	11	7,730	67,200	27,900	17,500	
18	6,670	* 23,800	9,110	* 13,800	5,340	7,610	11	7,340	163,000	27,100	16,700	
19	11,400	* 33,200	9,110	* 12,200	6,340	7,150	11	7,010	145,000	26,200	16,600	
20	28,300	* 44,400	9,560	* 11,700	9,560	7,150	11	7,340	40,100	25,800	26,000	
21	27,900	* 43,600	9,110	* 11,200	15,200	7,150	11	17,700	27,900	26,200	25,000	
22	34,000	* 26,300	13,600	* 10,400	14,300	7,190	11	16,500	34,200	25,400	29,200	
23	40,400	* 18,000	102,000	* 11,200	16,000	7,190	11	63,400	94,800	23,400	32,000	
24	44,800	* 21,000	111,000	* 13,600	21,600	6,730	11	32,900	145,000	21,000	* 59,500	
25	51,000	* 30,000	37,800	* 15,700	28,800	6,730	11	19,800	135,000	19,100	* 41,200	
26	51,500	* 27,000	37,300	* 15,200	40,000	6,340	11	12,700	64,000	17,900	* 34,800	
27	51,400	* 23,000	28,600	* 15,000	57,000	6,340	11	9,990	41,500	16,600	* 34,800	
28	25,800	* 21,500	25,000	* 14,000	81,800	6,340	11	8,650	35,200	18,500	* 35,200	
29	21,000	* 20,000	17,200	* 13,000	105,000	6,010	11	7,340	37,700	25,800	* 37,300	
30	17,900	* 18,000	10,400	* 10,900	84,800	6,010	11	6,340	40,300	21,000	* 39,200	
31	16,600	* 8,560	9,560	* 7,070	818,000	5,670	11	5,600	45,600	18,500	* 48,100	
Sum		* 470,000	* 719,200	* 619,390	* 513,900	* 564,300		* 374,310	* 332,100	* 1,550,000	* 940,600	* 652,330

Month and Year	Elevation			Average Second Foot	Total Acre Feet	Month and Year	Elevation			Average Second Foot	Total Acre Feet
	Extrem High	Day	Sec. Ft.				Extrem High	Day	Sec. Ft.		
June 1899	388.9	15	172,000			May 1914	369.6	26	57,200	15,200	932,000
Apr. 1900	387.2	7	160,000			June 1914	367.6	21	48,200	24,000	1,427,000
May 1900	373.5	15	77,000	11,400	700,000	Oct. 1914	384.3	24	140,000	20,900	1,288,000
Sept. 1900	373.5	25	77,000	14,400	860,000	Sept. 1916	370.3	4	60,600	17,100	1,019,000
June 1903	372.8	15	73,500	12,900	766,000	Sept. 1917	378.7	29	105,000	18,500	1,119,000
Sept. 1904	383.8	17	137,000	32,700	2,123,000	Oct. 1917	369.6	1	57,200	12,100	742,000
June 1905	384.6	30	142,000	16,400	976,000	Oct. 1918	372.4	23	71,200	10,700	659,000
July 1905	388.1	1	166,000	15,400	947,000	Sept. 1919	391.8	18	192,000	51,700	3,074,000
Aug. 1906	379.2	14	109,000	27,800	1,711,000	Sept. 1919	387.6	24	163,000		
Sept. 1906	366.8	2	44,300	16,300	971,000	Oct. 1919	367.5	5	47,800	30,300	1,866,000
Sept. 1910	365.8	8	40,200	7,070	421,000	Aug. 1920	370.7	24	62,500	21,000	1,294,000
June 1912	378.5	19	105,000	13,700	818,000						

* Estimated * Partly estimated # Above mean sea level at the railroad bridge

* Estimated from gage height discharge relationship in 1932

FLOOD FLOWS AND CORRECTED FLOWS

RIO GRANDE AT LAREDO STATION

Mean Daily Discharge in Second Feet and Summary

Day	1920		1922		1923		1925			1926		1932			
	Sept.	June	Sept.	May	June	July	Aug.	Sept.	Oct.	Aug.	Sept.	Oct.	Sept.	Oct.	
1	* 52,600	* 2,200	9,580	4,100	* 101,000	2,700	3,200	2,480	1,130	66,800	63,300				
2	* 57,700	* 2,200	7,730	2,800	* 20,000	3,700	23,200	2,470	1,120	* 73,900	72,400				
3	* 62,000	* 2,200	9,500	2,350	11,500	5,050	13,500	2,450	1,200	* 225,000	48,000				
4	* 58,600	* 2,200	10,200	2,180	10,000	5,800	12,600	2,390	1,500	* 198,000	39,600				
5	* 56,300	* 2,200	8,990	2,050	7,300	6,200	4,500	2,880	1,530	66,300	40,000				
6	* 55,400	* 11,700	10,500	2,080	5,650	7,400	4,020	3,060	1,630	30,900	46,800				
7	* 58,600	* 5,330	27,300	2,050	5,300	7,600	3,600	2,910	1,520	25,400	67,300				
8	* 57,200	* 4,200	73,600	2,020	4,900	5,950	3,850	2,890	1,500	31,300	71,900				
9	* 59,600	* 3,920	26,100	4,700	4,720	5,550	8,300	2,830	1,530	74,700	52,900				
10	* 62,500	* 3,670	17,800	2,580	5,020	13,800	3,180	1,580	70,600	44,000					
11	* 65,800	* 7,230	11,500	4,500	4,400	9,900	13,500	2,970	1,550	62,400	36,500				
12	* 61,300	* 23,100	9,510	3,120	4,500	5,500	18,000	2,700	1,950	46,900	29,800				
13	* 51,700	* 9,990	12,900	2,620	4,300	6,300	22,500	2,550	7,590	39,900	25,600				
14	* 46,800	* 23,400	12,100	3,180	4,020	10,000	25,200	2,150	6,220	28,300	25,200				
15	* 42,000	* 60,400	13,400	3,620	3,820	11,200	28,700	2,150	6,110	26,800	25,200				
16	* 42,000	* 49,000	15,000	5,100	3,750	9,150	24,500	2,160	8,515	34,200	22,400				
17	* 39,000	* 30,700	25,900	2,750	3,650	10,600	24,700	2,170	8,020	42,400	22,100				
18	* 33,000	* 30,200	34,300	2,700	3,520	11,500	23,000	2,110	7,800	42,400	22,400				
19	* 30,000	* 87,500	41,300	2,900	3,400	8,000	23,300	2,050	6,740	35,400	22,100				
20	* 29,800	* 248,000	41,700	2,400	3,350	6,200	19,700	1,950	8,050	22,800	21,200				
21	* 30,700	* 119,000	46,500	2,380	3,700	7,000	18,500	* 28,800	6,500	19,200	21,000				
22	* 30,000	* 51,500	47,800	2,580	3,580	6,700	17,000	* 31,300	4,910	18,500	20,600				
23	* 27,000	* 25,100	36,800	2,280	3,580	5,750	15,000	* 9,990	4,240	21,000	17,400				
24	* 22,000	* 14,700	22,500	2,180	3,620	5,000	13,000	* 5,240	3,960	30,100	17,000				
25	* 19,000	* 9,110	17,100	2,120	3,420	4,520	11,400	* 3,670	3,410	35,700	21,000				
26	* 16,800	* 7,010	13,400	2,020	3,200	4,150	10,600	* 5,240	2,920	34,300	16,200				
27	* 15,800	* 6,340	10,500	1,880	3,080	4,000	9,200	* 5,970	2,750	19,100	15,800				
28	* 14,500	* 5,970	10,500	1,850	3,550	3,850	9,450	* 5,240	2,790	15,200	15,400				
29	* 12,500	* 5,600	10,600	39,000	3,820	3,500	9,350	* 4,510	2,760	17,200	14,900				
30	* 11,000	* 5,600	10,300	3,000	3,300	3,300	9,100	* 6,670	2,600	28,900	14,900				
31					* 183,000		3,300	9,320		7,100					
Sum	* 1,221,200		* 859,270		644,910	* 431,690	189,470	445,390	* 157,090	120,755	* 1,483,600	983,600			

Month and Year	Elevation		Discharge		Average Second Feet	Total Acre Feet	Month and Year	Elevation		Discharge		Average Second Feet	Total Acre Feet
	Extreme High	Foot	Day	Sec. Ft.				Extreme High	Foot	Day	Sec. Ft.		
Sept. 1920	4	371.4	11	66,100	40,700	2,422,000	Aug. 1925	6	363.4	15	30,500	14,400	883,000
June 1922	4	371.0	15	64,000	28,600	1,704,000	Apr. 1926	4	365.5	21	56,800	5,240	312,000
June 1922	4	402.4	20	312,000			Aug. 1932	6	366.00	31	40,900	3,900	240,000
Sept. 1923	4	375.0	8	85,200	21,500	1,279,000	Sept. 1932	4	403.70	3	335,000	49,500	2,943,000
May 1925	4	391.4	31	189,000	13,900	856,000	Sept. 1932	4	374.90	9	84,600		
June 1925	4	390.9	1	186,000	8,340	496,000	Oct. 1932	4	373.97	2	79,500	31,700	1,951,000
July 1925	4	359.4	17	13,500	6,110	376,000	Oct. 1932	4	373.87	8	79,000		

RIO GRANDE AT ROMA STATION

Mean Daily Discharge in Second Feet

Day	1900		1905		1909		1910		1911		1912		1913		Day	1914		1919		1920	
	May	June	Sept.	July	Sept.	July	Sept.	Oct.	June	Oct.	Sept.	Oct.	Sept.	Oct.		Sept.	Day	Sept.	Day	Sept.	Day
1	19,000	4,420	2,050	56,900	15,500	3,500	5,390	6,320	24	94,000	26	186,000	1	45,000							
2	18,500	5,170	2,390	95,900	34,400	19,500	4,700	10,000	29,600	25	127,000	27	85,000	2	47,000						
3	11,500	5,620	3,140	41,800	55,000	13,700	4,800	9,700	87,300	26	89,000	28	53,500	3	52,000						
4	8,400	10,300	3,280	35,100	54,800	5,910	4,220	6,960	60,800	27	65,000	29	40,000	4	54,000						
5	6,920	5,440	3,070	28,100	54,800	4,950	3,800	5,030	26,800	28	51,000	30	36,500	5	53,000						
6	6,500	4,750	3,280	23,700	53,400	4,230	3,400	6,000	16,800						6	51,000					
7	6,310	4,750	4,990	21,600	39,600	3,650	4,480	7,500	12,800						7	51,000					
8	5,950	4,750	17,000	17,900	25,100	3,270	7,000	6,000	13,800						8	53,200					
9	5,500	3,200	29,300	14,600	21,800	24,800	12,500	5,800	12,700						9	56,000					
10	6,100	4,400	26,300	14,000	17,400	1,700	6,780	6,000	10,300						10	60,000					
11	5,600	7,280	30,800	13,400	10,300	5,130	4,950	8,280							11	61,000					
12	5,300	9,440	26,500	12,800	7,090	6,470	4,770	7,850							12	63,000					
13	5,890	30,800	47,800	12,100	6,070	7,420	6,370	7,700							13	61,500					
14	5,910	52,200	55,800	11,500	11,200	25,600	8,680	7,270							14	56,500					
15	6,290	68,800	100,000	11,000	35,900	32,200	10,800	6,540							15	68,500					
16	40,000	69,300	139,000	10,600	7,900	11,000	11,000	6,260							16	52,210					
17	45,000	58,900	139,000	10,700	7,900	11,000	10,800	6,120							17	44,000					
18	14,500	33,100	126,000	12,100	52,700	10,500	13,300	5,980							18	40,000					
19	9,900	18,600	60,600	10,400	38,100	10,000	25,800	5,700							19	39,500					
20	12,000	18,100	30,900	9,970	28,000	10,500	25,000	5,560							20	39,000					
21	15,000	19,100	28,400	10,500	* 16,900	10,500	63,100	5,210							21	37,500					
22	12,800	13,600	27,900	14,600	* 13,600	10,500	40,700	4,860							22	37,000					
23	12,100	12,400	33,100	15,500	* 11,900	10,000	32,600	4,510							23	37,500					
24	14,500	12,700	34,400	14,700	* 11,700	10,000	28,400	4,160							24	37,500					
25	17,000	12,700	31,800	14,400	* 11,100	10,000	25,400	3,880							25	36,000					
26	14,300	13,300	26,500	15,400	* 10,500	10,000	22,100	3,740							26	46,000					
27	11,400	23,700	27,000	15,500</																	

FLOOD FLOWS AND CORRECTED FLOWS

RIO GRANDE AT ROMA STATION

Mean Daily Discharge in Second Feet and Summary

Day	1925						1926						Day	1925						1926					
	# May	# June	# July	# Aug.	# Sept.	# Oct.	April							# May	# June	# July	# Aug.	# Sept.	# Oct.	April					
1	7,860	154,000	3,580	3,320	9,540	69,000	1,580	17	3,390	4,580	9,310	24,000	23,000	11,400	1,450							13,200	8,450	34,000	
2	6,410	97,000	2,860	3,220	13,700	27,900	1,580	18	3,010	4,220	10,700	24,500	20,900	15,500	1,450							12,300	10,000	33,500	
3	4,950	22,200	3,860	25,000	14,300	14,000	1,580	19	2,920	4,000	11,600	23,900	20,100	12,600	1,500							11,200	10,000	10,000	
4	3,350	12,500	5,180	16,000	12,900	12,500	1,600	20	3,400	3,830	8,070	23,000	17,200	9,080	1,350							14,800	10,800	5,300	
5	2,840	10,600	5,890	13,000	12,500	13,000	1,580	21	2,720	3,720	6,250	20,400	15,300	15,300	1,600							10,500	4,800	4,800	
6	2,560	7,770	6,290	7,000	11,900	11,000	1,620	22	2,680	3,650	7,030	19,100	13,200	8,450	34,000										
7	2,480	6,030	7,490	6,000	12,300	9,900	1,620	23	2,730	3,740	6,730	17,500	12,300	10,000	33,500										
8	2,380	5,750	7,690	5,000	26,100	9,100	1,600	24	2,580	3,910	5,780	15,400	12,000	11,200	10,000										
9	2,510	7,160	6,050	4,700	7,900	1,620	25	2,410	3,950	5,020	13,400	14,800	10,800	5,300											
10	4,960	6,570	5,660	8,920	28,900	7,600	1,620	26	2,320	3,690	4,540	11,800	16,300	10,500	4,800										
11	3,220	5,970	5,090	14,400	30,200	7,630	1,580	27	2,180	3,450	4,170	11,100	11,800	9,900	6,500										
12	5,780	5,170	5,490	14,100	32,300	7,900	1,450	28	2,000	3,300	4,020	9,640	11,400	9,200	6,200										
13	4,440	5,190	5,810	18,500	31,500	8,120	1,450	29	1,950	5,600	3,870	9,770	11,500	8,900	5,600										
14	3,220	1,950	7,260	28,800	30,500	12,400	1,450	30	39,000	3,520	9,620	13,700	8,300	5,300											
15	3,600	4,580	10,200	25,000	30,500	11,400	1,450	31	118,000	3,400	9,340	7,210													
16	3,970	4,300	11,400	26,000	26,200	10,100	1,450		Sum	414,850	455,730	584,340	389,890	143,630											
									255,620	414,850	193,690	584,340	143,630												
Month and Year	Gage	Discharge		Average Second Foot	Total Acre Feet	Month and Year	Gage	Discharge		Average Second Foot	Total Acre Feet														
	Extreme High	Foot	Day	Sec. Ft.		Extreme High	Foot	Day	Sec. Ft.																
June 1899		16	130,000			Sept. 1917		30	102,000																
April 1900		8	120,000			Sept. 1919		25	155,000																
May 1900		16	62,000			Sept. 1920		11	64,000																
June 1903	19.50	16	70,200	18,300	1,090,000	June 1922	35.00	22	202,000																
Sept. 1904	26.00	16	143,000	37,400	2,242,000	Sept. 1923	17.10	9	89,500																
July 1905	22.80	2	102,000	20,200	1,240,000	May 1925	22.00	31	130,000																
July 1909	19.20	3	57,000			June 1925	24.80	2	161,000	13,800															
Sept. 1910	20.50	16	82,000	18,900	1,123,000	July 1925	4.46	18	13,500	6,250															
Oct. 1911	21.60	8	77,600	11,500	705,000	Aug. 1925	11.92	3	32,000	14,700															
June 1912	21.30	20	90,000	17,800	1,060,000	Sept. 1925	17.10	8	68,000	19,500															
Oct. 1913	22.50	3	90,000	12,500	770,000	Oct. 1925	19.32	1	97,000	12,600															
Oct. 1914	24	140,000				Apr. 1926	12.60	22	50,300	8,790															

RIO GRANDE AT RIO GRANDE CITY STATION

Mean Daily Discharge in Second Feet

Day	1914			1916			1917			1918			1919			1920			1922		
	* May	June	Oct.	Sept.	* Sept.	Oct.	Oct.	Sept.	* Oct.	Aug.	Sept.	* June									
1	4,980	* 33,600	15,500	* 24,900	4,650	* 88,200	* 3,180	# 32,000	39,800	# 9,370	# 46,000										3,960
2	9,650	* 31,500	15,600	* 22,700	4,750	* 62,000	* 2,660	# 30,000	44,000	# 9,290	# 48,200										3,700
3	7,830	* 30,600	13,200	* 28,400	4,750	* 4,500	* 2,660	# 32,000	47,000	# 9,210	* 53,000										2,660
4	4,980	* 34,000	11,800	* 45,000	4,850	* 36,000	* 2,660	# 32,000	46,800	# 9,100	* 55,800										2,660
5	4,820	* 32,700	11,700	* 58,700	4,750	* 28,200	* 2,660	# 31,000	47,000	# 8,900	* 55,500										2,920
6	4,380	* 27,800	11,600	* 37,200	4,650	* 20,500	* 2,540	# 31,500	50,000	# 8,900	* 50,300										4,100
7	3,960	* 24,900	11,200	* 28,200	4,650	* 15,000	* 2,180	# 32,500	52,100	# 8,800	* 49,700										4,790
8	3,310	* 23,400	10,200	* 20,500	4,750	* 14,700	* 2,100	# 32,000	42,000	# 8,700	* 52,400										10,000
9	2,660	* 26,900	9,950	* 14,100	4,650	* 13,000	* 2,580	# 32,000	41,600	# 8,700	* 52,200										3,670
10	2,300	* 29,000	9,120	* 10,400	4,750	* 12,500	* 18,900	# 32,000	41,000	# 8,600	* 58,300										6,220
11	2,070	* 29,800	* 8,030	* 16,500	4,750	* 11,500	* 12,300	# 31,800	39,000	# 8,600	* 60,100										21,000
12	5,100	* 30,200	* 19,300	* 28,000	4,750	* 10,500	* 16,000	# 31,800	39,400	# 8,100	* 61,300										75,900
13	23,800	* 30,600	* 34,000	* 55,800	4,850	* 10,500	* 5,850	# 31,900	39,000	# 8,100	* 58,300										101,000
14	32,300	* 29,800	* 37,800	* 79,500	5,420	* 10,000	* 8,050	# 32,800	37,000	# 10,500	* 52,300										65,800
15	17,000	* 29,000	* 31,500	* 60,800	5,540	* 9,500	* 9,880	# 42,700	39,000	# 23,000	* 48,000										33,700
16	7,390	* 27,800	* 18,000	* 39,300	5,660	* 8,600	* 5,490	# 42,700	39,000	# 27,000	* 42,700										112,000
17	5,310	* 25,300	* 16,500	* 29,000	5,660	* 8,100	* 5,850	# 47,700	51,000	# 25,500	* 46,600										130,000
18	6,990	* 27,800	* 15,000	* 25,300	5,810	* 9,000	* 10,700	# 47,700	51,000	# 22,000	* 36,000										90,300
19	17,600	* 34,000	* 18,300	* 23,400	6,810	* 8,300	* 28,400	# 40,000	40,000	# 27,000	* 32,000										85,200
20	22,700	* 31,000	* 28,000	* 20,600	6,810	* 6,100	* 6,500	# 42,000	42,000	# 22,000	* 42,000										123,000
21	22,700	* 40,900	* 11,500	* 20,500	10,600	* 7,400	* 33,900	# 49,500	39,700	# 31,000	* 34,200										166,000
22	16,500	* 44,000	* 12,000	* 14,100	29,800	* 7,300	* 24,800	# 48,800	39,700	# 32,000	* 35,800										166,000
23	35,000	* 36,900	* 32,400	* 8,500	21,900	* 7,200	* 59,100	# 69,900	38,400	# 34,000	* 32,700										100,000
24	44,500	* 28,000	* 8,400	* 10,200	20,500	* 7,200	* 54,100	# 107,000	27,000	# 37,000	* 51,000										58,500
25	53,500	* 29,400	* 13,200	* 12,000	15,000	* 6,900	* 25,300	# 122,000	25,000	# 48,700	* 48,700										28,200
26	68,200	* 31,000	* 87,500	* 16,000	21,100	* 6,800	* 18,300	# 133,000	24,000	# 43,000	* 25,000										10,500
27	76,100	*																			

FLOOD FLOWS AND CORRECTED FLOWS

RIO GRANDE AT RIO GRANDE CITY STATION

Summary

Month and Year	Gage			Average Second Feet	Total Acre Feet	Month and Year	Gage			Average Second Feet	Total Acre Feet					
	Discharge						Extreme High									
	Feet	Day	Sec. Ft.				Feet	Day	Sec. Ft.							
May 1914	20.8	27	85,600	20,200	1,243,000	Sept. 1919	26.5	26	136,000	56,500	3,359,000					
June 1914	14.3	22	45,600	29,700	1,769,000	Oct. 1919	18	57,500	37,900	2,328,000						
Oct. 1914	25.8	25	129,000	28,000	1,721,000	Aug. 1920	15.2	25	50,300	22,500	1,586,000					
Sept. 1916	20.8	14	85,600	28,200	1,676,000	Sept. 1920	17.2	12	61,900	42,400	2,520,000					
Sept. 1917	21.6	30	91,200	16,000	951,000	June 1922	29.5	22	176,000	44,300	2,638,000					
Oct. 1917	21.7	1	91,900	16,300	1,002,000	Sept. 1923	23.3	11	104,000	40,000	2,378,000					
Oct. 1918	17.8	24	65,700	13,300	819,000	April 1926	17.0	22	34,000	3,970	236,000					

RIO SALADO STATION AT CD. GUERRERO, TAMAULIPAS

Mean Daily Discharge in Second Feet 1925 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	933	576	353	367	2,513	3,180	141	22.2	334	25,640	1,360	749
2	908	576	353	353	2,154	1,250	124	8,050	1,010	7,380	1,360	731
3	886	558	343	343	996	975	108	3,450	494	5,160	1,360	713
4	865	558	333	333	660	643	98.5	2,200	313	4,340	1,330	696
5	841	558	333	313	508	466	93.9	1,360	155	3,230	1,300	678
6	841	558	333	293	402	378	89.0	1,040	184	3,120	1,300	678
7	819	558	333	283	333	427	85.5	611	823	2,890	1,250	660
8	819	544	323	273	293	696	75.6	403	3,530	2,730	1,220	660
9	802	526	323	263	263	1,050	68.9	452	1,330	2,550	1,200	643
10	784	509	313	253	253	508	68.9	477	840	2,410	1,120	643
11	766	494	303	253	273	526	65.7	427	1,250	2,280	1,120	643
12	749	477	293	302	303	526	75.6	403	2,500	2,200	1,090	643
13	749	466	283	886	273	526	68.9	378	3,120	2,160	1,090	625
14	731	466	283	388	228	452	62.5	367	2,940	2,120	1,040	625
15	731	466	273	378	212	388	59.3	378	3,000	2,080	1,020	611
16	713	452	273	477	175	388	56.1	378	2,820	2,040	996	593
17	713	452	273	343	162	367	50.5	333	2,780	1,920	953	576
18	696	427	273	273	135	353	41.7	323	2,730	1,890	953	576
19	678	417	263	245	148	323	37.4	367	2,640	1,890	953	576
20	660	403	253	228	155	283	30.7	367	2,780	1,810	953	575
21	643	403	245	212	190	273	29.0	303	2,690	1,770	932	576
22	643	403	237	204	273	245	27.5	273	5,060	1,740	907	575
23	643	388	253	197	237	220	25.8	253	2,880	1,740	886	576
24	625	388	2,900	190	183	212	24.0	228	3,780	1,590	864	558
25	625	388	1,730	183	162	197	24.0	228	3,570	1,560	840	558
Sum		13,084		8,655		15,661		24,284.2		97,440		18,893
22,489		14,993		12,651.4		1,764.6		77,053		31,386		

Year 1925

Period One Year

Month	Extreme Gage			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	Fee			High				Normal	Maximum	Minimum		
	High	Low	Day	Day	Day			Day	Day	Day		
Jan.	4.76	4.17	1	933	#	593	725	44,610				
Feb.	4.13	3.61	#	576	#	353	467	25,950				
Mar.	8.14	3.22	24	6,040	22	237	484	29,740				
Apr.	5.12	2.82	13	1,200	30	148	288	17,170				
May	7.58	2.43	1	4,770	30	85.5	408	25,090				
June	7.38	2.79	1	4,340	30	141	522	31,060				
July	2.79	1.57	1	141	30	19.4	56.9	3,500				
Aug.	11.38	1.61	2	19,420	1	20.8	783	48,170				
Sept.	11.48	2.66	30	20,130	6	119	2,570	152,800				
Oct.	14.04	5.31	1	40,610	31	1,360	3,140	193,300				
Nov.	5.31	4.46	#	1,360	30	749	1,050	62,250				
Dec.	4.46	4.00	1	749	#	509	609	37,470				
Yearly	14.04	1.57		40,610		19.4	927	671,110				

And other days

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

In Thousands of Acre Feet

The data below cover all reservoirs in the Rio Grande Basin having over 15,000 acre-foot capacity. The monthly figures represent the acre feet of water in storage on the last day of each month. The capacities shown are at spillway level and any storage figures published which are greater than the capacity, indicate that the water surface was above spillway level.

The names of the reservoirs and the sources of the data are: Rio Grande, Continental, Santa Maria, Terrace, Mountain Home, and Sanchez from Colorado State Engineer, Costilla from San Luis Power and Water Company, and El Vado from New Mexico State Engineer. Bluewater data are from the Bluewater-Tultec Irrigation 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 Red Bluff Water Power Control District, Fesco, Texas. Willacy data are from the Willacy County Water Control and Improvement District No. 1.

The data for Boquilla Reservoir for 1945 is from the Compania 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 Crédito Agrícola, S. A. Data for Culebra, Villa Cardenas and Palito Blanco of 2 are from the National Production Commission of Mexico. The data for storage began in the new El Azucar Reservoir in March 1943. The data for storage in El Azucar are from the Lower San Juan Irrigation District of Tamaulipas, Mexico. For information on some temporary storage in El Azucar Reservoir in 1942 see Remarks under Rio San Juan Station at Santa Rosalia on page 39 of Water Bulletin No. 12.

