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WATER BULLETIN NUMBER 18

Flow of the Rio Grande and Tributary Contributions

From San Marcial, New Mexico to the Gulf of Mexico

1948

WITH MAXIMUMS, MINIMUMS AND NORMALS

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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FOREWORD

This bulletin presents the 18th compilation of stream discharges and hydrologic data relative to the international portion of the Rio Grande, prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission. The stream flow data and kindred subjects pertain to the Rio Grande and its important tributaries near their confluence with the main stream from San Marcial, New Mexico to the Gulf of Mexico. This covers the reach from the head of Elephant Butte Reservoir to the mouth of the river. The first publication in the series was Water Bulletin No. 1 for the year 1931. The present volume contains the information for the year 1948.

International stream gaging on the Rio Grande was initiated in 1889 when the station at El Paso, Texas, was established. A number of stations on the Rio Grande and its tributaries downstream from El Paso were established in 1900 and operated until 1914. Between 1914 and 1923, except for a few months in 1919 and 1920, all stream gaging work on the international reach of the river was suspended. In 1923 the work was resumed and carried on independently by the two countries until 1931 when the present joint program of stream measurement was started.

During 1948 the United States Section of the Commission operated the stream gaging stations on the Rio Grande at El Paso, American Dam, Island, County Line, Fort Quitman, Upper Presidio, Lower Presidio, Johnson Ranch, Langtry, Del Rio, Zapata, Rio Grande City, Hidalgo, and Lower Brownsville. The Mexican Section operated the stream gaging stations on the main stream at Juárez, Eagle Pass, Laredo, Roma, Las Palmas, and Matamoros. Each Section operated the gaging stations on tributary streams within its own country and those on floodways and diversions within its borders.

The total drainage area within the outer rim of the Rio Grande Basin is 335,500 square miles. However, nearly half of this area yields no run-off to the river, the productive area of the watershed being estimated as 171,900 square miles. It is estimated that the average annual virgin yield from this area was 9,062,000 acre-feet. More than 8,000,000 acre-feet of storage has been provided to irrigate a present total of 2,550,000 acres. The residual flow from the Rio Grande that escapes to the Gulf of Mexico averages 3,500,000 acre-feet.

While the data presented herein pertain primarily to the year 1948, similar information for earlier years is available in the previous reports of this same series. A list of the stream flow records pertinent to the Rio Grande and its tributaries from San Marcial, New Mexico to the Gulf of Mexico can be found in Water Bulletin No. 16 for the year 1946.

Acknowledgments

Other agencies which have each contributed to some part of the data published herein include: the Bureau of Plant Industry, Division of Soils and Agricultural Engineering, and the Soil Conservation Service of the U.S. Department of Agriculture; the Bureau of Reclamation and the Geological Survey of the U.S. Department of the Interior; the Weather Bureau of the U.S. Department of Commerce; the Corps of Engineers of the U.S. Army; Texas Agricultural and Mechanical College; Texas Board of Health; New Mexico State Engineer; El Paso City-County Health Unit; El Paso Department of Water and Sewerage; Laredo City Water Department; Red Bluff Water Power Control District; Ministry of Hydraulic Resources of Mexico; Mexican Department of Agriculture and Livestock; Meteorological Service of Mexico; Cía. Agrícola y de Fuerza Eléctrica del Río Conchos, S.A., and Federal Board of Public Improvement Works of Nuevo Laredo, Tamaulipas.

In addition contributions have been made by individuals and corporations, and specific notation is made for such, as well as for those of the above named agencies, where the data appear. The courtesy and cooperation of those who made these contributions is acknowledged with our appreciation.

General Hydrologic Conditions for 1948

Along and Adjacent to The International Portion of the Rio Grande

Mean annual temperatures averaged about normal on the effective watershed and about 1° below normal in the Lower Rio Grande Valley. Evaporation was about 106% of normal on the effective watershed. Rainfall was about 82% of normal on the effective watershed and about 104% in the Lower Valley. Dividing the watershed at the east side of the Pecos Valley it may be said that west of this line temperatures and evaporation were relatively higher and rainfall and stream flow relatively lower than east of this line. The average monthly amounts of water in storage were about 56% of normal on the United States side and about 93% on the Mexican side.

The volume of yearly flow of the Rio Grande was much below normal, varying from 13% at Upper Presidio to 87% at Eagle Pass, with 58% at Matamoros and 70% at Del Rio. The minimum yearly flow of record occurred at all points from El Paso to Langtry, inclusive. During the year 1,910,130 acre-feet of water, in addition to that which flowed through the floodways, was wasted to the Gulf of Mexico.

The annual flow of the measured Mexican tributaries, exclusive of the Rio San Juan, was 1,175,000 acre-feet, or 65% of normal and varied from 35% for the Rio Conchos to 256% for the Rio Alamo. The annual flow of the measured tributaries in the United States was 1,205,000 acre-feet, or 121% of normal with Alamito Creek flowing 38% of normal while Pinto Creek contributed 338% of its normal.

There were three noteworthy floods in 1948. The first two originated in the Devils River-Del Rio area and the last one came from the Rio Alamo in Mexico. During the first flood a peak of 476,000 second-feet occurred at the Devils River gaging Station at 8:00 P.M. June 24 and a peak of 399,000 second-feet occurred at a point 1 mile below U.S. Highway 90 on Sycamore Creek at 2:30 P.M. June 24. This was the second largest peak of record from the Devils River and the greatest of record from Sycamore Creek where 1,008 second-feet per square mile on 396 square miles of watershed occurred. The peak of this flood on the Rio Grande passed Laredo with 299,500 second-feet at 7:30 P.M. June 26 where it overflowed the highway bridge to a depth of 3 feet. It reached the Lower Brownsville gaging station at 5:30 P.M. July 2 with a flow of 24,800 second-feet after causing overflow into floodways.

The second flood came principally from Devils River with a peak flow of 210,000 second-feet at 4:30 P.M. July 4. This flood is notable primarily because it came the same year as another larger peak from the same source. This flood passed Lower Brownsville at 8:00 P.M. July 11 with 25,000 second-feet after causing overflow into floodways.

The third flood came principally from the Rio Alamo in Mexico at 3:30 A.M. September 11 when a peak 144,800 second-feet passed the gaging station. This was almost twice as much as had ever been recorded from this river, and is considered to be the biggest flood that has occurred since at least 1753 when Cd. Mier, Tamaulipas was established. The crest of this flood at Roma was 177,000 second-feet at 9:30 A.M. September 11 and at Lower Brownsville it was 26,400 second-feet at 5:00 P.M. September 17. This flood also caused overflow in the floodways.

There was a critical shortage of irrigation water on the United States side of the Lower Rio Grande Valley. The river was dry at Lower Brownsville gaging station all or part of each day for 36 out of 37 days April 22 to May 28, also 58 out of 68 days April 22 to June 28, and for 15 days in August. Despite these shortages the annual volume of water diverted for irrigation on the United States side below Rio Grande City was 110% of normal for the period 1938 to 1948. The annual diversions of water for irrigation of lands under the Maverick Canal Extension below the power plant was the maximum of record. Municipal diversions on both sides averaged 148% of normal.

The greatest acreage ever irrigated on each side of the Lower Rio Grande below Roma was served in 1948. Also the greatest acreage ever irrigated on both sides of the Rio Grande Basin below El Paso and below Girvin on the Pecos was served in 1948.

The 1948 sanitary sampling and assaying program of Rio Grande water extended from above El Paso to Mercedes. The annual tonnage of salts, or total dissolved solids, carried by the river was very much below normal. 1948 was the minimum year of record at all sampling points from El Paso downstream except at Roma where it was slightly above the minimum. The quantity of suspended silt passing down the Rio Grande was generally below normal. Minimum annual amounts for the period of record were observed at Cuchillo Parado and Langtry where these amounts were 18% and 25% of normal respectively. Maximum annual amounts for the period of record were observed for the Rio Alamo and Retamal Canal. These amounts were 402% and 134% of normal respectively.

RIO GRANDE AT SAN MARCIAL, NEW MEXICO

DESCRIPTION: Water-stage recorder, 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 with gage zero at 4,455.38 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: After July 1, 1946, the operation of this station was turned over to the U.S.G.S. who furnished the record. Records available: January 1895 to December 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. October 11, 1904, 50,000 second-feet with water surface level of 4,459.5 feet above mean sea level, U.S.C. & G.S. datum, about .25 mile above the present gage. Min. sometimes dry.

Average Flow in Second-feet

Daily:	Max.	33,000,	Oct. 11, 1904.	Min.		sometimes dry.
Monthly:	Max.	16,159,	May 1941.	Min.		sometimes dry.
Yearly:	Max.	3,911,	1941.	Min.	277,	1902.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	650	154	1,200	983	2,250	11,000	660	37.0	11.0	64.0	117	450
2	670	216	1,180	1,110	2,250	8,920	478	36.0	7.0	56.0	148	730
3	710	340	1,180	1,090	2,790	7,720	320	48.0	6.0	77.0	570	604
4	828	886	1,260	934	3,360	8,000	280	34.0	7.0	53.0	388	510
5	720	1,890	1,180	946	3,140	7,720	236	33.0	6.0	43.0	335	486
6	622	1,450	1,130	1,070	3,110	8,000	236	27.0	4.0	37.0	352	556
7	700	1,100	1,050	946	2,990	8,000	232	31.0	5.0	30.0	346	622
8	680	910	910	839	2,730	8,600	196	116	6.0	29.0	335	613
9	710	970	784	886	2,620	8,600	148	208	5.0	24.0	340	586
10	690	806	680	1,010	2,820	9,230	114	250	4.0	29.0	340	534
11	670	762	773	1,010	3,140	10,200	83.0	200	5.0	16.0	330	542
12	670	478	817	1,050	2,730	10,600	62.0	139	6.0	9.0	330	542
13	660	275	828	1,590	2,550	9,560	47.0	127	6.0	9.0	305	542
14	660	305	720	2,150	2,170	8,300	46.0	99.0	6.0	7.0	335	542
15	680	526	700	2,080	1,570	7,430	41.0	204	6.0	8.0	335	518
16	700	862	660	1,850	1,300	6,530	37.0	125	3.0	78.0	305	577
17	680	700	631	1,770	1,160	6,380	33.0	66.0	2.0	40.0	320	568
18	640	650	640	1,970	1,280	5,950	35.0	66.0	2.0	26.0	330	586
19	640	773	730	2,250	784	5,110	36.0	47.0	2.0	25.0	325	595
20	640	850	710	2,870	886	4,110	36.0	34.0	1.0	42.0	428	613
21	670	874	740	2,820	1,660	3,860	36.0	32.0	2.0	43.0	470	631
22	690	720	1,010	2,990	2,370	3,620	35.0	31.0	2.0	58.0	502	604
23	650	690	1,170	3,680	2,960	2,650	43.0	29.0	4.0	33.0	518	586
24	622	795	1,100	4,180	3,620	2,320	52.0	27.0	5.0	19.0	478	613
25	550	1,100	828	4,790	4,750	2,060	56.0	25.0	4.0	16.0	550	631
26	550	1,680	751	5,370	5,540	1,890	68.0	24.0	8.0	15.0	478	730
27	442	1,930	795	5,110	6,380	1,730	92.0	23.0	39.0	19.0	534	710
28	414	1,660	1,060	3,860	7,720	1,730	139	19.0	245	28.0	540	586
29	168	1,420	1,200	3,140	8,920	1,440	86.0	17.0	220	31.0	450	502
30	139		1,100	2,620	10,200	850	79.0	16.0	90.0	47.0	490	631
31	130		1,090		11,000		47.0	15.0		72.0		568
Sum	18,645	25,772	28,607	66,964	110,750	182,110	4,089.0	2,185.0	719.0	1,083.0	11,624	18,108

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	# Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Maximum	Minimum	Acre-Feet Normal 1938-1948
Jan.			4	828	31	130	601	37,000	43,802	72,600	17,400	45,945
Feb.			27	1,930	1	154	889	51,100	46,753	77,100	29,600	45,200
Mar.			4	1,260	17	631	923	56,700	56,444	119,000	20,100	55,836
Apr.			26	5,370	8	839	2,230	133,000	118,396	432,000	3,940	98,289
May			31	11,000	19	784	3,570	220,000	270,313	994,000	4,450	280,572
June			1	11,000	30	850	6,070	361,000	159,574	609,000	" 32.7	181,631
July			1	660	17	33.0	132	8,110	52,110	246,000	0	53,615
Aug.			10	250	31	15.0	70.5	4,330	44,404	275,000	1,620	33,530
Sept.			28	245	20	1.0	24.0	1,430	46,937	308,000	1,430	30,382
Oct.			16	78.0	14	7.0	34.9	2,150	37,375	221,000	0	41,460
Nov.			3	570	1	117	387	23,100	36,162	171,000	2,550	44,890
Dec.			2	730	1	450	584	35,900	46,859	95,300	15,100	55,591
Yearly				11,000		1.0	1,290	933,820	959,129	2,832,100	244,489	966,941

Mean daily " Estimated

RIO GRANDE BELOW ELEPHANT BUTTE DAM, NEW MEXICO

DESCRIPTION: Water-stage recorder one mile below dam and cable with sit-down cable car with winch 100 feet below recorder. Zero of gage is 4,242.09 feet above mean sea level, U.S.C. & G.S. datum. Elephant Butte Dam is 135.1 river miles above the American Dam at El Paso, Texas, and 42.0 river miles below the San Marcial gaging station at the upper end of Elephant Butte Reservoir.

RECORDS: Based upon 72 meter measurements during the year and a stable rating curve. Records furnished by the El Paso office of the United States Bureau of Reclamation. Records available: January 1915 to December 1948.

REMARKS: The station described here is operated by the Bureau of Reclamation. It has been the official station since 1931. Reservoirs, diversions, and drainage returns modify the river flow at this station. Beginning December 1940 hydroelectric power generation facilities for 27,000 kva were placed in operation.

COMPARATIVE FLOWS FROM RECORDS:

		Average Flow in Second-Feet			
Daily:	Max.	8,220, May 22, 1942.	Min.	sometimes dry.	
Monthly:	Max.	7,590, May 1942.	Min.	3.0	Jan. 1930.
Yearly:	Max.	2,510, 1942.	Min.	771	1947.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	94.0	925	1,170	1,820	1,560	1,500	1,420	1,280	1,780	473	538	652
2	119	1,180	1,250	1,760	1,290	1,550	1,460	1,280	1,260	415	549	729
3	112	1,320	1,270	1,760	1,520	1,650	1,500	1,260	1,260	454	479	788
4	211	1,370	1,160	1,600	1,440	1,610	1,210	1,180	1,240	785	532	677
5	152	1,340	1,230	1,720	1,670	1,580	1,160	1,160	901	938	570	205
6	139	1,340	1,120	1,780	1,620	1,350	1,440	1,210	1,060	870	416	696
7	141	1,290	975	1,790	1,590	1,490	1,540	1,340	1,240	890	89.0	620
8	158	1,110	1,140	1,900	1,520	1,440	1,540	1,590	1,200	922	464	632
9	135	1,270	1,420	1,820	1,230	1,430	1,570	1,230	948	817	504	841
10	103	1,380	1,510	1,860	1,480	1,400	1,600	1,380	805	618	395	695
11	95.0	1,380	1,610	1,720	1,630	1,360	1,280	1,280	678	824	457	629
12	289	1,310	1,620	1,760	1,630	1,240	1,660	1,320	361	1,060	540	266
13	987	1,300	1,300	1,900	1,680	1,050	1,740	1,310	688	989	366	522
14	1,020	1,240	1,000	1,870	1,650	1,190	1,670	1,160	597	623	104	664
15	825	1,100	1,170	1,770	1,580	1,300	1,680	890	552	590	517	673
16	858	1,290	1,310	1,750	1,320	1,120	1,740	1,100	603	277	475	604
17	1,150	1,350	1,340	1,740	1,480	1,450	1,630	1,300	594	122	503	606
18	703	1,430	1,350	1,640	1,700	1,460	1,380	1,380	471	539	666	635
19	1,060	1,330	1,090	1,680	1,750	1,340	1,590	1,430	510	528	611	119
20	1,050	1,360	1,300	1,740	1,700	1,140	1,720	1,510	491	671	480	470
21	1,000	1,320	1,320	1,690	1,750	1,440	1,720	1,650	568	747	123	615
22	1,080	1,110	1,590	1,740	1,600	1,490	1,740	1,060	480	640	501	643
23	1,200	1,300	1,850	1,630	986	1,570	1,690	1,660	494	373	578	664
24	1,040	1,400	1,900	1,660	1,620	1,640	1,520	1,790	418	291	628	471
25	848	1,580	1,700	1,350	1,620	1,660	920	1,780	434	423	186	166
26	1,020	1,420	1,670	1,510	1,650	1,650	1,640	1,790	323	557	602	161
27	1,150	1,320	1,670	1,680	1,690	1,570	1,710	1,810	313	611	674	760
28	1,290	1,450	897	1,700	1,670	1,500	1,620	1,860	453	651	444	802
29	1,160	1,080	1,640	1,680	1,610	1,520	1,700	1,810	464	508	647	741
30	1,170		1,740	1,650	1,320	1,400	1,690	1,800	457	327	730	712
31	1,220		1,700		1,650		1,630	1,880		194		645
Sum	21,579.0	37,595	43,012	51,670	48,206	43,090	48,110	44,480	21,643	18,727	14,368.0	18,103