On the United States Side

Month	Rio Grande (Capacity 51.1)		Continental (Capacity 26.7)		Santa Maria (Capacity 20.1)		Terrace (Capacity 17.7)		Mountain Home (Capacity 20.1)		Sanchez (Capacity 103.2)		Costilla (Capacity 15.7)		El Vado (Capacity 20.3)		Bluewater (Capacity 43.5)	
	1945	#Normal 1929-1945	1945	#Normal 1929-1945	1945	#Normal 1929-1945	1945	#Normal 1929-1945	1945	#Normal 1929-1945	1945	#Normal 1929-1945	1945	#Normal 1922-1945	1945	#Normal 1935-1945	1945	#Normal 1927-1945
Jan.	18.9	14.8	17.7	4.9	10.9	7.7	3.3	2.7	1.7	4.7	9.5	13.5	2.0	3.9	88.2	55.6	0	6.5
Feb.	20.2	16.1	17.7	4.9	11.3	8.4	3.4	3.1	1.9	5.1	9.4	13.5	2.2	4.2	91.3	56.4	0	7.6
Mar.	21.4	17.4	17.7	4.9	11.8	9.9	3.7	3.5	2.4	5.4	10.1	14.3	2.7	4.7	98.6	61.2	1.4	12.4
Apr.	22.3	17.2	19.5	5.0	16.7	12.0	4.0	4.1	3.2	6.1	12.1	16.1	3.8	6.0	139.3	120.3	4.9	16.3
May	29.3	26.4	19.3	7.3	14.9	17.0	8.1	7.6	6.1	8.5	21.9	22.0	8.0	8.7	201.7	176.8	2.6	13.9
June	16.5	26.1	16.1	8.0	16.2	19.4	5.7	9.4	7.1	8.6	18.4	20.7	7.3	7.7	202.5	167.5	1.2	10.9
July	1.1	16.7	16.5	6.7	6.0	15.0	3.6	4.6	3.5	12.2	17.4	20.7	2.9	4.4	174.8	134.8	1.6	9.2
Aug.	1.4	7.1	13.3	5.2	2.8	3.3	1.5	3.1	3.1	3.9	11.6	12.4	1.4	2.3	137.0	106.0	1.3	7.9
Sept.	.4	6.5	13.2	5.3	2.0	5.1	5.5	2.5	1.8	3.4	3.1	12.4	2.8	3.6	98.6	61.0	1.0	7.6
Oct.	.1	7.8	15.2	4.9	2.0	5.5	6.6	2.7	1.6	3.5	3.8	13.2	7	2.7	98.8	59.8	0	7.1
Nov.	2.6	11.5	15.2	5.0	3.3	6.4	.8	2.1	2.0	4.0	4.3	12.9	.9	3.1	83.2	57.3	0	6.9
Dec.	3.8	12.9	13.1	5.3	4.3	6.9	1.0	2.1	2.4	4.3	5.0	12.8	1.1	3.4	64.6	60.2	0	6.6
Avg.	11.4	15.2	15.7	5.6	8.6	9.7	3.0	4.1	3.2	5.3	9.7	14.8	2.8	4.5	123.4	92.7	.9	9.4
Max.	29.3	51.8	19.5	22.2	16.7	42.1	8.1	17.7	7.1	16.4	21.9	62.4	8.0	15.1	208.3	202.3	4.9	47.1
Min.	.4	0	13.1	0	2.0	0	.5	0	1.6	0	3.1	1.6	.4	0	83.2	2.3	0	0

Month	Elephant Butte (Capacity 2,219.0)		Caballo (Capacity 346.0)		Alamogordo (Capacity 132.2)		McMillan and Avalon (Capacity 44.8)		Red Bluff (Capacity 310.0)		Willacy (Capacity 25.0)		Total in United States Reservoirs (Capacity 3,598.9)		
	1945	Normal 1919-1945	1945	#Average 1939-1945	1945	#Average 1939-1945	1945	#Average 1939-1945	1945	#Normal 1908-1945	1945	#Average 1936-1945	1945	#Average 1939-1945	1945
Jan.	1,272.1	1,059.7	266.3	207.5	30.0	73.7	8.9	35.0	155.3	170.5	14.1	16.5	1,990.9	1,675.2	
Feb.	1,257.1	1,041.9	297.8	181.1	55.7	71.9	6.6	33.5	155.3	174.6	16.5	15.1	1,977.0	1,671.7	
Mar.	1,239.9	1,021.4	261.0	165.7	57.7	64.3	5.1	31.4	155.3	171.3	11.4	12.0	1,873.2	1,671.7	
Apr.	1,209.6	1,042.3	218.9	61.1	59.7	10.7	22.1	123.9	149.2	15.3	17.8	1,813.1	1,646.3		
May	1,184.6	1,216.3	171.2	117.6	21.0	77.3	26.1	104.0	171.8	10.0	14.9	2,104.7	1,912.8		
June	1,196.7	1,271.9	123.2	94.2	4.0	64.6	5.8	68.1	190.9	7.4	17.9	2,025.8	1,944.0		
July	1,423.2	2,029.8	66.0	72.6	8.1	69.2	0	20.0	162.8	170.7	16.7	19.3	2,177.1	1,777.1	
Aug.	1,353.2	1,131.6	27.6	58.6	15.8	65.5	1.3	18.2	39.5	151.2	16.6	16.8	1,618.4	1,574.5	
Sept.	1,327.7	1,071.4	25.2	38.2	1.8	63.9	2.0	20.4	32.4	151.2	1.7	1.8	1,485.6	1,418.8	
Oct.	1,307.7	1,065.3	65.0	7.0	6.9	47.7	4.3	38.8	183.9	16.8	18.3	1,469.5	1,558.0		
Nov.	1,167.7	1,079.7	114.5	118.1	10.3	61.2	6.9	42.9	147.9	16.9	16.6	1,408.5	1,482.6		
Dec.	1,130.1	1,080.9	164.0	161.9	18.0	64.7	5.5	29.8	49.1	153.3	18.2	18.2	1,490.5	1,623.1	
Avg.	1,292.5	1,116.1	150.1	118.9	16.4	67.5	4.9	25.6	86.0	161.4	14.4	17.0	1,743.1	1,667.9	
Max.	1,519.7	2,308.8	400	346.6	37.0	106.3	10.7	85.5	155.6	387.5	16.9	27.3	2,104.7		
Min.	1,130.1	3.3	5.1	4.1	4.0	4.0	0	0	28.8	11.0	7.4	7.4	1,444.1		

On the Mexican Side

Month	Boquilla (Capacity 2,116.0)		Centenario and San Miguel (Capacity 19.9)		Don Martin (Capacity 1,123.0)		** El Azucar (Capacity 42.6)		* Culebra (Capacity 244.9)		Total in Mexican Reservoirs (Capacity 3,929.4)	
	1945	#Normal 1924-1945	1945	Normal 1934-1945	1945	Normal 1930-1945	1945	Estimated Normal	1945	#Average 1939-1945	1945	Estimated Normal
Jan.	1,833.5	1,549.1	20.1	12.5	729.1	396.3	296.7	271	124.2	76.3	3,003.4	2,305.2
Feb.	1,769.5	1,529.8	18.7	12.2	710.9	393.3	291.9	252	122.4	68.0	2,924.2	2,220.8
Mar.	1,660.7	1,511.7	11.5	9.2	679.2	360.7	290.0	194	91.1	59.0	2,669.3	2,081.7
Apr.	1,602.7	1,349.7	11.9	8.0	647.3	363.3	288.9	141	81.4	50.0	2,469.0	1,881.4
May	1,506.0	1,349.7	13.1	9.1	606.2	337.7	295.3	86	48.2	44.8	2,467.0	1,887.3
June	1,405.0	1,258.7	6.8	8.0	541.2	336.0	229.0	158	39.2	57.1	2,247.2	1,884.8
July	1,390.2	1,302.5	5.1	7.9	510.3	330.0	250.5	216	50.9	53.4	2,355.0	1,909.8
Aug.	1,667.3	1,478.0	5.1	8.6	480.5	307.8	247.9	270	32.4	57.2	2,433.2	2,141.6
Sept.	1,389.1	1,636.8	5.3	11.2	472.3	393.0	264.0	306	24.0	68.9	2,355.2	2,111.9
Oct.	1,663.1	1,631.0	10.1	12.5	517.5	414.6	378.9	303	119.2	87.1	2,683.7	2,144.5
Nov.	1,593.0	1,594.4	9.8	11.1	518.5	424.0	346.2	299	110.0	70.0	2,629.0	2,145.6
Dec.	1,544.6	1,579.0	9.4	11.6	565.1	430.1	323.1	281	107.3	78.4	2,191.5	2,180.1
Avg.	1,625.0	1,482.0	11.0	10.2	578.3	374.1	295.0	231	79.1	63.2	2,308.5	2,166.5
Max.	1,833.3	2,284.5	20.1	20.6	729.1	1,165.4	372.9	240.0	124.2	143.3	3,003.4	
Min.	1,405.0	37.6	5.1	.6	472.3	.7	247.9	240.0	18.2	2,247.2		

* Some months missing. † Daily extremes. * Combined storage of Culebra, Villa Cardenas and Palito Blanco. ** Capacity at 72 meters elevation. Spillway under construction. ‡ The minimum published in Water Bulletins 11, 12, 13 and 14 should be disregarded.

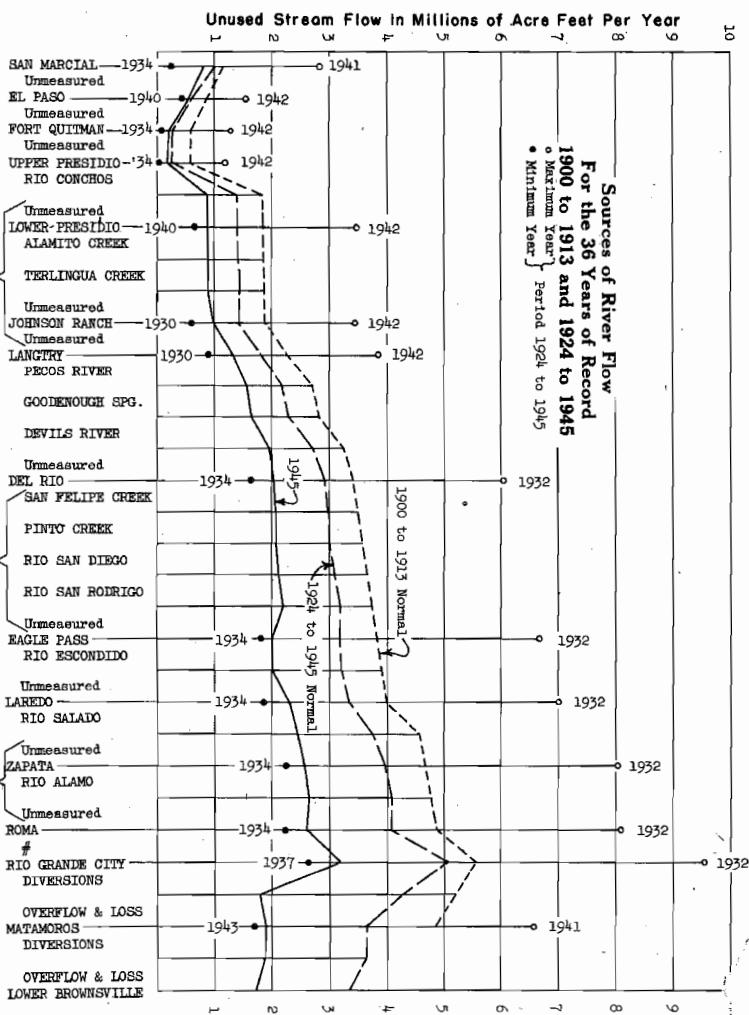
SOURCES OF RIVER FLOW

A distinction must be made clear between the figures in the table at the lower or left side of this page showing average annual unused run-off, and the graphical part of the page, showing average annual unused stream flow. As an illustration of this distinction, consider these two different values at Langtry. Both values are expressed as average annual amounts tributary to the station. The amount shown graphically above or to the right of the page is the water which actually flowed past this station. On the other hand, the amount shown by figures below, or to the left of the page, is the water which actually flowed past this station, and from which a certain amount of water is subtracted, and to which certain other amounts of water are added. In the case of Langtry, these subtractive and additive amounts of water are: (a) Subtractive - the water which ran off the watershed into Boquilla Reservoir in years prior to 1924, and was drawn from the reservoir during the period 1924-1945. (b) Subtractive - the water impounded prior to 1924 and withdrawn from Caballo and Elephant Butte reservoirs during the period 1924-1945. (c) Additive - the water impounded since 1924 in El Vado and several small reservoirs on the Upper Rio Grande in New Mexico and Colorado, and which remained therein at the end of 1945. This additive carry-over storage in El Vado and the small reservoirs on the Rio Grande above San Marcial averaged 4,870 acre feet per year. In Caballo and Elephant Butte reservoirs, the storage loss averaged 4,190 acre feet per year subtractive. The carry-over storage in Boquilla Reservoir averaged 26,880 acre feet per year subtractive. Other carry-over storage figures are: Alamogordo, Avalon, McMillan, and Red Bluff on the Pecos River, 1,210 acre feet per year additive. Centenario and San Miguel on the Rio San Rodrigo, 430 acre feet per year additive. Don Martin on the Rio Salado, 22,960 acre feet per year additive. El Azucar on the Rio San Juan, 14,780 acre feet per year additive.

Average Annual
Unused Run-off
A. F. Per Sq. Mi.

1900-1913 1924-1945

46.8 *	41.2 *
29.7 *	20.8 *
17.1 *	8.4 *
16.6 *	7.4 *
51.0	44.5
23.6	21.6
28.6 *	22.5 *
12.3	10.4
115,000	104,700
106	104.6
55.3	67.3
28.1 *	23.8 *
109	69.3
30.5 *	25.1 *
29.7	33.8
30.5 *	25.4 *
27.2	19.6
60.9	63.8
31.0 *	25.9 *
32.6 *	29.7 *



* Unused run-off at and above gaging station. # Estimated. # San Juan plus unmeasured. Prior to March 1943, the San Juan flowed into the Rio Grande and afterwards it was mostly retained in Azucar Reservoir.

DIVERSIONS FROM THE RIO GRANDE INTO THE ACEQUIA MADRE

Near Juárez, Chihuahua

DESCRIPTION: Water-stage recorder and bridge for meter measurement located about 260 feet below the canal intake at the International Dam at Juárez, Chihuahua, which is 2½ river miles below the American Dam at El Paso, Texas. Prior to July 29, 1944, the station was located 1 mile below the canal intake.

RECORDS: Based upon 135 meter measurements during the year, 107 by the Mexican Section and 28 by the American Section. Computations by shifting channel methods. 1945 records good. Records available: 1938-1945.

REMARKS: In 1945, 58,300 acre feet were distributed to 17,653 acres of land irrigated in the first unit under the canal where a diversion duty of 3.30 acre feet per acre was obtained. 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 further down the canal.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. July 21, 1944, 480 sec.ft. with a gage height of 6.00 ft. Min. Dry through January, February, October, November, and December of each year.

Average Daily: Max. May 10, 1942, 339 sec. ft.; Min. Dry during 5 months of each year.

Average Monthly: Max. May 1958, 283 sec. ft.; Min. Dry during 5 months of each year.

Average Yearly: Max. 1942, 116 sec. ft.; Min. 1941, 76.3 sec. ft.

Average of Two Successive Years: Max. 1942-1943, 100 sec. ft.; Min. 1940-1941, 78.4 sec. ft.

Average of Three Successive Years: Max. 1942-1944, 95.3 sec. ft.; Min. 1939-1941, 80.2 sec. ft.

Average of Four Successive Years: Max. 1942-1945, 92.5 sec. ft.; Min. 1938-1941, 80.9 sec. ft.

Average of Five Successive Years: Max. 1941-1945, 89.3 sec. ft.; Min. 1938-1942, 87.9 sec. ft.

Average of Eight Years: 1938-1945, 86.9 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	9.9	62.5	176	186	155	163	157	62.5	0	0
2	0	0	25.8	109	202	170	156	162	167	0	0	0
3	0	0	29.7	113	205	171	160	155	159	0	0	0
4	0	0	28.2	97.8	212	174	157	157	170	0	0	0
5	0	0	27.2	95.0	216	167	155	156	162	0	0	0
6	0	0	28.2	101	217	171	153	147	168	0	0	0
7	0	0	26.8	95.3	233	166	152	152	* 163	0	0	0
8	0	0	29.7	103	227	164	156	156	* 166	0	0	0
9	0	0	26.1	119	217	175	155	158	153	0	0	0
10	0	0	22.2	99.9	216	177	162	151	161	0	0	0
11	0	0	20.8	101	224	172	154	151	166	0	0	0
12	0	0	21.5	99.2	220	167	149	160	174	0	0	0
13	0	0	23.3	94.6	224	165	155	165	169	0	0	0
14	0	0	23.3	96.4	228	167	162	163	164	0	0	0
15	0	0	25.1	104	226	162	160	160	167	0	0	0
16	0	0	29.7	109	223	156	166	163	173	0	0	0
17	0	0	30.4	106	219	152	164	157	170	0	0	0
18	0	0	33.2	105	227	162	156	158	166	0	0	0
19	0	0	38.8	105	227	155	153	158	164	0	0	0
20	0	0	27.9	116	191	155	147	157	163	0	0	0
21	0	0	28.9	119	217	159	159	163	155	0	0	0
22	0	0	24.7	123	214	156	156	154	155	0	0	0
23	0	0	25.1	119	217	152	162	157	158	0	0	0
24	0	0	27.2	116	217	155	159	154	157	0	0	0
25	0	0	28.9	113	231	157	153	155	161	0	0	0
26	0	0	28.2	116	203	164	153	162	157	0	0	0
27	0	0	27.9	133	295	159	159	161	159	0	0	0
28	0	0	31.8	145	233	164	158	165	161	0	0	0
29	0	0	31.8	143	215	169	169	156	165	0	0	0
30	0	0	28.6	135	217	158	205	152	162	0	0	0
31	0	0	31.4	113	218	199	147	0	0	0	0	0
Sum	0	842.3	3,293.7	6,747	4,927	4,959	4,875	4,892	62.5	0		

Month	1938-45		Current Year 1945				Period 1938-1945		
			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet		
	Average Rainfall Inches	Day	High Day	Low Day			Average	Maximum	Minimum
Jan.	.43	.12			0	0	0	0	0
Feb.	.33	.07			0	0	0	0	0
Mar.	.36	.75	29	44.1	1	0	27.2	2,549	5,540
Apr.	.21	.20	8	187	1	26.1	1,670	7,754	1,000
May	.36	0	29	245	1	130	6,530	11,720	6,040
June	.93	.01	1	222	20	145	218	13,380	11,200
July	1.32	1.26	31	265	31	135	164	9,770	15,700
Aug.	1.40	.43	12	178	31	141	157	9,670	9,760
Sept.	1.28	.04	16	186	22	147	163	9,700	10,400
Oct.	1.17	3.85	1	166	#	0	2.0	124	15,170
Nov.	.40	0			0	0	0	0	7,910
Dec.	.56	.01			0	0	0	0	5,920
Yearly	8.75	6.74		265		0	83.8	60,684	62,776
Acreage Irrigated on First Unit only							17,653	16,226	17,653
Mean Acre Feet per Acre on the First Unit only							3.30	3.26	3.90
Average Rainfall in Inches(Entire Valley Floor above Island)							6.74	8.75	16.70
* Partly estimated # Various days of the month ◊ Period 1939-1945									5.85

DIVERSIONS FROM THE RIO GRANDE

INTO THE AMERICAN CANAL AT EL PASO, TEXAS

DESCRIPTION: This gaging station is an open channel rating station in concrete lined canal with water-stage recorder located 396 feet below the head gates at the American Dam near El Paso, Texas. The center of the American Dam is about .03 mile upstream from the point where the Western Land Boundary joins the River Boundary between the United States and Mexico. Measurements are made at the downstream end of the first covered section of this canal. Zero of the gage is 3,712.09 feet above U. S. C. & G. S. sea level datum.

RECORDS: Based upon 32 current meter measurements during the year and a stable rating curve. 1945 records excellent. Records available: June 2, 1938, to December 31, 1945. Monthly records 1938-1943 will be found in Water Bulletin No. 13.

REMARKS: This canal diverts water from the Rio Grande at the American Dam near El Paso, Texas, 2.1 river miles above the International Dam near Juarez, Chihuahua. 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, two small diversions are made from this canal. See lower part of second page, hereafter, for details concerning these two diversions.

COMPARATIVE FLOWS FROM RECORDS: **Momentary Peak:** Mar. Mar. 27, 1944, @ 1,840 sec. ft.; Min. ** sometimes dry. Average Daily: Mar. Aug. 13, 1945, @ 1,510 sec. ft.; Min. ** sometimes dry. Average Monthly: Mar. Aug. 1943, @ 1,210 sec. ft.; Min. ** sometimes dry. Average Yearly: Mar. 1943, 748 sec. ft.; Min. 1940, 491 sec. ft. Average of Two Successive Years: Mar. 1943-1944, 728 sec. ft.; Min. 1940-1941, 508 sec. ft. Average of Three Successive Years: Mar. 1943-1945, 712 sec. ft.; Min. 1939-1941, 528 sec. ft. Average of Four Successive Years: Mar. 1942-1945, 695 sec. ft.; Min. 1939-1942, 557 sec. ft. Average of Five Successive Years: Mar. 1941-1945, 661 sec. ft.; Min. 1939-1943, 595 sec. ft. Average of Seven Years: 1939-1945, @ 623 sec. ft.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	206	0	471	1,210	894	1,030	852	1,280	789	909	287	217
2	205	41.2	433	1,130	831	1,020	1,070	1,320	766	811	278	212
3	202	163	500	907	877	896	1,310	1,190	874	1,010	274	198
4	201	166	447	1,080	855	913	1,240	1,170	1,000	1,070	274	200
5	82.9	170	456	1,220	837	962	1,160	1,240	1,040	959	337	198
6	0	163	612	1,060	827	891	853	1,310	1,020	909	463	189
7	0	234	617	787	1,120	856	880	1,160	897	680	439	178
8	0	473	607	891	1,110	837	863	1,100	871	568	447	174
9	0	359	575	1,380	1,110	835	1,020	1,060	803	691	402	171
10	0	291	499	1,260	1,020	977	1,210	1,010	887	919	473	470
11	0	302	459	1,230	946	1,120	1,150	970	1,050	699	471	584
12	0	349	466	835	889	1,030	1,060	1,100	1,000	579	371	630
13	0	276	493	705	865	994	1,020	1,510	1,040	518	323	627
14	0	228	452	827	995	961	1,010	1,290	1,000	466	299	500
15	0	214	420	1,160	954	800	959	1,310	937	395	273	495
16	0	226	521	1,270	910	800	959	1,510	1,030	385	254	542
17	0	291	504	1,210	858	758	1,040	1,340	1,090	362	252	661
18	0	278	698	903	806	853	995	1,180	951	424	268	637
19	0	324	1,140	889	775	882	910	1,190	784	561	264	592
20	0	276	1,080	1,090	678	877	909	1,170	760	521	267	419
21	0	335	1,100	987	698	855	915	1,110	734	529	256	326
22	0	473	997	1,020	872	858	1,050	1,140	768	493	255	303
23	0	457	913	1,240	851	786	1,120	1,110	778	377	254	289
24	0	387	956	1,160	828	696	1,090	1,030	823	344	255	282
25	0	328	1,310	987	726	737	1,030	938	643	342	256	278
26	0	288	1,280	957	674	940	992	968	575	317	256	270
27	0	340	1,030	868	682	952	998	1,170	571	309	252	165
28	0	446	1,120	873	681	1,010	1,080	1,200	606	306	248	" 1.0
29	0	1,230	910	865	927	1,220	1,060	701	305	233	" 1.0	" 1.0
30	0	1,240	1,060	857	929	1,290	998	* 806	300	224	" 1.0	" 1.0
31	0	1,180		1,080				876	296			
Sum		7,878.2	/	31,106	26,942	36,010			17,354	9,811		
	896.9	23,806		26,971	32,545	25,594			9,205			

Current Year 1945

a Period 1938-1945

Month	Extreme Gage Feet			Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet			
	High		Low	Day	High			Average	Maximum	Minimum	
	High	Low			Day	Day	Low				
Jan.	5.73		2	210	6	0	28.9	1,780	2,629	8,110	61.5
Feb.	7.35		8	519	1	0	281	15,600	13,323	19,500	5,170
Mar.	10.88	6.57	25	1,650	2	378	768	47,200	39,750	50,100	24,450
Apr.	10.77	8.03	9	1,610	14	658	1,040	61,700	59,229	70,900	45,800
May	9.74	7.73	7	1,250	20	633	870	53,500	52,671	69,000	39,700
June	9.79	7.95	11	1,200	24	660	898	53,400	55,825	65,700	51,200
July	10.46	8.45	31	1,480	1	796	1,050	64,600	60,262	70,700	42,600
Aug.	10.72	8.54	13	1,570	31	810	1,160	71,400	62,150	74,600	44,000
Sept.	9.55	7.52	17	1,160	27	538	853	50,800	48,075	63,100	38,200
Oct.	10.77	6.00	9	1,630	31	286	560	34,400	26,500	39,000	13,100
Nov.	7.41	5.78	11	535	29	223	307	18,300	14,124	21,000	5,650
Dec.	8.51		18	756	428	1.0	316	19,500	15,134	25,500	8,440
Yearly	10.88			1,650		0	680	492,180	449,972	541,610	356,622

[#] Estimated [#] The average maximum and minimum discharges for January through May are for period 1938-1945
[†] And other days * Partly estimated [†] Beginning June 1938 ^{**} Except for seepage of less than 2.0 sec. ft.

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

RECORDS: July 1, 1938, to December 31, 1945.

REMARKS: 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 Fort Quitman gaging station.

The diversions were measured for 70,138 acres, or 98.7% 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 the United States Bureau of Reclamation. For 925 acres, (or 1.3% of the total area) lying below the Hudspeth District and above the Fort Quitman gaging station, the diversions were estimated.

From two diversions (the Franklin Canal below the Leon Street Wasteway and 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.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.1	0	434	493	929	884	999	1,149	808	20.3	127	4.1
2	11.1	0	437	992	769	969	1,134	1,123	655	0	208	96.2
3	11.1	0	443	912	929	903	1,177	1,137	962	126	26.3	208
4	5.1	0	539	1,078	922	922	1,187	1,068	938	204	102	174
5	0	48.6	467	1,074	920	976	1,219	1,009	984	181	227	176
6	0	89.1	601	1,197	823	945	1,043	1,073	1,009	10.1	434	345
7	0	0	667	835	910	950	931	1,058	954	153	440	91.2
8	0	63.8	701	858	1,050	971	894	1,083	835	189	430	6.1
9	0	333	682	1,045	1,191	911	995	1,066	822	269	422	0
10	0	334	633	930	1,104	1,059	981	1,080	854	227	97.2	344
11	0	270	569	1,157	1,022	1,108	1,215	1,078	1,031	157	70.9	378
12	0	364	500	919	973	1,155	1,147	1,004	976	212	75.0	479
13	0	330	527	846	844	1,130	1,018	1,092	990	32.4	193	439
14	0	221	495	807	1,075	876	946	1,158	947	43.6	221	384
15	0	227	416	1,030	1,155	911	681	1,133	888	102	186	13.2
16	0	115	421	1,063	931	810	1,039	1,323	866	95.2	228	163
17	0	281	602	1,111	918	796	1,087	1,268	973	100	176	435
18	0	210	592	1,008	798	806	973	1,159	977	153	180	400
19	0	268	837	950	735	937	849	1,030	789	139	342	375
20	0	261	794	1,116	759	920	1,009	1,133	653	23.3	347	412
21	0	284	855	1,040	736	868	963	1,090	785	85.1	336	219
22	0	424	854	981	865	1,006	1,022	1,108	756	276	333	118
23	0	462	883	1,193	859	926	1,105	1,123	751	287	262	109
24	0	366	886	1,152	840	739	1,114	1,074	743	272	45.8	87.1
25	0	258	898	1,062	838	711	1,024	1,016	665	274	136	0
26	0	252	1,085	861	783	948	934	1,041	580	184	181	0
27	0	275	1,048	962	722	980	993	1,040	570	27.4	134	0
28	0	371	1,020	875	816	1,009	1,062	1,045	575	86.1	227	0
29	0	904	942	860	1,019	1,030	1,008	820	110	230	0	0
30	0	1,173	570	821	948	1,191	928	517	122	39.4	0	0
31	0	793	1,114	898	1,114	1,120	858	1,120	113	0	0	0
Sum		6,107.5	29,059	28,093	33,535		4,273.5	5,455.9				
	38.4	21,756	27,990	32,082	24,673		6,476.6					

Month	1938-45		Current Year 1945				** Period 1938-1945		
	Average Rainfall Inches		# Extreme Second Feet		Average Second Feet		Total	Acre Feet	
	Day	Day	High	Low	Day	Acre Feet	Average	Maximum	Minimum
Jan.	.47	.13	‡ 1	11.1	‡ 5	0	1.2	76.2	369
Feb.	.36	.08	23	462	‡ 1	218	12,100	10,770	15,010
Mar.	.38	.81	30	1,173	15	416	702	43,200	36,376
Apr.	.23	.21	6	1,197	1	493	969	57,600	56,661
May	.38	0	9	1,191	27	722	903	55,500	51,423
June	1.00	.01	12	1,155	25	711	936	55,700	53,596
July	1.42	1.36	5	1,219	15	681	1,035	65,600	58,098
Aug.	1.51	.47	16	1,323	31	858	1,082	66,500	58,700
Sept.	1.38	.08	11	1,031	30	517	822	48,900	41,038
Oct.	1.26	4.14	23	287	2	0	138	8,480	49,090
Nov.	.33	0	7	440	3	26.3	216	12,800	14,614
Dec.	.60	.01	12	479	‡ 9	0	176	10,800	11,608
Yearly	9.72	7.26		1,323		0	601	435,256.2	414,445
Irrigated Acreage							71,063	67,874	71,063
Mean Acre Feet Per Acre							6.12	# 6.09	# 7.12
Average Rainfall in Inches							7.26	9.72	17.96

* Mean daily # Period 1939-1945 ‡ And other days ** July to December for the period 1938-1945, January to June for the period 1939-1945 ♦ Valley floor El Paso to Fort Quitman

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 1945, 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 inspection, it is estimated that the Smelter diversion averaged 1 second-foot and the Globe Mill averaged .5 second-foot. Thus a total of 1,086 acre-feet were diverted in 1945.

DIVERSIONS FROM THE RIO GRANDE

INTO THE MAVERICK CANAL EXTENSION BELOW THE POWER PLANT

Near Eagle Pass, Texas,

The Maverick Canal diverts water for power and irrigation from the Rio Grande into Texas at a point 17.4 river miles below the international bridge between Del Rio, Texas, and Villa Acuña, Coahuila, and 711.0 river miles below the American Dam at El Paso, Texas. The tail water from the hydroelectric plant (cap. 9,000 K.V.A.) returns to the river about 32.2 miles farther downstream.

The Maverick Canal Extension begins at the hydroelectric 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 31, 1945.

From this canal extension in 1945 there were 11,980 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 1945 the cultivated area was 5,087 acres, all of which were irrigated. Some waste water from this canal extension reaches the river below the Eagle Pass gaging station.

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	172	"161	117	146	103	126	151	144	130	170	164	206
2	150	"164	128	132	124	124	146	140	151	157	166	230
3	149	165	129	141	120	123	146	139	161	136	175	200
4	150	186	153	137	119	149	158	141	136	134	223	198
5	150	173	139	124	117	115	181	169	125	132	191	195
6	144	170	134	113	149	112	160	143	129	129	185	191
7	210	157	133	116	124	127	148	133	118	115	207	185
8	155	159	121	140	104	128	161	133	112	135	192	183
9	152	158	126	121	112	130	154	137	121	108	190	212
10	183	150	136	119	127	154	146	157	120	62.8	186	190
11	178	175	163	121	139	148	144	158	120	59.8	230	179
12	164	157	128	121	119	130	150	* 155	118	58.7	205	179
13	172	140	118	116	151	119	150	* 150	127	60.2	193	186
14	210	103	127	112	136	114	144	136	126	65.5	191	192
15	188	102	144	113	110	162	130	127	127	60.2	184	185
16	180	103	134	113	114	123	146	* 129	140	62.8	172	213
17	154	99.2	131	114	115	160	156	* 128	127	85.1	189	188
18	132	110	173	106	100	135	157	* 128	119	140	229	180
19	138	108	140	101	96.3	145	161	* 127	127	150	195	178
20	131	108	122	150	102	131	159	* 126	137	153	191	179
21	107	114	123	142	129	127	161	125	160	157	193	172
22	107	114	123	146	141	119	172	123	149	192	177	
23	105	116	127	143	146	118	159	135	167	146	191	178
24	106	116	125	143	135	160	158	136	159	147	188	166
25	" 107	122	161	125	129	147	153	125	143	147	230	188
26	" 108	115	146	102	125	157	155	112	187	165	186	161
27	" 108	116	121	101	133	164	158	125	216	177	187	168
28	" 109	118	125	97.3	150	151	155	135	190	191	192	194
29	" 128	152	116	145	116	151	156	136	188	171	197	196
30	" 159	153	106	119	147	154	129	174	164	165	229	
31	" 160	136	128				152	128			200	
Sum	3,779.2	3,697.3	4,044						4,212	3,953.1	5,876	
	4,566	4,188	3,864.3						4,813	4,327	5,811	

Month	Current Year 1945				Period 1939-1945			
	1924-45		Extreme Second Feet		Average Second Feet		Acres Feet	
	Average Rainfall Inches	Day	High	Low	Day	Acre Feet	Average	Maximum
Jan.	.90	1.39	6	233	10	93.5	147	9,060
Feb.	.74	.95	4	198	21	86.4	155	7,500
Mar.	.91	1.97	31	203	13	51.7	155	8,310
Apr.	1.53	1.37	21	199	19	48.8	123	7,330
May	3.27	1.65	13	195	10	60.2	125	7,660
June	2.25	.54	17	187	6	61.7	135	8,020
July	1.82	.41	5	187	11	98.0	155	9,550
Aug.	1.74	.56	5	178	26	82.8	156	7,256
Sept.	2.91	2.22	26	248	8	77.7	144	8,350
Oct.	1.69	4.31	28	204	11	45.8	128	8,580
Nov.	.77	.08	18	258	22	91.0	194	11,500
Dec.	1.20	.11	2	261	26	84.3	190	11,700
Yearly	19.73	15.56	261		45.8	146	105,400	85,597
Irrigated acreage							11,980	10,230
Mean acre feet per acre								11,980
Average rainfall in inches						15.56	19.73	29.27

" Estimated * Partly estimated ϕ Period 1924-1945

DIVERSIONS FROM THE RIO GRANDE ON THE UNITED STATES SIDE BELOW RIO GRANDE CITY STATION

Diversions from the Rio Grande for irrigation are made here almost entirely by pumping. 90.0% 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 109,036 acre-feet of water were diverted and used on the new Willacy County Irrigation District, where 70,900 acres were cultivated, of which 65,000 acres were irrigated. The cultivated area and water diverted to Willacy County are all included in the tables below. During the year 4,981 acres were cultivated in Starr County below Rio Grande City gaging station, of which 2,608 acres were irrigated from the Rio Grande. The cultivated areas shown here are all 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 91.6% of the cultivated area.

COMPARATIVE FLOWS FROM RECORDS:

♦ Average Daily:	Max. July 10, 1945, 3,680 sec.ft.;	Min. Dec. 25, 1938, 0.8 sec.ft.
Average Monthly:	Max. July 1945, 2,608 sec.ft.	Min. June 1930, 25.2 sec.ft.
Average Yearly:	Max. 1945, 1,561 sec.ft.;	Min. 1941, 653 sec.ft.
Average of Two Successive Years:	Max. 1944-1945, 1,440 sec.ft.;	Min. 1930-1931, 681 sec.ft.
Average of Three Successive Years:	Max. 1943-1945, 1,432 sec.ft.;	Min. 1930-1932, 733 sec.ft.
Average of Four Successive Years:	Max. 1942-1945, 1,437 sec.ft.;	Min. 1930-1933, 729 sec.ft.
Average of Five Successive Years:	Max. 1941-1945, 1,284 sec.ft.;	Min. 1930-1934, 744 sec.ft.
Average of Ten Successive Years:	Max. 1936-1945, 1,156 sec.ft.;	Min. 1929-1938, 821 sec.ft.
Average of Twenty-four Years:	1922-1945, 991 sec. ft.	

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	804	306	1,560	852	1,030	1,150	913	2,930	1,080	2,100	2,040	1,740
2	1,170	1,208	1,790	2,190	1,050	459	2,000	2,640	920	1,180	2,400	1,540
3	1,380	349	1,300	2,470	1,460	987	1,820	2,410	745	836	2,040	2,130
4	1,290	51.7	949	2,430	1,740	2,070	1,210	1,880	1,430	827	1,560	1,980
5	456	336	2,010	2,540	1,540	2,030	1,020	1,270	1,150	864	2,300	2,030
6	91.9	288	2,280	2,570	1,020	1,840	409	2,010	1,190	940	2,620	2,040
7	98.9	253	2,280	2,520	1,780	1,750	792	2,180	1,090	772	2,410	1,940
8	506	438	2,200	1,870	1,950	1,170	1,320	2,350	1,010	798	2,320	1,610
9	947	344	2,250	2,430	2,050	707	2,860	2,220	915	523	2,450	1,260
10	725	619	2,140	2,540	1,750	1,160	3,680	2,180	1,710	267	2,110	1,980
11	788	321	1,770	2,810	1,760	2,330	3,650	1,740	1,840	388	1,590	1,480
12	930	913	2,310	2,700	1,480	2,160	3,620	1,220	1,390	586	2,280	1,240
13	836	413	2,510	2,450	1,450	1,800	3,520	2,030	697	346	2,390	1,820
14	245	575	2,350	2,210	2,150	1,250	3,190	2,100	843	408	2,460	1,450
15	348	509	2,550	1,850	2,340	410	2,880	2,110	963	755	2,370	526
16	331	312	3,020	2,320	2,450	651	3,410	2,050	750	716	2,500	413
17	413	540	3,030	2,260	2,980	1,410	3,310	2,020	1,910	783	2,070	1,460
18	337	80.3	2,680	2,180	3,020	2,470	3,210	2,020	2,150	417	1,680	2,020
19	456	718	3,030	1,970	2,500	2,110	3,510	1,910	1,950	867	2,380	1,620
20	413	722	2,970	1,180	1,690	1,510	3,280	2,180	1,650	815	2,560	1,000
21	235	1,300	2,840	300	2,310	1,480	2,820	1,840	1,500	850	2,420	1,150
22	363	1,450	2,660	541	1,250	1,400	1,860	1,890	795	1,120	1,860	992
23	618	676	2,580	916	1,040	1,850	3,060	2,100	850	1,380	2,170	642
24	445	667	2,470	1,210	1,570	1,580	3,040	1,760	1,870	1,300	1,680	482
25	615	233	2,090	1,170	1,750	2,020	2,970	834	1,880	2,040	1,120	319
26	1,070	1,830	2,570	1,090	1,290	2,610	3,010	137	1,490	1,840	1,970	1,940
27	764	1,720	2,490	996	1,190	2,060	3,070	516	918	1,700	2,230	1,970
28	246	1,440	2,350	711	1,980	1,110	2,880	1,130	123	933	2,300	1,670
29	520	2,240	209	1,700	234	2,350	1,170	357	2,100	2,310	1,290	
30	478	2,050	559	1,560	301	3,000	1,160	1,160	2,260	2,170	953	
31	231	654	1,420			2,960	1,080		2,200		1,650	
Sum	17,712.0	52,044	54,250	44,049			55,067		32,911		14,337	
	18,150.8	69,933		80,624					36,286		64,760	

Month	1922-45		Current Year 1945				Period 1922-1945		
	**	@	Extreme Second Feet		Average Second Feet	Total	Acre Feet		
			High	Low			Acres	Normal	Maximum
Jan.	1.55	2.81	3	1,380	6	91.9	586	36,000	37,350
Feb.	.99	1.50	26	1,830	4	51.7	633	35,100	61,996
Mar.	1.28	.33	417	3,030	31	634	2,260	139,000	136,034
Apr.	1.27	2.23	11	2,810	29	209	1,730	103,000	123,000
May	3.44	1.32	18	3,020	6	1,020	1,750	108,000	121,697
June	2.85	1.17	26	2,610	29	234	1,470	87,400	98,538
July	2.01	1.08	10	3,680	6	409	2,600	160,000	161,115
Aug.	2.01	4.74	1	2,930	26	137	1,780	109,000	114,181
Sept.	4.69	1.41	18	2,150	28	123	1,210	72,000	84,791
Oct.	2.15	3.92	30	2,260	10	267	1,060	65,300	56,850
Nov.	1.31	.20	6	2,620	25	1,120	2,160	128,000	128,997
Dec.	1.91	.47	3	2,130	25	319	1,430	87,900	41,262
Yearly	25.46	21.18		3,680		51.7	1,560	1,130,700	1,130,700
							718,232		472,500
							544,415	372,836	544,415
									216,300
							2.08	1.93	2.68
							21.18	25.46	16.68
							21.18	25.46	16.68

** Lower Rio Grande Valley area on the United States side, Rio Grande City to the Gulf

† And other days @ Mean daily ♦ Period 1938-1945

DIVERSIONS FROM RIO GRANDE INTO THE RETAMAL CANAL

Near Rio Bravo, Tamaulipas

DESCRIPTION: Cable with car and water-stage recorder .87 mile below canal head gate. Zero of gage is .85 ft. above United States Coast and Geodetic Survey sea level datum. Head gate about 1,000 ft. from river bank. Canal leaves river about 24 river miles below Hidalgo-Reynosa Bridge near Hidalgo, Texas, and 1,108.8 river miles below American Dam at El Paso, Texas.

RECORDS: Based upon 147 meter measurements during the year. Computations by shifting channel methods. 1945 records good. Records available: September 1939 to December 1945.

REMARKS: Retamal Canal capacity is about 7,000 sec. ft. It empties into Culebron Reservoir which, in turn discharges into Villa Cardenas Reservoir from which a canal leads to Palito Blanco reservoirs nos. 1, 2 and 3. These reservoirs are used for irrigation purposes. During Rio Grande floods, flood water may escape from Villa Cardenas via floodway no. 1 to the Gulf of Mexico, but in 1945 there was no such escape. In 1945, 123,552 acres with irrigation facilities were cultivated under Retamal Canal, of which 35,748 acres were irrigated with 29,920 acre feet of water, and 87,804 acres were dry farmed.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. Sept. 12, 1944, 6,990 sec. ft. with a gage height of 76.31 ft.; Min. sometimes dry.

Average	Daily	Max.	Sept. 12, 1944,	6,920 sec. ft.;	Min.	sometimes dry.
Average	Monthly	Max.	Sept. 1944,	3,280 sec. ft.;	Min.	sometimes dry.
Average	Yearly	Max.	1944,	703 sec. ft.;	Min.	1943, 232 sec. ft.
Average of Two Successive Years:		Max.	1944-1945,	547 sec. ft.;	Min.	1942-1943, 308 sec. ft.
Average of Three Successive Years:		Max.	1943-1945,	441 sec. ft.;	Min.	1941-1943, 315 sec. ft.
Average of Four Successive Years:		Max.	1942-1945,	427 sec. ft.;	Min.	1940-1943, 315 sec. ft.
Average of Five Successive Years:		Max.	1941-1945,	410 sec. ft.;	Min.	1940-1944, 392 sec. ft.
Average of Six Successive Years:			1940-1945,	392 sec. ft.		

Mean Daily Discharge in Second Feet 1945 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	260	338	108	74.2	270	0	27.2	169	0	0	456	209
2	247	309	102	189	261	2.1	0	161	0	0	452	240
3	251	295	99.6	717	182	13.4	0	168	0	0	434	253
4	244	299	123	94.3	122	8.1	0	163	0	0	445	220
5	257	308	132	710	111	1.8	0	168	0	0	413	222
6	298	301	80.9	389	115	0	47.7	162	0	0	367	202
7	330	299	52.6	256	125	0	208	101	0	46.6	367	191
8	344	297	56.0	215	85.1	0	239	48.7	0	3,422	103	186
9	305	290	21.9	210	50.1	25.4	1,045	116	0	2,327	420	200
10	274	290	27.9	146	35.0	75.9	2,112	170	0	2,843	357	206
11	289	301	53.7	114	23.0	18.4	1,420	98.5	0	5,650	351	215
12	294	306	102	106	21.9	3.5	1,151	82.3	0	6,321	307	247
13	290	286	57.2	73.4	52.6	0	1,412	86.2	0	6,463	280	226
14	315	278	27.5	43.8	65.0	0	1,028	21.2	0	6,427	281	189
15	342	308	142	43.8	36.4	.7	1,780	7.4	0	4,626	230	191
16	338	307	431	65.0	52.6	9.9	2,211	13.8	0	3,955	210	214
17	346	276	313	34.2	199	13.8	1,653	31.4	0	3,524	220	211
18	424	267	257	44.1	157	5.3	1,352	45.2	0	2,984	277	168
19	431	299	305	45.9	118	1.4	968	36.4	0	2,253	300	148
20	385	289	134	84.8	83.3	0	791	32.5	0	1,971	251	182
21	364	257	44.1	167	58.3	0	795	18.4	0	1,635	191	186
22	392	233	32.1	1,918	5.3	17.7	1,713	31.8	0	1,367	199	193
23	438	217	26.8	2,970	11.7	175	1,137	10.9	0	1,268	230	200
24	445	204	25.4	1,600	9.5	183	717	0	0	1,155	237	240
25	431	204	25.8	989	0	152	547	0	0	922	296	207
26	364	184	26.1	742	0	23.7	487	41.3	0	717	302	137
27	322	155	7.8	487	0	0	406	261	0	650	242	112
28	317	117	3.9	367	8.8	0	332	378	0	667	200	126
29	325		3.2	332	3.2	0	353	262	0	622	193	134
30	327		2.5	340	0	72.7	335	43.4	0	523	204	172
31	352		4.9	0	0	227	0	0	501	501	197	
Sum	7,494		14,416.2		803.8		2,928.4		62,839.6		6,024	
Sum	10,341		2,808.9		2,261.8		24,493.9		0		9,115	

Month	1922-45	Current Year 1945				Period 1939-1945		
		Extreme Second Feet		Average Second Feet		Acre Feet		
		High	Low			Acre	Average	Maximum
Month	Average Rainfall Inches	Day	Day	Second	Total	Acre	Average	Maximum
				Feet	Acre Feet			
Jan.	1.55	2.81	24	456	4	29,510	13,498	25,080
Feb.	.99	1.50	1	345	28	14,860	6,752	14,860
Mar.	1.28	.33	16	452	31	0	5,570	7,193
Apr.	1.27	2.23	23	3,240	#	29.7	481	28,590
May	3.14	1.32	1	316	#	0	1,490	8,137
June	2.85	1.17	23	192	#	0	26.8	18,078
July	2.01	1.08	16	2,510	#	0	790	48,580
Aug.	2.01	4.74	28	385	#	0	94.5	5,810
Sept.	4.69	1.41	#	0	#	0	0	25,488
Oct.	2.15	3.92	14	6,600	#	0	0	96,180
Nov.	1.31	.20	1	487	21	184	304	195,100
Dec.	1.91	.47	2	270	27	104	194	16,741
Yearly	25.46	21.18		6,600		0	393	284,630
							267,810	508,160
								168,290
Water used for irrigation						29,920	† 27,791	† 32,374
Acreage cultivated						123,552	† 91,584	† 123,552
Mean acre feet per acre cultivated						.24	.30	.68
Average rainfall in inches						21.18	† 25.46	† 38.84
# Various days of the month						†	†	†
* Record began September 1, 1939						1945	1943-1945	
** Lower Rio Grande Valley area on the United States side, Rio Grande City to the Gulf								

Various days of the month * Record began September 1, 1939 † Period 1922-1945 ‡ Period 1943-1945

** Lower Rio Grande Valley area on the United States side, Rio Grande City to the Gulf

MUNICIPAL WATER USES

Tabulated below are yearly and monthly amounts of water pumped into the municipal distribution systems of several towns along the Rio Grande. The municipal and industrial water supply for the El Paso area in Texas and Juarez in Chihuahua came from deep wells (See Outfalls from Deep Wells, page 11, hereof) prior to November 7, 1943, when the city of El Paso began diverting some water from the Rio Grande for municipal use as shown in the table below. The Del Rio water comes from San Felipe Springs, the Eagle Pass water comes from infiltration wells in or adjacent to the bed of the Rio Grande, the Guerrero water comes from the Rio Salado, the others from the Rio Grande. Because of changing conditions, the period records are limited here to the past ten years. For earlier records see earlier water bulletins.

On The United States Side

In Acre Feet

Month	El Paso (Pop. 111,000 ***)			Del Rio (Pop. 15,500 ***)		
	1945	# Period 1943-1945		1945	* Period 1935-1945	
		Average	Maximum		Normal	Maximum
Jan.	0	35.3	70.6	0	87.5	78.3
Feb.	27.7	13.8	27.7	0	90.5	82.1
Mar.	371.2	286.0	371.2	200.7	129.1	112.1
Apr.	500.1	431.8	500.1	365.6	145.6	126.8
May	430.3	491.4	552.6	430.3	212.4	142.1
June	559.2	547.8	559.2	536.3	225.5	166.1
July	538.1	604.6	671.2	538.1	218.7	186.0
Aug.	514.4	551.4	588.5	514.4	239.2	167.8
Sept.	424.3	531.6	658.9	424.3	210.2	137.5
Oct.	454.8	324.1	454.8	193.4	84.8	103.6
Nov.	404.1	280.7	404.1	176.8	85.4	86.0
Dec.	139.8	201.5	273.2	139.8	78.5	76.9
Yearly	4,364.0	4,300.0	4,364.0	4,350.1	1,807.4	1,465.3
					1,902.1	1,916.5

On The Mexican Side

Month	Nuevo Laredo (Pop. 28,872 **)			Guerrero (Pop. 1,786 **)			Matamoros (Pop. 15,699 **)					
	Period 1936-1945			Period 1943-1945			Period 1942-1945					
	1945	Normal	Maximum	1945	Average	Maximum	1945	Average	Maximum			
Jan.	157.4	109.0	157.4	93.8	5.0	5.5	5.0	79.7	75.1	80.2	" 68.4	
Feb.	148.6	108.1	148.6	89.0	4.5	4.6	4.7	75.3	72.0	75.6	" 68.4	
Mar.	206.6	135.3	206.6	105.6	5.3	5.5	6.3	5.0	88.4	80.0	88.4	" 68.5
Apr.	210.5	153.2	210.5	109.2	6.1	6.9	7.3	6.1	86.8	77.4	86.8	" 68.4
May	269.2	168.2	269.2	101.6	7.5	7.7	8.0	7.5	91.9	79.8	91.9	" 68.4
June	268.8	170.7	268.8	129.6	8.0	8.3	8.5	8.0	84.3	79.0	88.6	" 68.5
July	265.9	180.3	299.6	115.2	8.8	9.3	10.1	8.8	90.5	83.5	92.1	" 68.4
Aug.	290.3	188.6	300.2	117.9	10.6	10.7	11.3	10.1	85.9	85.3	104.8	" 68.4
Sept.	262.4	161.8	262.4	115.0	8.5	8.1	8.5	7.3	83.5	81.2	88.2	" 68.5
Oct.	215.4	153.8	272.1	105.7	8.0	7.3	8.0	6.5	78.5	80.8	91.4	" 68.4
Nov.	220.8	132.8	220.8	82.3	6.6	5.9	6.6	4.9	77.2	77.7	85.2	" 66.8
Dec.	200.0	120.8	200.0	86.1	5.8	5.4	5.8	5.0	74.8	75.4	79.4	70.0
Yearly	2,715.9	1,775.2	2,715.9	1,343.1	84.7	84.9	87.5	82.4	996.8	947.2	1,010.4	* 821.1

* 1936 record missing. # Record began November 1943. ☠ Period 1944-1945.

*** 1945 estimate.

** 1940 census.

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES AND DIVERSIONS—1945

The gravimetric percentages of dried silt reported here were determined from numerous water samples taken in small necked bottles. Two methods of sampling were used.

- A. By lowering one 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 at all depths.
 B. By sampling in three bottles each at the surface of the stream, one bottle at the mid-point and one bottle at each side, one-sixth of the width from the water's edge. Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream cross section within reasonable limits of accuracy. (See Tech. Bull. No. 302, 1933, U. S. Department of Agriculture.)

The gravimetric percentages of dried silt were determined from the samples by two methods:
 1. By determining the silt in a single monthly composite which was composed by taking from each individual sample an amount proportional to the river flow represented by that sample. (One filtering, drying, and weighing each month.)
 2. By determining the silt in each sample bottle. (One filtering, drying, and weighing for each bottle.)

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.

Samples at San Marcial, Langtry, and Pecos River were collected by the U. S. Section, Method A, analyzed by the U. S. Section, Method 1.

Samples at Eagle Pass and Roma were collected by the Mexican Section, Method A, analyzed by the U. S. Section, Method 1.

Samples at Cuchillo Parado, Rio Alamo, Retamal Canal, and Las Palmas were collected by the Mexican Section, Method B, analyzed by the Mexican Section, Method 2.