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	# Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Maximum	Minimum	Acre-Feet Normal 1938-1948
Jan.			28	1,290	1	94.0	696	42,800	23,922	86,500	184	50,905
Feb.			25	1,580	1	925	1,300	74,600	37,679	76,300	969	48,291
Mar.			24	1,900	28	897	1,390	85,300	62,617	88,700	1,520	58,956
Apr.			‡ 8	1,900	25	1,350	1,720	102,000	104,256	162,000	57,200	93,827
May			‡19	1,750	23	986	1,560	95,600	110,712	467,000	63,000	116,100
June			25	1,660	13	1,050	1,440	85,500	117,548	363,000	64,400	112,882
July			‡13	1,740	25	920	1,550	95,400	117,212	211,000	72,700	107,573
Aug.			31	1,880	15	890	1,430	88,200	111,276	161,000	68,700	97,455
Sept.			1	1,780	27	313	721	42,900	68,928	129,000	22,600	62,145
Oct.			12	1,060	17	122	604	37,100	30,777	72,100	506	50,717
Nov.			30	730	7	89.0	479	28,500	29,196	158,000	884	50,903
Dec.			9	841	19	119	584	35,900	28,829	87,300	916	52,667
Yearly				1,900		89.0	1,120	813,800	842,952	1,818,800	558,050	902,421

Mean daily ‡ And other days

RIO GRANDE BELOW CABALLO DAM, NEW MEXICO

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, Texas. Elevation of zero of the gage is 4,140.90 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 84 meter measurements during the year. Records available: February 26, 1938, to December 31, 1948. Records furnished by the El Paso office of the United States Bureau of Reclamation.

REMARKS: This gaging station was installed by the Bureau of Reclamation on the Rio Grande on February 26, 1938 to measure the flow from the Caballo Reservoir. Reservoirs, diversions, and drainage returns modify the river flow at 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. There were diverted in 1948 from Caballo Reservoir into a small irrigation canal (Bonito Lateral) just below the dam 1,780 acre-feet of water not accounted for in the tables below.

COMPARATIVE FLOWS FROM RECORDS:

Average Flow in Second-Feet

Daily:	Max.	7,650,	May 20, 1942.	Min.	1.3	Dec. 12, 1940.
Monthly:	Max.	6,710,	May 1942.	Min.	1.4	Dec. 1940.
Yearly:	Max.	2,480,	1942.	Min.	972	1941.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	2.1	2.4	2,680	1,440	1,120	2,690	2,480	1,950	2.6	1.6	2.2
2	1.9	2.2	2.4	2,630	1,530	968	2,580	2,330	1,900	545	1.6	2.2
3	1.9	2.3	2.4	2,540	1,520	613	2,500	2,150	1,890	803	1.6	2.2
4	1.8	2.4	2.7	2,570	1,490	704	2,510	2,050	1,920	619	1.6	2.2
5	1.8	2.5	2.7	2,710	1,280	1,120	2,470	2,070	1,960	574	1.5	2.2
6	1.9	2.6	2.8	2,850	1,190	1,250	2,480	2,170	1,970	475	1.5	2.2
7	2.0	2.5	2.8	2,760	1,080	1,270	2,510	2,560	1,960	376	1.5	2.2
8	2.0	2.4	2.9	2,660	1,060	1,200	2,470	2,810	1,630	215	1.5	2.2
9	2.1	2.3	3.2	2,600	1,110	1,130	2,450	2,830	1,120	58.0	1.1	2.2
10	2.1	2.3	3.5	2,620	1,050	1,060	2,650	2,770	1,100	7.6	1.1	2.2
11	2.0	2.3	3.7	2.640	1,020	1,020	2,850	2,770	1,150	3.2	1.3	393
12	2.0	2.3	4.0	2,570	1,070	1,210	2,840	2,670	1,150	3.2	1.3	597
13	2.0	2.4	4.0	2,350	1,230	1,270	2,820	2,570	1,120	3.0	1.3	564
14	2.0	2.6	4.0	2,060	1,360	1,240	2,720	2,480	1,090	2.7	1.3	552
15	2.1	2.6	601	2,010	1,450	1,370	2,700	2,460	1,080	2.7	596	380
16	2.1	2.6	972	1,890	1,510	1,840	2,690	2,410	1,050	2.7	863	90.0
17	2.0	2.5	817	1,790	1,470	2,170	2,750	2,230	1,030	2.4	819	5.8
18	2.0	2.3	899	1,760	1,470	2,370	2,680	1,950	350	2.4	697	4.2
19	1.9	2.1	1,060	1,780	1,460	2,840	2,710	1,900	5.2	2.0	405	3.8
20	1.8	2.0	1,450	1,820	1,360	2,990	2,720	1,870	4.3	2.0	120	3.8
21	1.8	2.0	1,500	1,740	1,410	2,820	2,650	1,980	4.0	1.9	32.0	3.8
22	1.8	2.1	1,670	1,650	1,420	2,820	2,510	2,160	3.4	1.7	4.0	3.8
23	1.8	2.1	1,980	1,530	1,420	2,790	2,420	2,210	3.3	1.7	3.0	3.4
24	1.7	2.2	2,260	1,320	1,410	3,030	2,200	2,260	3.0	1.8	2.6	3.4
25	1.5	2.2	2.470	1,230	1,290	2,950	2,020	2,420	2.8	1.8	2.6	2.8
26	1.4	2.2	2.480	1,170	1,100	2,850	2,260	2,540	2.7	1.8	2.6	3.0
27	1.5	2.3	2,520	1,120	1,020	2,850	2,190	2,460	2.4	1.8	2.4	3.0
28	1.6	2.3	2,520	1,050	978	2,830	1,660	2,510	2.5	1.8	2.2	3.0
29	1.7	2.4	2.640	1,090	1,080	2,820	1,690	2,590	2.5	1.7	2.2	2.6
30	1.8		2,650	1,250	1,140	2,750	1,890	2,350	2.6	1.7	2.2	2.6
31	2.0		2,660		1,100		2,390	2,050		1.7		2.6
Sum	57.9	67.1	31,192.5	60,440	39,518	57,265	76,670	73,060	25,458.7	3,720.9	3,575.6	2,649.6

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	# Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948: Acre-Feet Normal	Maximum	Minimum
Jan.			‡ 9	2.1	26	1.4	1.9	115	1,379	4,850	97.0
Feb.			‡ 6	2.6	‡20	2.0	2.3	133	21,127	64,300	133
Mar.			31	2,660	‡ 1	2.4	1,010	61,900	78,591	95,100	49,300
Apr.			6	2,850	28	1,050	2,010	120,000	129,555	212,000	106,000
May			2	1,530	28	978	1,270	78,400	129,709	412,000	86,200
June			24	3,030	3	613	1,910	114,000	140,964	354,000	112,000
July			11	2,850	28	1,660	2,470	152,000	142,491	234,000	109,000
Aug			9	2,830	20	1,870	2,360	145,000	133,164	179,000	110,000
Sept.			6	1,970	27	2.4	849	50,500	74,664	181,000	34,500
Oct.			3	803	‡22	1.7	120	7,380	13,869	35,400	111
Nov.			16	863	‡ 9	1.1	119	7,090	7,470	14,400	107
Dec.			12	597	‡ 1	2.2	85.5	5,260	8,095	19,100	83.3
Yearly				3,030		1.1	1,020	741,778	881,078	1,795,620	703,547

Mean daily ‡ And other days

RIO GRANDE AT EL PASO, TEXAS

DESCRIPTION: Staff gage and cable located in the pass opposite Courchesne Quarry, 4 miles northwest of El Paso, Texas, 5 miles northwest of Juárez, Chihuahua, and .9 river mile above the American Dam. Zero of gage is 3,720.51 feet above mean sea level, U.S.C. & G.S. datum. Water-stage recorder 1 mile farther upstream with zero of its gage 3,722.30 feet on the same datum has been the official gage since August 3, 1938.

RECORDS: Discharges in 1948 were computed by taking the sum of the flows in the American Canal and the flows at the station below American Dam. Records available: 1889-1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 24,000 second-feet on June 12, 1905, with 6.0 feet stage (lower gage). Min., sometimes dry. Since Elephant Butte Dam was closed in 1915, the largest peak flow to pass this station was 13,500 second-feet on September 3, 1925.

Average Flow in Second-Feet

Daily:	Max.	23,680,	June 12, 1905.	Min.		sometimes dry.
Monthly:	Max.	14,300,	June 1905.	Min.		sometimes dry.
Yearly:	Max.	2,780,	1905.	Min.	70.1	1902.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	142	154	97.5	1,020	711	665	1,200	715	1,330	365	242	201
2	138	114	95.2	825	785	860	1,200	1,200	932	338	235	198
3	136	113	96.2	727	1,030	937	1,130	1,260	821	323	232	204
4	126	113	94.4	706	974	994	1,150	1,170	853	313	222	208
5	136	132	96.0	913	964	770	1,290	958	943	330	207	199
6	133	122	98.8	733	947	569	1,100	829	1,010	393	207	193
7	128	118	102	856	857	808	1,080	836	898	370	213	191
8	131	117	99.8	1,070	760	803	1,060	900	964	383	209	190
9	127	120	98.0	1,030	760	797	1,120	1,260	1,010	376	200	181
10	126	116	96.5	953	731	802	1,160	1,240	956	362	204	185
11	124	115	99.0	986	631	709	1,190	1,270	775	347	206	187
12	123	110	98.4	1,110	592	680	1,330	1,220	741	317	205	185
13	121	118	102	927	540	663	1,320	1,240	886	293	203	182
14	117	114	97.3	932	588	732	1,240	1,400	724	284	201	188
15	119	116	96.5	867	724	707	1,290	1,390	681	308	202	249
16	125	114	97.5	674	901	633	1,250	1,440	627	329	201	286
17	129	110	96.8	798	989	623	1,330	1,350	604	305	199	323
18	130	108	125	789	884	897	1,350	1,300	680	291	194	289
19	130	107	340	804	910	1,180	1,400	1,180	682	290	290	247
20	128	107	370	765	849	1,930	1,410	985	827	300	290	224
21	120	110	430	821	932	1,810	1,370	978	551	293	312	230
22	123	108	721	933	866	1,180	1,260	1,050	469	280	320	232
23	121	103	657	912	838	1,100	1,420	1,080	436	270	256	211
24	123	101	496	884	998	1,160	1,490	1,010	403	263	225	206
25	118	104	543	970	871	1,190	1,560	1,020	385	264	223	203
26	115	115	813	922	858	1,630 *	1,340	1,010	368	266	215	216
27	112	104	981	791	800	1,470 *	1,010	1,160	369	262	209	218
28	85.8	98.5	1,070	797	728	1,500 *	1,100	1,280	436	252	210	215
29	111	99.4	1,120	809	716	1,170	1,070	1,300	384	252	206	218
30	154		965	696	676	1,200	783	1,400	351	250	206	214
31	168		943		656		686	1,760		247		211
Sum	3,919.8	3,280.9	11,235.9	26,020	25,066	30,169	37,689	36,191	21,096	9,516	6,744	6,684

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	3.83	2.99	30	252	28	73.8	126	7,770	11,106	17,500	7,770	11,039
Feb.	3.62	3.22	1	190	28	92.4	113	6,510	19,461	52,200	6,510	17,225
Mar.	5.60	3.22	29	1,370	18	86.3	362	22,300	40,099	62,500	18,400	41,264
Apr.	6.62	4.56	12	3,110	16	628	867	51,600	66,752	139,000	44,900	70,900
May	5.62	4.26	3	1,100	13	475	809	49,700	77,550	357,000	47,600	89,491
June	6.88	4.11	20	3,000	6	507	1,010	59,800	78,350	304,000	56,200	88,691
July	6.48	4.31	25	2,520	31	607	1,220	74,800	84,244	198,000	68,900	86,718
Aug.	6.38	4.39	31	2,630	1	670	1,170	71,800	87,617	158,000	61,000	84,600
Sept.	6.12	3.69	1	1,770	30	336	703	41,800	65,496	171,000	40,600	67,018
Oct.	3.91	3.52	9	431	28	243	307	18,900	26,865	57,900	14,600	28,018
Nov.	3.90	3.37	22	367	30	196	225	13,400	17,583	29,500	10,400	16,345
Dec.	3.75	3.34	17	333	13	178	216	13,300	16,625	27,700	9,460	16,151
Yearly	6.88	2.99		3,110		73.8	595	431,680	591,748	1,559,200	431,680	617,460

* Partly estimated

RIO GRANDE BELOW AMERICAN DAM

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 above mean sea level, U.S.C. & G.S. datum. The American Dam is 1,241.4 river miles above the Gulf of Mexico.

RECORDS: Based upon 47 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: June 1, 1938 to December 31, 1948.

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") and the remainder, including excess flood flows, passed this station. Reservoirs, diversions, and drainage returns, modify the river flow at this station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 6,770 second-feet on May 18, 1942, with a gage height of 9.77 feet. Min. " 0.3 second-feet on February 14, 1941.

Average Flow in Second-Feet

Daily:	Max.	6,040,	May 20, 1942.	Min.	1.2	Oct. 28-31,	1939.
Monthly:	Max.	4,880,	May 1942.	Min.	2.0	Dec.	1942.
Yearly:	Max.	1,510,	1942.	Min.	106		1945.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.8	10.4	3.2	737	126	198	180	195	610	124	13.7	10.8
2	10.4	12.2	4.4	760	143	168	177	214	137	60.8	12.9	9.9
3	11.0	12.2	11.3	553	144	161	177	208	137	42.9	12.8	9.9
4	85.5	12.2	12.0	337	145	155	173	211	161	28.8	11.9	13.4
5	136	12.2	12.8	139	143	155	172	207	162	16.0	11.2	15.6
6	133	11.6	11.3	79.9	143	163	161	204	161	20.3	11.7	12.7
7	128	11.0	10.5	86.9	137	168	167	198	161	21.1	11.6	11.7
8	131	11.0	10.5	101	136	162	164	207	168	20.6	10.8	11.5
9	127	13.3	10.5	106	151	167	165	212	172	137	11.3	11.6
10	126	13.3	9.7	104	147	174	162	205	166	215	11.6	11.1
11	124	11.6	10.5	106	143	172	163	211	168	193	11.8	10.2
12	123	10.4	10.5	208	141	171	174	208	173	175	12.0	9.8
13	121	10.4	10.5	88.8	137	174	166	209	176	169	11.6	10.8
14	117	12.2	9.7	97.0	138	173	166	203	179	168	11.2	11.4
15	119	12.2	8.6	102	190	175	167	204	182	166	14.4	13.4
16	125	11.6	7.6	107	229	174	170	201	173	80.7	14.8	13.4
17	129	10.4	7.6	108	231	177	163	199	182	24.2	16.8	14.1
18	130	8.7	8.1	96.7	232	184	166	191	180	18.0	14.6	11.6
19	62.1	8.3	17.9	93.0	235	180	170	184	181	14.0	13.5	11.7
20	13.5	7.4	3.2	94.7	238	853	170	183	199	12.4	12.5	11.2
21	13.4	7.4	2.3	102	239	763	182	186	193	12.3	12.0	10.9
22	14.7	5.5	6.7	97.9	235	167	189	196	182	12.3	10.5	11.1
23	14.1	5.1	5.0	83.8	238	158	200	208	187	12.2	9.0	10.8
24	13.6	4.3	4.7	80.5	241	191	266	188	186	12.8	9.0	10.2
25	13.0	4.0	5.1	85.0	247	192	577	188	187	12.8	9.0	10.4
26	12.4	4.0	9.7	81.3	236	665	177	189	196	13.4	9.0	10.7
27	13.1	3.3	10.7	75.8	221	609	175	196	196	13.8	8.5	10.4
28	14.3	3.3	79.9	80.9	214	691	179	185	200	12.8	11.9	10.8
29	11.4	3.3	216	90.9	233	162	179	185	196	13.2	15.7	11.8
30	11.5		233	86.5	243	168	171	211	197	13.6	15.7	11.7
31	11.5		243		233		154	824		13.4		12.1
Sum	2,104.3	262.8	1,006.5	4,969.6	5,909	7,870	5,822	6,810	5,748	1,849.4	363.0	356.7

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948 #: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	5.22	4.32	17	148	1	9.8	67.9	4,170	8,661	12,000	4,170
Feb.	4.56	4.15	2	28.5	29	3.0	9.1	521	5,402	32,800	521
Mar.	5.42	4.11	31	309	21	2.0	32.5	2,000	4,024	17,500	1,820
Apr.	6.82	4.70	12	1,640	25	47.4	166	9,860	14,590	74,500	6,360
May	5.68	4.87	21	266	1	86.8	191	11,700	41,770	300,000	11,700
June	7.22	5.02	20	1,900	19	82.0	262	15,600	34,777	250,000	9,660
July	6.38	5.17	24	1,050	20	101	188	11,500	26,122	155,000	9,800
Aug	6.76	5.03	31	1,180	4	79.2	220	13,500	22,620	114,000	6,040
Sept.	6.69	5.00	1	1,100	4	59.3	192	11,400	23,147	124,000	3,530
Oct.	5.66	4.43	11	225	31	12.8	59.7	3,670	3,999	19,000	197
Nov.	4.92	4.36	15	58.5	28	7.7	12.1	720	2,478	8,700	" 119
Dec.	4.77	4.46	17	32.5	11	9.2	11.5	708	1,996	7,760	120
Yearly	7.22	4.11		1,900		2.0	118	85,349	189,586	1,093,553	76,919

" Estimated # The normal, maximum, and minimum discharges for January through May are for the period 1939-1948.