Month	1945			Period of Record		
	Tons		Number of Samples	Gravimetric Percentages		Acre-Feet at 1,452 Tons Per Acre Foot
	Water	Silt		Average	Maximum Sample	

Rio Grande at San Marcial Station

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Period 1925-1945			
												Average	Maximum	Minimum	
64,746,000	64,741,000	78,337	26	.156									374.4	27.8	
55,865,000	27,532	31	.121										1,027.0	23.3	
94,633,000	157,423	30	.050										1,012.0	19.2	
517,331,000	1,101,215	29	.166										108.4	18.6	
132,528,000	197,170	30	.213										26.7	5.6	
21,718,000	21,457	23	.119										758.9	1,465.6	
29,915,000	556,281	29	.0988										1,143.5	5,610.4	
9,991,000	35,368	27	.1858										382.8	2,322.0	2.4
32,525,000	192,518	28	.354										24.4	1,170.0	83.4
28,752,000	63,254	26	.592										132.6	766.8	0
54,527,000	145,587	30	.220										43.6	134.8	7.2
													100.3	155.2	346.4
Yearly	1,107,273,000	2,677,816	340	.242									1,844.4	9,954.8	41,317.6
															1,844.4

Rio Conchos Station at Cuchillo Parado, Chihuahua

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Silt analyses began January 1, 1945			
												Average	Maximum	Minimum	
72,912,000	0	5	0	0	0	0	0	0	0	0	0	0			
51,830,000	0	12	0	0	0	0	0	0	0	0	0	0			
15,890,000	0	13	0	0	0	0	0	0	0	0	0	0			
19,830,000	0	13	0	0	0	0	0	0	0	0	0	0			
12,968,000	0	13	0	0	0	0	0	0	0	0	0	0			
21,515,000	0	13	0	0	0	0	0	0	0	0	0	0			
282,669,000	1,291,970	17	.5324	1,4397	0	0	889.8								
15,292,000	6,927	14	.0160	.0407	0	0	4.8								
9,726,000	467	12	.0048	.0609	0	0	.3								
285,027,000	1,447,620	26	.5908	1,4988	0	0	997.0								
76,440,000	0	13	0	0	0	0	0	0	0	0	0	0			
26,665,000	0	15	0	0	0	0	0	0	0	0	0	0			
Yearly	866,824,000	2,746,984	166	.3169	1,4988	0	1,891.9								

Rio Grande at Langtry Station

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Period April 1944-1945			
												Average	Maximum	Minimum	
112,005,000	15,233	7	.0136										10.5	66.4	3.3
99,383,000	12,920	8	.0130										8.9	95.5	3.2
77,189,000	9,335	7	.0121										6.4	15.3	3.7
97,611,000	96,419	10	.1030										66.4	34.8	3.7
36,617,000	5,346	9	.0146										3.7	46.4	2.8
34,580,000	4,115	7	.0119										2.8	90.0	2.7
511,384,000	6,509,918	23	1.2730										4,483.4	2,531.2	4,483.4
80,127,000	241,984	2	.3020										166.7	559.1	166.7
59,387,000	179,349	2	.3020										123.5	1,614.2	3,105.0
468,769,000	4,734,567	6	1.0100										3,260.7	2,302.4	3,260.7
138,354,000	24,489	5	.0177										16.9	14.8	12.6
93,717,000	8,247	6	.0088										5.7	8.6	5.7
Yearly	1,805,083,000	11,841,922	92	.6560									8,155.6		

Pecos River Station

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Period June 1943-1945			
												Average	Maximum	Minimum	
23,701,000	1,069	16	.00451										.74	.74	.37
20,087,000	1,243	14	.00619										.86	.86	.42
21,907,000	953	15	.00445										.66	.84	.66
20,756,000	280	14	.00135										.39	.50	.39
15,584,000	925	16	.00596										.64	.87	.64
12,703,000	897	15	.00706										.62	1.06	.62
72,750,000	97,485	19	.13400										67.11	27.28	67.14
17,328,000	451	10	.00260										.31	.54	.31
16,942,000	1,127	3	.00665										.78	3.29	.62
74,033,000	76,305	12	.10300										52.95	17.84	.52.55
24,262,000	523	15	.00224										.37	.57	.25
20,683,000	666	14	.00322										.46	.69	.28
Yearly	1,804,726,000	181,944	163	.0534									125.32	54.52	17.09

Period 1944-1945

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES AND DIVERSIONS—1945

Month	1945						Period of Record		
	Tons		Number of Samples	Gravimetric Percentages			Acre-Feet at 1,452 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum
Eagle Pass Station									
Jan.	205,181,000	27,329	28	.0133			18.8	26.0	124.0
Feb.	166,187,000	20,773	27	.0125			14.3	16.2	38.1
Mar.	151,999,000	26,326	29	.0174			18.1	30.7	2.6
Apr.	156,100,000	77,113	30	.0494			53.1	51.9	4.7
May	95,464,000	25,680	30	.0269			17.7	69.4	204.3
June	66,832,000	6,226	30	.0094			4.3	97.5	3,821.0
July	554,166,000	3,984,454	29	.7190			2,744.1	1,421.2	4,217.8
Aug.	122,968,000	21,519	31	.0175			14.8	1,294.1	7,835.8
Sept.	95,073,000	18,392	27	.0198			13.0	3,388.0	65.2
Oct.	714,236,000	4,163,996	27	.5830			2,867.8	1,307.1	13.0
Nov.	221,825,000	55,682	26	.0042			37.0	105.5	190.0
Dec.	170,879,000	25,119	29	.0147			17.3	26.2	305.5
Yearly	2,719,910,000	8,451,041	343	.3107			5,820.3	9,240.7	20,842.8
Period 1934-1945									

Month	Rio Alamo Station						Period 1934-1945		
	Water	Silt	Number of Samples	Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum
Jan.	3,733,000	0	8	0	0	0	4.0	21.8	0
Feb.	3,955,000	0	7	0	0	0	.05	.45	0
Mar.	4,745,000	270	7	* .0057	0	0	6.0	45.4	0
Apr.	9,190,000	18,068	8	.1966	.3468	0	12.4	30.7	227.4
May	4,696,000	20,528	8	.4371	.8360	0	14.1	45.6	229.7
June	1,114,000	0	7	0	0	0	67.0	471.0	2.2
July	2,220,000	4,218	8	.1900	.3326	0	2.9	27.1	92.8
Aug.	3,247,000	15,170	9	.1672	.6841	0	10.4	20.6	1,600.8
Sept.	9,809,000	86,064	10	.8774	1.1241	0	59.3	118.6	362.9
Oct.	55,942,000	305,866	9	1.2485	0	0	210.7	99.1	557.9
Nov.	2,199,000	0	7	0	0	0	0	1.1	5.2
Dec.	2,652,000	0	7	0	0	0	1.8	16.1	0
Yearly	83,478,000	450,182	95	.5393	1.2485	0	310.0	603.65	1,990.8
Period 1934-1945									

* No sample on March 31 of silty water

Month	Roma Station						Period March 1929-1945		
	Water	Silt	Number of Samples	Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum
Jan.	230,914,000	36,023	29	.0156			24.8	46.6	168.7
Feb.	195,799,000	28,978	25	.0148			20.0	27.3	.8
Mar.	190,136,000	136,328	31	.0717			93.9	149.7	1.3
Apr.	352,439,000	1,050,268	30	.2980			723.3	268.1	1,345.0
May	124,168,000	22,350	30	.0180			15.4	1,302.0	15.4
June	73,411,000	15,343	30	.0209			10.6	1,250.0	7,216.0
July	607,852,000	3,865,939	30	.6360			2,662.5	1,473.7	19.3
Aug.	148,764,000	50,431	30	.0339			34.7	1,421.8	37.4
Sept.	95,060,000	19,392	30	.0204			13.4	4,091.0	17,998.0
Oct.	1,125,657,000	6,945,304	31	.6170			1,783.3	2,303.6	133.0
Nov.	234,123,000	59,935	29	.0295			41.3	169.3	659.7
Dec.	187,196,000	17,222	30	.0092			11.9	61.9	319.0
Yearly	3,565,519,000	12,247,513	355	.3435			8,455.1	12,545.0	30,859.0
Period March 1929-1945									

Month	Retamal Canal Station						Period 1943-1945		
	Water	Silt	Number of Samples	Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum
Jan.	27,889,000	5,522	5	.0198	.0266	.0105	3.8	3.0	3.8
Feb.	20,211,000	2,607	4	.0129	.0244	.0091	1.8	1.8	.2
Mar.	7,575,000	1,295	5	.0171	.0319	.0072	.9	2.3	.1
Apr.	38,880,000	164,112	4	.4221	.7690	.0083	113.0	37.7	113.0
May	61,100,000	1,568	3	.0257	.0699	.0050	1.1	76.8	185.8
June	2,168,000	364	4	.0168	.0218	.0098	.3	40.7	.3
July	66,059,000	414,983	5	.6882	1.0363	.0069	285.8	133.8	285.8
Aug.	7,899,000	3,704	5	.0469	.1079	.0303	2.6	210.2	615.1
Sept.	0	0	0	0	0	0	0	227.6	699.4
Oct.	169,476,000	2,221,152	4	1.3106	1.7776	.2913	1,585.7	564.2	1,929.7
Nov.	24,583,000	7,080	5	.0289	.0489	.0121	4.9	5.0	6.5
Dec.	16,246,000	3,152	5	.0194	.0449	.0087	2.2	2.9	5.9
Yearly	387,085,000	2,825,539	50	.7300	1.7776	.0050	1,946.1	1,305.1	1,946.1
Period 1943-1945									

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE
AND TRIBUTARIES—1945

The chemical analyses reported here for the Pecos River at Girvin Power Plant were made by the Texas State Department of Health, all others were made by the United States Department of Agriculture at Riverside, California. All analyses were from composites made up periodically from independent water samples composed by taking from each sample an amount of water proportional to the acre footage of river flow represented by that sample. 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 and Water Commission.

Water samples from the stations at Eagle Pass, Rio Salado, and Roma were gathered by the Mexican Section of this Commission. Water samples from the stations at Caballo Dam and Leasburg Dam were gathered by the United States Bureau of Reclamation. Water samples from the Pecos River at Girvin Power Plant were gathered by A. Z. Derman. All others were gathered by the United States Section of this Commission.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are ($\text{HCO}_3 + \text{CO}_3$), 50.5; Cl, 35.5; SO_4 , 48; Ca, 20; Mg, 12.16; Na, 25; NO_3 , 62. To convert tons per acre foot to parts per million, multiply tons per acre foot by 735.5.

Conductance, reported in the tables as $(K \times 10^3 \text{ at } 25^\circ\text{C})$, 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 forward part of this bulletin where the stream discharges are reported for these same stations.

**CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE
AND TRIBUTARIES—1945**

Month	No. of Sam- ples							Mean Milligram Equivalents per Liter						
		Per Acre Foot	Dissolved Solids	K _{10⁵} @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Ca	Mg	Na	CO ₃ + HCO ₃	SO ₄	Cl

Water Samples from Rio Grande at San Marcial Station

Jan.	31	.66	31,400	74.6	.16	7.9	44	19	3.17	1.04	3.27	3.15	3.02	1.45	T
Feb.	26	.68	32,400	75.9	.10	7.8	45	17	3.21	1.05	3.43	3.03	3.41	1.32	.03
Mar.	31	.64	26,300	73.2	.12	7.9	45	19	3.04	1.02	3.27	3.08	2.99	1.41	.03
Apr.	30	.64	44,600	70.4	.14	7.9	44	19	2.92	.96	3.11	2.75	2.92	1.32	.06
May	29	.58	144,000	41.3	.08	7.9	36	13	1.99	.60	1.47	2.03	1.51	.52	.03
June	30	.39	37,900	45.3	.06	8.2	36	15	2.08	.63	1.54	2.15	1.59	.57	T
July	23	.73	11,700	79.7	.09	7.9	44	17	3.45	1.08	3.59	3.16	3.60	1.43	.01
Aug.	29	1.08	23,800	111	.14	7.9	42	14	5.14	1.07	4.91	2.97	7.06	1.69	.03
Sept.	27	.82	6,030	88.0	.13	8.1	47	19	3.68	1.17	4.25	3.23	4.20	1.73	.03
Oct.	29	.73	17,400	80.4	.13	8.0	45	16	3.40	1.05	3.64	3.21	3.75	1.31	.01
Nov.	26	.75	15,800	83.2	.13	7.8	44	17	3.63	1.12	3.73	3.55	3.58	1.46	.01
Dec.	30	.68	27,300	76.7	.12	7.9	42	17	3.41	1.08	3.25	3.38	3.16	1.30	.01
Mean \pm	341	.514	418,630	56.7	.097	7.93	41	15	2.56	1.799	2.30	2.48	2.33	.886	.025
Period Average		.659	679,000	72.6					3.12	1.06	3.07	2.56	3.46	1.20	
Tons of Constituents, 1945									56,800	10,800	58,500	83,700	124,000	34,800	
Average Tons Period 1931-1945									87,600	18,000	99,100	109,000	233,000	59,800	

Water Samples from Rio Grande at Caballo Dam

Jan.	31	.79	529	91.2	.13	7.9	51	21	3.19	1.44	4.74	4.10	3.45	1.96	T
Feb.	28	.61	14,000	70.6	.15	7.7	42	18	3.00	1.04	2.97	2.77	3.07	1.32	T
Mar.	31	.61	52,000	70.5	.12	7.9	42	18	3.08	1.01	2.95	2.80	3.10	1.30	.01
Apr.	30	.62	80,000	71.4	.13	7.9	42	18	3.13	1.03	3.00	2.81	3.14	1.32	.01
May	31	.64	71,700	72.7	.16	7.9	42	18	3.16	1.07	3.07	2.85	3.24	1.32	.01
June	30	.65	79,200	74.2	.18	8.1	43	18	3.13	1.08	3.19	2.85	3.29	1.38	T
July	31	.67	94,500	74.1	.16	8.0	45	18	3.15	1.06	3.19	2.85	3.27	1.35	.01
Aug.	31	.66	87,100	74.0	.18	8.3	44	19	3.11	1.07	3.28	2.85	3.24	1.40	.01
Sept.	30	.67	65,900	75.6	.08	8.1	45	20	3.24	1.15	3.26	2.94	3.28	1.52	.01
Oct.	31	.71	7,890	80.0	.15	7.9	47	22	3.13	1.16	3.75	3.07	3.34	1.78	T
Nov.	30	.66	6,270	76.2	.13	7.9	50	22	2.64	1.14	3.73	2.57	3.36	1.72	T
Dec.	31	.89	17,000	103	.19	7.9	55	25	3.19	1.56	5.78	4.57	3.67	2.40	T
Mean \pm	365	.653	476,179	74.0	.114	8.02	43	19	3.23	1.08	3.20	2.89	3.24	1.40	.007
Period Average		.715	611,000	78.4					3.36	1.18	3.53	2.75	3.93	1.43	
Tons of Constituents, 1945									75,300	15,800	88,400	106,000	187,000	59,600	
Average Tons Period 1931-1945									78,300	16,600	94,200	97,300	219,000	59,100	

Water Samples from Rio Grande at Leasburg Dam

Jan.	4	1.13	3,320	123	.20	7.8	46	24	5.00	1.75	5.83	3.56	6.18	3.09	.01
Feb.	28	.71	15,000	81.1	.19	7.9	42	19	3.57	1.13	3.44	3.11	3.59	1.62	.01
Mar.	31	.66	50,000	75.2	.08	7.8	42	18	3.33	1.07	3.17	2.94	3.32	1.42	T
Apr.	30	.67	77,800	75.5	.12	7.9	42	18	3.33	1.10	3.21	2.97	3.39	1.44	.01
May	31	.69	71,500	77.4	.13	7.9	44	19	3.21	1.10	3.37	2.84	3.51	1.48	.01
June	30	.69	74,800	78.3	.12	7.9	44	19	3.19	1.14	3.44	2.76	3.57	1.52	.03
July	31	.68	88,700	76.3	.12	8.3	44	19	3.13	1.11	3.36	2.75	3.46	1.45	.03
Aug.	31	.67	81,100	74.9	.10	8.1	46	20	2.84	1.16	3.47	2.47	3.56	1.54	.01
Sept.	30	.73	65,500	79.5	.14	7.9	45	21	3.20	1.14	3.62	2.88	3.54	1.66	.01
Oct.	31	.83	16,100	92.2	.15	7.9	43	21	4.05	1.29	4.10	3.31	4.25	2.00	.01
Nov.	27	.90	9,700	96.3	.17	7.8	44	21	4.25	1.41	4.41	3.59	4.52	2.14	.01
Dec.	29	.78	13,600	86.6	.15	7.3	42	19	3.88	1.21	3.68	3.49	3.76	1.75	T
Mean \pm	353	.694	456,320	77.8	.121	7.97	44	19	3.23	1.13	3.43	2.84	3.53	1.53	.015
Period Average		.773	634,000	84.1					3.63	1.25	3.86	2.89	4.17	1.75	
Tons of Constituents, 1945									71,700	15,200	87,300	95,900	188,000	60,100	
Average Tons Period 1931-1945									81,200	17,000	99,200	98,200	223,000	69,200	

Water Samples from Rio Grande at El Paso Station

Jan.	29	1.80	20,500	202	.37	7.9	60	35	6.09	2.07	12.42	4.97	8.67	7.42	T
Feb.	28	1.36	22,700	153	.20	7.9	55	31	5.26	1.84	8.62	4.29	6.63	4.95	.01
Mar.	31	.31	44,600	106	.15	7.9	49	26	4.11	1.36	5.27	3.52	4.62	2.80	T
Apr.	30	.39	65,400	105	.14	7.9	48	25	4.14	1.38	5.16	3.50	4.64	2.71	.01
May	30	1.03	67,100	113	.07	8.1	50	26	4.27	1.44	5.62	3.67	4.88	2.96	T
June	29	.99	62,600	112	.20	8.0	50	26	4.28	1.47	5.64	3.69	4.93	2.97	.01
July	31	1.03	78,500	114	.19	8.2	50	26	4.23	1.52	5.83	3.67	5.03	3.09	.01
Aug.	31	1.01	88,200	112	.20	8.3	51	26	4.14	1.49	5.77	3.58	4.97	3.02	.03
Sept.	30	1.11	67,200	123	.20	8.0	52	28	4.53	1.60	6.53	3.89	5.36	3.56	T
Oct.	31	1.33	47,100	149	.23	7.9	54	31	5.16	1.75	8.19	4.29	6.34	4.70	.01
Nov.	30	1.60	29,000	178	.26	7.9	57	32	5.85	2.07	10.32	4.81	7.66	6.00	T
Dec.	31	1.40	30,200	153	.17	7.9	50	30	4.51	1.88	8.46	4.47	6.55	4.82	T
Mean \pm	362	1.09	617,400	121	.176	8.04	51	27	4.46	1.55	6.33	3.80	5.29	3.43	.009
Period Average		1.11	666,000	122					5.62	1.62	6.64	3.52	5.46	3.80	
Tons of Constituents, 1945									69,200	14,600	113,000	89,700	197,000	94,100	
Average Tons Period 1930-1945									75,300	16,100	129,000	87,700	214,000	110,000	

** Percent of total cations \pm Weighted mean \ddagger Period total

*** Percent of total anions \dagger Total

**CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE
AND TRIBUTARIES—1945**

Month	No. of Sam- ples	Total Tons of Dissolved Solids	Mean K ₁₀₅ at 25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter					
								Ca		Mg	Na	CO ₂ + HCO ₃	SO ₄
								Ca	Mg	Na	CO ₂ + HCO ₃	SO ₄	Cl

Water Samples from Rio Grande at Fort Quitman Station

Jan.	7	2.88	53,600	325	.39	8.0	61	53	9.43	3.51	20.46	4.95	10.86	17.90	.03
Feb.	5	2.58	37,200	295	.32	7.9	61	52	8.39	3.46	18.31	4.47	10.00	15.85	.03
Mar.	6	2.61	26,000	302	.31	8.1	61	56	8.34	3.61	18.63	4.09	9.66	17.20	.01
Apr.	5	2.48	47,400	281	.26	8.1	60	54	8.09	3.31	17.30	4.09	9.19	15.70	.01
May	7	3.23	33,600	369	.37	8.1	63	60	9.31	4.34	23.21	3.62	11.34	22.24	T
June	5	4.23	17,900	473	.42	8.2	64	64	11.32	5.76	30.91	3.37	13.71	31.01	0
July	8	3.88	24,600	435	.36	8.1	64	63	10.88	5.38	28.51	3.71	13.14	28.16	T
Aug.	7	3.93	36,000	441	.35	8.1	64	63	11.06	5.32	29.07	3.75	13.29	28.61	0
Sept.	6	3.60	28,200	407	.38	7.9	63	61	10.44	4.80	26.49	3.80	12.60	25.55	T
Oct.	6	2.39	140,000	272	.32	7.9	61	53	7.70	3.08	16.60	4.11	8.86	14.52	.01
Nov.	6	3.22	71,800	368	.35	7.9	62	56	10.07	4.12	23.08	4.50	11.83	21.18	.01
Dec.	5	2.55	68,600	290	.30	7.9	62	53	7.70	3.29	18.03	3.67	10.00	15.55	.01
Mean \pm	73	2.88	584,900	320	.330	7.97	62	56	8.73	3.67	20.02	4.11	10.34	18.17	.011
Period Average		2.19	584,000	249			60	54	7.19	2.86	15.36	3.50	8.15	13.80	
Tons of Constituents, 1945									49,400		12,600	130,000	35,400	140,000	182,000
Average Tons Period 1930-1945									52,300		12,600	128,000	35,700	142,000	178,000

Water Samples from Rio Grande at Upper Presidio Station

Jan.	4	2.02	49,600	333	.41	7.9	61	55	8.89	3.68	21.24	3.87	11.52	18.85	.03
Feb.	9	2.87	37,900	324	.36	7.8	64	56	8.09	3.69	20.88	3.16	11.47	18.42	T
Mar.	5	5.10	23,500	352	.32	7.9	60	56	9.69	4.19	22.17	3.47	12.42	20.52	T
Apr.	5	2.57	36,000	314	.31	7.9	63	57	7.38	3.48	18.44	2.59	10.18	16.78	.01
May	4	1.08	8,610	452	.45	7.9	60	29	13.26	5.51	28.09	3.49	15.82	28.05	T
June	5	2.24	4,350	294	.14	8.0	56	58	8.53	2.39	13.81	5.31	9.03	9.53	0
July	9	1.01	38,300	112	.49	7.9	55	58	3.83	1.07	6.19	2.38	4.46	4.28	.03
Aug.	4	3.36	4,790	466	.49	7.9	57	59	15.54	5.57	28.11	3.77	16.72	29.06	0
Sept.	5	3.86	2,300	423	.13	7.9	55	58	14.67	5.00	24.19	3.31	15.35	25.43	T
Oct.	7	1.95	105,000	225	.23	7.7	60	51	6.56	2.31	13.41	3.13	7.89	11.35	.03
Nov.	4	2.86	55,800	322	.36	8.0	63	55	8.22	3.69	20.67	3.38	11.23	18.20	T
Dec.	5	2.82	62,600	317	.31	7.9	61	54	8.89	3.60	19.58	4.15	10.70	17.42	.01
Mean \pm	60	2.28	430,770	259	.277	7.86	61	53	7.23	2.85	15.96	3.22	9.13	13.89	.039
Period Average	1.89	549,000	214				59	50	6.44	2.39	12.67	3.11	7.98	10.87	
Tons of Constituents, 1945									37,200		8,890	94,200	25,200	113,000	126,000
Average Tons Period 1935-1945									51,000		11,500	115,000	37,400	144,000	152,000

Water Samples from Rio Conchos near Ojinaga, Chihuahua

Jan.	3	.78	48,100	95.6	.19	7.9	44	14	4.31	1.15	4.36	3.39	5.20	1.39	.01
Feb.	5	.78	31,700	92.6	.21	8.0	43	13	4.01	1.06	3.53	3.19	4.10	1.19	.01
Mar.	5	2.10	20,500	95.8	.17	7.9	43	16	4.45	1.19	4.17	3.14	5.21	1.59	T
Apr.	5	.97	14,000	106	.16	7.9	47	22	4.43	1.05	4.96	3.10	5.36	2.38	T
May	6	1.14	9,600	122	.19	8.1	47	23	5.10	1.42	5.83	2.95	6.64	2.92	T
June	5	1.08	14,400	114	.22	7.9	48	19	4.67	1.43	5.53	2.70	6.77	2.28	.01
July	7	5.6	111,000	58.9	.05	7.9	34	11	3.26	.67	2.05	2.44	2.85	.68	.03
Aug.	6	.85	25,800	89.1	.24	7.9	45	17	4.00	1.03	4.05	3.00	4.69	1.58	.01
Sept.	5	1.09	7,380	117	.24	7.8	48	23	4.86	1.28	5.65	2.89	6.34	2.75	.01
Oct.	6	4.71	92,100	51.4	.07	7.9	37	10	2.71	.58	1.90	2.42	2.24	.50	.01
Nov.	5	.74	44,900	79.3	.16	7.9	40	13	3.86	.98	3.24	3.03	4.06	1.08	T
Dec.	5	1.01	22,400	107	.13	7.7	45	18	4.76	1.26	4.92	3.57	5.52	2.00	.03
Mean \pm	63	.665	449,880	71.1	.111	7.92	40	14	3.51	.836	2.88	2.73	3.56	.993	.015
Period Average		.564	631,000	60.7			37	14	3.18	.758	2.32		2.84	.861	
Tons of Constituents, 1945									64,800		9,360	61,000	76,700	157,000	32,400
Average Tons Period 1935-1945									97,100		14,000	81,400	116,000	208,000	46,500

Water Samples from Rio Grande at Langtry Station

Jan.	7	1.20	98,900	136	.26	7.8	55	36	4.25	1.82	7.38	2.56	6.22	4.85	.03
Feb.	8	1.04	76,000	118	.21	7.7	55	35	3.44	1.70	6.36	2.09	5.47	4.12	.03
Mar.	8	1.11	62,900	127	.09	7.9	50	35	4.16	1.67	6.52	2.61	5.69	4.45	.01
Apr.	10	6.66	66,000	109	.17	7.9	50	35	3.88	1.42	5.29	2.11	4.78	3.51	.03
May	9	.95	25,600	108	.16	7.9	48	33	3.61	1.82	5.10	2.60	4.58	3.48	.03
June	7	1.99	25,100	111	.22	7.9	51	35	3.48	1.90	5.52	2.14	5.18	3.57	.05
July	20	.61	229,000	63.4	.08	7.7	38	15	3.30	.64	2.38	2.37	3.17	.87	.04
Aug.	2	.74	43,600	86.9	.16	7.7	44	22	3.24	1.31	3.60	2.64	3.72	1.88	.04
Sept.	2	.76	33,400	83.1	.16	7.8	47	21	3.39	1.36	3.72	2.73	3.84	1.88	.04
Oct.	6	.71	245,000	78.3	.13	7.8	47	21	3.53	.77	3.58	2.24	3.80	1.66	.03
Nov.	6	1.17	119,000	134	.21	7.9	53	36	4.44	1.73	7.01	2.87	5.65	4.80	.01
Dec.	7	1.18	61,300	135	.20	7.9	51	36	4.60	1.65	6.77	2.96	5.46	4.82	.03
Mean \pm	92	.833	1,105,800	92.1	.150	7.79	48	27	3.60	1.15	4.35	2.44	4.26	2.46	.031
Period Average		.833	92.1				48	27	3.64	1.11	4.41	2.62	4.07	2.52	
Tons of Constituents, 1945									130,000		25,300	181,000	134,000	369,000	159,000
Average Tons Period 1944-1945															

** Percent of total cations ♦ Weighted mean * Period total

*** Percent of total anions Total

**CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE
AND TRIBUTARIES - 1945**

Month	No. of Sam- ples	Total Tons of Per Acre Foot	Dissolved Solids Kx10 ⁵ @25°C	Mean 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 Pecos River at Girvin Power Plant

Jan.	19	15.43	89,600	1,671	7.8	64	65	35.93	33.11	124.28	3.51	64.50	107.37	.02	
Feb.	15	18.58	92,500	1,784	7.7	63	66	39.92	39.14	133.58	2.59	70.21	141.39	.01	
Mar.	30	17.58	84,600	1,703	7.8	60	65	41.52	38.08	120.91	2.59	68.74	130.16	.01	
Apr.	24	15.95	78,500	1,559	7.7	62	65	35.53	35.14	111.88	3.50	64.40	111.64	.01	
May	24	18.59	63,400	1,756	7.8	61	65	41.72	38.90	128.40	2.49	72.75	135.18	.01	
June	19	17.99	61,500	1,729	7.8	62	64	40.32	37.70	125.02	3.02	71.48	130.36	.01	
July	11	12.05	138,000	1,191	7.3	59	60	30.94	29.42	81.62	3.21	52.32	114.10	.01	
Aug.	24	16.14	67,300	1,554	7.3	62	61	37.72	35.31	113.93	3.61	69.06	114.34	.01	
Sept.	23	18.85	82,300	1,829	7.4	63	62	37.92	35.31	120.10	3.70	70.71	119.16	.01	
Oct.	26	14.85	109,000	1,484	7.5	61	62	35.73	35.11	105.23	3.59	61.82	108.15	.01	
Nov.	29	17.68	94,600	1,719	7.6	62	64	38.32	36.84	122.97	4.20	67.92	128.16	.01	
Dec.	24	17.64	94,700	1,705	7.6	62	64	38.36	36.88	123.10	4.20	67.99	128.30	.01	
Mean ♦	♦ 267	15.98	♦ 1,036,500	1,570	/	7.57	62	63	36.68	33.81	113.25	3.50	64.82	117.17	.011
Period Average	15.91							36.14	33.05	114.76	3.48	65.10	117.31		

Tons of Constituents, 1945

Average Tons Period May 25, 1944-1945

64,800 36,300 230,000 9,420 275,000 367,000

Water Samples from Pecos River Station

Jan.	15	6.02	105,000	653	.46	7.8	62	63	14.45	12.39	43.39	2.21	24.17	44.25	.03
Feb.	14	6.09	90,100	659	.42	7.8	62	63	14.15	12.56	44.03	2.14	24.02	45.00	.01
Mar.	15	5.44	87,600	596	.37	7.7	62	64	12.41	11.16	39.27	1.87	21.08	40.20	.03
Apr.	14	5.53	84,600	591	.38	7.9	62	63	12.43	11.47	38.59	1.62	21.95	39.40	.01
May	16	4.79	54,600	530	.36	7.7	61	62	11.02	10.28	33.76	1.55	19.42	34.22	.03
June	15	4.74	44,300	517	.35	7.9	62	62	10.59	9.91	33.02	1.52	18.85	33.57	.03
July	16	2.32	124,000	256	.16	7.4	56	56	6.90	4.44	14.31	1.76	9.56	14.40	
Aug.	10	4.56	57,800	506	.36	7.7	60	60	11.27	9.50	31.47	1.49	19.47	31.92	.03
Sept.	2	4.24	53,000	470	.36	7.7	60	60	10.49	8.84	29.27	1.39	18.12	29.92	.03
Oct.	13	2.52	137,000	287	.25	7.9	59	59	6.76	5.04	16.99	1.72	10.11	17.16	.06
Nov.	15	4.96	88,300	564	.25	7.9	59	59	13.34	9.95	33.53	3.39	19.97	33.88	
Dec.	14	5.47	83,100	604	.36	7.9	62	61	13.32	11.47	38.95	2.13	21.50	39.60	.04
Mean ♦	♦ 159	4.05	♦ 1,009,400	445	.298	7.74	60	61	10.09	8.21	27.81	1.91	16.23	28.20	.037
Period Average	4.24							13.65	8.32	25.72	2.55	19.15	25.96		

Tons of Constituents, 1945

Average Tons Period 1935-1945

68,900 34,000 218,000 19,800 266,000 341,000

154,000 57,100 334,000 44,000 519,000 520,000

Water Samples from Devils River Station

Jan.	3	.28	4,700	35.7	.08	7.9	12	11	2.25	.96	.44	3.04	.20	.40	.07
Feb.	3	.26	3,870	31.5	.07	8.2	12	11	1.85	.81	.36	2.50	.17	.33	.07
Mar.	3	.24	3,810	29.1	.07	7.9	15	13	1.56	1.02	.46	2.39	.19	.39	.07
Apr.	2	.26	3,660	31.5	.07	7.9	15	13	1.68	1.10	.50	2.58	.21	.42	.07
May	3	.26	3,240	30.5	.07	7.9	17	14	1.58	1.13	.57	2.46	.23	.45	
June	1	.21	2,300	24.6	.02	7.9	17	14	1.25	.89	.45	1.94	.18	.36	.03
July	3	.27	3,790	31.6	.07	7.9	17	14	1.63	1.17	.59	2.55	.24	.47	
Aug.	2	.27	3,300	32.2	.06	7.8	18	10	1.93	1.00	.46	2.76	.23	.38	.30
Sept.	3	.31	3,460	37.0	.05	7.8	18	10	2.18	1.12	.52	3.11	.26	.42	.30
Oct.	5	.21	27,200	22.6	.05	7.9	12	8	1.70	.35	.28	1.86	.17	.18	.14
Nov.	3	.36	6,970	38.7	.05	7.9	12	8	2.86	.59	.48	3.14	.26	.31	.14
Dec.	3	.30	5,160	37.0	.08	8.0	12	10	2.40	1.04	.46	3.20	.20	.39	.14
Mean ♦	♦ 34	.248	♦ 71,460	28.4	.055	7.91	13	10	1.85	.693	.389	2.34	.196	.295	.124
Period Average	252			29.3				1.90	.744	.411		2.42	.202	.323	

Tons of Constituents, 1945

Average Tons Period March 1944-1945

14,500 3,300 3,500 28,000 3,690 4,100

208,000 61,900 385,000 179,000 602,000 493,000

411,000 105,000 601,000 514,000 1,075,000 784,000

** Percent of total cations ♦ Weighted mean * Period total

*** Percent of total anions ♦ Total

** Percent of total cations ♦ Weighted mean * Period total

*** Percent of total anions ♦ Total

** Percent of total cations ♦ Weighted mean * Period total

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*** Percent of total anions ♦ Total

** Percent of total cations ♦ Weighted mean * Period total

*** Percent of total anions ♦ Total

** Percent of total cations ♦ Weighted mean * Period total

*** Percent of total anions ♦ Total

**CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE
AND TRIBUTARIES - 1945**

Month	No. of Sam- ples	Mean Milligram Equivalents per Liter											
		Total Tons of Per Acre Foot	Dissolved Solids	Mean Kx10 ⁵ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Ca	Mg	Na	CO ₃ + HCO ₃	SO ₄

Water Samples from Rio Salado Station

Jan.	14	2.07	14,000	217	.6k	7.6	46	36	7.41	5.07	10.53	1.85	12.73	8.35	.11
Feb.	13	1.95	11,100	206	.63	7.9	46	36	7.09	4.61	9.90	1.87	11.92	7.95	.16
Mar.	15	2.59	17,800	261	.81	7.8	47	35	9.23	5.80	13.37	2.08	16.30	10.08	.11
Apr.	14	.86	22,900	96.8	.79	7.9	43	32	3.78	1.59	4.04	1.71	4.67	3.05	.05
May	14	.98	3,140	109	.35	8.0	42	30	4.50	1.75	4.50	2.07	5.50	3.31	.03
June	13	1.44	3,670	153	.51	7.9	45	33	5.75	2.89	7.09	1.94	8.71	5.21	.03
July	14	1.92	16,900	197	.62	7.7	45	30	7.57	4.03	9.33	1.61	12.96	6.44	.13
Aug.	13	3.52	11,500	331	1.35	7.7	46	29	12.36	8.02	17.40	1.54	25.57	11.00	.01
Sept.	13	2.76	24,500	267	.93	7.9	47	30	9.80	5.96	13.87	1.75	19.16	8.96	.01
Oct.	21	.49	36,900	54.9	.09	7.9	28	17	3.22	.77	1.54	2.67	1.89	.96	.06
Nov.	14	.89	3,180	100	.25	7.9	39	27	4.27	1.91	3.90	2.37	4.95	2.75	.06
Dec.	14	1.28	3,230	137	.34	8.0	42	30	5.34	2.78	5.78	2.34	7.44	4.18	.04
Mean #	172	1.10	168,820	116		7.87	41	29	4.86	2.22	4.98	2.24	6.34	3.51	.065
Period Average		.968	253,000	101			40	28	4.53	1.81	4.26	1.95	5.68	2.95	
Tons of Constituents, 1945									20,400	5,660	24,000	14,300	63,800	26,100	
Average Tons Period 1935-1945									36,200	7,850	34,800	21,200	97,000	37,200	

Water Samples from Rio Grande at Roma Station

Jan.	29	1.41	239,000	165	.20	7.7	55	47	4.57	2.77	8.85	2.19	6.39	7.72	.04
Feb.	29	1.41	203,000	162	.15	7.9	54	46	4.63	2.69	8.70	2.43	6.29	7.58	.03
Mar.	31	1.34	187,000	156	.21	7.9	55	47	4.44	2.51	8.33	2.16	5.95	7.22	.03
Apr.	30	.89	231,000	107	.18	7.9	51	42	3.48	1.51	5.19	1.86	4.05	4.28	.06
May	30	1.03	94,100	122	.17	7.9	51	45	3.76	2.01	6.01	2.05	4.40	5.35	
June	30	1.22	65,900	145	.23	7.9	55	49	3.84	2.58	7.76	2.12	5.15	6.94	.01
July	30	.91	407,000	104	.13	8.3	48	37	3.74	1.59	4.92	2.14	4.29	3.82	.04
Aug.	30	1.00	109,000	114	.24	7.9	50	38	3.84	1.74	5.56	2.01	4.96	4.28	.02
Sept.	30	1.22	85,300	140	.25	7.8	54	44	3.85	2.35	7.28	2.00	5.67	6.05	.01
Oct.	31	.56	464,000	66.4	.09	7.8	41	28	2.92	.85	2.66	2.21	2.40	1.82	.05
Nov.	29	1.31	226,000	152	.18	7.7	53	45	4.64	2.29	7.94	2.59	5.57	6.88	.03
Dec.	30	1.39	191,000	161	.18	7.9	55	45	4.92	2.54	8.34	2.86	5.79	7.12	.03
Mean #	1755	.954	1,202,300	111	.149	7.91	50	41	3.73	1.69	5.44	2.21	4.25	4.43	.033
Period Average		.954	2,861,000	101			49	39	3.53	1.50	4.83	2.24	3.75	3.90	
Tons of Constituents, 1945									267,000	73,300	446,000	240,000	728,000	560,000	
Average Tons Period 1935-1945									306,000	78,600	480,000	295,000	777,000	596,000	

Water Samples from Rio Grande at Rio Grande City Station

Jan.	10	1.30	287,000	151	.19	7.9	51	43	4.78	2.56	7.65	2.60	5.88	6.55	.04
Feb.	13	1.34	243,000	154	.22	7.9	53	44	4.69	2.55	8.03	2.57	6.05	6.70	.03
Mar.	13	1.32	205,000	157	.23	7.8	55	47	4.39	2.48	8.23	2.23	5.88	7.12	.03
Apr.	15	.95	274,000	110	.20	7.9	49	39	3.80	1.58	5.22	1.90	4.62	4.20	.03
May	13	1.07	106,000	165	.19	8.3	52	45	3.79	2.01	6.34	2.11	4.55	5.44	.01
June	14	1.17	87,200	138	.24	8.0	54	46	3.85	2.38	7.22	2.08	5.15	6.29	.03
July	16	.76	334,000	85.4	.11	7.9	46	31	3.38	1.19	3.82	2.16	3.60	2.60	.04
Aug.	12	1.04	126,000	114	.24	7.7	50	38	3.94	1.72	5.63	1.88	5.16	4.26	
Sept.	11	1.19	94,500	155	.20	7.9	54	43	3.88	2.34	7.16	2.11	5.56	5.79	.01
Oct.	14	.55	613,000	64.9	.10	7.9	41	28	2.86	.86	2.55	2.12	2.39	1.78	.04
Nov.	12	1.16	268,000	137	.16	7.9	51	43	4.45	2.07	6.84	2.34	5.06	5.72	.03
Dec.	12	1.28	238,000	147	.16	7.9	51	43	4.75	2.37	7.41	2.90	5.37	6.25	.04
Mean #	1755	.902	2,875,700	104	.156	7.90	49	38	3.67	1.56	4.96	2.24	4.06	3.94	.035
Period Average		.884	4,340,000	101			45	36	3.93	1.58	4.45	2.29	4.01	3.60	
Tons of Constituents, 1945									319,000	83,300	495,000	296,000	846,000	606,000	
Average Tons Period 1935-1945									586,000	128,000	683,000	466,000	1,285,000	851,000	

Water Samples from North Floodway Near Sebastian, Texas

Jan.															
Feb.															
Mar.															
Apr.															
May															
June															
July															
Aug.															
Sept.															
Oct.															
Nov.															
Dec.															
Mean #	1724	2.70	1,76,800	304	1.39	7.85	61	57	6.61	5.16	18.62	1.90	11.11	17.57	
Period Average		1.48	95,800	165			54	51	4.84	2.66	8.89	2.29	5.87	8.34	.01
Tons of Constituents, 1945									5,120	2,420	16,500	2,240	20,600	24,100	
Average Tons Period 1935-1945									8,560	2,860	18,000	6,150	24,900	26,100	

** Percent of total cations @ Weighted mean # Period total

*** Percent of total anions \$ Total * Period 1943-1945

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

1945

San Marcial Station

January	February	March	April	May	June	July	August	September	October	November
1 76.8	1 73.8	6 72.1	6 81.2	7 46.9	9 43.2	18 87.7	20 91.1	23 88.6	24 89.3	29 85.5
2 76.0	2 73.3	5 70.9	5 80.5	10 45.9	11 41.8	19 82.8	21 86.8	23 87.9	24 88.2	29 December
3 73.2	3 74.0	6 73.5	11 70.4	11 90.5	12 40.3	13 43.2	13 82.9	23 89.4	27 91.1	1 84.2
4 73.5	4 74.0	5 73.9	10 70.2	10 89.5	11 41.2	12 41.1	21 73.1	25 82.0	26 85.6	2 84.2
5 74.9	5 73.9	10 70.4	9 69.7	9 88.5	10 41.5	14 47.5	23 82.9	23 89.5	26 90.3	10 85.2
6 73.2	6 73.5	11 70.4	11 70.4	12 89.5	13 41.2	14 47.5	23 82.9	25 80.1	31 84.7	1 85.2
7 73.5	7 73.8	12 70.6	12 70.6	13 89.4	14 41.5	15 47.5	23 82.9	27 80.3	30 84.2	1 85.2
8 74.8	8 73.2	13 70.9	13 70.9	14 89.4	15 41.2	16 47.5	23 82.9	28 80.3	30 84.2	1 85.2
9 73.1	9 73.4	14 70.9	14 69.9	14 73.3	15 41.2	16 47.5	23 82.9	28 80.3	30 84.2	1 85.2
10 74.4	10 80.9	15 70.9	15 75.6	16 89.5	17 41.2	18 47.5	23 82.9	29 80.1	31 84.7	1 85.2
11 75.1	11 76.5	16 70.9	16 73.7	17 89.5	18 41.2	19 47.5	23 82.9	29 80.1	31 84.7	1 85.2
12 74.8	12 76.1	17 70.9	17 73.7	18 89.5	19 41.2	20 47.5	23 82.9	29 80.1	31 84.7	1 85.2
13 74.8	13 76.3	18 70.9	18 73.2	19 89.5	20 41.2	21 47.5	23 82.9	29 80.1	31 84.7	1 85.2
14 74.7	14 76.3	19 70.9	19 73.4	20 89.5	21 41.2	22 47.5	23 82.9	29 80.1	31 84.7	1 85.2
15 73.5	15 74.2	20 70.9	20 72.1	21 89.5	22 41.2	23 47.5	23 82.9	29 80.1	31 84.7	1 85.2
16 73.6	16 74.2	21 70.9	21 73.4	22 89.5	23 41.2	24 47.5	23 82.9	29 80.1	31 84.7	1 85.2
17 72.9	17 72.2	22 70.9	22 73.4	23 89.5	24 41.2	25 47.5	23 82.9	29 80.1	31 84.7	1 85.2
18 73.3	18 72.0	23 70.9	23 73.9	24 89.5	25 41.2	26 47.5	23 82.9	29 80.1	31 84.7	1 85.2
19 73.4	19 72.1	24 70.9	24 76.0	25 89.5	27 41.2	28 47.5	23 82.9	29 80.1	31 84.7	1 85.2
20 75.5	20 71.6	25 70.9	25 78.5	26 89.5	27 41.2	28 47.5	23 82.9	29 80.1	31 84.7	1 85.2
21 76.7	21 76.5	26 70.9	26 78.5	27 89.5	28 41.2	29 47.5	23 82.9	29 80.1	31 84.7	1 85.2
22 75.9	22 76.0	27 70.9	27 79.0	28 89.5	29 41.2	30 47.5	23 82.9	29 80.1	31 84.7	1 85.2
23 74.8	23 76.7	28 70.9	28 76.2	29 89.5	31 41.2	32 47.5	23 82.9	29 80.1	31 84.7	1 85.2
24 74.8	24 76.8	29 70.9	29 76.0	30 89.5	31 41.2	32 47.5	23 82.9	29 80.1	31 84.7	1 85.2
25 73.9	25 77.0	30 70.9	30 78.0	30 89.5	31 41.2	32 47.5	23 82.9	29 80.1	31 84.7	1 85.2
26 73.2	26 77.0	31 70.9	31 78.6	31 89.5	32 41.2	33 47.5	23 82.9	29 80.1	31 84.7	1 85.2
27 73.3	27 78.0	March	April 1	May 1	June 1	July 1	August 1	September 1	October 1	November 1
28 73.4	1 78.9	28 70.9	28 80.5	29 89.5	30 41.2	31 47.5	23 82.9	29 80.1	31 84.7	1 85.2
29 72.6	2 78.2	29 70.9	29 80.3	30 89.5	31 41.2	32 47.5	23 82.9	29 80.1	31 84.7	1 85.2
30 71.3	3 69.9	31 70.9	31 81.5	32 89.5	33 41.2	34 47.5	23 82.9	29 80.1	31 84.7	1 85.2
31 71.4	4 70.1	32 70.9	32 80.7	33 89.5	34 41.2	35 47.5	23 82.9	29 80.1	31 84.7	1 85.2
32 69.5	5 69.5	33 70.9	33 81.1	34 89.5	35 41.2	36 47.5	23 82.9	29 80.1	31 84.7	1 85.2

El Paso Station

January	February	March	April	May	June	July	August	September	October	November
1 197	2 195	10 114	12 111	15 106	19 121	21 119	23 112	25 131	28 186	30 197
2 198	3 203	11 122	13 114	16 110	20 112	23 113	25 125	26 154	29 187	December
3 199	7 201	12 124	14 114	17 111	21 112	24 111	25 125	27 141	30 198	1 196
4 203	8 203	13 124	15 108	18 110	21 112	24 111	26 123	28 154	2 197	2 197
5 203	9 203	14 124	16 114	19 116	21 112	24 111	26 123	28 154	31 188	4 196
6 201	10 145	15 125	17 103	20 150	23 119	26 111	28 115	30 124	1 196	3 196
7 202	11 152	16 125	18 103	21 121	24 125	27 121	29 115	30 124	2 196	5 194
10 201	12 159	17 117	19 107	22 114	26 110	28 115	30 124	1 197	2 197	6 195
11 202	13 160	18 116	20 102	23 116	26 110	29 115	30 124	2 197	3 197	7 197
12 203	14 165	19 102	21 103	24 114	27 110	30 124	3 197	4 197	5 197	6 197
13 203	15 170	20 99.2	22 107	25 115	28 110	31 103	1 197	2 197	3 197	4 197
14 201	16 173	21 98.1	23 106	26 119	29 110	31 103	2 197	3 197	5 197	6 197
15 202	17 169	22 100	24 106	26 120	29 110	31 103	3 197	4 197	6 197	7 197
16 202	18 169	25 102	25 102	26 120	29 110	31 103	4 197	5 197	6 197	7 197
17 205	19 151	24 102	26 107	27 116	1 117	2 117	3 197	4 197	5 197	6 197
18 202	20 150	25 97.3	27 107	28 110	2 117	3 117	4 197	5 197	6 197	7 197
19 202	21 148	26 95.5	28 112	29 110	3 107	4 107	5 197	6 197	7 197	8 197
20 200	22 136	26 95.5	27 102	28 110	1 109	2 109	3 107	4 107	5 197	6 197
21 203	23 121	26 94.6	27 102	28 109	2 109	3 107	4 107	5 107	6 197	7 197
22 205	24 135	29 97.3	30 104	3 109	4 109	5 109	6 109	7 109	8 109	9 109
23 205	25 147	30 97.2	1 110	4 111	7 118	9 115	11 113	13 111	14 167	16 187
24 205	26 153	31 97.9	2 110	5 108	8 111	10 115	12 122	15 133	17 189	19 204
25 207	27 161	3 109	5 111	7 113	9 115	11 123	13 133	15 133	18 189	21 205
26 208	28 122	1 109	5 114	7 113	11 106	13 115	15 123	17 123	19 150	21 177
27 205	March	2 104	5 114	7 111	12 112	14 115	16 120	18 120	20 153	22 188
28 206	1 115	3 104	5 114	7 109	10 107	13 111	15 115	17 115	19 150	21 177
29 206	2 115	4 98.0	5 114	7 109	10 107	13 107	15 115	17 115	19 150	21 177
30 205	3 115	5 99.2	6 114	8 109	11 108	13 107	15 115	17 115	19 150	21 177
31 204	4 120	5 98.7	9 102	12 102	15 107	18 117	20 120	22 133	23 166	25 191
February	5 124	7 109	10 104	13 107	16 120	18 107	20 115	22 133	23 176	25 189
1 205	6 120	8 108	11 104	14 109	17 119	19 120	21 133	23 176	25 190	27 189
2 203	7 110	9 101	12 100	15 115	18 109	20 115	22 133	23 176	25 180	27 191
3 205	8 109	10 104	13 113	16 118	19 120	21 119	23 129	25 129	26 185	28 193
4 203	9 111	11 102	14 112	17 117	20 117	22 117	24 124	27 187	29 186	31 188

Fort Quitman Station

January	February	March	April	May	June	July	August	September	October	November
3 320	7 341	14 399	18 275	23 344	4 533	1 357	4 357	4 357	4 239	1 373
10 325	10 273	29 344	30 549	5 549	9 569	12 565	15 561	18 561	10 216	8 360
15 324	21 275	29 344	30 549	6 549	16 590	14 531	18 536	15 536	13 265	12 345
27 347	March	7 214	12 553	25 101	21 270	25 95	4 434	22 434	12 235	24 361
27 347	4 305	9 406	16 468	25 619	28 382	22 434	29 434	25 341	25 366	27 312
31 336	7 300	11 264	20 399	27 596	31 557	26 388	30 388	27 347	27 371	29 366

Rio Conchos Canal at Lower Presidio Station

August	September	September	September	October	October	November	November	November	December	December
25 109	8 117	15 118	22 97.0	27 84.0	3 86.8	4 79.2	5 79.2	6 79.2	8 102	15 113

Rio Conchos at Ojinaga, Chihuahua

January	February	March	April	May	June	July	August	September	October	November	December
6 320	7 321	29 321.8	7 121	7 124	9 125	1 125	4 437	1 128	1 126	2 121	8 380
13 324	24 324	31 371	28 May	9 569	10 569	11 569	12 569	13 569	14 569	15 569	12 345
20 342	26 310	April 1	5 490	16 590	14 531	15 531	16 531	17 531	18 531	19 531	10 345
27 347	March	5 495	11 103	17 123	27 105	18 531	20 531	22 531	24 531	25 531	12 345
1 357	10 375	8 105	19 121	30 116	21 539	25 109	29 109	31 107	20 536	21 536	13 345
3 357	17 325	21 381	26 382	27 382	28 382	29 382	30 382	31 382	27 347	27 371	29 366
10 357	17 332	21 381	26 382	27 382	28 382	29 382	30 382	31 382	27 347	27 371	29 366
15 357	22 91.8	30 112	4 July	4 60.7	4 60.7	4 60.7	4 60.7	4 60			

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

1945

Langtry Station

January	February	March	April	May	June	July	July	July	October	November
1 139	3 125	9 125	3 97.8	2 118	4 68.9	15 79.5	26 79.9	10 69.3	20 139	
2 143	6 184	16 134	1 98.1	6 122	6 85.5	17 50.7	31 88.7	12 78.2	26 122	
3 143	17 114	16 133	7 89.0	7 107	13 70.6	18 23.5	16 60.3	16 60.3	December	
4 135	17 114	16 133	11 100	15 96.5	10 67.0	19 26.4	6 87.5	21 65.0	5 125	
5 136	23 116	24 127	13 131	10 100	20 88.4	21 27.0	17 77.7	21 72.7	5 125	
6 136	23 116	27 127	17 120	18 99.6	22 86.2	21 61.7	10 89.9	5 125	10 132	
7 142	23 116	31 135	19 146	20 109	29 13.1	13 24.6	22 61.3	10 89.9	5 125	
8 132	26 135	31 135	21 146	20 109	29 13.1	14 21.7	23 61.3	20 79.3	5 127	17 135
9 132	March	April	21 66.6	27 98.2	July	14 71.2	23 62.6	20 68.6	11 139	19 146
10 130	2 115	1 133	24 135	30 103	5 53.8	14 58.7	24 62.6	2 137	31 152	
11 133					15 53.3	15 69.0	2 79.9	18 337		