OUTFALLS FROM WELLS

Near El Paso, Texas, and Juarez, Chihuahua

Several outfall ditches or pipe lines discharge water into the Rio Grande between the station below American Dam and Juarez Station. The source of this water is wells in the vicinity of El Paso and Juarez, except that some of the water from the El Paso Sewage Outfall is from the Rio Grande. During 1948 such outfalls contributed a total of 11,316 acre-feet of water to the Rio Grande flow, which is equivalent to an average steady flow of 15.6 second-feet during the year. All of this flow came from the United States side.

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 and records of diversions from this outfall by the city of El Paso, it is calculated that 1,368 acre-feet flowed into the river in 1948. This corresponds to an average flow of 1.9 second-feet.

JUAREZ SEWAGE OUTFALL

This outfall enters the river 4.7 miles below the American Dam. From several inspections it was found that the flow from this source was too small to be of account.

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 below the American Dam. The 1948 record of total outfall consists of flows measured by a Parshall meter and estimates of amounts which by-passed the meter made by the Department of Water and Sewerage of the City of El Paso. The breakdown of this total into water from wells, or from the Rio Grande, is made in co-operation with the El Paso Water and Sewerage Department. Water for 108 acres of land was diverted from this outfall between the sewage plant and the Rio Grande.

	1948						Period 1936-1948
Month	From Wells		From Rio Grande		Diversions	To Rio Grande	
	Mean Sec.-Ft.	Acre-Feet	Mean Sec.-Ft.	Acre-Feet	Acre-Feet	Acre-Feet	Normal
Jan.	11.6	714	1.3	81	0	795	679
Feb.	7.7	441	5.5	314	0	755	640
Mar.	7.2	440	5.7	352	0	792	688
Apr.	9.2	548	4.0	238	89	697	688
May	9.7	595	4.3	267	86	776	744
June	11.7	696	4.4	262	86	872	788
July	12.6	774	4.5	279	98	955	839
Aug.	11.4	699	4.8	298	104	893	810
Sept.	11.1	659	4.3	253	77	835	761
Oct.	9.5	587	5.4	334	0	921	773
Nov.	9.3	554	4.9	293	0	847	730
Dec.	6.5	400	6.7	410	0	810	717
Year	9.8	7,107	4.7	3,381	540	9,948	8,857

RIO GRANDE AT JUAREZ, CHIHUAHUA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located 2.9 river miles downstream from El Paso, Texas, and Juárez, Chihuahua. This station is 7.0 river miles below the American Dam at El Paso, Texas and 4.9 river miles below the International Dam. The zero of the gage is 3,683.98 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 177 meter measurements during the year, 142 by the Mexican, and 35 by the United States Section. Computations by shifting channel methods. Records available: April 1, 1938 to December 31, 1948.

REMARKS: Reservoirs, irrigation diversions, and drainage returns modify the river flow at this station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 6,600 second-feet on May 18, 1942 with a gage height of 11.15 feet. Min. 15.2 second-feet on December 22, 1944 with a gage height of 2.17 feet.

Average Flow in Second-Feet

Daily:	Max.	6,460,	May 20, 1942.	Min.	17.0	Dec. 21, 1944.
Monthly:	Max.	5,300,	May 1942.	Min.	45.9	Dec. 1947.
Yearly:	Max.	1,820,	1942.	Min.	335	1948.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	146	151	95.0	890	277	210	710	267	904	150	60.7	54.0
2	146	136	89.3	731	304	494	710	632	459	138	64.6	54.0
3	133	130	90.4	657	576	636	632	798	364	103	63.6	85.5
4	128	128	92.9	685	576	664	632	696	341	88.3	67.1	193
5	137	139	88.6	798	533	484	759	441	427	80.9	61.4	183
6	134	122	83.3	667	516	240	636	333	477	150	60.7	181
7	124	113	84.0	501	441	396	576	326	392	146	57.2	180
8	138	112	97.5	675	325	505	544	353	431	128	57.9	181
9	127	110	93.6	664	304	463	590	653	456	249	59.7	175
10	124	113	103	551	292	516	657	717	431	351	57.9	177
11	122	116	97.1	569	232	371	731	728	256	335	53.7	170
12	126	116	54.7	766	230	284	844	678	203	288	57.9	106
13	123	119	45.6	544	216	227	879	738	357	275	53.7	68.2
14	127	119	43.1	544	222	300	731	918	279	263	53.3	75.2
15	132	119	44.5	565	310	289	823	915	216	299	57.9	68.5
16	138	118	43.1	272	448	232	749	978	208	310	62.5	94.6
17	143	120	42.0	367	501	175	766	865	152	167	51.9	183
18	133	123	42.0	347	374	378	826	780	250	66.7	53.3	266
19	117	90.4	162	381	381	957	890	667	243	91.1	67.5	202
20	138	51.6	327	324	337	1,760	911	498	420	91.1	65.0	207
21	131	54.4	385	364	399	1,260	858	456	176	83.3	62.9	213
22	120	53.0	770	505	349	752	738	561	97.8	75.6	83.3	220
23	124	55.4	533	516	320	667	893	509	63.9	68.5	83.0	209
24	126	49.1	360	448	487	699	904	494	61.4	61.1	68.9	190
25	120	47.3	501	703	371	713	915	509	53.7	59.0	59.0	197
26	121	48.0	600	509	331	1,250	925	491	48.0	66.7	62.2	203
27	104	44.5	745	456	367	1,300	593	604	42.0	59.7	44.5	135
28	101	43.4	918	374	424	805	547	738	73.1	61.4	42.7	66.4
29	91.8	50.1	879	381	254	604	615	809	69.6	63.2	48.7	69.9
30	129		724	291	206	703	420	858	39.2	59.3	57.9	91.1
31	158		756		169		283	1,080		60.0		180
Sum	3,961.8	2,791.2	8,989.7	16,045	11,072	18,334	22,287	20,090	7,990.7	4,487.9	1,800.6	4,678.4

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	3.61	2.95	23	251	29	71.3	128	7,860	⊕ 11,236	⊕ 13,270	⊕ 7,860
Feb.	3.61	2.66	19	238	29	33.9	96.2	5,540	⊕ 11,836	⊕ 42,690	⊕ 4,730
Mar.	4.79	2.69	#	929	#	34.3	290	17,830	⊕ 27,344	⊕ 45,790	⊕ 14,140
Apr.	5.28	3.54	12	2,130	16	251	535	31,830	46,288	111,500	30,900
May	4.99	3.31	3	749	31	161	357	21,960	57,364	325,100	19,590
June	6.66	3.18	20	2,910	1	126	611	36,370	59,265	272,400	29,740
July	5.94	* 3.22	15	1,050	30	*210	719	44,210	56,820	162,500	40,830
Aug	6.33	3.35	31	1,280	1	236	648	39,850	55,630	127,300	38,700
Sept.	6.27	2.56	1	1,200	28	33.5	266	15,850	42,762	143,800	15,850
Oct.	4.07	2.53	16	364	1	32.1	145	8,900	19,175	45,390	8,610
Nov.	3.18	2.66	22	112	27	36.7	60.1	3,570	9,942	13,670	3,570
Dec.	3.84	2.69	17	279	3	45.2	151	9,280	10,448	18,060	2,820
Yearly	6.66	2.53		2,910		32.1	335	243,050	408,110	1,315,890	243,050

Various days of the month * Partly estimated ⊕ Period 1939-1948

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 Augustín, 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, U.S.C. & G.S. datum.

RECORDS: Based upon 72 meter measurements during the year, 52 by the United States and 20 by the Mexican Section of this Commission. Computations by shifting channel methods. Records available: August 17, 1938 to December 31, 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 6,490 second-feet on May 19, 1942 with a gage height of 16.06 feet. Min., sometimes dry.

Average Flow in Second-Feet

Daily:	Max.	6,140,	May 19, 1942.	Min.		sometimes dry.	
Monthly:	Max.	4,880,	May 1942.	Min.	.2	Nov.	1940.
Yearly:	Max.	1,490,	1942.	Min.	48.8		1948.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103	138	16.3	67.2	8.2	14.5	15.2	5.0	250	10.5	16.0	5.7
2	118	112	23.8	78.8	8.9	122	15.6	35.9	30.4	18.8	12.5	6.6
3	115	95.5	17.3	50.5	32.3	130	15.3	121	19.0	15.5	10.7	6.6
4	114	89.7	13.7	45.0	48.4	162	14.3	* 21.0	18.0	10.8	9.1	6.9
5	106	93.6	16.2	73.3	20.2	205	14.7	16.8	17.0	9.6	8.1	6.9
6	114	88.7	19.9	26.6	17.6	65.4	15.1	15.3	17.0	8.8	9.9	8.6
7	108	83.8	18.5	21.4	67.3	46.8	14.1	15.1	17.0	52.4	11.3	9.1
8	*105	79.5	22.9	20.9	95.6	" 32.9	52.4	15.6	40.5	89.3	47.4	9.5
9	*104	79.2	34.3	21.4	24.5	* 32.9	19.2	13.4	174	18.5	100	9.0
10	*105	82.3	* 37.2	18.3	20.2	* 33.9	25.3	13.9	276	20.0	125	8.8
11	*104	78.4	28.6	15.2	18.4	* 35.0	20.1	14.4	195	20.3	87.3	8.2
12	*105	76.7	25.4	81.1	16.8	36.0	20.3	19.3	139	17.7	36.0	7.5
13	*102	78.6	20.7	18.5	15.8	29.5	48.7	17.5	79.2	18.5	26.9	7.3
14	*103	80.5	15.9	17.1	15.6	21.6	20.0	138	25.7	20.4	105	7.7
15	* 94.8	77.7	12.7	15.7	16.2	24.2	18.6	220	* 10.3	19.6	93.7	7.0
16	* 95.2	76.6	10.4	12.6	17.0	* 17.0	16.5	265	" 12.8	18.3	56.8	6.8
17	*103	47.4	9.1	11.0	29.7	21.7	27.4	230	" 15.2	19.3	46.3	7.0
18	* 99.4	53.0	9.1	10.1	18.5	23.2	59.9	104	* 17.7	16.2	41.8	132
19	* 92.0	86.1	9.3	8.9	16.0	25.6	15.3	83.6	" 15.9	12.4	40.4	109
20	* 87.7	71.6	31.4	9.1	15.1	273	35.7	26.9	" 14.1	11.8	99.7	16.4
21	* 86.7	80.3	16.7	9.8	14.1	503	159	19.8	" 12.2	10.6	36.1	15.7
22	* 81.7	66.3	16.2	10.5	14.0	51.4	37.8	16.3	" 10.4	9.9	29.7	14.9
23	* 91.4	70.7	18.4	11.3	13.8	* 30.3	105	16.2	* 8.6	10.4	25.7	15.6
24	* 75.8	47.9	15.1	10.3	12.5	29.0	253	17.1	" 8.6	13.3	19.1	39.2
25	* 74.9	" 28.0	12.9	10.1	13.5	28.8	477	13.2	12.8	15.8	14.0	113
26	* 76.0	* 16.4	12.8	39.2	12.2	51.0	274	14.3	11.0	16.3	12.3	119
27	* 70.9	15.4	46.8	12.4	12.4	* 191	116	14.5	9.9	17.5	11.1	118
28	" 27.4	14.8	24.0	10.9	12.6	* 107	199	16.1	11.0	17.6	10.0	98.6
29	" 21.7	15.9	80.9	9.4	13.4	48.8	22.9	17.2	11.3	17.6	9.0	62.2
30	*135		45.6	9.1	13.6	17.3	15.6	17.8	12.7	16.9	7.5	59.0
31	200		56.8		12.4		11.2	138		17.3		111
Sum		2,024.6		755.7		2,409.8		1,692.2		591.9		1,152.8
	*3,019.6		738.9		666.8		2,154.2		1,492.3		1,158.4	

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948 ⊕ Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1939-1948
Jan.	10.49	9.19	30	335	29	" 13.4	* 97.4	* 5,990	9,307	11,900	5,990	9,307
Feb.	10.05	9.14	1	148	29	14.3	69.8	4,020	7,974	37,000	2,930	7,974
Mar.	10.02	8.98	20	139	19	7.7	23.8	1,470	5,257	21,000	876	5,257
Apr.	10.92	9.25	1	603	30	8.0	25.2	1,500	11,043	70,500	1,190	11,043
May	10.77	9.16	8	492	1	7.1	21.5	1,320	33,627	299,800	1,050	33,627
June	12.07	9.17	20	1,660	1	11.2	80.3	4,780	28,437	241,000	1,200	28,437
July	11.61	9.38	28	1,140	31	10.3	69.5	4,270	18,787	118,500	2,100	18,787
Aug.	11.24	9.17	14	934	‡ 1	4.4	54.6	3,360	19,277	* 99,400	2,460	19,277
Sept.	10.77		10	470	‡23	* 8.6	49.7	2,960	20,742	119,200	1,090	19,876
Oct.	9.90	8.86	9	124	5	8.3	19.1	1,170	9,525	42,800	1,170	10,316
Nov.	10.29	8.92	20	236	30	6.7	38.6	2,300	2,306	7,270	11.5	2,314
Dec.	10.32	9.01	25	167	1	4.4	37.2	2,290	4,386	12,900	1,050	4,577
Yearly	12.07			1,660		4.4	48.8	35,430	170,668	1,079,340	35,430	170,792

" Estimated * Partly estimated ‡ And other days ⊕ The average, maximum, and minimum discharges for January through August are for the period 1939-1948.

RIO GRANDE AT COUNTY LINE

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

RECORDS: Based upon 63 meter measurements during the year, 46 by the United States and 17 by the Mexican Section of this Commission. Computations by shifting channel methods. Records available: January 1, 1938 to December 31, 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 6,340 second-feet on May 19, 1942 with a gage height of 8.66 feet. Min. Dry ‡ May 19, 1948.

Average Flow in Second-Feet

Daily:	Max.	6,180,	May 18, 1942.	Min.	0	‡ May 19, 1948.
Monthly:	Max.	4,920,	May 1942.	Min.	3.3	May 1948.
Yearly:	Max.	1,720,	1942.	Min.	82.9	1948.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	* Nov.	* Dec.
1	169	254	5.1	5.0	3.9	" 0	1.6	20.9	276	143	249	202
2	185	172	4.8	5.0	4.2	34.5	.3	19.9	93.9	149	223	196
3	179	138	4.8	4.3	4.2	72.4	3.9	23.4	22.0	170	197	169
4	187	137	4.6	4.0	4.8	193	5.3	10.3	8.7	114	193	193
5	196	141	4.4	3.4	4.5	236	6.0	10.4	3.0	59.6	196	214
6	185	145	4.2	3.4	5.4	158	17.6	9.7	.9	56.3	185	159
7	174	110	3.8	3.1	5.6	108	5.2	8.0	0	75.9	213	145
8	167	89.3	3.7	3.3	19.4	89.8	7.2	6.4	13.4	" 30.0	192	153
9	167	* 70.2	3.4	3.8	7.5	167	7.2	5.5	190	" 30.0	184	182
10	171	" 60.1	3.4	5.8	6.0	218	3.0	5.2	261	* 43.8	194	203
11	156	* 55.7	3.5	5.5	5.7	133	0	4.2	277	62.4	212	202
12	153	51.8	3.5	5.6	5.4	89.7	0	4.2	130	73.6	163	189
13	136	49.2	3.4	5.8	4.8	82.9	4.3	5.8	85.0	74.5	93.4	191
14	149	26.8	3.3	5.7	4.0	75.0	5.7	6.8	95.9	89.8	79.1	187
15	167	23.1	3.2	5.2	3.7	53.0	2.5	166	79.6	103	88.5	172
16	170	22.4	2.9	5.4	3.9	11.3	0	222	" 68.4	99.5	82.0	187
17	166	27.1	3.0	5.0	3.9	3.7	0	290	" 57.1	121	65.7	239
18	170	25.0	3.2	4.5	3.9	3.7	0	137	* 45.9	197	60.6	320
19	169	14.2	3.4	4.6	0	2.0	0	63.5	" 48.0	277	52.2	293
20	166	15.5	3.4	5.0	0	1.5	0	12.0	" 50.0	215	67.4	214
21	162	15.0	3.5	5.9	0	260	30.2	7.4	" 52.1	212	96.8	187
22	158	14.4	3.4	6.0	0	64.0	13.5	7.6	* 69.5	265	110	206
23	151	13.7	3.7	5.8	0	10.4	0	7.8	80.0	264	228	231
24	161	12.5	4.0	5.4	0	7.4	99.2	8.7	* 43.3	274	257	203
25	150	11.0	3.8	5.6	0	6.7	295	6.6	68.7	223	263	212
26	147	12.1	3.6	5.5	0	5.7	210	1.3	131	227	247	207
27	143	8.6	3.8	6.1	0	34.0	125	0	109	213	253	206
28	" 73.8	6.9	4.0	4.4	0	7.3	138	0	106	260	221	173
29	" 73.8	6.8	4.0	4.0	0	3.7	146	0	135	238	224	172
30	* 120		44.0	3.9	0	3.8	30.9	0	133	241	208	187
31	186		28.7		0		23.6	1.3		248		220
Sum	4,907.6	1,728.4	181.5	146.0	100.8	2,135.5	1,181.2	1,071.9	2,733.4	4,849.4	*5,097.7	*6,214

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948 Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1939-1948
Jan.	3.27	2.43	31	255	29	18.8	158	9,730	15,403	20,000	9,730	15,293
Feb.	3.36	1.83	1	304	29	5.6	59.6	3,430	14,129	47,900	3,430	13,822
Mar.	3.12	1.74	30	183	16	2.9	5.9	360	13,123	38,900	360	12,915
Apr.	1.92	1.77	22	6.2	6	2.9	4.9	290	20,406	84,200	290	20,867
May	2.70		8	78.7	‡19	0	3.3	200	39,357	303,000	200	41,903
June	3.88		5	591	‡ 1	0	71.2	4,240	34,727	239,000	4,240	35,450
July	4.05		25	728	‡ 1	0	38.1	2,340	30,269	140,000	1,320	29,056
Aug.	3.63		15	564	‡26	0	34.6	2,130	30,530	123,000	2,130	32,003
Sept.	3.64		11	375	‡ 7	0	91.1	5,420	32,885	140,000	3,220	31,513
Oct.	3.46		19	319	‡ 8	" 30.0	156	9,620	21,692	61,400	1,590	22,531
Nov.	3.55	2.42	25	* 338	20	* 43.7	*170	* 10,100	14,010	20,400	7,980	14,131
Dec.	3.67	2.92	18	* 397	7	*109	*200	* 12,300	16,392	29,700	8,770	16,641
Yearly	4.05			728		0	82.9	* 60,160	282,923	1,247,500	* 60,160	286,125

" Estimated * Partly estimated ‡ And other days

RIO GRANDE AT FORT QUITMAN, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights located on the rectified channel of the Rio Grande 1.5 miles below Old Fort Quitman and 81.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,450.57 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 71 meter measurements during the year, 51 by the United States and 20 by the Mexican Section of this Commission. Computations by shifting channel methods. Records available: January 1923 to December 1948.

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

COMPARATIVE FLOWS FROM RECORDS #: Momentary Peak: Max. 17,000 second-feet about June 20, 1905. Min., frequently dry prior to January 1915.**

Average Flow in Second-Feet

Daily:	Max.	● 17,000, June 20, 1905.	Min. frequently dry prior to Jan. 1915.	
Monthly:	Max.	5,030, May 1942.	Min. frequently dry prior to Jan. 1915.	
Yearly:	Max.	2,140, 1905.	Min.	42.4 1902.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	* Nov.	* Dec.
1	97.7	110	52.7	¤ 24.5	28.6	741	37.7	156	62.3	¤ 48.3	186	169
2	87.9	142	40.0	* 19.2	27.0	* 940	42.3	105	50.9	¤ 49.0	240	173
3	143	129	37.0	23.7	27.7	* 155	38.0	95.3	53.1	65.0	243	176
4	160	128	37.0	26.0	32.5	* 113	43.5	87.9	56.8	67.0	223	167
5	159	112	41.7	32.1	28.4	321	40.2	69.9	56.6	71.5	199	175
6	160	113	40.7	32.0	31.0	132	43.7	68.7	54.1	67.1	191	188
7	156	115	35.4	31.0	26.7	97.7	58.6	57.6	52.7	55.9	182	169
8	160	116	36.3	31.9	20.9	84.9	84.9	51.0	245	144	182	165
9	163	121	36.4	30.1	18.3	76.6	62.3	46.9	221	130	180	171
10	158	114	40.0	29.3	12.7	74.2	52.0	45.7	178	115	174	195
11	162	92.0	49.7	30.6	13.9	101	46.9	49.5	194	151	187	199
12	162	99.8	44.5	30.5	24.0	83.9	47.7	46.3	182	147	175	196
13	164	101	39.6	29.6	35.4	86.7	39.6	44.2	147	125	163	200
14	157	* 98.2	36.8	31.0	24.1	64.5	30.2	44.0	107	116	146	217
15	170	¤ 93.9	40.3	30.8	26.7	60.2	33.6	186	93.8	127	148	215
16	177	¤ 88.2	34.7	31.6	18.7	47.4	39.7	51.5	113	146	178	205
17	172	¤ 82.5	32.9	29.7	13.0	44.5	37.2	47.0	158	156	174	210
18	177	* 77.4	32.9	24.3	18.8	43.6	36.1	48.7	112	174	124	206
19	185	68.3	29.3	20.0	24.1	42.6	38.6	47.2	115	180	125	204
20	133	64.8	28.5	17.0	18.0	47.5	32.4	42.5	134	251	129	204
21	110	62.4	24.9	18.7	14.5	42.6	41.5	40.9	94.6	309	191	175
22	114	61.8	26.7	23.2	22.4	68.4	¤ 53.9	40.1	73.3	342	246	142
23	133	57.6	29.1	20.7	27.6	50.8	¤ 37.9	52.6	68.8	324	283	146
24	104	58.3	25.5	18.5	26.7	48.0	¤ 42.1	54.5	73.1	323	311	154
25	101	57.7	24.9	21.6	21.2	45.3	¤ 148	58.7	68.7	309	270	154
26	96.9	42.2	21.5	24.3	26.4	43.7	¤ 365	53.0	80.7	263	240	170
27	97.1	39.8	23.7	22.5	35.1	40.1	¤ 99.6	36.0	73.5	271	228	172
28	74.3	39.4	23.1	20.4	23.1	41.4	* 55.7	31.1	76.3	262	219	161
29	74.3	44.8	25.5	22.6	19.8	35.9	69.6	666	* 59.7	260	206	155
30	83.4		* 25.7	26.3	18.1	31.6	70.0	¤ 70.0	¤ 49.0	146	193	157
31	106		¤ 22.2		370		89.8	* 67.2		192		184
Sum	4,197.6	2,530.1	1,039.2	773.7	1,075.4	*3,805.1	*1,958.3	2,561.0	3,104.0	5,386.8	*5,936	*5,574

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	2.73	1.87	19	189	29	41.4	135	8,330	13,350	20,900	5,370	15,390
Feb.	2.57	1.82	2	148	29	38.9	87.2	5,020	13,750	50,100	3,510	15,200
Mar.	2.03	1.52	1	61.7	31	18.2	33.5	2,060	11,538	38,900	1,090	12,143
Apr.	1.75	1.45	14	35.4	21	12.7	25.8	1,530	14,542	77,000	1,200	15,537
May	5.96	1.42	31	3,270	16	9.4	34.7	2,130	26,489	309,000	800	38,505
June	6.18	1.74	1	3,580	30	28.1	*127	* 7,550	24,064	240,000	3,630	34,550
July	* 2.93	1.68	26	* 445	14	27.5	* 63.2	* 3,880	23,250	140,000	2,000	29,240
Aug.	7.26	1.75	29	5,290	28	26.8	82.6	5,080	30,092	* 127,000	2,490	28,487
Sept.	5.33	1.83	8	2,460	2	31.6	103	6,160	33,830	147,000	5,480	36,540
Oct.	3.32	1.93	22	393	7	47.8	174	10,700	24,964	66,500	4,520	28,209
Nov.	3.52	2.53	28	* 386	19	* 102	*198	* 11,800	15,673	24,500	4,990	16,445
Dec.	3.42	2.66	18	* 310	4	* 121	*180	* 11,100	16,449	31,000	5,640	17,484
Yearly	7.26	1.42		5,290		9.4	*104	* 75,340	247,991	1,270,400	* 75,340	287,730

¤ Estimated * Partly estimated ** Elephant Butte Reservoir closed January 1915 # Including estimated records ● Estimated from peak flow at El Paso and Upper Presidio

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. The recorder was moved to a new gage well fifty feet upstream from the cableway on June 14, 1948 at which time the zero of the gage was lowered 3.0 feet to 2,576.82 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 31 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to March 1914 and August 1923 to December 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 15,200 second-feet on June 12, 1912. Datum of gage in 1912 is unknown. Min., sometimes dry. On May 26, 1942, a gage height of 10.57 feet was reached with a flow of 5,160 second-feet. This level was the highest reached during the years 1923-1948 inclusive.

Average Flow in Second-Feet

Daily:	Max.	15,200,	June 12, 1912.	Min.		sometimes dry.
Monthly:	Max.	10,150,	June 1912.	Min.		sometimes dry.
Yearly:	Max.	1,970,	1907.	Min.	43.7	1948.

CORRECTION: In the period summary for this station published in Water Bulletin No. 17, the period should have been shown as 1924-1947 instead of 1932-1947.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	58.8	52.8	15.6	2.7	* .3	0	0	27.4	0	0	96.0	137
2	61.2	56.2	14.2	2.7	* .3	0	0	23.5	0	0	94.5	129
3	61.2	49.9	9.4	2.7	* .2	0	0	8.9	0	0	59.3	117
4	60.5	47.3	8.2	2.5	* .2	882	0	3.9	0	0	50.5	123
5	55.5	49.6	6.8	2.6	* .2	278	0	3.6	0	0	45.1	118
6	58.2	56.7	6.1	2.6	* .2	94.8	0	0	0	0	58.8	106
7	60.9	50.6	6.0	2.2	* .1	48.3	0	0	0	0	78.3	90.5
8	58.1	59.4	5.7	2.2	* .1	32.5	0	0	0	0	75.3	98.5
9	70.2	59.2	5.5	2.1	* .1	31.3	0	0	424	0	78.8	91.4
10	78.0	54.4	4.8	2.1	* .1	25.7	0	0	88.6	0	75.8	86.3
11	77.3	47.5	4.9	1.9	0	* 10.0	0	0	576	0	77.7	77.0
12	77.9	52.2	4.4	1.6	0	¤ 3.0	0	0	136	0	83.2	66.9
13	76.0	54.3	4.5	1.6	0	¤ 1.5	0	.9	147	0	78.1	69.7
14	75.4	57.7	4.7	1.6	0	¤ .5	2.2	0	* 32.2	0	81.6	91.8
15	78.4	61.9	4.0	1.5	0	¤ .3	0	0	* 12.4	0	92.1	101
16	80.2	65.7	3.6	1.2	0	¤ .2	0	94.8	* 6.2	0	114	101
17	82.1	55.3	3.6	1.0	0	¤ .1	0	580	* 8.2	0	83.9	105
18	86.0	49.8	3.3	.8	0	0	0	478	* 13.2	0	70.0	117
19	91.3	46.9	3.3	.6	0	0	0	44.4	9.1	0	59.3	103
20	95.4	40.0	2.8	.6	0	0	0	* 12.7	2.2	0	* 63.1	101
21	95.7	35.4	2.5	.6	0	¤ .5	0	3.8	.9	65.3	* 57.3	83.5
22	97.2	37.5	2.7	.7	0	283	0	.7	1.0	514	* 51.2	70.3
23	97.6	35.3	1.7	.5	0	* 130	0	.2	.5	129	* 51.0	78.2
24	97.8	33.3	1.7	.4	0	* 29.5	0	0	2.6	173	* 56.5	76.4
25	86.0	22.5	2.1	* .4	0	* 2.1	148	0	¤ .4	184	* 63.0	80.6
26	76.1	18.2	1.9	* .4	0	* 1.0	14.9	0	0	176	* 72.8	83.2
27	69.1	15.8	2.0	* .4	0	2.1	.4	.1	0	167	134	* 79.4
28	72.2	17.0	2.0	* .3	0	¤ .4	0	0	0	158	155	* 80.5
29	70.9	15.7	2.2	* .3	0	¤ .2	11.2	0	0	132	149	* 83.1
30	68.4		2.6	* .3	0	¤ .1	1.1	0	0	103	139	* 84.3
31	60.7		2.3		0		* 149	0		93.9		* 85.6
Sum	2,334.3	1,298.1	145.1	41.1	* 1.8	1,857.1	* 326.8	1,282.9	1,460.5	1,895.2	2,444.2	2,915.2

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	- .33	- .67	24	100	5	53.4	75.3	4,630	12,655	24,400	644	15,244
Feb.	- .60	-1.15	16	69.9	29	15.2	44.8	2,570	12,124	40,800	1,420	13,862
Mar.	- 1.11	-1.57	1	16.5	23	1.2	4.7	288	9,915	39,100	285	11,033
Apr.	- 1.43	-1.61	2	2.9	‡28	¤ .3	1.4	81.5	8,184	41,600	0	8,242
May	- 1.56		‡ 1	* .3	‡11	0	* .1	* 3.6	19,569	240,000	0	28,926
June	4.04		4	1,320	‡ 1	0	61.9	3,680	18,778	216,000	* 218	29,006
July	4.95		31	570	‡ 1	0	* 10.5	* 648	24,732	156,000	* 13.1	33,978
Aug.	6.65		18	1,200	‡ 6	0	41.4	2,540	32,521	133,000	* 128	29,729
Sept.	7.68		9	1,710	‡ 1	0	48.7	2,900	36,288	* 151,000	602	35,893
Oct.	7.92		22	1,830	‡ 1	0	61.1	3,760	31,428	105,000	0	33,509
Nov.	3.23	2.50	27	168	4	42.5	81.5	4,850	15,116	34,500	0	14,691
Dec.	3.11	2.69	1	144	12	65.3	94.0	5,780	14,771	30,900	374	15,818
Yearly	7.92			1,830		0	43.7	31,731.1	236,081	1,176,700	31,731.1	269,931

¤ Estimated * Partly estimated ‡ And other days

RIO CONCHOS AT CUCHILLO PARADO, CHIHUAHUA

DESCRIPTION: Water-stage recorder and cable with cable car. Located in Salineta 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, U.S.C. & G.S. datum.