Pecos River at Girvin Power Plant

January	February	March	April	May	June	July	August	September	October	November
1 1,610	12 1,769	16 1,654	11 1,514	10 1,785	9 1,794	31 1,611	1 1,642	31 1,642	30 1,732	
2 1,650	14 1,717	17 1,729	12 1,483	10 1,629	8 1,565	1 1,579	2 1,642	12 1,729	3 1,724	
3 1,635	21 1,679	18 1,653	13 1,503	13 1,730	11 1,725	2 1,589	1 1,648	1 1,653	1 1,671	
4 1,660	22 1,679	19 1,847	1 1,545	19 1,730	14 1,723	3 1,611	2 1,579	4 1,595	2 1,653	
5 1,635	23 1,759	20 1,759	15 1,589	1 1,757	12 1,728	3 1,611	1 1,601	5 1,527	4 1,724	
6 1,660	24 1,751	21 1,794	17 1,613	17 1,757	18 1,685	2 1,567	4 1,601	6 1,408	2 1,678	
7 1,660	25 1,751	22 1,794	18 1,613	18 1,757	19 1,685	3 1,567	4 1,601	7 1,408	2 1,678	
8 1,660	26 1,751	23 1,794	19 1,613	19 1,757	20 1,685	7 1,521	8 1,602	8 1,572	9 1,678	
9 1,595	27 1,751	24 1,794	20 1,613	20 1,757	21 1,685	7 1,521	8 1,602	9 1,572	9 1,678	
10 1,587	27 1,751	25 1,794	21 1,613	21 1,757	22 1,685	7 1,521	8 1,602	9 1,572	9 1,678	
11 1,635	28 1,787	26 1,685	21 1,613	21 1,757	25 1,685	14 1,565	14 1,601	10 1,527	12 1,724	
12 1,660	March	1,655	21 1,685	23 1,757	24 1,685	15 1,565	14 1,601	11 1,527	12 1,724	
13 1,660	28 1,847	27 1,685	22 1,685	23 1,757	24 1,685	15 1,565	14 1,601	12 1,527	13 1,724	
14 1,660	29 1,847	28 1,685	23 1,685	27 1,757	28 1,685	16 1,545	15 1,601	13 1,527	14 1,724	
15 1,635	29 1,847	29 1,685	24 1,685	27 1,757	29 1,685	17 1,545	16 1,601	14 1,527	15 1,724	
16 1,660	30 1,847	30 1,685	25 1,685	27 1,757	30 1,685	18 1,545	17 1,601	15 1,527	16 1,724	
17 1,660	31 1,847	31 1,685	26 1,685	27 1,757	31 1,685	19 1,545	18 1,601	16 1,527	17 1,724	
18 1,660	31 1,847	32 1,685	27 1,685	28 1,757	32 1,685	20 1,545	19 1,601	17 1,527	18 1,724	
19 1,660	32 1,847	33 1,685	28 1,685	29 1,757	33 1,685	21 1,545	20 1,601	18 1,527	19 1,724	
20 1,660	33 1,847	34 1,685	29 1,685	30 1,757	34 1,685	22 1,545	21 1,601	19 1,527	20 1,724	
21 1,660	34 1,847	35 1,685	30 1,685	31 1,757	35 1,685	23 1,545	22 1,601	20 1,527	21 1,724	
22 1,660	35 1,847	36 1,685	31 1,685	32 1,757	36 1,685	24 1,545	23 1,601	21 1,527	22 1,724	
23 1,660	36 1,847	37 1,685	32 1,685	33 1,757	37 1,685	25 1,545	24 1,601	22 1,527	23 1,724	
24 1,660	37 1,847	38 1,685	33 1,685	34 1,757	38 1,685	26 1,545	25 1,601	23 1,527	24 1,724	
25 1,660	38 1,847	39 1,685	34 1,685	35 1,757	39 1,685	27 1,545	26 1,601	24 1,527	25 1,724	
26 1,660	39 1,847	40 1,685	35 1,685	36 1,757	40 1,685	28 1,545	27 1,601	25 1,527	26 1,724	
27 1,660	40 1,847	41 1,685	36 1,685	37 1,757	41 1,685	29 1,545	28 1,601	26 1,527	27 1,724	
28 1,660	41 1,847	42 1,685	37 1,685	38 1,757	42 1,685	30 1,545	29 1,601	27 1,527	28 1,724	
29 1,660	42 1,847	43 1,685	38 1,685	39 1,757	43 1,685	31 1,545	30 1,601	28 1,527	29 1,724	
30 1,660	43 1,847	44 1,685	39 1,685	40 1,757	44 1,685	32 1,545	31 1,601	29 1,527	30 1,724	
31 1,660	44 1,847	45 1,685	40 1,685	41 1,757	45 1,685	33 1,545	32 1,601	30 1,527	31 1,724	
32 1,660	45 1,847	46 1,685	41 1,685	42 1,757	46 1,685	34 1,545	33 1,601	31 1,527	32 1,724	
33 1,660	46 1,847	47 1,685	42 1,685	43 1,757	47 1,685	35 1,545	34 1,601	32 1,527	33 1,724	
34 1,660	47 1,847	48 1,685	43 1,685	44 1,757	48 1,685	36 1,545	35 1,601	33 1,527	34 1,724	
35 1,660	48 1,847	49 1,685	44 1,685	45 1,757	49 1,685	37 1,545	36 1,601	34 1,527	35 1,724	
36 1,660	49 1,847	50 1,685	45 1,685	46 1,757	50 1,685	38 1,545	37 1,601	35 1,527	36 1,724	
37 1,660	50 1,847	51 1,685	46 1,685	47 1,757	51 1,685	39 1,545	38 1,601	36 1,527	37 1,724	
38 1,660	51 1,847	52 1,685	47 1,685	48 1,757	52 1,685	40 1,545	39 1,601	37 1,527	38 1,724	
39 1,660	52 1,847	53 1,685	48 1,685	49 1,757	53 1,685	41 1,545	40 1,601	38 1,527	39 1,724	
40 1,660	53 1,847	54 1,685	49 1,685	50 1,757	54 1,685	42 1,545	41 1,601	39 1,527	40 1,724	
41 1,660	54 1,847	55 1,685	50 1,685	51 1,757	55 1,685	43 1,545	42 1,601	40 1,527	41 1,724	
42 1,660	55 1,847	56 1,685	51 1,685	52 1,757	56 1,685	44 1,545	43 1,601	41 1,527	42 1,724	
43 1,660	56 1,847	57 1,685	52 1,685	53 1,757	57 1,685	45 1,545	44 1,601	42 1,527	43 1,724	
44 1,660	57 1,847	58 1,685	53 1,685	54 1,757	58 1,685	46 1,545	45 1,601	43 1,527	44 1,724	
45 1,660	58 1,847	59 1,685	54 1,685	55 1,757	59 1,685	47 1,545	46 1,601	44 1,527	45 1,724	
46 1,660	59 1,847	60 1,685	55 1,685	56 1,757	60 1,685	48 1,545	47 1,601	45 1,527	46 1,724	
47 1,660	60 1,847	61 1,685	56 1,685	57 1,757	61 1,685	49 1,545	48 1,601	46 1,527	47 1,724	
48 1,660	61 1,847	62 1,685	57 1,685	58 1,757	62 1,685	50 1,545	49 1,601	47 1,527	48 1,724	
49 1,660	62 1,847	63 1,685	58 1,685	59 1,757	63 1,685	51 1,545	50 1,601	48 1,527	49 1,724	
50 1,660	63 1,847	64 1,685	59 1,685	60 1,757	64 1,685	52 1,545	51 1,601	49 1,527	50 1,724	
51 1,660	64 1,847	65 1,685	60 1,685	61 1,757	65 1,685	53 1,545	52 1,601	50 1,527	51 1,724	
52 1,660	65 1,847	66 1,685	61 1,685	62 1,757	66 1,685	54 1,545	53 1,601	51 1,527	52 1,724	
53 1,660	66 1,847	67 1,685	62 1,685	63 1,757	67 1,685	55 1,545	54 1,601	52 1,527	53 1,724	
54 1,660	67 1,847	68 1,685	63 1,685	64 1,757	68 1,685	56 1,545	55 1,601	53 1,527	54 1,724	
55 1,660	68 1,847	69 1,685	64 1,685	65 1,757	69 1,685	57 1,545	56 1,601	54 1,527	55 1,724	
56 1,660	69 1,847	70 1,685	65 1,685	66 1,757	70 1,685	58 1,545	57 1,601	55 1,527	56 1,724	
57 1,660	70 1,847	71 1,685	66 1,685	67 1,757	71 1,685	59 1,545	58 1,601	56 1,527	57 1,724	
58 1,660	71 1,847	72 1,685	67 1,685	68 1,757	72 1,685	60 1,545	59 1,601	57 1,527	58 1,724	
59 1,660	72 1,847	73 1,685	68 1,685	69 1,757	73 1,685	61 1,545	60 1,601	58 1,527	59 1,724	
60 1,660	73 1,847	74 1,685	69 1,685	70 1,757	74 1,685	62 1,545	61 1,601	59 1,527	60 1,724	
61 1,660	74 1,847	75 1,685	70 1,685	71 1,757	75 1,685	63 1,545	62 1,601	60 1,527	61 1,724	
62 1,660	75 1,847	76 1,685	71 1,685	72 1,757	76 1,685	64 1,545	63 1,601	61 1,527	62 1,724	
63 1,660	76 1,847	77 1,685	72 1,685	73 1,757	77 1,685	65 1,545	64 1,601	62 1,527	63 1,724	
64 1,660	77 1,847	78 1,685	73 1,685	74 1,757	78 1,685	66 1,545	65 1,601	63 1,527	64 1,724	
65 1,660	78 1,847	79 1,685	74 1,685	75 1,757	79 1,685	67 1,545	66 1,601	64 1,527	65 1,724	
66 1,660	79 1,847	80 1,685	75 1,685	76 1,757	80 1,685	68 1,545	67 1,601	65 1,527	66 1,724	
67 1,660	80 1,847	81 1,685	76 1,685	77 1,757	81 1,685	69 1,545	68 1,601	66 1,527	67 1,724	
68 1,660	81 1,847	82 1,685	77 1,685	78 1,757	82 1,685	70 1,545	69 1,601	67 1,527	68 1,724	
69 1,660	82 1,847	83 1,685	78 1,685	79 1,757	83 1,685	71 1,545	70 1,601	68 1,527	69 1,724	
70 1,660	83 1,847	84 1,685	79 1,685	80 1,757	84 1,685	72 1,545	71 1,601	69 1,527	70 1,724	
71 1,660	84 1,847	85 1,685	80 1,685	81 1,757	85 1,685	73 1,545	72 1,601	70 1,527	71 1,724	
72 1,660	85 1,847	86 1,685	81 1,685	82 1,757	86 1,685	74 1,545	73 1,601	71 1,527	72 1,724	
73 1,660	86 1,847	87 1,685	82 1,685	83 1,757	87 1,685	75 1,545	74 1,601	72 1,527	73 1,724	
74 1,660	87 1,847	88 1,685	83 1,685	84 1,757	88 1,685	76 1,545	75 1,601	73 1,527		

ELECTRICAL CONDUCTANCE OF WATER SAMPLES

1945

Rio Salado Station

January	February	March	April	May	June	July	August	September	October	November	December
1 222	2 209	14 269	16 293	18 307	18 328	31 395	3 167	4 60.5	1 183	1 183	1 183
3 222	7 193	16 293	18 307	21 318	21 328	21 395	4 210	5 229	2 79.9	3 131	3 131
5 227	9 188	19 303	20 314	23 323	23 328	7 262	5 57.3	5 85.5	7 87.9	7 136	7 136
8 232	12 191	21 309	21 358	25 358	7 307	10 270	6 38.5	7 17.8	1 14.5	10 141	10 141
10 230	14 198	23 303	23 352	30 368	1 273	6 400	12 261	7 35.4	9 94.4	10 141	10 141
12 224	16 201	28 303	28 352	29 47.5	51 51	8 314	17 177	5 44.5	1 14.5	1 14.5	1 14.5
14 224	16 201	28 303	28 352	29 47.5	51 51	18 314	10 177	5 44.5	1 14.5	1 14.5	1 14.5
17 218	21 197	30 303	30 352	30 73.0	June	24 249	10 177	5 44.5	1 14.5	1 14.5	1 14.5
19 215	23 234	31 303	31 352	30 73.0	May	6 67.4	9 177	11 224	21 342	11 14.8	16 109
20 206	26 267	31 303	31 352	31 352	1 112	8 68.8	13 210	17 348	26 352	15 60.9	21 114
24 157	28 298	April	1 164	2 111	11 71.3	16 249	20 474	25 354	17 70.5	27 114	24 147
26 158	28 298	April	1 164	2 111	11 71.3	16 249	20 474	25 354	17 70.5	27 114	24 147
29 213	1 268	4 264	7 137	15 72.3	20 190	24 146	October	22 63.8	28 118	28 145	28 145
31 235	2 266	4 280	9 148	18 74.7	23 55.5	27 179	1 111	24 63.0	30 121	31 141	31 141
February	5 260	6 384	11 159	20 154	25 85.7	29 260	2 40.7	20 62.2	29 66.8	31 121	31 141
1 225	7 263	11 193	14 108	22 199	27 354	September	3 47.8	4 47.8	5 51.6	31 71.6	
2 220	12 278	15 170	16 100	25 217	30 415	1 231	4 51.6	5 51.6	6 51.6		

Roma Station

January	February	March	April	May	June	July	August	September	October	November	December
1 176	2 176	15 29.9	15 157	18 159	21 145	26 189	28 211	29 151	2 151	2 151	2 151
2 171	7 171	14 26.3	16 157	18 159	22 110	26 79.5	29 108	1 145	2 136	6 166	6 166
3 178	8 164	15 23.0	17 158	21 165	23 116	27 78.6	30 159	1 145	2 145	8 159	8 159
4 165	9 166	16 159	17 173	18 156	22 105	28 84.8	31 145	2 109	9 153	10 158	10 158
5 165	10 167	17 173	18 156	23 146	25 105	29 87.5	September	6 145	10 158	11 159	11 159
7 165	12 160	19 171	21 171	24 148	26 105	30 94.0	1 145	2 145	5 145	15 151	15 151
8 168	12 160	19 171	21 171	24 148	26 105	31 94.7	2 121	5 145	9 145	15 151	15 151
9 173	13 157	20 137	22 154	24 148	26 101	31 159	3 137	6 145	9 145	15 151	15 151
10 174	13 155	21 158	23 162	27 113	29 151	1 95.7	4 145	7 150	10 151	15 151	15 151
11 176	13 155	22 158	24 155	26 131	30 139	2 97.7	5 158	8 145	11 151	15 151	15 151
12 178	13 155	23 158	25 154	27 145	29 144	3 95.0	7 140	10 145	13 151	16 156	16 156
13 178	13 160	24 158	26 154	28 145	31 145	1 151	5 158	8 145	11 151	16 156	16 156
14 172	16 162	25 147	27 177.6	31 145	2 131	5 98.2	8 142	11 145	15 151	18 156	18 156
15 170	19 163	26 148	28 133	31 145	3 145	5 98.2	8 142	12 145	15 149	19 155	19 155
16 177	20 160	27 125	29 105	31 145	4 145	7 101	10 145	13 145	16 149	20 158	20 158
17 173	21 161	28 125	30 105	31 145	2 145	5 98.6	8 142	11 145	14 151	17 156	21 156
19 173	23 159	30 203	2 103	4 152	7 156	10 112	13 142	15 145	18 152	22 156	22 156
20 154	23 161	31 172	3 102	5 154	8 162	11 109	14 105	17 109	20 155	23 159	23 159
21 174	26 162	April	1 148	6 158	8 188.9	12 115	15 159	18 151	21 160	25 167	25 167
22 174	26 166	1 148	2 148	8 150	11 145	14 151	17 151	20 155	23 160	26 167	26 167
23 174	March	1 148	2 148	8 150	11 145	14 151	17 151	20 155	23 160	26 167	26 167
24 166	1 173	3 172	7 143	9 157	12 153	15 153	18 140	21 158	24 161	27 167	27 167
26 146	2 175	3 182.3	8 145	10 150	13 156	16 156	19 139	22 154	25 158	28 168	28 168
27 165	3 169	2 178.1	9 140	11 151	14 156	17 156	20 144	23 158	26 164	30 166	30 166
28 152	6 175	5 175.3	10 150	13 156	16 156	19 156	22 153	25 158	28 164	31 166	31 166
29 148	5 168	7 158.6	11 117	13 164	16 164	19 156	22 139	25 158	28 156	31 166	31 166
30 168	6 175	8 118	12 125	14 169	17 169	18 164	21 135	23 140	26 159	29 155	
31 165	7 177	9 117	13 158	15 168	18 164	22 137	24 143	27 133	30 159	33 164	
February	8 175	10 159	14 133	16 160	19 159	22 140	25 142	28 121	31 121	December	
1 161	10 172	12 153	16 137	18 135	21 90.7	23 188.3	26 143	29 125	32 125	1 161	
2 159	11 177	13 150	17 109	19 150	22 112	26 158	28 149	31 135	3 164		
3 167	12 177	14 154	18 108	20 162	23 118	27 102	29 151	31 151	4 150		

Rio Grande City Station

January	February	March	April	May	June	July	August	September	October	November	December
3 154	9 156	14 55.6	17 158	18 94.7	15 147	12 66.4	13 118	17 145	20 72.9	24 146	24 146
5 149	12 151	15 151	17 151	20 159	22 130	15 147	18 145	24 143	26 143	29 138	
12 160	14 151	20 159	19 131	16 156	22 130	15 147	18 145	24 143	26 143	29 138	
15 157	16 151	23 147	22 130	24 98.2	21 121	17 59.9	20 135	27 156	29 135	December	
17 157	16 151	23 147	22 130	24 90.2	23 116	19 92.2	25 129	29 158	3 145	3 145	
19 143	21 156	28 171	21 156	26 87.1	25 111	21 87.9	27 99.9	October	5 172	7 172	
22 159	23 155	29 150	26 154	28 111	27 125	23 125	25 131	27 131	3 145	5 172	
24 159	26 156	31 160	31 161	31 145	29 119	25 106	2 178	5 158	10 158	12 156	
26 154	28 160	April	31 178.2	June	July	27 79.5	September	4 105	7 145	10 158	
30 144	March	2 156	5 155	8 153	2 133	8 135	30 101	4 138	5 158	10 151	14 142
1 157	2 156	5 155	8 153	4 155	4 136	4 136	8 125	8 125	15 151	17 145	
3 157	9 168	9 112	7 139	8 148	7 158	3 104	10 145	12 145	13 156	15 156	
5 158	12 172	11 155	9 145	11 148	9 101	8 87.3	11 114	12 145	14 141	16 148	
7 157	14 170	13 156	11 134	12 140	10 73.7	11 114	14 89.7	15 68.4	21 136	29 150	31 148

Retamal Canal Station

January	February	March	April	May	June	July	August	September	October	November	December
January	January	February	March	April	May	June	July	August	September	October	November
1 155	26 159	14 155	5 163	28 127	20 169	7 104	11 144	16 101	9 142	24 146	24 146
3 155	29 151	15 155	16 164	30 156	22 119	9 160	18 151	27 153	10 153	16 153	16 153
8 151	14 154	19 153	9 159	1 159	15 156	11 149	16 156	25 156	26 156	December	
10 147	February	21 156	12 165	1 175	29 104.4	14 187	30 126	August	November	11 160	9 159
12 148	1 165	23 157	18 167	2 205	27 73.2	18 137	July	October	December	12 148	
15 154	2 166	26 156	16 169	4 115	30 82.5	21 141	1 181	13 95.8	7 126	28 142	
17 157	3 165	28 154	17 161	6 172	May	2 104	10 145	11 145	12 145	24 141	
19 149	1 169	March	1 153	23 172	14 117	2 117	13 117	26 111	2 117	12 149	
22 146	9 155	1 153	23 172	18 160	18 163	4 161	4 130	11 86.0	October	26 140	
24 144	12 155	3 158	26 160	18 163	18 163	4 161	4 130	13 110	8 56.9	28 138	

Las Palmas Station

November	December	January	February	March	April	May	June	July	August	September	October
5 119	9 124	12 128	26 138	28 138	November	30 143	December	3 138	9 125	14 142	14 142
7 126	27 305	30 305	20 282	29 285	November	30 143	December	3 138	9 125	14 142	14 142

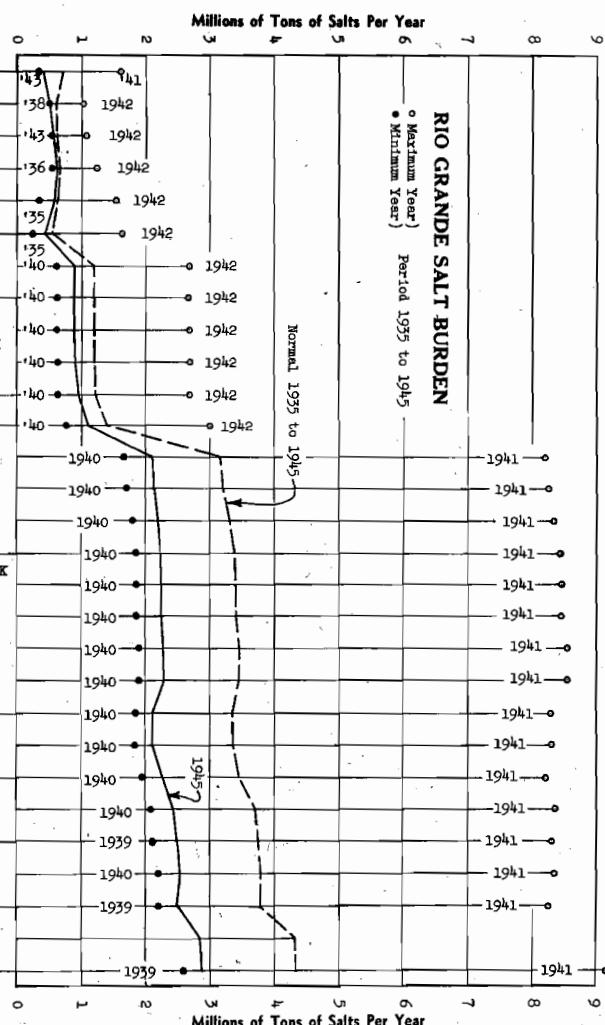
North Floodway Near Sebastian, Texas

January	February	March	April	May	June	July	August	September	October	November	December
13 349	28 356	6 300	11 318								

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 approximate relationship between salt concentration and amount of stream flow. For other stations and stream contributions, the results are arrived at by secondary deductions. At stations carrying the sign * the results are based upon the analysis of water samples.

Concentration Tons/Acre Foot	
1945	Normal 1935 to 1945
.51 *	.63
.65 *	.68
.69 *	.75
1.09 *	1.06
2.82 *	2.05
2.28 *	1.89
.66 *	.56
1.02	.84
.30	.34
.76	.56
.98	.80
.83 *	.73
4.03 *	4.24
.28	.55
.25 *	.29
1.09	1.14
.40	.54
.40	.57
.40	.38
.40	.26
1.05 *	1.07
.40	.55
.98	1.00
1.10 *	.97
.96	.98
.57	.51
.95 *	.95
.90 *	.88



SANITARY ASPECTS OF WATER QUALITY

The sanitary water sampling and assay program along the Rio Grande is a joint undertaking of the Texas State Health Department, the Federal Department of Public Health and Welfare, and the American and Mexican Sections of this Commission. Some co-operation was rendered by the Pan-American Sanitary Bureau, and the United States Public Health Service. Analysis was made under the "Pan-American Laboratory Procedure" set out on page 75 of Water Bulletin No. 15. The "Most Probable Number" method was used to determine the number of coliform organisms per 100 c.c. of sample water were obtained from the analyses by means of the N.P.N. table shown on pages 75 and 76 of Water Bulletin No. 15. Some analyses were made for Biological Oxygen Demand(B.O.D.) and for Dissolved Oxygen(O.D.). The results of all of these analyses for 1945 are tabulated below for each of the sampling points.

Analysis of the records published in these Water Bulletins since 1932 for Nuevo Laredo, since October 1940 for Laredo, and since 1937 for El Paso show that the monthly average coliform density in Rio Grande water at these points correlates quite well with surface washings of the tributary watershed as indicated by rainfall or surface inflow to the river.

The coliform content shown in the three Arroyos at the end of the tributary headwaters, were from storm flow from normally dry desert watersheds, none with no human habitation. This and the preceding paragraph indicates that proportionately large coliform concentrations occur in the Rio Grande come from the surface wash of the Rio Grande watershed, even from uninhabited desert areas.

Date 1945	B.O. Percent Saturation	B.O.D. Parts Per Million	Coliform Organisms per 100 c.c.	Date 1945	B.O. Percent Saturation	B.O.D. Parts Per Million	Coliform Organisms per 100 c.c.	Date 1945	B.O. Percent Saturation	B.O.D. Parts Per Million	Coliform Organisms per 100 c.c.	Date 1945	Coliform Organisms per 100 c.c.	Date 1945	Coliform Organisms per 100 c.c.
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FRANKLIN CANAL AT WATER PLANT

Jan. 2	88.2	1.8	500
Mar. 13	28	2,300	500
15	28	2,500	500
17	28	2,500	500
20	90.5	2.6	600
22	28	600	500
27	28	2,100	500
29	28	2,100	500
31	2,100	500	500
Apr. 3	2.0	87.5	500
5	2.0	87.5	500
7	2.0	87.5	500
10	88.6	2.1	250
12	2.0	87.5	500
17	84.7	1.1	2,300
19	2.0	87.5	500
21	2.0	87.5	500
24	76.8	7.8	500
26	2.0	87.5	500
28	2.0	87.5	500
30	2.0	87.5	500
May 1	71.0	1.2	1,100
3	2.0	87.5	500
5	2.0	87.5	500
8	77.0	1.2	3,000
10	2.0	87.5	500
12	2.0	87.5	500
15	79.3	0.9	2,100
17	2.0	87.5	500
22	76.1	1.2	1,100
24	2.0	87.5	500
26	2.0	87.5	500
28	2.0	87.5	500
30	2.0	87.5	500
June 1	83.8	0.8	1,100
3	2.0	87.5	500
5	2.0	87.5	500
7	2.0	87.5	500
9	2.0	87.5	500
12	80.7	0.8	2,100
14	2.0	87.5	500
16	2.0	87.5	500
18	2.0	87.5	500
21	2.0	87.5	500
23	2.0	87.5	500
25	2.0	87.5	500
27	2.0	87.5	500
29	2.0	87.5	500
July 3	87.5	1.2	2,300
5	2.0	87.5	500
7	2.0	87.5	500
10	76.1	1.2	1,100
12	2.0	87.5	500
14	2.0	87.5	500
16	2.0	87.5	500
18	2.0	87.5	500
20	2.0	87.5	500
22	2.0	87.5	500
24	2.0	87.5	500
26	2.0	87.5	500
28	2.0	87.5	500
30	2.0	87.5	500
Aug. 1	83.8	0.8	1,100
3	2.0	87.5	500
5	2.0	87.5	500
7	2.0	87.5	500
9	2.0	87.5	500
12	80.7	0.8	1,100
14	2.0	87.5	500
16	2.0	87.5	500
18	2.0	87.5	500
20	2.0	87.5	500
22	2.0	87.5	500
24	2.0	87.5	500
26	2.0	87.5	500
28	2.0	87.5	500
30	2.0	87.5	500
Sept. 1	83.3	1.6	1,100
3	2.0	87.5	500
5	2.0	87.5	500
7	2.0	87.5	500
9	2.0	87.5	500
12	80.9	1.9	6,200
14	2.0	87.5	500
16	2.0	87.5	500
18	2.0	87.5	500
20	78.4	0.8	3,600
22	2.0	87.5	500
24	2.0	87.5	500
26	2.0	87.5	500
28	2.0	87.5	500
30	2.0	87.5	500
Oct. 1	77.3	0.9	3,600
3	2.0	87.5	500
5	2.0	87.5	500
7	2.0	87.5	500
9	2.0	87.5	500
11	76.3	0.9	16,000
13	2.0	87.5	500
15	67.0	2.9	3,600
17	2.0	87.5	500

FRANKLIN CANAL AT WATER PLANT

Jan. 2	20	3,600	500
Mar. 13	28	6,200	500
15	28	5,600	500
17	28	2,300	500
20	28	1,100	500
22	31	81.2	1.0
24	Nov. 2	81.2	1.0
26	28	1,100	500
28	28	1,600	500
30	28	5,200	500
Dec. 3	28	1,600	500
5	28	6,200	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,600	500
11	28	3,600	500
13	28	3,600	500
15	28	3,600	500
17	28	3,600	500
19	28	3,600	500
21	28	3,600	500
23	28	3,600	500
25	28	3,600	500
27	28	3,600	500
29	28	3,600	500
31	28	3,600	500
Jan. 3	28	3,600	500
5	28	3,600	500
7	28	3,600	500
9	28	3,	

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED—IN INCHES—1945

The rainfall records shown below have not been published elsewhere. The source of each record, and type of rain gage used, are shown below. Latitude, longitude, and elevation of each rainfall station will be found in one of the following indexes.