RECORDS: Based upon 162 meter measurements during the year. Computations by shifting channel methods. Records available: January 1, 1945 to December 31, 1948.

REMARKS: The flow of this stream is modified by irrigation diversions and drainage returns and 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 and also by Madero Reservoir located on the San Pedro River, which enters the Rio Conchos 122 river miles above this station. Storage in Madero Reservoir began July 25, 1948.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Maximum 34,360 second-feet on October 9, 1945 with a gage height of 15.85 feet. Min., 53.3 second-feet on September 17, 1945, with a gage height of 2.00 feet.

Average Flow in Second-Feet

Daily:	Max.	17,660,	Oct. 9, 1945.	Min.	57.2	Sept. 17, 1945.
Monthly:	Max.	3,580,	Sept. 1946.	Min.	120	Sept. 1945.
Yearly:	Max.	972,	1946.	Min.	494	1948.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	466	653	950	291	266	424	216	999	103	346	590	445
2	752	599	957	210	194	297	223	1,500	118	348	459	728
3	512	752	1,250	183	186	360	262	791	199	340	547	491
4	438	770	925	162	214	353	374	551	202	301	876	473
5	413	717	763	166	193	565	314	544	164	360	632	459
6	547	756	586	448	177	331	233	392	127	314	445	643
7	477	657	526	327	238	484	196	374	106	239	798	784
8	516	643	710	231	188	339	180	286	95.0	245	583	703
9	516	646	763	174	155	291	256	262	756	316	703	703
10	427	791	844	157	149	269	263	248	220	245	720	657
11	367	487	763	132	172	367	325	193	125	294	724	494
12	403	600	699	127	222	315	267	434	342	345	445	502
13	498	805	770	121	199	434	186	231	1,050	395	953	470
14	586	629	752	145	696	632	207	306	738	530	961	456
15	750	858	876	189	260	622	338	551	487	537	1,000	427
16	473	1,030	759	204	353	306	565	278	798	657	1,130	357
17	544	819	597	229	360	213	1,010	263	756	590	851	413
18	519	632	773	182	512	162	396	200	784	745	738	367
19	501	886	763	162	343	142	558	163	1,030	883	756	336
20	484	752	668	152	360	158	678	141	876	614	586	399
21	505	618	784	149	270	417	385	117	759	982	703	431
22	579	1,020	879	174	249	164	431	135	509	1,110	727	374
23	777	925	770	155	253	110	1,360	113	583	961	635	360
24	671	780	731	245	257	212	1,010	130	477	1,000	674	448
25	699	894	745	177	312	246	957	137	495	1,110	505	381
26	1,060	798	671	159	289	245	699	108	777	809	554	351
27	1,150	607	703	170	274	139	756	103	512	477	463	333
28	1,090	724	894	230	360	175	516	92.9	657	399	441	374
29	837	911	636	203	310	199	466	83.3	357	1,040	629	353
30	724		657	268	271	247	713	131	280	953	752	291
31	680		403		282		805	138		742		374
Sum	18,961	21,759	23,567	5,922	8,564	9,218	15,145	9,995.2	14,482	18,227	20,580	14,377

Month	Current Year 1948								Period 1945-1948		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	4.76	2.53	27	1,530	#	357	612	37,610	46,912	55,810	37,610
Feb.	4.82	2.72	29	1,600	11	420	750	43,160	41,478	49,500	35,130
Mar.	4.99	2.53	3	1,780	31	351	760	46,750	37,885	46,750	32,280
Apr.	3.22	1.57	6	590	13	116	197	11,750	15,965	29,110	8,420
May	5.68	1.74	14	2,230	10	143	276	16,990	13,292	16,990	9,540
June	4.13	1.54	21	964	23	105	307	18,280	18,395	24,430	15,050
July	5.61	1.90	23	2,150	14	158	489	30,040	66,580	178,500	11,570
Aug	5.64	1.25	2	2,140	30	66.4	322	19,830	54,190	142,100	19,830
Sept.	7.97	1.41	9	4,450	8	90.1	483	28,730	108,170	213,300	7,150
Oct.	4.82	1.97	22	1,580	8	194	588	36,150	97,695	180,200	28,930
Nov.	4.92	2.56	15	1,540	28	350	686	40,820	51,922	60,290	40,820
Dec.	4.36	2.26	6	1,230	30	273	464	28,520	33,375	45,570	19,610
Yearly	7.97	1.25		4,450		66.4	494	358,630	585,859	703,660	358,630

Various days of the month

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 upon discharge records of the Rio Grande at Upper Presidio and Lower Presidio stations and estimated irrigation diversions and arroyo inflow between these two stations. Records available: May 1900 to March 1914, and August 1923 through 1948.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. La Colina Reservoir with 21,900 acre-feet capacity and a maximum surface area of 1,160 acres, located about 10.5 miles downstream from La Boquilla Dam, and La Rosetilla Reservoir, located about 52.7 miles farther downstream, with a capacity of 15,400 acre-feet and a maximum surface area of 840 acres, are used for power development. The daily river flow may be modified by these reservoirs, but except for evaporation, the monthly flow is not. Power generation facilities: La Boquilla 14,647 kw., La Colina 3,620 kw., La Rosetilla 5,150 kw.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 162,000 second-feet on September 11, 1904. Min. 3.0 second-feet on May 14, 1904.

		Average Flow in Second-Feet					
Daily:	Max.	148,900,	Sept. 11, 1904.	Min.	5.0	May 14,	1904.
Monthly:	Max.	24,540,	Sept. 1904.	Min.	11.0	May	1902.
Yearly:	Max.	3,720,	1914.	Min.	348,		1922.

Month	Current Year 1948						Period 1924-1948			Acre-Feet	
	Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			Normal 1938-1948	Average 1945-1948
	Day	High	Day	Low			Normal	Maximum	Minimum		
Jan.	28	1,290	12	408	637	39,200	60,384	147,000	20,300	52,536	48,400
Feb.	16	1,180	12	499	751	43,200	50,680	87,700	29,100	45,618	42,100
March	4	1,430	31	502	760	46,700	45,724	80,800	20,900	40,173	38,125
April	1	489	24	124	209	12,500	32,818	79,700	5,000	20,268	15,650
May	14	1,530	11	132	254	15,600	39,079	148,000	3,950	29,893	13,855
June	21	1,230	30	123	324	19,300	43,762	91,900	8,720	33,791	16,700
July	31	7,860	1	156	530	32,600	91,352	502,000	8,890	121,154	71,598
Aug.	29	1,780	28	77.4	364	22,400	131,716	601,000	11,300	126,100	48,525
Sept.	21	1,160	3	77.9	459	27,300	277,963	1,173,000	6,770	341,697	109,018
Oct.	21	1,320	9	202	579	35,600	170,040	798,000	33,200	176,455	107,200
Nov.	16	1,430	29	429	752	44,700	63,520	110,000	29,000	62,245	54,600
Dec.	7	1,040	31	342	519	31,900	55,224	97,700	22,200	46,336	36,825
Yearly		7,860		77.4	511	371,000	1,062,262	2,431,850	509,600	1,096,266	602,596

RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: Water-stage recorder, cable with sit-down cable car equipped for winch and heavy weights, located about 1.7 miles above the international highway bridge between Presidio, Texas, and Ojinaga, Chihuahua, 2.0 miles below the confluence of the Rio Conchos with the Rio Grande and 295.5 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,556.42 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 59 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to July 1915 and August 1923 to December 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 162,000 second-feet on September 11, 1904. Min. 3.0 second-feet on May 14, 1904.

Average Flow in Second-Feet

Daily:	Max.	149,200,	Sept. 11, 1904.	Min.	5.0	May 14, 1904.
Monthly:	Max.	24,870,	Sept. 1904.	Min.	11.0	May 1902.
Yearly:	Max.	4,870,	1906.	Min.	553,	1948.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	635	751	1,010	434	173	256	193	807	133	287	868	830
2	625	714	928	358	199	370	177	1,130	109	310	764	680
3	790	650	980	292	181	299	188	1,450	80.0	326	623	802
4	636	781	1,200	261	152	1,060	213	724	95.5	320	699	653
5	575	802	935	234	160	701	281	589	118	302	958	627
6	522	802	752	217	152	644	267	562	118	334	738	602
7	633	788	643	382	140	483	217	* 493	101	301	674	842
8	566	780	571	347	147	475	200	* 404	85.1	232	921	853
9	606	740	743	264	162	383	181	* 289	970	225	778	846
10	610	803	724	219	146	332	180	* 270	626	296	821	813
11	550	791	857	201	135	280	205	244	* 679	246	901	769
12	499	593	723	183	144	301	213	214	* 364	263	818	643
13	504	703	712	192	157	312	236	347	* 587	327	672	622
14	582	859	758	158	541	353	190	298	* 971	367	1,150	619
15	710	723	725	147	612	536	176	332	624	498	1,030	626
16	782	1,030	830	146	296	508	349	556	520	541	1,230	602
17	622	1,080	695	145	295	341	479	705	765	709	1,280	557
18	682	822	644	166	309	265	827	779	798	617	983	569
19	667	750	740	166	418	228	380	284	803	828	841	526
20	658	890	689	154	340	203	537	170	901	729	859	489
21	636	762	672	142	317	504	566	143	908	738	769	522
22	654	721	750	134	274	768	390	119	638	* 1,890	812	541
23	723	1,040	826	136	288	503	1,080	109	558	1,130	773	506
24	865	917	727	134	246	248	1,260	99.5	518	1,110	752	487
25	766	758	761	158	222	207	1,130	96.9	485	1,140	732	566
26	849	916	699	165	239	238	851	102	582	1,310	636	518
27	1,110	745	661	148	279	260	837	89.6	607	882	706	484
28	1,180	661	699	143	243	159	721	84.7	548	643	661	455
29	1,150	706	821	163	272	133	781	166	570	631	661	478
30	884		615	162	297	135	512	647	368	1,160	882	465
31	809		602		260		2,750	115		1,160		421
Sum	22,080	23,078	23,692	6,151	7,796	11,485	16,567	12,418.7	15,229.6	19,852	24,992	19,013

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	3.17	1.97	28	1,360	6	479	712	43,800	73,032	164,000	30,400	67,764
Feb.	3.06	2.12	16	1,250	12	552	796	45,800	62,796	99,700	33,900	59,473
Mar.	3.27	2.04	4	1,440	31	504	764	47,000	55,616	89,400	21,200	51,200
Apr.	2.04	1.27	1	503	24	125	205	12,200	40,407	84,100	4,460	28,001
May	3.37	1.31	14	1,530	11	132	251	15,500	58,346	270,000	3,660	58,609
June	3.32	1.25	4	1,500	30	119	383	22,800	62,250	267,000	9,250	62,609
July	6.98	1.34	31	7,860	1	156	534	32,900	115,228	564,000	8,910	154,337
Aug.	3.58	1.09	29	1,780	28	78.4	401	24,600	163,832	675,000	18,400	155,564
Sept.	3.86	1.09	9	2,080	3	77.9	508	30,200	314,283	1,324,000	7,370	377,570
Oct.	* 4.58	1.46	22	* 3,040	9	202	640	39,400	201,476	864,000	33,800	209,982
Nov.	3.40	2.09	16	1,550	4	559	833	49,600	78,648	141,000	37,800	76,955
Dec.	2.92	1.86	7	1,120	31	416	613	37,700	69,988	116,000	31,400	62,127
Yearly	6.98	1.09		7,860		77.9	553	401,500	1,295,902	3,466,700	401,500	1,364,191

* Partly estimated

ALAMITO CREEK NEAR PRESIDIO, TEXAS

DESCRIPTION: Water-stage recorder about 1,800 feet above the confluence with the Rio Grande and six miles below Presidio, Texas, and Ojinaga, Chihuahua. This creek enters the Rio Grande near the lower end of Presidio Valley and 306.9 river miles below the American Dam at El Paso, Texas. Zero of gage is 2,541.42 feet above mean sea level, U.S.C.& G.S. datum.

RECORDS: Based upon a continuous record of gage heights and 1 meter measurement during the year. All steady low flows were based upon weekly estimates by the hydrographer and the low stage hydrograph because at times the gage well was isolated by low sand or gravel bars. All other flows were based upon the gage height hydrograph and the station rating curve. Computations of medium and high flows by shifting channel methods. Records available: January 1932 to December 1948.

REMARKS: The flow of this spring-fed creek is modified by a small irrigation reservoir (San Estaban) 10.5 miles south of Marfa, Texas and by irrigation diversions below the reservoir. 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. 9,670 second-feet on July 20, 1937 with a gage height of 5.33 feet. Min. .87 second-feet in May 1932.

Average Flow in Second-Feet

Daily:	Max.	3,290,	Oct. 24, 1941.	Min.	.87	May 1-22, 1932.
Monthly:	Max.	329,	Sept. 1936.	Min.	2.0	Feb. 1935.
Yearly:	Max.	55.9	1941.	Min.	8.8	1934.

Mean Daily Discharge in Second-Feet 1948 —— 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	# 3.5	* 90.0	* 2.6	* 77.0	# 3.0	# 2.5	# 3.0	# 3.0
2	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	* 11.6	# 2.0	# 2.5	# 3.0	# 2.5	# 3.0	# 3.0
3	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 3.0	# 2.5	# 3.0	# 3.0
4	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
6	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
7	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
8	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	*131	# 2.5	# 3.0	# 3.0
9	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	* 32.3	# 2.5	# 3.0	# 3.0
10	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
11	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
12	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.9	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
13	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.5	# 2.0	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
14	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 2.5	* 17.3	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
15	# 3.5	# 3.5	# 3.5	# 3.5	# 3.2	# 2.5	* 7.2	# 2.5	# 2.5	# 2.5	# 3.0	# 3.0
16	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	# 2.5	* 6.9	# 2.5	# 2.5	* 3.1	# 3.0	# 3.0
17	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	# 2.5	# 2.0	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
18	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	# 2.5	# 2.0	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
19	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	# 2.5	# 2.0	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
20	# 3.5	# 3.5	* 6.7	# 3.5	# 3.0	# 2.5	# 2.0	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
21	# 3.5	# 3.5	# 3.5	* 21.2	# 3.0	* 3.0	# 2.0	# 2.5	* 63.8	* 39.2	# 3.0	# 3.0
22	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	* 38.2	# 2.0	# 2.5	* 4.3	# 4.0	# 3.0	# 3.0
23	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	# 2.5	* 436	# 2.5	# 2.5	* 4.2	# 3.0	# 3.0
24	# 3.5	# 3.5	# 3.5	# 3.5	* 3.2	* 30.3	* 227	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
25	# 3.5	# 3.5	# 3.5	# 3.5	* 6.9	* 14.0	* 4.8	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
26	# 3.5	# 3.5	# 3.5	# 3.5	* 5.3	# 3.0	# 2.0	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
27	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	* 30.7	# 2.5	# 2.5	# 3.0	# 3.0	# 3.0
28	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	* 4.0	# 3.0	# 2.5	# 3.0	# 3.0	# 3.0
29	# 3.5	# 3.5	# 3.5	# 3.5	# 3.5	# 3.0	* 87.5	# 3.0	# 2.5	# 3.0	# 3.0	# 3.0
30	# 3.5		# 3.5	# 3.5	# 3.5	# 3.0	* 30.3	# 3.0	# 2.5	# 3.0	# 3.0	# 3.0
31	# 3.5		# 3.5		# 3.5		* 852	# 3.0		# 3.0		# 3.0
Sum	#108.5	#101.5	#108.5	#125.9	#109.1	* 259.0	*1,744.3	* 154.0	*297.9	*124.0	# 90.0	# 93.0

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1932-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.			‡ 1	# 3.5	‡ 1	# 3.5	# 3.5	# 215	207	273	123	217
Feb.			‡ 1	# 3.5	‡ 1	# 3.5	# 3.5	# 201	190	234	111	196
Mar.			‡ 1	# 3.5	‡ 1	# 3.5	# 3.5	# 215	204	270	123	215
Apr.	4.28		20	* 240	‡ 1	# 3.5	# 4.2	# 250	245	743	119	285
May	3.74		25	* 15.4	‡16	# 3.0	# 3.5	# 216	1,418	8,520	184	1,251
June	4.60		24	* 580	‡13	# 2.5	* 8.6	* 514	1,829	* 6,360	206	1,608
July	6.17		31	*7,910	‡ 2	# 2.0	* 56.3	* 3,460	2,852	6,650	232	2,618
Aug.	4.35		1	* 290	‡ 2	# 2.5	* 5.0	* 305	3,572	16,330	216	2,188
Sept.	4.89		8	*1,180	‡ 4	# 2.5	* 9.9	* 591	3,901	19,600	179	2,299
Oct.	4.42		21	* 354	‡ 1	# 2.5	* 4.0	* 246	2,540	19,200	157	3,358
Nov.			‡ 1	# 3.0	‡ 1	# 3.0	# 3.0	# 179	258	807	119	254
Dec.			‡ 1	# 3.0	‡ 1	# 3.0	# 3.0	# 184	230	408	117	242
Yearly	6.17			*7,910		# 2.0	* 9.1	* 6,576	17,446	40,444	* 6,397	14,731

Estimated * Partly estimated ‡ And other days

TERLINGUA CREEK NEAR TERLINGUA, TEXAS

DESCRIPTION: Water-stage recorder located about 12 miles south of Terlingua, Texas, 2.4 river miles above the confluence with the Rio Grande at the lower end of Santa Helena Canyon. Zero of gage is 2,192 ±.5 feet above mean sea level, U.S.G.S. datum. This creek enters the Rio Grande 371.6 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 46 meter measurements during the year at low flow and a 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. Records available: January 1, 1932, to December 31, 1948.