In Water Bulletin No. 10 will be found an index, by years, to rainfall stations and their records. This index covers all available records for stations in the Rio Grande Basin on the United States side and a fringe adjacent thereto below Las Cruces, New Mexico, for the years 1850 to 1940. It also covers a similar area on the Mexican side for the years 1891 to 1940.

In Water Bulletin No. 14 will be found an index, by months, to all stations with available records, longer than eleven months, for the years 1938 to 1944, inclusive. It covers the same area on the United States side as the former index.

Fort Bliss, Texas

Yakima, Tacoma 1944

Ysleta, Texas — 1945

Island Station

Father - Grandfather - Brother - Uncle

Period 1940-1945 Total 1945 8.24 9.54

15 of 15

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES - 1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	----------------------

Period 1938-19

Total 1945 6.10

Period 1940-194

Total 1945 7.79 1

Period 1940-1941

Total 1945 8-17

100 200 300 400

6

10 of 10

.02

1

8
.54

1

5

1

3.53

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED
INCHES—1945

* Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal Average
Standard gage																														R. D. Harper Ranch			
S. C. S.																																	
Jan.																																	
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	
July	.46																																
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	
					</td																												

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

77

* Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES—1945

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES—1945

* Some mouths missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	-------------------------

Standard gage Roma, Texas																													I. B. & W. C.	1.57			
Jan.	.11																																
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

Period 1941-1945 Total 1945 14.68 19.21

Recording gage Rio Grande City, Texas																													I. B. & W. C.	1.39			
Jan.	.22																																
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

Period 1941-1945 Total 1945 11.15 16.45

Standard gage San Benito Pump																													I. B. & W. C.	1.60			
Jan.	.20																																
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

Period 1941-1945 Total 1945 17.39 23.12

AVERAGE RAINFALL ON THE RIO GRANDE WATERSHED AND SUBDIVISIONS

IN INCHES

The records below show average monthly rainfalls on the entire Devils River Watershed above Devils River Station and on the entire Lower Rio Grande Valley area on the United States side from Rio Grande City Station to the Gulf and lying within the outer limits of present irrigation districts. Earlier records beginning with 1871 will be found in Water Bulletin No. 10, p. 78 and subsequent bulletins.

Devils River Watershed

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1945	1.06	1.02	1.97	.79	.50	1.02	2.98	1.28	1.43	3.86	.04	.23	16.39
Total	30.16	16.64	90.70	19.05	187.66	1.20	1.32	227.51	155.61	1.80	1.80	1.80	1,040.72
Total	20.16	16.64	137.74	19.05	187.66	1.20	1.32	227.51	155.61	1.80	1.80	1.80	1,040.72
Avg.	.67	.62	1.21	1.04	2.64	.21	.21	3.03	2.19	1.81	1.14	1.14	33.36

For the 75 years, 1871-1945, inclusive.

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

The 1945 rainfall records shown hereunder have not been published elsewhere. The source of each record and the type of rain gage used are shown with each record. The latitude, longitude, and elevation of each station will be found in the index to rainfall stations in W. B. 10 or with station records in subsequent Water Bulletins.

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 Inches	Total Normal or Average
Standard gage Juárez, Chih.																														Mat'l. Irrig. Com.			
Jan.																																	
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

Period 1941-1945 Total 1945 6.53 8.97

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	----------------------

* Period 1965-1969 Total 1965-1970 55.00 15.20

Ballana, Chit

Barrel Chib National Grid, v1.0

La Bouville, Chib.

Villalba, Chih. Nativia, Texia, Com.

[Standard.com](#) | [Las Virgenes, Chih.](#) | [Natalia_Torres.Com](#)

Hormiguero, Chih. Vulture, Starr, or Mex.

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED INCHES—1945

Palestine, Conn.										Natl. Irrig. Com.		
Standard gauge												
Jan.												
Feb.												
Mar.												
Apr.												
May												
June	.48											
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												
No daily figures for March through December												
# Period	1941-1945	Total	1949	187.74	20.49							

Piedras Negras, Coah.—1941												Meteoric. Surv. of Mex.												
Standard gauge																								
Sept.	Oct.	Nov.				T	.61	.01	T	.04	.49	.09	T	.10	.04	T	T	.08	T	.16	T	T	.26	.30
						T	.06		T	.08	T	.08	T	.08		T	T	.08	T	.16	T	T	.26	.30

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

83

INCHES

Period 1907-1945 Total 1945 19.35 19.41

La Mariposa, Coah.—1940												Nearest Surv. of Mex.	
Standard gauge													
Jan.	.19	.03		.27						.25			.25
Feb.										.30	.77	.36	
Mar.													.19
Apr.													.18
May													.18
June													.18
July													.26
Aug.													.26
Sept.													.54
Oct.													.54
Nov.													
Dec.													
													Total 1940 22.95

* Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	-------------------------

Standard gage		Muzquiz, Chih.																											Meteor. Surv. of Mex.			
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
Jan.																																
Feb.																																
Mar.																																
Apr.																																
May																																
June																																
July																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																
					</																											

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Rainfall inches	Average
Standard gauge																											Villa Juarez, Coah.		Est. 1 Irrig. Cm.					
Jan. Feb. Mar. Apr. May June																											T	.58	1.36					
July																											T	.77	.77					
Aug. Sept. Oct. Nov. Dec.																											T	.58	.58					
.40																											T	.58	.58					
T																											T	.58	.58					
.75																											T	.58	.58					
.41																											T	.58	.58					
.12																											T	.58	.58					
.06																											T	.58	.58					
.43																											T	.58	.58					
.61																											T	.58	.58					
.21																											T	.58	.58					
.02																											T	.58	.58					
.01																											T	.58	.58					
.02																											T	.58	.58					
.34																											T	.58	.58					
1.77																											T	.58	.58					
.59																											T	.58	.58					
11.59																											T	.58	.58					
Period 1943-1946																											T	.58	.58					
Total 1943																											T	.58	.58					
1946																											T	.58	.58					

• Some months missing.

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	-------------------------

Presa El Cuije, Coah.

Monthly rainfall records at this station for the years 1936 through 1939 were published in Water Bulletin No. 10 and the location of this station was given as latitude 28° 04' longitude 101° 39', elevation 1,640 feet. It is now found that the above location is in error and that this station is not on the Rio Grande Watershed but is located at latitude 25° 42', longitude 103° 20' with an elevation of 3,651 feet.

Standard gauge												Saltillo, Coah.												Nat'l. Irrig. Com.								
Jan.	T	T	T	.20	.30							.05	1.02	T											T	.09	.04	.61	.65			
Feb.													.08																1.07	.54		
Mar.																														.09	.50	
Apr.																														.26	.72	
May																														1.01		
June	T	.28																														
July	.08																															
Aug.	.27	.10																														
Sept.																																
Oct.																																
Nov.																																
Dec.	T																															

Period 1806-1945 Total 1945 12.30 16.39

Standard gauge												Ramos Arizpe, Coah.												Nat'l. Irrig. Com.							
Jan.	T	T	T	.67								.21	.77	T											T	.08	.04	.71	.56		
Feb.																															
Mar.																															
Apr.																															
May																															
June	.13	.65																													
July	T																														
Aug.																															
Sept.																															
Oct.																															
Nov.																															
Dec.	T																														

Period 1907-1945 Total 1945 7.75 9.96

Recording gauge												Rinconada, N. L.—1944												Nat'l. Irrig. Com.							
Jan.																															
Feb.																															
Mar.																															
Apr.																															
May																															
June																															
July																															
Aug.																															
Sept.																															
Oct.																															
Nov.																															
Dec.																															

Period 1907-1945 Total 1945 7.75 9.96

Recording gauge												Bisneca, N. L., 1945												Nat'l. Irrig. Com.							
Jan.	T	.02	.24	.32								.02	1.05	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.07	.12	.14	.16	.18		
Feb.																															
Mar.																															
Apr.																															
May																															
June	.07																														
July	.01	T																													
Aug.																															
Sept.																															
Oct.																															
Nov.																															
Dec.																															

Period 1944-1945 Total 1945 12.97 20.46

Recording gauge												Santa Caterina, N. L.												Nat'l. Irrig. Com.							
Jan.																															
Feb.																															
Mar.																															
Apr.																															
May																															
June	.01																														
July	.04																														
Aug.	.02																														
Sept.	.65	5.99	1.96	.01																											
Oct.																															
Nov.																															
Dec.																															

Period 1944-1945 Total 1945 17.81 23.47

Standard gauge												Topo Chico, N. L.												Nat'l. Irrig. Com.			

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RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES

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	Total Dobies	Average or Normal
Monterrey, N. L. 1930																																
Standard gauge																														Meteor. Serv. of Mex.		
Jan.	.14	.32	.17	.02	.01		T			.26	T	T	.19	T		T		T		T		T		T		T		T		.46		
Feb.		T	.09							T	.20	T		T		T		T		T		T		T		T		T		.31		
Mar.		.02																													.57	
Apr.																															.45	
May																															.45	
June	.02	T	.01	.67	T	T	T	T	T	1.06	.54	.15																		3.05		
																															.85	
July		T								.04	1.15	.74	.01			T	T	.22													.62	
Aug.																															1.44	
Sept.																															1.15	
Oct.																															3.09	
Nov.																															0.97	
Dec.																															1.31	
																															.10	
																															Total 1920	29.76

Standard gauge												Monterey, N. L. -- 1934												Motor. Serv. of Mex.	
Jan.	.05	T			T	T	T	.04	T	T	T	.03	.14				.02		.07	T	.10	.18	.13	.33	.97
Feb.		T	T	T	.06	.09	.07	.04	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Mar.		T	T	T	.07	.10	.08	.05	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Apr.		T	T	T	.08	.11	.09	.06	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
May		T	T	T	.09	.12	.10	.07	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
June		T	T	T	.10	.13	.11	.08	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
July		T	T	T	.11	.14	.12	.09	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Aug.		T	T	T	.12	.15	.13	.10	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Sept.		T	T	T	.13	.16	.14	.11	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Oct.		T	T	T	.14	.17	.15	.12	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Nov.		T	T	T	.15	.18	.16	.13	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
Dec.		T	T	T	.16	.19	.17	.14	T	.98	.44	.07	.07	.73	.01		1.04	.03	.02	.44	.06	.06	.04	.11	.13
																								Total 1934 29.03	

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	-------------------------

Recording gauge															Monterrey, N. L.										Nat'l. Irrig. Com.									
Jan.	T				.18	.21																												
Feb.					.10																													
Mar.																																		
Apr.																																		
May																																		
June																																		
July																																		
Aug.																																		
Sept.																																		
Oct.																																		
Nov.																																		
Dec.																																		

Period 1896-1945 Total 1945 25.16 25.05

Standard gauge															Ciénegas de Flores, N. L.										Nat'l. Irrig. Com.								
Jan.	T				.19	.21																											
Feb.					.05	.04																											
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

Period 1938-1945 Total 1945 17.81 24.85

Recording gauge															Cadereyta, N. L.										Nat'l. Irrig. Com.							
Jan.	T				.31																											
Feb.					.05	.03																										
Mar.																																
Apr.																																
May																																
June																																
July																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																

Period 1904-1945 Total 1945 28.02 28.59

Standard gauge															Villa de Santiago, N. L.										Nat'l. Irrig. Com.							
Jan.	T				.39	.08																										
Feb.					.06	T																										
Mar.																																
Apr.																																
May																																
June																																
July																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																

Period 1923-1945 Total 1945 39.93 41.89

Standard gauge															Rayones, N. L.										Nat'l. Irrig. Com.							
Jan.																																
Feb.																																
Mar.																																
Apr.																																
May																																
June																																
July																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																

Period 1926-1945 Total 1945 25.97 26.10

Recording gauge															Los Ramones, N. L.										Nat'l. Irrig. Com.			

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RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

670-100-00

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1945

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 Inches	Normal or Average
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------------	-------------------------

Recording gage												Linares, N. L.												Mat'l. Irrig. Com.							
Jan.	.02																														
Feb.																															
Mar.																															
Apr.																															
May																															
June	.02	.28																													
July																															
Aug.																															
Sept.	.05	.02																													
Oct.	1.29	3.75	.75	.04																											
Nov.																															
Dec.																															

Period 1900-1945 Total 1945 29.35 31.73

Recording gage												Villagrán, Tamps.												Mat'l. Irrig. Com.							
Jan.																															
Feb.																															
Mar.																															
Apr.																															
May																															
June	T	.02																													
July																															
Aug.																															
Sept.	.10																														
Oct.	.18	.51	.49	.51	.14	.26	T	T	1.24	.15	.04	T	.46																		
Nov.																															
Dec.																															

Period 1939-1945 Total 1945 21.30 36.99

Standard gage												Mendez, Tamps.												Mat'l. Irrig. Com.						
Jan.	T												T	.09	T	.51									T	.22	.58	.56	2.22	1.93
Feb.													T		T										T	.43				
Mar.													T		T										T	0				
Apr.													T		T										T	.75				
May													T		T										T	.96				
June													T		T										T	2.07				
July	T	T											T		T										T					
Aug.													T		T										T					
Sept.	.10												T		T										T					
Oct.	.11	.37	1.04										T		T										T					
Nov.													T		T										T					
Dec.													T		T										T					

Period 1939-1945 Total 1945 11.84 25.27

Recording gage												Reynosa, Tamps.												Mat'l. Irrig. Com.						
Jan.	T	T											T	.08	.64	.45	T	T	T	T	T	T	T	T	.44	.39	.38	2.12	1.77	
Feb.													T		T										T	.26				
Mar.													T		T										T	.84				
Apr.													T		T										T	2.13				
May													T		T										T	.92				
June	1.13	T											T		T										T	.45				
July													T		T										T	.65				
Aug.													T		T										T					
Sept.	.09	-1.14	2.61										T		T										T					
Oct.													T		T										T					
Nov.													T		T										T					
Dec.													T		T										T					

Period 1943-1945 Total 1945 13.04 20.64

Standard gage												Control (C I-K-9), Tamps.												Mat'l. Irrig. Com.								
Jan.	.25												.19	.55	.04	T	.01	T	.04	T	.44	T	.04	T	.04	.05	.05	.24	1.33	4.93	1.67	
Feb.													.04												T							
Mar.													.04												T							
Apr.													.04												T							
May													.04												T							
June	T	T											.43												T	.76						
July	.20												T		T										T							
Aug.	.61	.15											T		T										T							
Sept.	.03	.49	.01	.20									.06		.06		.46		.28													
Oct.																										T						
Nov.																										T						
Dec.																										T						

Period 1943-1945 Total 1945 15.12 27.98

Some months missing

Standard gage												Matamoros, Tamps.												Metear. Surv. of Mex.				

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EVAPORATION IN THE RIO GRANDE BASIN

Five types of land pans are used for determining evaporation in the Rio Grande Basin below San Miguel, New Mexico. The results reported below are inches evaporation from each pan.

1. Circular land pan 4 feet in diameter and 10 inches deep, made of 22 gauge galvanized iron, set upon wooden platform with top of pan about 18 inches above ground. Water in pan kept at about 7 to 9 inches depth. Measured by micrometer hook gage. This type of pan was used at Jornada, Elephant Butte, Caballo Dam, State College, Yeltes, Fort Stockton, Red Bluff Dam, Balmorhea (Weather Bureau), Grandfalls, Fort Stockton, Dilley, and all Mexican stations except La Boquilla and Palestine. This is the standard Weather Bureau pan. Prior to November 1936, a floating pan, described in previous bulletins, was used at Jornada.

2. Circular land pan 4 feet in diameter and 2 feet deep, made of 22 gauge galvanized iron, set in ground with top of pan 4 inches above ground. Water in pan kept at about 10 to 16 inches deep. Measured by micrometer hook gage. This type of pan was used at Belen (A. & M. College) and Weslaco.

3. Circular land pan made of galvanized iron 8 feet in diameter and 24 inches deep, set in ground with the top edge of the pan about 9 inches above ground. Water in pan is kept about 12 to 18 inches deep. Measurements by micrometer hook gage. This type of pan is used at Winterhaven and Moab.

4. Circular copper land pan 4.1 feet in diameter and ten inches deep, set upon concrete pillars with top of pan about 18 inches above the

ground. Water in pan is kept between 4.7 inches and 7.9 inches depth. Measured by micrometer hook gage. This type of pan is used at La Boquilla, Chihuahua, and has been erroneously described in previous water bulletins as being Type 1.

5. This type same as Type 1, except that it is set on a platform 3 feet above ground and operated with water four to nine inches deep in pan. This type of pan is used at Palestine, Coahilla, and has been previously described as being Type 1.

The type of operation and use of the water in these pans is very different with respect to the rim of the pan and also with respect to sun exposure.

For example, Elephant Butte Dam pan is on top of a desert hill while Losco pan is in an irrigated orchard with large trees within about 30 feet of the pan. The area surrounding Dryden pan is flat and bare for more than 100 feet on all sides, whereas the Palestine pan has mesquite brush on three sides just outside the fence of horizontally spaced boards.

The United States Weather Bureau has records for Elephant Butte, Caballo Dam, Jornada, New Mexico State College, Yeltes, Alvarado, A. & M. College camp records of Balmorhea, Winterhaven, Dilley, and Weslaco. The Mexican records are from the Meteorological Service of Mexico and the National Irrigation Commission.

The latitude, longitude, and elevation of all stations is shown either in Water Bulletin No. 12, page 94, or Water Bulletin No. 13, page 95.

In The United States

Month	Elephant Butte Dam N. M.		Caballo Dam, N. M.		Jornada, N. M.		State College, N. M.		Yeltes, Texas Weather Bureau		Dryden, Texas		Alamogordo Dam N. M.				
	1945	# Normal 1939-1945	1945	# Average 1940-1945	1945	# Average 1940-1945	1945	# Normal 1939-1945	1945	# Average 1940-1945	1944	1945	# Average 1940-1945	1945	# Average 1939-1945		
Jan.	2.45	3.15	2.73	2.94	2.86	2.47	3.00	2.98	3.21	2.90	4.06	2.55	2.80	4.06	2.80		
Feb.	5.91	5.08	5.55	5.35	5.80	3.95	5.26	4.45	5.28	4.57	4.93	4.80	4.28	4.93	4.28		
Mar.	8.68	8.67	8.53	8.93	7.40	7.83	7.57	9.58	8.38	10.41	9.20	8.00	10.41	9.20	8.00		
Apr.	12.32	12.42	12.07	12.01	10.86	10.35	10.96	9.73	11.12	11.12	12.31	9.19	9.84	12.31	9.19	9.84	
May	17.07	17.06	17.00	17.00	15.97	15.43	15.97	15.28	15.28	15.28	15.65	16.89	17.65	15.65	16.89	17.65	
June	17.05	17.06	17.42	17.30	16.49	17.70	14.88	18.23	14.88	17.49	17.72	17.12	17.21	17.72	17.12	17.21	
July	14.44	14.28	13.62	13.50	12.94	12.50	13.58	11.59	13.12	12.20	11.67	13.73	12.92	11.67	13.73	12.92	
Aug.	13.22	12.66	12.62	12.18	11.39	10.84	11.58	10.13	10.82	10.42	16.87	11.94	11.92	16.87	11.94	11.92	
Sept.	15.17	9.80	12.50	10.02	10.74	8.79	9.51	8.16	9.60	8.34	12.03	11.84	9.67	12.03	11.84	9.67	
Oct.	8.24	7.71	6.70	6.70	5.40	5.98	5.63	6.05	5.26	5.99	5.03	5.84	6.36	5.03	5.84	6.36	
Nov.	6.48	4.98	6.20	4.97	4.46	3.81	6.09	3.98	4.35	3.73	4.78	5.25	4.55	4.78	5.25	4.55	
Dec.	5.37	3.16	5.62	2.89	2.53	2.56	5.06	2.65	3.91	2.79	3.50	4.48	3.67	3.50	4.48	3.67	
Total	125.41	113.63	118.83	112.74	102.85	96.18	104.00	91.66	106.18	97.53	120.92	112.64	100.56	120.92	112.64	100.56	
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Month	Red Bluff Dam Texas		Balmorhea, Texas Tex. A. & M.		Balmorhea, Texas Weather Bureau		Grand Falls, Texas		Fort Stockton, Texas		Winterhaven, Texas		Dilley, Texas		Weslaco, Texas		
	1945	# Average 1939-1945	1945	# Normal 1939-1945	1945	# Average 1940-1945	1945	# Average 1940-1945	1945	# Normal 1939-1945	1945	# Normal 1939-1945	1945	# Normal 1939-1945	1945	# Normal 1939-1945	
Jan.	2.81	3.08	2.39	2.44	3.34	3.45	3.69	3.51	1.84	1.90	3.19	2.74	2.10	2.33	2.74	2.10	
Feb.	5.91	5.08	5.55	5.35	5.80	3.95	5.26	4.45	5.28	4.57	4.93	4.80	4.28	4.93	4.80	4.28	
Mar.	8.68	8.67	8.53	8.93	7.40	8.09	8.95	8.09	8.49	8.39	9.22	9.22	8.00	9.22	9.22	8.00	
Apr.	11.42	11.24	5.70	6.36	7.33	8.11	11.00	12.04	11.12	10.49	10.50	9.12	7.21	4.91	10.50	9.12	7.21
May	14.73	13.54	7.94	7.39	10.64	9.23	14.02	12.98	15.90	14.29	14.05	11.69	8.12	6.84	14.05	11.69	8.12
June	16.18	14.50	9.10	7.97	11.42	9.60	12.49	13.33	16.31	13.11	9.46	7.08	6.48	10.46	13.11	9.46	7.08
July	11.31	13.27	6.72	6.78	8.09	9.32	10.89	12.04	11.22	12.42	8.12	11.97	10.51	7.06	11.97	10.51	7.06
Aug.	13.49	12.65	7.07	6.90	8.61	8.63	12.20	12.10	13.58	12.18	12.18	10.28	9.51	8.75	12.18	10.28	9.51
Sept.	10.01	10.09	5.34	5.34	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41
Oct.	4.29	5.22	4.11	3.57	4.59	5.92	6.86	4.76	5.86	4.40	5.31	5.21	5.21	4.26	5.31	5.21	4.26
Nov.	5.48	4.42	3.13	2.87	3.81	5.17	4.55	5.31	4.41	2.98	3.59	4.97	4.97	3.59	3.59	4.97	3.59
Dec.	3.87	3.28	9.31	2.04	3.03	2.46	3.25	2.97	4.63	3.81	2.21	1.86	3.38	2.63	2.98	3.38	2.63
Total	105.90	101.41	61.41	74.06	102.50	103.47	112.95	99.56	53.61	99.21	98.19	77.78	77.78	99.21	98.19	77.78	99.21
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In Mexico																	
Month	San Buenaventura Chih.		San Antonio, Durango		La Junta, Chih.		Villalba, Chih.		La Boquilla Dam Chih.		Delicias, Chih.						
	1945	# Normal 1939-1945	1945	Average 1940-1945	1945	# Average 1940-1945	1945	# Average 1940-1945	1945	# Normal 1939-1945	1945	# Average 1939-1945	1945	# Average 1939-1945	1945	# Average 1939-1945	
Jan.	2.33	3.21	6.66	5.03	2.54	2.84	5.68	5.38	4.72	4.08	4.33	3.94	3.94	3.94	3.94	3.94	3.94
Feb.	6.65	6.66	8.67	7.00	3.18	3.81	6.39	15.10	11.37	11.48	5.69	6.00	6.00	6.00	6.00	6.00	6.00
Mar.	8.65	7.81	11.97	10.30	7.57	6.39	10.85	13.80	13.99	12.49	10.68	9.92	10.10	10.10	10.10	10.10	10.10
Apr.	9.49	9.05	13.06	12.18	8.80	9.08	10.85	15.43	15.56	15.78	13.31	13.33	13.33	13.33	13.33	13.33	13.33
May	11.51	10.75	12.45	12.26	11.89	10.89	10.85	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47
June	12.61	11.14	13.65	11.52	12.07	10.46	15.06	14.34	17.38	13.55	13.71	12.17	12.17	12.17	12.17	12.17	12.17
July	8.68	8.86	7.88	8.34	7.50	7.22	8.44	10.70	11.11	10.70	10.28	9.37	9.37	9.37	9.37	9.37	9.37
Aug.	11.46	11.74	8.77	8.77	6.62	7.25	5.26	10.77	11.61	10.77	10.53	10.53	10.53	10.53	10.53	10.53	10.53
Sept.	6.45	7.83	5.34	5.34	6.25	7.25	5.26	10.77	11.61	10.77	10.53	7.44	7.44	7.44	7.44	7.44	7.44
Oct.	5.78	5.22	5.63	5.86	5.18	4.75	6.51	6.76	6.51	6.76	6.28	6.28	6.28	6.28	6.28	6.28	6.28
Nov.	3.90	4.42	5.40	4.84	4.12	3.29	6.95	5.46	6.24	4.55	4.97	4.97	4.97	4.97	4.97	4.97	4.97
Dec.	2.91	4.32	4.03	2.74	2.46	2.46	4.37	4.51	5.28	4.51	3.52	3.52	3.52	3.52	3.52	3.52	3.52
Total	81.90	105.11	96.37	80.27	72.97	120.14	113.01	120.22	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38	99.38
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Month	Palestine, Coah.		Sabina, Coah.		Don Martin, Coah.		Lag. De Salinillas, N. L.		Montemorelos, N. L.								
	1945	# Normal 1939-1945	1945	# Average 1940-1945	1945	# Normal 1940-1945	1945	# Average 1940-1945	1945	# Normal 1939-1945	1945	# Average 1939-1945	1945	# Average 1940-1945	1945	# Average 1940-1945	
Jan.	5.82	5.36	4.18	3.12	3.21	3.45	4.16	4.02	2.06	2.56	3.02	2.83	2.83	2.83	2.83	2.83	2.83
Feb.	4.08	4.72	3.84	3.97	3.35	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Mar.	4.94	7.05	6.77	7.56	6.14	7.94	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36
Apr.	5.65	8.20	8.82	9.95	8.08	9.31	10.57	10.65	12.49	12.49	9.72	9.72	9.72	9.72	9.72	9.72	9.72
May	10.75	9.56	9.48	10.93	10.59	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47
June	12.44	10.99	11.77	11.57	11.56	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92	12.92
July	11.87	11.57	11.57	11.56	10.99	10.76	12.73	12.73	12.73	12.73	12.73	12.73	12.73	12.73	12.73	12.73	12.73
Aug.	11.90	11.78	11.87	11.87	9.99	12.74	10.76	10.76	11.91	11.91	12.44	12.44	12.44	12.44	12.44	12.44	12.44
Sep.	11.41	9.34	7.77	7.77	8.49	8.48	10.81	10.81	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44
Oct.	5.59	8.25	4.78	5.61	4.74	6.36	5.33	5.33	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36
Nov.	4.57	6.61	3.99	3.83													

DRAINAGE BASIN AND IRRIGATED AREAS**Along the Rio Grande and Tributaries—1945**

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 171,887 square miles of productive watershed. Only the productive watershed areas are listed below.

The irrigated areas listed hereunder include only areas below San Marcial gaging station on the Rio Grande and below Girvin gaging station on the Pecos River. These figures are from the most reliable sources and are the best figures available. Below Laredo the figures are for cultivated acreages, all of which have 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, No. 10, page 102, No. 11, page 81, No. 12, pages 96 to 98, No. 13, pages 94 and 95, and No. 14, pages 96 and 97.

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres		
	In		Total	In		Total
	United States	Mexico		United States	Mexico	
Above San Marcial Station	24,717	0	24,717			
San Marcial to Elephant Butte Dam	1,747	0	1,747	0	0	0
Above Elephant Butte Dam	26,464	0	26,464	0	0	0
Elephant Butte Dam to Caballo Dam	1,290	0	1,290	98	0	98
Above Caballo Dam	27,754	0	27,754	98	0	98
Caballo Dam to El Paso Station	1,513	0	1,513	99,803	0	99,803
Above El Paso Station	29,267	0	29,267	99,901	0	99,901
El Paso Station to American Dam	4	0	4	0	0	0
Above American Dam	29,271	0	29,271	99,901	0	99,901
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 Fort Quitman, excluding Guayuco Arroyo	501	679	1,180			
County Line to Fort Quitman, including Guayuco Arroyo	663	679	1,342			
El Paso Station to Fort Quitman Station - total	1,339	1,384	2,723	71,063	52,140	123,203
Above Fort Quitman Station	30,606	1,384	31,990	170,964	52,140	223,104
Quitman Arroyo (I. B. & W. C.name) above measuring point near its mouth	36	0	36			
Quitman Arroyo (I. B. & W. C. name)above rocky canyon	18	0	18			
Red Light Arroyo(I. B. & W. 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			
Fort Quitman to La Nutria, excluding Quitman Arroyo, Red Light Arroyo, and Van Horn Creek	628	886	1,514			
Fort Quitman to La Nutria - total	1,041	886	1,927	1,030	5,680	6,710
Above La Nutria Station	31,647	2,270	33,917	171,994	57,820	229,814
Capote Creek, above measuring point near its mouth	93	0	93			
La Nutria to Upper Presidio - total	580	503	1,083	1,000	9,390	10,390
Above Upper Presidio Station	32,227	2,773	35,000	172,994	67,210	240,204
Rio Conchos, above Boquilla Dam	0	7,322	7,322	0	2,970	2,970
Rio Conchos, below Boquilla Dam	0	17,419	17,419	0	170,500	12,100
Rio Conchos - total	0	24,741	24,741	0	173,470	12,100
Upper to Lower Presidio, excluding Rio Conchos	21	5	26	200	0	200
Upper Presidio to Lower Presidio - total	21	24,746	24,767	200	173,470	12,100
Above Lower Presidio Station	32,248	27,519	59,767	173,194	240,680	425,974
Alamito Creek, above gaging station	1,504	0	1,504	805	0	805
Terlingua Creek, above gaging station	1,070	0	1,070	288	0	288
Lower Presidio to Johnson Ranch, excluding Alamito and Terlingua	1,439	2,671	4,110	1,600	3,710	5,310
Lower Presidio to Johnson Ranch - total	4,013	2,671	6,684	2,693	3,710	6,403
Above Johnson Ranch Station	36,261	50,190	66,451	175,887	244,390	12,100
Johnson Ranch to Boquillas	471	3,735	4,206	0	0	0
Above Boquillas Station	36,732	33,925	70,657	175,887	244,390	12,100
Maravillas Creek,above proposed gaging station	2,192	0	2,192	0	0	0
Lozier Creek, above gaging station	1,806	0	1,806	0	0	0
Boquillas to Langtry, excluding Maravillas and Lozier	2,125	2,595	4,720	0	0	0
Boquillas to Langtry - total	6,125	2,595	8,718	0	0	0
Johnson Ranch to Langtry, excluding Maravillas and Lozier	2,596	6,330	8,926	0	0	0
Johnson Ranch to Langtry - total	6,594	6,330	12,924	0	0	0
Above Langtry Station	42,855	36,520	79,375	175,887	244,390	12,100
						432,377

DRAINAGE BASIN AND IRRIGATED AREAS
Along the Rio Grande and Tributaries—1945

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres		
	In		Total	In		Total
	United States	Mexico		United States	Mexico	
Pecos River, above Girvin	29,562	0	29,562			
Pecos River, Girvin to I.B.& W.C. gaging station	5,731	0	5,731	419	0	0
Pecos River, above I.B.& W.C. gaging station	35,293	0	35,293	419	0	0
Goodenough Spring, above gaging station	1	0	1	0	0	0
Devils River, above Juno gaging station	2,947	0	2,947	0	0	0
Devils River, below gaging station near Juno to I.B.& W.C. gaging station	1,238	0	1,238	0	0	0
Devils River, above I.B.& W.C. gaging station	4,185	0	4,185	0	0	0
Las Vacas Arroyo, above gaging station	0	146	146	0	741	494
Langtry to Del Rio, excluding above tributaries	416	2,495	2,911	5	0	3
Langtry to Del Rio - total	39,895	2,641	42,536	422	741	494
Above Del Rio Station	82,750	39,161	121,911	176,309	245,131	12,594
						434,034
San Felipe Creek, above gaging station	62	0	62	1,088	0	0
Sycamore Creek, above gaging station	515	0	515	0	0	0
Pinto Creek, above gaging station	229	0	229	0	0	0
Rio San Diego, above gaging station	0	931	931	0	16,310	
Las Moras Creek, above gaging station	162	0	162	334	0	0
Rio San Rodrigo, above gaging station	0	586	586	0	3,210	3,210
Del Rio to Eagle Pass, excluding above tributaries	527	2,270	561	1,108	17,670	8,190
Del Rio to Eagle Pass - total	1,495	2,098	3,593	** 19,092	27,670	3,230
Above Eagle Pass Station **	84,445	41,259	125,504	195,401	272,801	15,804
						484,006
Rio Escondido, above gaging station	0	1,130	1,130	0	6,180	8,650
Arroyo Amole - total	0	482	482	0	0	0
Eagle Pass to El Jardin, excluding above tributaries	736	1,191	1,987	1,671	247	0
Eagle Pass to El Jardin - total	736	2,803	3,539	1,671	6,427	8,650
Above El Jardin Dam Site	84,981	44,062	129,043	197,072	279,228	24,454
						500,754
Santa Isabella Arroyo, above river road	350	0	350	0	0	0
El Jardin to Laredo, excluding Santa Isabella	387	1,079	1,466	4,605	1,480	0
El Jardin to Laredo - total	737	1,079	1,816	4,605	1,480	0
Eagle Pass to Laredo, excluding above tributaries	1,123	2,470	3,393	6,276	1,727	0
Eagle Pass to Laredo - total	1,473	3,882	5,355	6,276	7,907	8,650
Above Laredo Station	85,718	45,141	130,859	201,677	280,708	24,454
						506,839
Dolores Creek, above gaging station	606	0	606	0	0	0
Rio Salado, above Don Martin Dam	0	13,819	13,819	0	94,360	8,900
Rio Salado, below Don Martin Dam	0	7,709	7,709	0	58,070	10,130
Rio Salado, above gaging station	0	21,528	21,528	0	112,430	131,460
Laredo to Zapata, excluding above tributaries	491	942	1,433	0	14,114	1,240
Laredo to Zapata, including Dolores, and excluding Salado	1,097	942	2,039	0	14,114	1,240
Laredo to Zapata - total	1,097	22,470	23,567	0	14,114	113,670
Above Zapata Station	86,815	67,611	154,426	215,791	394,378	43,484
						653,653
El Tigre Arroyo, above gaging station	261	0	261	0	0	0
Rio Alamo, above gaging station	0	1,675	1,675	0	4,940	5,440
Zapata to Roma, excluding above tributaries	771	315	1,086	# 4,298	0	0
Zapata to Roma, including El Tigre and excluding Alamo	1,032	315	1,347	# 4,298	0	0
Zapata to Roma - total	1,032	1,990	3,022	# 4,298	4,940	5,440
Above Roma Station	87,847	69,601	157,448	220,089	399,318	48,924
						668,331
Rio San Juan, above Azucar Dam	0	12,473	12,473	0	102,550	67,210
Los Olmos Creek, above gaging station	535	0	535	0	0	0
Mexican Side, below Azucar dam and San Pedro de Roma and above Reynosa	0	817	817	0	14,830	0
Roma to Rio Grande City, excluding above tributaries	143	387	530	# 3,000		
U.S.Side, Roma to Rio Grande City, including Los Olmos	678	0	678	# 3,000		
Roma to Rio Grande City - total	678	12,860	13,538	# 3,000		
Above Rio Grande City Station	88,525	82,461	170,986	229,089		
						14,830
Rio Grande City to Hidalgo	415	430	845			
Above Hidalgo Station	88,940	82,891	171,831		516,698	116,134
Hidalgo to Mercedes Bridge Station	15	15	30		35,748	87,804
Above Mercedes Bridge Station	88,955	82,906	171,861		552,446	203,938
Mercedes Bridge to Matamoros Station	11	11	22			
Above Matamoros Station	88,966	82,917	171,883		552,446	203,938
Matamoros to Lower Brownsville Station	2	2	4		0	0
Rio Grande City to Lower Brownsville Station	143	458	901	* 544,415		
Above Lower Brownsville Station	88,968	82,919	171,887	# 767,504	552,446	* 203,938
						1,523,888

Includes 2,370 acres of dry farmed + Dry farmed in 1945 * Includes 40,615 acres of dry farmed ** Includes all areas under Maverick Canal, some of which are below Eagle Pass but the canal diverts from the Rio Grande above Eagle Pass Station. *** Includes 135,029 acres of dry farmed + Includes 1,084 acres of dry farmed * Includes 1,156 acres of dry farmed # Includes 45,225 acres of dry farmed + Includes 87,804 acres of dry farmed

AUTHENTICATED AND OTHER DISCHARGES

The tabulation below shows publications in which may be found the discharges at gaging stations on the Rio Grande and on tributaries and outfalls near their confluence with the Rio Grande as well as on floods and diversions leading from the Rio Grande, from San Marcial, New Mexico, to the Gulf of Mexico. The table shows which discharges are authenticated by this Commission, as well as other discharges.

All Rio Grande and tributary discharges authenticated by this Commission, including the latest revisions, are aggregated from the other discharges in the following listing. Listed among the other discharges are those not yet authenticated and those unpermitted.

In the following table B means Water Bulletins, of various numbers, published by this Commission. F means Water Supply Papers of various numbers published by the United States Geological Survey. An exponent indicates the Water Bulletin number in which a revision has been made.

- * Indicates daily and monthly discharges.
- † Indicates monthly discharges.
- ‡ Indicates period discharges.
- § Indicates annual discharges.
- Indicates daily gage heights.

Within the Period	Where Published	Within the Period	Where Published	Within the Period	Where Published		
San Marcial							
AUTHENTICATED							
1895 - 1945	B. 13 #	1924 - 1927	B. 5 *	1952 - 1945	B. 2 ± 15, 6 #,		
1895	B. 7 4/4, 12 #	1924 - 1927	B. 13 #	OTHER	OTHER		
1924 - 1935	B. 6 #	1924 - 1927	B. 1 ± 7	Aug., Dec. 1934	B. 4 1/3		
1931 - 1945	B. 1 ± 15	OTHER	P. * 668, 688, 703, 718	Jan. 1937	B. 7 1/3		
Decade 1936 - 1937	B. 7 *	County Line	County Line	Tarlingus Creek			
OTHER							
Feb. 1895, Apr. 1896	B. 12 1/3, F. * 358	1938 - 1945	B. 8 ± 15, 13 #	AUTHENTICATED			
1897 - 1931	P. * 358, 388, 408, 438	1938 - 1945	OTHER	1952 - 1945	B. 2 ± 15, 6 #,		
	458, 478, 508, 528, 628	1900 - 1903	B. 13 #	OTHER	OTHER		
	668, 688, 703, 718, 733	1900 - 1903	P. * 708	June, Sept. 1937	B. 7 1/3		
Mar., Apr. 1932	B. 2 6/3, F. * 733	1900 - 1903	OTHER	Johnson Ranch			
1933 - 1945	P. * 748, 763, 785, 808	1900 - 1903	P. * 708	1956 - 1945	B. 6 ± 15		
	828, 858, 878, 898, 928	1900 - 1903	OTHER	Boquillas			
	928, 958, 1,008	1900 - 1903	P. * 708	1924 - 1935	B. 5 #, 6 #		
Decade 1936 - 1937	P. * 628	1900 - 1903	OTHER	1931 - 1936	B. 1 ± 6		
Below Elephant Butte Dam							
AUTHENTICATED							
1915 - 1943	B. 12 #, 13 #	1924 - 1927	B. 5 *	1928 - 1935	B. 2 ± 5, 6 #		
1915 - 1916	B. 10 *	1924 - 1927	B. 12 #	OTHER	OTHER		
1938 - 1945	B. 8 ± 15	1924 - 1927	B. 6 #	June, Sept. 1937	B. 7 1/3		
OTHER							
June 1915	B. 10 1/3	1924 - 1927	B. 1 ± 15	1956 - 1945	B. 6 ± 15		
1916 - 1944	P. * 458, 478, 508, 528	1924 - 1927	OTHER	Tarlingus Creek			
	548, 568, 588, 608, 628	1924 - 1927	P. * 668, 688, 703, 718	AUTHENTICATED	AUTHENTICATED		
	668, 688, 703, 733	1924 - 1927	OTHER	1952 - 1945	B. 2 ± 15, 6 #,		
	748, 763, 788, 808, 828	1924 - 1927	P. * 668, 688, 703, 718	OTHER	OTHER		
	808, 828, 848, 868, 888	1924 - 1927	OTHER	June, Sept. 1937	B. 7 1/3		
	908, 928, 948, 968, 988	1924 - 1927	P. * 668, 688, 703, 718	Lozier Creek			
	978, 1,008	1924 - 1927	OTHER	1952 - 1935	B. 2 ± 5, 6 #		
Below Caballo Dam							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	B. 5 ± 11, 6 #, 13 #	1928 - 1935	B. 2 ± 5, 6 #		
OTHER							
1938 - 1944	P. * 878, 898, 928, 958	1924 - 1927	OTHER	Langtry			
	978, 1,008	1924 - 1927	P. * 668, 688, 703, 718	AUTHENTICATED	AUTHENTICATED		
El Paso							
AUTHENTICATED							
1889 - 1943	B. 13 #	1924 - 1927	B. 7 #, 9 *	1900 - 1913	B. 7 #		
1889 - 1895 - 1896	B. 12 #, 12 #	1924 - 1927	B. 4 *	1924 - 1927	B. 6 #		
Jan., 1896	B. 12 #	1924 - 1927	B. 6 #	1924 - 1927	B. 1 ± 15		
April, July 1914	B. 7 *	1924 - 1927	B. 8 *	1924 - 1927	OTHER		
Dec. 1915	B. 7 #, 12 #	1924 - 1927	B. 9 *	1900 - 1914	P. * 358, 388, 408		
1924 - 1935	B. 6 #	1924 - 1927	B. 10 *	1904, 1906, 1908	B. 7 #, 7 1/4		
1931 - 1945	B. 1 ± 15	1924 - 1927	B. 1 ± 15	1919, 1920	P. * 358		
OTHER				1924 - 1927	668, 688, 703, 718		
1889 - 1893	P. * 358	1924 - 1927	OTHER	1924 - 1927	668, 688, 703, 718		
1897 - 1905	P. * 358, 388, 408, 568	1924 - 1927	P. * 358, 388, 408, 568	1931 - 1945	668, 688, 703, 718		
Jan., Feb. 1893	B. 12 #	1924 - 1927	668, 688, 703, 718	Pecos River			
Jan., Aug. 1930	B. 12 #	1924 - 1927	668, 688, 703, 718	AUTHENTICATED	AUTHENTICATED		
1916 - 1931	P. * 568, 588, 608, 628	1924 - 1927	668, 688, 703, 718	1900 - 1913	B. 7 #		
	668, 688, 703, 718	1924 - 1927	668, 688, 703, 718	1924 - 1927	B. 6 #		
American Canal				1924 - 1927	B. 1 ± 15		
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	March - Dec., 1896	P. * 358, 388, 408		
OTHER				1900 - 1931	668, 688, 703, 718		
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	P. * 358, 388, 408	1900 - 1931	668, 688, 703, 718		
Below American Dam							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	Goodenough Spring			
Acagua Madre							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	1924 - 1927	B. 3 1/2		
Diversions in the El Paso Valley							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15	1924 - 1927	OTHER	1924 - 1927	B. 6 1/2		
Juarez							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	1924 - 1927	B. 1 ± 15		
Outfalls Near El Paso							
AUTHENTICATED							
1936 - 1945	B. 8 ± 15	1924 - 1927	OTHER	1924 - 1927	OTHER		
Clarens Creek							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	1931 - 1935	B. 1 ± 5, 5#		
Island							
AUTHENTICATED							
1938 - 1945	B. 8 ± 15, 13 #	1924 - 1927	OTHER	1931 - 1935	B. 1 ± 5, 5#		

AUTENTICATED AND OTHER DISCHARGES

Within the Period	Where Published	Within the Period	Where Published	Within the Period	Where Published				
Arroyo Las Vacas									
AUTHENTICATED									
1935 - 1945	B. 6 ± 15	June 1899, Apr. 1900	B. 15 Peak discharge	1943 - 1945	B. 13 ± 15				
OTHER		1900 - 1913	B. 7 #	OTHER					
1938, 1939, 1940	B. 8 ¹⁴ , 9 ¹⁴ , 10 ¹⁴	May, Sept. 1900	B. 15 *	1944	B. 14 ¹⁴				
Del Rio									
AUTHENTICATED									
1900 - 1913	B. 7 #	June 1903, Sept. 1904	B. 15 *	Rio San Juan below Azucar Dam					
1934 - 1935	B. 7 #	June, July 1905	B. 15 *	AUTHENTICATED					
July - 1925	B. 15 *	Aug., Sept. 1906	B. 15 *	1943 - 1945	B. 13 ± 15				
1931 - 1945	B. 1 ± 15	Sept. 1906, June 1912	B. 15 *	OTHER					
OTHER		May, June, Oct. 1913	B. 15 *	1944	B. 14 ¹⁴				
1900 - 1915	P. * 358, 388, 408	Sept. 1916, Sept. 1917	B. 15 *	Los Olmos Creek					
1919 - 1920	P. * 358	Oct. 1917, Oct. 1918	B. 15 *	AUTHENTICATED					
1923 - 1931	P. * 588, 608, 628, 648	Sept., Oct. 1919	B. 15 *	1932 - 1936	B. 2 ± 6, 6 #				
July 1925	668, 688, 703, 728	Aug., Sept. 1920	B. 1 ± 15	Rio Grande City					
May 1925	B. 6 ¹⁴	June 1921, Sept. 1923	B. 15 *	AUTHENTICATED					
July 1925	B. 6 ¹⁴	1900 - 1914	B. 6 ± 15	May, June, Oct. 1911	B. 15 *				
San Felipe Creek									
AUTHENTICATED									
1931 - 1935	B. 6 #	1900 - 1913	B. 7	OTHER					
1931 - 1945	B. 1 ± 15	June 1903, Sept. 1904	B. 7	April 1926	B. 5 ¹⁴ , 6 ¹⁴				
OTHER		June, July 1905	B. 7	Aug. 1932	B. 2 ¹⁴				
June 1935	B. 5 ¹⁴	Aug., Sept. 1906	B. 7	Sept. 1937	B. 7 ¹⁴				
Sycamore Creek									
AUTHENTICATED									
1930 - 1935	-	Sept. 1906, June 1912	B. 7	U. S. Diversions below Rio Grande City					
1930 - 1935	B. 2 ± 5, 6 #	1900 - 1914	B. 7	AUTHENTICATED					
Maverick Canal									
AUTHENTICATED									
1939 - 1945	B. 9 ± 15	1932 - 1936	B. 2 ± 6, 6 #	1922 - 1937	B. 7 #				
Pinto Creek									
AUTHENTICATED									
1928 - 1935	B. 6 #	1900 - 1913	B. 7	1935 - 1945	B. 2 ± 15				
1931 - 1945	B. 1 ± 15	1924 - 1935	B. 3 #, 6 #	North Floodway South of McAllen					
OTHER		1925	B. 15 *	AUTHENTICATED					
1928 - 1931	P. * 608, 703, 718	1924, 1926 - 1930	B. 3 *, 5 *	1926 - 1935	B. 2 ± 5				
Rio San Diego									
AUTHENTICATED									
1930-1935	B. 6 #	1932 - 1936	B. 6 #	1938 - 1945	B. 8 ± 15				
1930 - 1945	B. 2 ± 15	1932 - 1945	B. 2 ± 15	South Floodway South of McAllen					
Las Moras Creek									
AUTHENTICATED									
1932 - 1935	B. 2 ± 5	Sept. 1938	B. 8 ¹⁴	1926 - 1935	B. 2 ± 5				
OTHER		Sept. 1941	B. 11 ¹⁴	1938 - 1945	B. 8 ± 15				
Oct. - Dec. 1934	B. 4 ¹⁴ , 6 ¹⁴ These in error	El Tigre Creek							
Rio San Rodrigo									
AUTHENTICATED									
1932 - 1935	B. 6 #	1932 - 1936	B. 2 ± 6, 6 #	AUTHENTICATED					
1932 - 1945	B. 2 ± 15	1932 - 1945	B. 2 ± 15	1940 - 1945	B. 10 ± 15				
OTHER		OTHER		Hidalgo					
1941	B. 11 ¹⁴	Sept. 1938	B. 8 ¹⁴	AUTHENTICATED					
Eagle Pass									
AUTHENTICATED									
June 1899, Apr. 1900	B. 15 Peak discharge	1900 - 1914	B. 3 ± 10 Peak discharge	1928 - 1931	P. * 668, 688, 703, 718				
1900 - 1913	B. 7 #	May 1900, June 1903	B. 15 *	1930 - 1935	B. 2 ± 5				
May, Sept. 1900	B. 15 *	Sept. 1904, July 1905	B. 15 *	1938 - 1945	B. 8 ± 15				
June, July 1903	B. 15 *	July, Aug. 1909	B. 15 *	North Floodway South of Sebastian					
Aug., Sept. 1905	B. 15 *	Sept. 1910, Oct. 1911	B. 15 *	1940 - 1945	B. 10 ± 15				
Sept. 1910, Oct. 1912	B. 15 *	Sept. 1912, Oct. 1913	B. 15 *	AUTHENTICATED					
May, June, Oct. 1914	B. 15 *	Sept. 1913	B. 15 *	1940 - 1945	B. 10 ± 15				
Sept. 1916, Sept. 1917	B. 15 *	Sept. 1917	B. 15 *	Rio Alamo					
Oct. 1917, Oct. 1918	B. 15 *	Sept., Oct. 1919	B. 15 *	AUTHENTICATED					
Sept., Oct. 1919	B. 15 *	Aug., Sept. 1920	B. 15 *	1940 - 1945	B. 13 ± 14				
Aug., Sept. 1920	B. 15 *	June 1922, Sept. 1923	B. 15 *	Buenos Aires					
June 1922, Sept. 1923	B. 15 *	1924 - 1935	B. 5 #, 6 #	AUTHENTICATED					
1924 - 1926	B. 15 *	1924 - 1935	B. 5 #, 6 #	1943 - 1944	B. 13 ± 14				
1924 - 1939	B. 6 #	1924 - 1935	B. 5 #, 6 #	Retamal Canal					
Sept. 1928	B. 15 *	1924 - 1935	B. 5 #, 6 #	AUTHENTICATED					
1931 - 1945	B. 1 ± 15	1924 - 1935	B. 5 #, 6 #	1939 - 1945	B. 9 ± 15				
OTHER		OTHER		Las Palmas					
Matamoros									
AUTHENTICATED									
1939 - 1945	B. 15 *	Mercedes Bridge							
AUTHENTICATED									
1930 - 1935	B. 2 ± 5	1930 - 1935 - 1937	B. 8 ± 5 ± 7	AUTHENTICATED					
1935 - 1941	B. 8 ± 11	1935 - 1941	B. 8 ± 11	1939 - 1945	B. 10 ± 15				
Rancho Viejo Floodway									
AUTHENTICATED									
1935 - 1946	B. 5 *, 6 *	1935 - 1946	B. 5 *, 6 *	Lower Brownsville					
1938 - 1945	B. 8 ± 15	1935 - 1946	B. 8 ± 15	AUTHENTICATED					
Matamoros									
AUTHENTICATED									
1900 - 1914	B. 7 #	1900 - 1914	P. * 358, 388	OTHER					
1922 - 1926	B. 7 #	May 1900, Sept. 1901	P. 7 ¹⁴	1900 - 1914	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	Sept. 1909, Sept. 1910	P. 7 ¹⁴	1922 - 1926	P. * 358, 388				
1924 - 1935	B. 6 #	Oct. 1911 - 1912	P. 7 ¹⁴	1924 - 1930	P. * 358, 388				
1929 - 1931	B. 1 ± 15	June 1912, Sept. 1913	P. 1*	1924 - 1930	P. * 358, 388				
Sept., Oct. 1932	B. 2 ± 6	1924 - 1932; June 1, '25	P. 1*	1924 - 1930	P. * 358, 388				
Rio San Juan at Santa Rosalia, Tamps.									
AUTHENTICATED									
1900 - 1914	B. 15 Peak discharge	1900 - 1914	P. * 358, 388	OTHER					
1922 - 1926	B. 7 #	May 1900, Sept. 1901	P. 7 ¹⁴	1922 - 1926	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	Sept. 1909, Sept. 1910	P. 7 ¹⁴	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	Oct. 1911 - 1912	P. 7 ¹⁴	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	June 1912, Sept. 1913	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932; June 1, '25	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	B. 7 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1900 - 1913	P. * 358	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1922 - 1926	B. 2 ± 6	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1930	B. 3 *, 5 *	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1924 - 1935	B. 6 #	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
1931 - 1943	B. 1 ± 15	1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				
OTHER		1924 - 1932	P. 1*	1924 - 1930	P. * 358, 388				