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. 34,900 second-feet on May 24, 1935. with a gage height of 17.59 feet. Min., # 0 second-feet on September 29-30, 1937.

Average Flow in Second-Feet

Daily:	Max.	17,200,	June 1, 1937.	Min.	# 0	Sept. 29-30, 1937.
Monthly:	Max.	921,	June 1937.	Min.	.83	Oct. 1934.
Yearly:	Max.	146,	1937.	Min.	5.5	1943.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	# 2.7	# 3.7	# 3.0	# 2.2	* 1.9	# 85.9	# 15.1	# 385	# 3.1	# 2.7	# 2.1	# 2.4
2	* 2.7	* 3.6	* 3.0	* 2.2	# 1.9	# 18.1	# 12.1	# 59.1	* 3.1	# 2.7	* 2.1	* 2.4
3	# 2.7	# 3.5	# 3.0	# 2.2	# 1.8	* 18.1	# 9.2	# 47.0	# 3.3	# 2.7	# 2.1	# 2.4
4	# 2.8	# 3.4	# 3.0	# 2.3	# 1.8	# 15.8	# 6.2	# 38.2	# 3.4	* 2.7	# 2.1	# 2.4
5	# 2.8	# 3.3	# 3.0	# 2.3	# 1.8	# 13.4	* 3.3	# 29.5	# 3.6	# 2.8	# 2.1	# 2.3
6	# 2.9	# 3.2	# 3.0	# 2.3	# 1.7	# 11.1	# 3.3	# 20.7	# 3.8	# 3.0	# 2.1	# 2.3
7	# 2.9	# 3.0	# 2.9	# 2.4	# 1.7	# 8.8	# 3.2	# 12.0	# 3.9	# 3.1	# 2.1	# 2.3
8	# 3.0	# 2.9	# 2.9	# 2.4	# 1.7	# 6.5	# 3.2	# 3.2	* 4.1	# 3.2	# 2.0	# 2.3
9	# 3.0	# 2.8	# 2.9	# 2.4	# 1.6	# 4.1	# 3.2	* 3.2	# 3.8	# 3.3	# 2.0	# 2.2
10	# 3.1	* 2.7	# 2.9	# 2.4	* 1.6	* 1.8	# 3.2	# 2.8	# 3.5	# 3.5	# 2.0	# 2.2
11	# 3.1	# 2.7	* 2.9	# 2.5	# 1.7	# 1.9	# 3.1	# 2.3	# 3.2	* 3.6	# 2.0	* 2.2
12	# 3.2	# 2.7	# 2.8	# 2.5	# 1.8	# 2.0	* 3.1	# 1.8	# 2.9	# 4.8	# 2.0	# 2.2
13	* 3.2	# 2.7	# 2.8	# 2.5	# 1.8	# 2.1	# 3.1	* 1.4	# 2.6	# 5.9	* 2.0	# 2.2
14	# 3.3	# 2.7	# 2.7	# 2.6	# 1.9	# 2.3	# 3.1	# 1.6	* 2.3	# 7.1	# 2.0	# 2.2
15	# 3.4	# 2.7	# 2.6	* 2.6	# 2.0	# 2.4	* 3.8	# 1.8	# 2.4	# 8.2	# 2.0	# 2.2
16	# 3.5	# 2.7	# 2.6	# 2.5	# 2.0	* 2.5	#2,190	# 2.0	# 2.4	# 9.4	# 2.0	# 2.2
17	# 3.6	# 2.6	# 2.5	# 2.5	# 2.1	# 4.2	# 316	# 2.1	# 2.5	# 10.6	# 1.9	# 2.2
18	# 3.7	# 2.6	# 2.5	# 2.4	# 2.2	# 5.9	# 8.1	# 2.3	# 2.6	# 11.7	# 1.9	# 2.2
19	# 3.8	# 2.6	# 2.4	# 2.3	# 2.2	# 7.7	# 3.0	# 2.5	# 2.6	* 12.9	# 1.9	# 2.2
20	# 3.9	# 2.6	# 2.3	# 2.3	# 2.1	# 9.4	* 2.5	* 2.7	# 159	# 11.3	* 1.9	* 2.2
21	# 4.0	# 2.6	# 2.3	# 2.2	# 2.0	* 11.1	# 2.5	# 2.6	# 505	# 9.7	# 1.9	# 2.2
22	# 4.1	# 2.6	* 2.2	# 2.1	# 2.0	# 220	# 726	# 2.6	# 37.3	# 8.1	# 2.0	# 2.2
23	* 4.2	* 2.6	# 2.2	# 2.1	# 2.0	# 658	# 56.7	# 2.5	# 18.8	# 6.6	# 2.0	# 2.2
24	# 4.1	# 2.6	# 2.2	* 2.0	* 1.9	# 32.6	#1,930	# 2.4	# 18.8	# 5.0	# 2.1	# 2.2
25	# 4.1	# 2.7	# 2.2	# 2.0	# 1.9	# 17.9	# 112	# 2.3	# 18.8	# 3.4	# 2.1	# 2.2
26	# 4.0	# 2.8	# 2.2	# 2.0	# 1.9	# 156	# 3.6	# 2.3	* 18.8	* 1.8	# 2.1	# 2.2
27	# 4.0	# 2.8	# 2.2	# 2.0	# 1.9	# 183	* 3.6	* 2.2	# 15.6	# 1.8	# 2.2	# 2.2
28	# 3.9	# 2.8	# 2.2	# 1.9	# 1.9	# 379	# 3.6	# 2.2	# 12.4	# 1.9	# 2.2	# 2.2
29	# 3.8	# 2.9	# 2.2	# 1.9	# 1.9	# 33.0	# 3.6	# 2.2	# 9.1	# 1.9	# 2.3	# 2.2
30	# 3.8		# 2.2	# 1.9	# 1.9	# 17.9	# 3.6	# 2.2	# 5.9	# 2.0	# 2.3	# 2.2
31	# 3.7		# 2.2		*622		# 630	# 26.0		# 2.0		# 2.2
Sum	#107.0	*83.1	# 80.0	# 67.9	* 678.6	#1,932.5	# 6,073	# 670.7	# 878.6	#159.4	# 61.5	#69.4

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1932-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.			23	* 4.2	‡ 1	# 2.7	# 3.5	# 212	204	743	82.7	234
Feb.			1	# 3.7	‡17	# 2.6	# 2.9	# 165	140	267	73.4	146
Mar.			‡ 1	# 3.0	‡22	* 2.2	# 2.6	# 159	179	489	72.4	179
Apr.			‡14	# 2.6	‡28	# 1.9	# 2.3	# 135	1,175	15,500	55.1	1,705
May	5.10		31	*2,120	‡ 9	# 1.6	# 21.9	# 1,350	5,028	* 26,000	117	3,232
June	* 5.40		23	*2,390	‡10	1.8	# 64.4	# 3,830	7,178	54,800	59.5	3,647
July	5.56		24	*3,550	‡20	* 2.5	#196	# 12,000	5,873	26,800	621	6,908
Aug.	# 3.45		1	#1,060	13	* 1.4	# 21.6	# 1,330	4,060	* 26,680	123	2,439
Sept.	# 3.82		20	#1,400	14	2.3	# 29.3	# 1,740	6,257	24,600	223	2,013
Oct.			19	* 12.9	‡26	1.8	# 5.1	# 316	2,246	8,100	50.8	1,308
Nov.			‡29	# 2.3	‡17	# 1.9	# 2.0	# 122	386	# 2,980	64.9	415
Dec.			‡ 1	# 2.4	‡ 9	# 2.2	# 2.2	# 138	362	3,080	90.0	206
Yearly	5.56			*3,550		* 1.4	# 29.6	# 21,497	33,088	105,807	3,958.0	22,432

Estimated * Partly estimated ‡ And other days

RIO GRANDE AT JOHNSON RANCH, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and winch, located about 2 miles above Johnson Ranch, 14 miles below Castolon, Brewster County, Texas, and Santa Helena Ranch, Chihuahua 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, U.S.C. & G.S. datum.

RECORDS: Based upon 47 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: April 1936 to December 1948.

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

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 58,800 second-feet on September 23, 1938 with a gage height of 19.75 feet. An estimated 97,000 second-feet occurred on October 3, 1932, with a stage of 24.6 feet. Min. 23.1 second-feet on June 6, 1938 with a gage height of .84 foot.

Average Flow in Second-Feet

Daily:	Max.	56,900,	Sept. 10, 1942.	Min.	27.2	June 14, 1938.
Monthly:	Max.	23,600,	Sept. 1942.	Min.	133	April 1947.
Yearly:	Max.	4,780,	1942.	Min.	574	1948.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	559	841	693	594	106	1,420	213	4,540	357	487	1,060	659
2	611	790	712	572	99.3	533	371	* 1,520	185	369	1,020	883
3	618	740	931	442	101	425	197	1,110	118	323	823	736
4	672	692	871	379	108	* 342	237	1,280	91.4	316	706	744
5	696	668	1,040	330	163	* 310	238	* 906	79.9	304	627	702
6	628	778	984	296	145	718	173	‼ 584	61.1	293	769	639
7	570	753	905	247	121	490	187	‼ 484	48.6	281	852	631
8	548	810	729	213	119	457	226	* 450	61.6	270	677	645
9	622	743	662	233	120	360	171	373	75.0	258	747	859
10	571	759	613	320	118	349	139	344	228	238	813	781
11	601	695	762	267	109	309	147	289	974	223	786	807
12	615	833	716	228	122	274	157	263	535	255	785	774
13	563	706	833	208	128	245	201	218	671	250	900	693
14	520	640	720	195	122	217	215	188	393	231	750	632
15	519	737	723	178	111	230	1,500	206	628	283	863	627
16	582	817	748	164	327	227	2,090	234	772	809	1,080	605
17	744	762	719	152	459	314	792	324	519	504	1,070	606
18	702	987	785	146	324	350	443	396	510	606	1,190	556
19	624	955	632	138	252	272	546	590	671	750	1,040	521
20	662	725	649	128	251	216	545	484	705	652	934	542
21	646	770	712	145	316	198	* 314	275	1,620	870	850	511
22	645	823	613	156	306	179	824	198	970	1,260	821	477
23	621	689	659	196	274	892	571	143	901	1,830	794	502
24	627	764	683	138	269	572	2,870	123	582	1,410	799	514
25	737	903	757	114	263	367	1,890	124	556	1,070	746	499
26	786	842	647	113	827	369	1,040	118	574	1,200	743	491
27	727	740	711	106	267	257	862	99.7	488	1,230	662	540
28	853	861	635	110	253	509	595	107	588	1,120	629	523
29	1,050	685	599	120	210	258	856	113	528	837	664	481
30	1,070		682	117	207	225	697	83.9	538	699	632	460
31	1,000		699		1,260		2,400	97.7		899		465
Sum	20,989	22,508	22,824	6,745	7,857.3	11,884	21,707	16,265.3	15,028.6	20,127	24,832	19,105

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1936-1948 #: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	2.22	1.46	30	1,130	15	505	677	41,600	66,058	86,400	35,900	66,991
Feb.	2.16	1.64	19	1,030	14	611	776	44,600	58,200	80,900	44,600	58,727
Mar.	2.30	1.54	5	1,180	29	570	736	45,300	49,292	85,300	31,100	50,173
Apr.	1.64	.62	1	646	27	104	225	13,400	26,010	79,300	7,940	28,776
May	4.73	.59	31	5,040	3	97.8	253	15,600	62,187	240,000	8,830	64,666
June	5.00	.84	1	5,640	22	160	396	23,600	72,838	251,000	12,600	74,382
July	6.23	.68	31	8,780	10	127	700	43,100	150,477	620,000	10,700	169,182
Aug.	6.23	.41	1	8,780	31	57.4	525	32,300	148,269	485,000	17,000	163,573
Sept.	3.24	.42	21	2,490	7	46.1	501	29,800	387,546	1,404,000	20,000	390,282
Oct.	3.30	.88	23	2,580	11	209	649	39,900	219,692	929,000	39,200	234,636
Nov.	2.24	1.53	18	1,250	5	605	828	49,300	77,469	164,000	40,500	80,745
Dec.	1.93	1.34	2	928	31	451	616	38,000	66,023	110,000	29,600	64,282
Yearly	6.23	.41		8,780		46.1	574	416,500	1,384,061	3,461,400	416,500	1,446,415

‼ Estimated * Partly estimated # Beginning April 1, 1936

SPECIAL STATIONS IN BIG BEND AREA

During a part of the year 1948 four special gaging stations on the Rio Grande between Johnson Ranch and Langtry were operated in conjunction with an investigation of dry weather losses and gains in this reach of the river channel.

The name and a brief description of each of these stations follows:

BOQUILLAS STATION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located 4 miles below the mouth of Tornillo Creek, a quarter of a mile east of Boquillas, Brewster County, Texas, and 447.7 river miles below the American Dam at El Paso, Texas. Zero of the gage is 1,802.73 feet above mean sea level, U.S.G.S. datum. 1948 records based on 7 current meter measurements by the U.S. Section by wading and a continuous record of gage heights. Computations by shifting channel methods.

MARAVILLAS STATION: Water-stage recorder located .4 mile above the mouth of Maravillas Creek and 489.2 river miles below the American Dam at El Paso, Texas. 1948 records based on 7 current meter measurements by the U.S. Section by wading and a continuous record of gage heights. Computations by shifting channel methods.

JONES RANCH STATION: Water-stage recorder located about 750 feet above Jones Ranch Pump and 516.3 river miles below the American Dam at El Paso, Texas. 1948 records based on 9 current meter measurements by the Mexican Section by wading and a continuous record of gage heights. Computations by shifting channel methods.

AGUA VERDE STATION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located at the Agua Verde Dam Site and 571.7 river miles below the American Dam at El Paso, Texas. Elevation of the zero of the gage is 1,241.07 feet, above mean sea level, U.S.C. & G.S. datum. 1948 records based on 121 current meter measurements by the Mexican Section, some by wading and others from the cable, and a continuous record of gage heights except for the last eleven days of June when one or more staff gage readings were made each day. Computations by shifting channel methods.

Mean Daily Discharge in Second-Feet 1948 — Period Summary

	Boquillas Station		Maravillas Station		Jones Ranch Station		Agua Verde Station					
Day	April	May	April	May	April	May	Jan.	Feb.	March	April	May	June
1		160		143		236	1,013	1,230	1,020	752	302	985
2		155		144		235	897	1,230	978	826	292	1,620
3		151		143		230	809	1,090	869	826	294	1,680
4				139		214	788	1,010	890	756	288	999
5						206	819	953	1,010	710	276	703
6						200	816	897	1,060	643	269	618
7						198	901	848	1,100	607	267	512
8						226	848	883	1,220	544	266	523
9		154		158			809	939	1,080	487	282	812
10		146		140		219	756	904	989	473	298	664
11		150		135		206	759	943	855	667	283	604
12				133		204	819	886	780	763	275	530
13		143				210	749	883	823	562	278	494
14	251	145		126	338	216	788	865	911	459	278	480
15	233	148	243	126	324	213	795	943	932	410	279	424
16	217	144	240	126	315	212	735	840	964	392	270	410
17	202	196	222	128	300	210	682	816	855	378	269	388
18	188		211		282	204	685	985	865	360	271	367
19	176		187		266		773	964	872	348	268	* 396
20	172		171		254		918	1,055	872	334	‡ 445	
21	203		171		247		865	1,150	908	313	459	* 480
22							840	1,010	791	308	410	* 441
23							830	890	805	347	547	* 434
24							802	1,020	855	348	1,500	* 420
25							798	953	777	367	505	* 420
26	180						780	1,120	830	403	3,080	*1,290
27	172		176		268		812	1,500	844	353	1,070	‡1,050
28	165		164		246		908	1,060	862	331	1,050	* 759
29	160		157		251		908	982	788	308	802	* 788
30	159		147		244		929		848	309	1,530	* 456
31							1,110		802		1,070	
Sum							25,741	28,849	28,055	14,684	17,759	*20,192

Agua Verde Station	Current Year 1948								Period 1947-1948		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	High Day	High	Low Day	Low			Average	Maximum	Minimum
Jan.	3.08	2.13	31	1,190	18	653	830	51,060			
Feb.	5.38	2.36	27	2,990	17	780	995	57,220			
Mar.	3.18	2.23	8	1,260	22	756	905	55,650			
Apr.	2.53	1.12	11	879	29	304	489	29,130	26,365	29,130	23,600
May	8.66	.92	26	7,130	18	257	573	35,220	37,560	39,900	35,220
June	4.92	* 1.25	1	2,550	18	* 357	* 673	* 40,050	34,725	* 40,050	29,400

‡ Estimated * Partly estimated

RIO GRANDE AT LANGTRY, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and winch located at Langtry, Texas, 79.5 miles above Villa Acuña, 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, U.S.C. & G.S. datum.

RECORDS: Based upon 29 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to October 1914; December 1919 to March 1920; and January 1924 to December 1948.

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

EXTREME FLOWS: The highest gage height of record is 56.9 feet which occurred about 3:00 P.M. June 17, 1922. The discharge for this stage was 204,000 second-feet which was estimated by extension of the rating curve. The lowest flow of record is 270 second-feet which occurred in May 1904.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,110	1,240	1,010	846	379	908	611	1,180	403	722	1,110	852
2	1,040	1,300	1,090	855	366	1,260	628	2,520	358	751	990	868
3	949	1,250	961	938	353	1,840	1,950	3,440	359	721	1,070	866
4	876	1,130	924	869	350	1,230	1,720	‖ 2,020	353	728	1,260	865
5	884	1,080	962	844	350	929	1,160	* 1,420	370	699	1,200	1,020
6	910	1,030	1,130	780	339	‖ 785	846	1,270	439	640	1,040	948
7	910	996	1,110	704	333	‖ 700	789	1,470	392	578	959	918
8	995	948	1,270	656	334	‖ 595	557	1,160	371	539	903	920
9	943	1,000	1,250	617	342	* 680	535	942	1,200	542	950	859
10	895	1,010	1,170	593	358	‖ 810	573	834	418	538	1,040	832
11	838	1,040	1,020	576	391	‖ 750	486	753	461	535	941	831
12	880	996	948	804	376	‖ 685	453	688	397	513	953	993
13	863	990	879	796	369	‖ 610	446	620	439	516	1,030	991
14	848	978	952	605	362	‖ 575	426	581	592	493	1,010	1,020
15	864	1,030	983	513	355	‖ 565	401	543	808	471	1,030	989
16	857	1,010	1,050	483	351	‖ 510	431	519	772	474	1,080	935
17	816	931	986	459	343	* 481	537	663	735	522	974	882
18	792	983	967	446	338	428	1,250	477	627	467	1,030	839
19	821	1,100	972	429	331	411	1,800	429	902	618	1,200	822
20	927	1,030	954	423	327	425	960	429	800	809	1,230	806
21	994	1,220	1,010	415	512	486	671	478	897	720	1,320	797
22	916	1,210	920	416	505	551	520	555	1,620	3,930	1,190	765
23	931	1,050	852	422	461	513	610	742	1,480	2,030	1,100	734
24	914	1,050	901	432	1,480	503	681	618	1,550	2,510	1,030	741
25	904	1,110	909	421	800	523	775	517	1,100	1,950	1,030	726
26	903	1,030	876	453	1,860	1,050	1,880	468	1,080	1,990	1,000	710
27	885	2,020	908	448	2,020	1,400	2,370	426	885	1,500	1,010	717
28	925	1,200	950	418	933	859	1,500	512	829	1,310	941	725
29	1,000	1,100	907	405	1,120	992	1,220	580	782	1,380	923	709
30	982		906	390	1,200	729	1,380	449	759	1,420	896	702
31	1,050		905		1,380		1,380	380		1,310		725
Sum	28,422	32,062	30,632	17,456	19,318	*22,783	29,546	27,683	22,178	31,926	31,440	26,101

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	1.35	.87	31	1,180	18	784	917	56,400	95,567	* 245,000	52,300	85,309
Feb.	2.69	.99	27	2,890	17	915	1,110	63,600	81,490	* 117,000	48,900	77,645
Mar.	1.48	.94	8	1,360	23	844	988	60,800	77,592	118,000	48,100	70,973
Apr.	1.08	.28	3	955	30	383	582	34,600	62,328	105,000	28,500	51,200
May	4.51	.15	26	5,810	20	320	623	38,300	100,438	271,000	26,900	99,409
June	2.18	.32	3	2,110	19	411	* 759	* 45,200	100,567	299,000	25,400	99,518
July	6.46	.30	3	9,740	15	389	953	58,600	157,881	719,000	31,700	211,618
Aug.	4.48	.26	2	5,830	31	375	893	54,900	202,008	* 730,000	33,800	194,300
Sept.	3.72	.19	9	4,360	4	337	739	44,000	376,563	1,410,000	35,700	394,909
Oct.	7.24	.42	22	11,200	16	456	1,030	63,300	259,589	1,063,000	55,200	288,355
Nov.	1.52	.98	21	1,340	30	853	1,050	62,400	103,487	* 211,000	56,600	104,209
Dec.	1.24	.84	5	1,060	‡29	702	842	51,800	91,262	135,000	49,800	84,109
Yearly	7.24	.15		11,200		320	873	633,900	1,708,772	3,851,500	633,900	1,761,554

‖ Estimated * Partly estimated ‡ And other days

PECOS RIVER 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, U.S.C. & G.S. datum.

RECORDS: Based upon 21 meter measurements during the year and continuous record of gage heights. Water-stage recorder installed May 11, 1942. Computations by shifting channel methods. Records available: March 17, 1898 to December 3, 1898, and May 1900 to December 1948.

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

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. 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.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	214	203	291	170	155	186	140	139	141	149	234	197
2	218	202	244	172	152	200	145	136	175	144	226	200
3	216	203	226	173	153	166	157	136	152	142	225	204
4	215	206	215	176	152	153	12,600	135	140	142	220	205
5	213	208	211	181	148	150	1,500	133	132	140	209	210
6	212	209	211	180	145	148	374	136	126	141	208	211
7	213	207	207	179	141	145	368	136	126	140	204	211
8	217	208	207	175	138	141	1,040	133	126	139	200	212
9	218	206	204	172	138	139	509	131	736	142	196	212
10	219	207	198	166	137	138	375	130	254	151	195	213
11	220	206	193	165	893	137	382	128	180	152	193	217
12	221	204	192	163	302	134	270	126	167	153	195	217
13	218	204	192	164	179	133	246	125	163	153	196	221
14	216	205	193	159	213	132	233	123	157	154	197	224
15	218	206	193	156	244	129	221	124	154	156	198	227
16	221	207	192	153	204	128	209	126	154	155	197	225
17	220	208	192	148	180	127	199	128	154	156	193	223
18	220	212	191	143	167	123	191	122	154	451	187	225
19	222	215	185	142	156	124	185	119	156	305	188	225
20	225	214	188	141	151	123	178	119	153	239	190	221
21	222	213	188	142	149	125	174	117	147	221	185	218
22	222	213	182	143	143	126	168	117	147	297	184	217
23	215	214	183	155	141	127	164	117	147	358	183	220
24	211	220	184	153	144	182	161	114	151	307	184	222
25	208	222	185	159	315	237	156	114	219	271	187	222
26	209	259	183	158	229	135	156	116	186	262	188	221
27	209	279	181	153	154	135	155	116	165	251	192	220
28	208	401	177	150	157	185	154	116	156	249	189	220
29	207	404	178	153	198	213	149	121	153	246	192	219
30	207		179	154	214	137	146	175	151	244	193	219
31	206		175		207		142	155		241		215
Sum	6,680	6,565	6,120	4,798	6,199	4,458	21,247	3,963	5,322	6,451	5,928	6,713

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	.88	.80	20	228	25	205	215	13,200	24,870	78,200	12,900	26,809
Feb.	2.04	.78	28	687	14	200	226	13,000	19,736	62,300	10,900	21,564
Mar.	1.20	.64	1	324	31	173	197	12,100	18,748	40,700	11,100	19,264
Apr.	.66	.50	5	184	21	140	160	9,520	17,081	42,400	9,520	17,838
May	4.31	.44	11	2,540	7	137	200	12,300	34,959	156,000	10,800	25,273
June	2.13	.36	25	826	18	121	149	8,840	35,293	197,000	8,840	35,362
July	21.52	.39	4	51,300	1	136	685	42,100	25,037	84,200	7,620	32,309
Aug.	.63	.26	30	195	25	112	128	7,860	19,668	50,400	7,620	21,160
Sept.	3.80	.33	9	2,160	7	124	177	10,600	43,121	324,420	6,190	25,973
Oct.	1.80	.39	18	654	8	137	208	12,800	54,143	486,000	9,520	72,255
Nov.	.68	.54	1	240	18	181	198	11,800	29,364	209,000	10,300	37,309
Dec.	.66	.58	‡15	227	1	197	217	13,300	24,402	91,800	12,200	26,418
Yearly	21.52	.26		51,300		112	231	167,420	346,422	1,330,900	167,420	361,534

‡ And other days

GOODENOUGH SPRING NEAR COMSTOCK, TEXAS

DESCRIPTION: Staff gage 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 968.42 feet. Prior to June 23, 1946 the elevation of the zero of the gage was 971.9 feet, both elevations above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 18 meter measurements during the year with the discharge estimated between measurements. Records available: February 23, 1929, to December 1948.

REMARKS: The flow of this spring is very uniform and not modified by diversions or storage. Backwater reaches this gaging station when the Rio Grande reaches a discharge of about 35,000 second-feet near this spring. A maximum gage height of 17.30 feet was reached by backwater on September 1, 1932.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 846 second-feet on September 18, 1941 with a gage height of 4.57 feet. Min. 75.7 second-feet on August 28, 1944 with a gage height of .47 feet.

Average Flow in Second-Feet

Daily:	Max.	# 455, Oct. 1, 1932.	Min.	77.2	Aug. 28, 1944.
Monthly:	Max.	* 421, Oct. 1932.	Min.	88.6	Aug. 1944.
Yearly:	Max.	266, 1933.	Min.	108,	1944.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	# 138	# 133	# 127	# 125	# 125	# 115	# 124	# 129	# 121	# 120	# 139	# 124
2	# 138	# 133	# 126	# 125	# 124	# 115	# 125	# 129	# 121	# 120	# 138	# 124
3	# 138	# 133	# 126	# 125	# 124	# 115	# 125	# 129	# 121	# 121	# 138	# 123
4	# 137	# 132	# 126	# 125	# 123	# 115	# 126	# 129	# 121	# 122	# 137	# 122
5	# 137	# 132	# 126	# 125	# 122	# 115	# 126	# 129	# 121	# 123	# 137	# 122
6	# 137	# 132	# 126	# 125	# 122	# 115	# 126	# 128	# 121	# 124	# 136	# 122
7	# 137	# 132	# 125	# 125	# 121	# 115	# 127	# 128	# 121	# 125	# 136	# 121
8	# 136	# 131	# 125	# 125	# 121	# 115	# 127	# 128	# 121	# 126	# 135	# 120
9	# 136	# 131	# 125	# 125	# 120	# 115	# 128	# 128	# 121	# 127	# 135	120
10	# 136	# 131	# 125	# 125	# 119	115	# 128	# 128	# 121	# 128	# 134	# 120
11	# 136	# 131	# 125	# 125	# 119	# 115	# 129	# 128	# 121	# 129	# 134	# 120
12	# 136	# 130	# 125	# 125	# 118	# 116	# 129	# 128	# 121	# 130	# 133	# 120
13	# 135	# 130	# 124	# 125	# 118	# 116	# 130	128	# 121	# 131	# 133	# 121
14	# 135	# 130	# 124	# 125	# 117	# 117	130	# 128	# 121	# 132	# 132	# 121
15	135	# 130	124	# 126	# 116	# 117	# 130	# 127	121	# 133	132	# 121
16	# 135	# 129	# 124	# 126	# 116	# 118	# 130	# 127	# 120	# 134	# 132	121
17	# 135	129	# 124	# 126	# 115	# 118	# 130	# 126	# 119	# 135	# 131	# 121
18	# 135	# 129	# 124	# 126	# 115	# 119	# 130	# 126	# 118	# 135	# 130	# 120
19	# 135	# 129	# 124	# 126	114	# 119	# 130	# 126	# 117	# 136	# 130	# 120
20	# 135	# 128	# 124	# 126	# 114	# 119	# 130	# 125	# 117	# 137	# 130	# 120
21	# 135	# 128	# 124	# 126	# 114	# 120	# 130	# 125	# 116	# 138	# 129	# 120
22	# 134	# 128	# 124	# 126	# 114	# 120	# 129	# 124	# 115	# 139	# 128	# 119
23	# 134	# 128	# 125	# 126	# 114	# 121	# 129	# 124	# 114	# 140	# 128	# 119
24	# 134	# 128	# 125	# 126	# 114	# 121	# 129	# 123	113	# 141	# 128	# 119
25	# 134	# 128	# 125	# 126	# 114	# 122	# 129	# 123	# 114	142	# 127	# 118
26	# 134	# 127	# 125	# 126	# 114	# 122	# 129	# 123	# 115	# 142	# 126	# 118
27	# 134	# 127	# 125	# 126	# 114	# 122	# 129	# 122	# 116	# 141	# 126	# 118
28	# 134	# 127	# 125	# 126	# 114	# 123	# 129	# 122	# 117	# 141	# 126	# 118
29	134	# 127	125	126	# 114	# 123	# 129	# 121	# 118	# 140	125	# 117
30	# 134		# 125	# 125	# 114	# 124	# 129	121	# 119	# 140	# 124	# 117
31	# 133		# 125		# 115		# 129	# 121		# 139		# 117
Sum	*4,196	*3,763	*3,872	*3,765	*3,638	*3,542	*3,980	*3,903	*3,563	*4,111	*3,949	*3,723

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet ϕ High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Maximum ⊕	Minimum ⊕	Normal 1938-1948
Jan.			‡ 1	# 138	31	# 133	* 135	* 8,320	8,661	19,620	6,130	7,584
Feb.			‡ 1	# 133	‡26	# 127	* 130	* 7,460	7,695	17,030	5,350	6,668
Mar.			1	# 127	‡13	# 124	* 125	* 7,680	8,169	17,770	5,900	7,228
Apr.			‡ 1	# 126	‡15	# 126	* 126	* 7,470	7,751	16,580	5,560	7,139
May			1	# 125	‡19	* 114	* 117	* 7,220	8,420	16,840	5,850	7,889
June			30	# 124	‡ 1	# 115	* 118	* 7,030	8,526	16,040	5,330	7,729
July			‡13	# 130	1	# 124	* 128	* 7,890	9,077	16,460	5,930	8,766
Aug.			‡ 1	# 129	‡29	# 121	* 126	* 7,740	8,711	15,840	5,450	8,285
Sept.			‡ 1	# 121	24	* 113	* 119	* 7,070	10,057	# 25,000	6,550	8,436
Oct.			‡25	* 142	‡ 1	# 120	* 133	* 8,150	9,975	* 25,870	6,840	8,862
Nov.			1	# 139	30	# 124	* 132	* 7,830	9,173	21,850	6,540	8,169
Dec.			‡ 1	# 124	‡29	# 117	* 120	* 7,380	8,997	20,470	6,380	8,035
Yearly				* 142		* 113	* 126	*91,240	105,212	192,840	78,490	94,790

Estimated * Partly estimated ‡ And other days ϕ Mean daily ⊕ Period 1929-1948

DEVILS RIVER 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. Zero of gage is 951.80 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 10 meter measurements during the year. On June 24 and 25, the stage hydrograph was estimated covering the period when the river dropped from a peak stage of 33.0 feet to 6.80 feet. Computations by shifting channel methods. Records available: May 1900 to March 1914 at a point .8 mile below Southern Pacific railroad bridge; December 1923 to September 1, 1932, at a point .2 mile above Southern Pacific railroad bridge; September 2, 1932 to December 31, 1948 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 two power dams with a combined hydroelectric generating capacity of 3,100 kva, 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 597,000 second-feet. This corresponds to a flow of 143 second-feet per square mile of watershed. Zero flow sometimes occurs for a few hours at this station. When this happens, the gage height falls to .84 foot or below.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	172	219	207	169	164	212	392	438	358	289	354	297
2	188	230	186	164	154	227	374	437	342	311	317	291
3	212	237	179	164	154	221	427	417	365	333	321	273
4	227	222	187	164	153	218	69,800	398	362	276	294	302
5	214	222	190	154	153	204	36,800	396	372	340	333	326
6	219	235	171	121	153	233	7,370	432	361	283	300	300
7	222	234	178	189	147	222	2,060	381	380	313	336	273
8	238	231	185	161	152	216	1,970	410	363	298	324	295
9	217	188	186	159	152	207	1,400	391	641	304	356	262
10	209	182	215	167	157	207	922	389	560	320	316	269
11	216	231	190	161	207	235	875	388	477	317	299	274
12	234	198	195	182	473	206	660	404	482	330	328	288
13	187	176	169	173	546	221	628	403	375	346	348	279
14	186	185	169	151	306	190	609	384	455	326	371	298
15	193	197	173	156	323	228	590	382	374	310	365	318
16	206	191	179	151	307	200	570	253	364	214	352	303
17	180	205	178	152	254	178	561	393	384	347	327	307
18	201	200	184	154	239	200	551	407	374	328	335	288
19	213	199	185	149	253	193	542	301	382	297	298	283
20	151	200	180	149	254	196	532	362	376	323	275	298
21	199	191	188	149	237	197	515	344	376	317	283	302
22	261	192	176	156	253	230	515	421	367	382	285	293
23	212	187	164	203	235	205	515	301	368	665	293	296
24	202	208	174	168	245	*146,000	497	360	348	541	296	297
25	204	206	182	242	274	* 33,500	479	315	356	413	289	303
26	197	223	185	201	229	4,830	479	438	351	396	302	283
27	248	230	171	173	229	1,080	462	308	272	377	351	289
28	183	212	164	155	229	610	461	357	340	368	372	294
29	188	215	164	174	226	497	442	293	187	347	294	286
30	206		164	184	236	427	441	389	319	414	281	286
31	202		170		244		439	396		369		290
Sum	6,387	6,046	5,588	4,995	7,338	*191,790	132,878	11,688	11,431	10,794	9,595	9,043

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	1.61	.77	22	501	20	39.4	206	12,700	22,826	45,250	12,700	18,809
Feb.	1.71	1.21	26	584	9	164	208	12,000	20,236	36,880	12,000	16,409
Mar.	1.50	1.00	21	375	23	91.6	180	11,100	21,102	39,420	11,100	16,927
Apr.	1.55	.63	‡25	418	6	16.9	166	9,910	23,220	67,800	9,910	17,592
May	1.81	.83	11	707	18	39.9	237	14,600	41,098	356,900	10,500	20,336
June	33.00	1.11	24	476,000	10	122	*6,390	*380,000	52,156	* 380,000	11,100	53,736
July	19.85	1.32	4	210,000	‡ 1	357	4,290	264,000	50,540	377,000	13,900	73,227
Aug.	1.70	.55	24	814	23	16.6	377	23,200	23,990	51,000	12,100	21,418
Sept.	1.91	.62	9	1,100	29	33.2	381	22,700	81,493	895,990	11,200	25,091
Oct.	1.64	.98	23	753	‡ 3	89.8	348	21,400	48,670	349,000	13,200	36,027
Nov.	1.43	1.01	18	518	23	77.5	320	19,000	25,258	60,300	13,900	22,136
Dec.	1.41	.96	‡ 5	480	3	52.1	292	17,900	23,419	49,520	13,500	18,555
Yearly	33.00	.55		476,000		16.6	*1,110	*808,510	434,008	1,284,080	180,000	340,263

‡ And other days * Partly estimated

ARROYO LAS VACAS NEAR VILLA ACUNA, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, located 1.5 miles upstream from Villa Acuña, Coahuila and 1.8 miles upstream from the confluence of Arroyo las Vacas with the Rio Grande at a point just above the Del Rio-Villa Acuña 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 above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 153 meter measurements during the year. Computations by shifting channel methods. Records available: occasional estimates from June 1935 to March 20, 1938, after which the present record extends to December 31, 1948.

REMARKS: The low flow of this stream is from springs. Backwater from the Rio Grande reaches this station whenever the stage at Del Rio Station reaches about 21.0 feet on the present gage, or a flow of about 110,000 second-feet.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 25,640 second-feet on October 3, 1944 with a gage height of 17.45 feet. Min. .7 second-feet on various days in November 1938 and on March 16, 1940 with a gage height of .98 foot.

Average Flow in Second-Feet

Daily:	Max.	3,530,	Oct. 3, 1944.	Min.	.7	Nov. 1938 & March 1940.
Monthly:	Max.	153,	Oct. 1944.	Min.	1.1	Jan. 1938.
Yearly:	Max.	25.8	1944.	Min.	7.4	1939.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.2	4.6	4.6	4.2	3.5	3.5	115	3.9	2.5	4.2	4.9	4.6
2	4.9	4.6	4.6	4.2	3.5	3.5	7.4	3.9	2.5	4.2	4.6	4.9
3	5.3	4.6	4.6	4.2	3.5	2.9	242	3.9	2.1	5.7	4.6	4.9
4	5.7	4.6	5.0	4.6	3.2	2.9	3,500	3.5	2.1	5.3	5.3	5.3
5	5.0	5.3	5.3	4.6	3.5	2.8	35.3	3.5	2.1	4.9	5.3	3.5
6	5.0	4.6	4.9	4.2	3.6	2.8	17.0	3.5	2.1	3.5	4.2	3.9
7	6.0	4.6	4.6	3.9	3.6	2.8	11.7	3.5	2.1	3.9	3.6	4.9
8	5.7	3.9	3.5	3.9	3.9	2.8	14.1	3.2	2.1	4.2	2.8	3.9
9	5.3	4.6	4.2	3.9	4.2	2.8	14.8	3.2	2,134	4.6	2.1	4.3
10	4.9	4.9	5.3	3.9	3.6	2.1	13.8	3.2	29.0	3.9	3.2	4.9
11	4.6	4.6	4.2	3.5	3.5	2.8	32.5	3.2	10.9	4.2	3.2	4.6
12	4.2	3.2	4.9	3.5	3.2	2.8	20.1	3.2	8.1	4.6	3.2	4.3
13	4.2	4.6	4.9	3.5	3.2	2.8	16.6	3.2	6.0	4.9	3.6	3.9
14	4.6	5.6	4.9	3.2	3.2	2.8	18.4	3.2	4.9	3.9	2.8	4.3
15	4.9	6.4	4.9	3.5	3.2	2.8	11.7	3.2	4.9	3.9	2.8	4.9
16	4.6	4.9	4.6	3.9	3.5	2.8	8.1	2.5	4.6	4.6	2.5	4.6
17	4.6	4.6	4.2	3.9	2.8	2.9	7.1	3.2	5.7	11.0	2.8	4.3
18	5.3	3.5	4.6	3.9	2.8	2.9	7.4	2.1	4.6	4.6	2.8	4.3
19	4.6	4.2	3.9	3.9	3.5	3.5	6.4	2.8	4.6	3.9	2.8	4.3
20	4.6	4.2	5.0	3.5	3.5	3.5	6.0	3.2	4.6	3.9	3.6	4.2
21	4.6	4.2	5.3	3.2	2.8	7.1	4.6	3.2	4.2	4.2	3.9	4.6
22	4.6	5.3	3.9	3.9	2.1	2.9	4.6	2.5	4.2	8.5	2.8	3.5
23	4.6	4.6	4.2	3.5	5.0	15.9	3.9	2.8	4.2	12.0	3.9	4.6
24	4.6	5.3	4.6	3.5	29.0	262	3.5	2.8	3.9	11.0	2.8	4.2
25	4.6	4.6	5.3	4.9	6.0	72.4	3.9	2.8	3.9	7.4	3.6	4.2
26	4.6	6.3	5.3	3.5	4.2	138	3.9	2.8	3.5	6.7	4.6	4.2
27	4.2	6.0	5.3	3.9	3.9	4.6	3.9	2.5	3.5	6.0	2.8	4.2
28	4.2	5.3	5.3	3.9	3.9	3.9	3.9	2.5	3.5	4.2	2.8	3.9
29	4.2	5.7	5.3	3.9	3.9	2.5	3.9	2.8	3.5	4.2	4.2	3.5
30	4.6		5.7	3.5	3.6	1.8	3.9	2.8	3.5	4.6	4.6	4.2
31	4.6		5.0		3.5		3.9	2.8		5.3		4.2
Sum	147.6	139.4	147.9	115.6	136.4	569.6	4,149.3	95.4	2,277.4	168.0	106.7	134.1

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	1.57	1.48	7	6.0	23	3.9	4.8	293	413	910	" 79.4
Feb.	1.74	1.41	26	45.6	#	3.2	4.8	276	425	1,380	" 113
Mar.	1.44	1.25	6	6.0	31	2.8	4.8	293	864	2,600	161
Apr.	1.94	1.25	22	82.6	1	2.1	3.9	229	1,073	4,580	168
May	3.54	1.25	23	685	23	1.1	4.4	271	1,314	4,310	156
June	5.35	1.25	24	2,540	30	1.8	19.0	1,130	1,002	3,900	118
July	14.57	1.08	4	18,120	24	3.5	134	8,230	2,014	8,230	176
Aug	1.08	1.02	#	3.9	#	2.1	3.1	189	801	1,960	129
Sept.	10.50	1.02	9	13,600	#	2.1	75.9	4,520	1,639	6,850	95.6
Oct.	2.07	1.54	17	102	11	3.2	5.4	333	1,239	9,390	134
Nov.	1.57	1.44	#	5.3	28	1.4	3.6	212	424	" 1,670	106
Dec.	1.64	1.44	31	5.7	5	1.8	4.3	266	363	704	132
Yearly	14.57	1.02		18,120		1.1	22.4	16,242	11,571	18,808	5,130

" Estimated # Various days of the month

RIO GRANDE NEAR DEL RIO, TEXAS

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 693.6 river miles below the American Dam at El Paso, Texas. Measurements from highway bridge. Zero of gage is 864.30 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 11 meter measurements during the year by the United States Section of this Commission and a continuous record of gage heights. Computations by shifting channel methods. Records available: July 2, 1941 to December 1948. Records are also available for a station 11 miles upstream from May 1900 to April 1915 and for a station 7.5 miles upstream at McKee's Switch, from December 1919 to March 1920, and for a station 900 feet above the international highway bridge from December 1923 to July 2, 1941.

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

EXTREME FLOWS: The highest recorded gage height was on September 1, 1932, when the gage height was 34.5 feet with a discharge of 605,000 second-feet. This is the greatest rate of discharge recorded at any point on the Rio Grande. The lowest flow of record was on May 8, 1948, when the gage height was 0.40 feet and the flow was 732 second-feet.

CORRECTION: In the period summary for this station published in Water Bulletin No. 17, the period should have been shown as 1924-1947 instead of 1929-1947.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,820	1,690	2,060	1,410	‖ 970	2,000	1,640	2,070	1,360	1,640	2,450	1,810
2	1,770	1,910	1,770	1,350	‖ 930	1,530	1,350	1,880	1,300	1,630	2,160	1,740
3	1,750	2,000	1,750	1,320	‖ 910	1,730	1,750	3,250	1,330	1,740	2,000	1,740
4	1,660	1,990	1,640	1,420	‖ 900	2,220	64,700	3,270	1,290	1,580	2,020	1,790
5	1,590	1,820	1,540	1,420	‖ 890	1,800	76,400	2,730	1,270	1,660	2,260	1,780
6	1,570	1,760	1,540	1,300	‖ 870	1,460	18,900	2,410	1,260	1,550	2,180	1,960
7	1,620	1,700	1,710	1,340	‖ 860	1,280	5,500	2,260	1,320	1,530	2,020	1,860
8	1,620	1,640	1,760	1,260	‖ 860	1,190	3,950	2,370	1,290	1,460	1,900	1,820
9	1,730	1,550	1,870	1,200	‖ 850	1,110	3,640	2,170	6,090	1,420	1,800	1,810
10	1,640	1,560	1,920	1,180	‖ 860	1,120	2,430	1,980	3,520	1,480	1,810	1,740
11	1,600	1,610	1,760	1,150	‖ 900	1,280	2,450	1,880	1,810	1,470	1,920	1,700
12	1,560	1,620	1,610	* 1,160	2,280	1,190	1,990	1,810	1,560	1,500	1,860	1,720
13	1,560	1,580	1,490	* 1,240	1,540	1,140	1,820	1,750	1,400	1,460	1,900	1,880
14	1,540	1,530	1,440	1,260	1,400	1,080	1,780	1,670	1,420	1,470	2,050	1,950
15	1,510	1,550	1,500	1,180	*1,000	1,010	1,710	1,610	1,410	1,440	2,010	2,010
16	1,520	1,560	1,540	‖ 1,100	1,050	1,000	1,630	1,450	1,820	1,430	2,030	1,930
17	1,520	1,620	1,600	‖ 1,170	* 966	* 926	1,600	1,540	1,760	1,540	2,090	1,850
18	1,480	1,550	1,580	‖ 1,100	* 878	* 884	1,610	1,610	1,760	1,440	1,950	1,760
19	1,480	1,550	1,530	‖ 970	* 856	* 823	2,060	1,390	1,590	1,760	1,950	1,680
20	1,490	1,670	1,530	‖ 960	* 793	* 813	2,490	1,390	1,860	1,660	2,170	1,660
21	1,520	1,610	1,540	‖ 970	* 814	1,420	2,020	1,350	1,820	1,990	2,210	1,590
22	1,690	1,780	1,520	‖ 1,050	* 856	* 894	1,760	1,400	1,800	2,750	2,330	1,560
23	1,620	1,840	1,490	‖ 1,100	1,130	* 1,070	1,640	1,400	2,730	5,250	2,200	1,510
24	1,550	1,720	1,390	‖ 1,150	1,460	104,000	1,600	1,600	2,490	4,270	2,100	1,500
25	1,570	1,670	1,430	1,340	4,070	101,000	1,660	1,500	2,750	3,990	1,990	1,500
26	1,570	1,780	1,460	‖ 1,170	1,880	6,050	1,640	1,550	2,280	3,480	1,980	1,440
27	1,570	2,040	1,390	‖ 1,050	2,640	2,440	2,330	1,380	2,130	3,390	1,960	1,420
28	1,570	2,640	1,390	‖ 1,030	2,460	2,140	2,630	1,370	1,820	2,810	1,960	1,470
29	1,540	2,250	1,400	‖ 1,000	1,570	2,030	2,180	1,360	1,550	2,550	1,850	1,450
30	1,640		1,430	‖ 1,050	1,740	1,680	1,950	1,560	1,680	2,660	1,810	1,410
31	1,650		1,410		1,750		2,010	1,490		2,660		1,440
Sum	49,520	50,790	48,990	*35,400	*40,933	248,310	220,820	56,450	57,470	66,660	60,920	52,480

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	1.34	.93	1	1,960	21	1,410	1,600	98,200	164,719	344,000	98,200	148,109
Feb.	1.92	1.05	28	3,010	18	1,490	1,750	101,000	140,579	229,970	96,200	131,091
Mar.	1.49	.95	1	2,200	‡24	1,380	1,580	97,200	138,586	224,670	94,700	124,282
Apr.	1.26	‖ .50	25	1,840	‡22	‖ 832	*1,180	* 70,200	125,242	200,000	* 70,200	110,309
May	4.06	‖ .40	25	7,560	‡ 8	‖ 732	*1,320	* 81,200	201,178	* 742,000	68,200	170,855
June	33.55	‖ .39	24	475,000	19	‖ 764	8,280	493,000	221,625	704,000	61,700	219,145
July	24.75	1.67	4	162,000	2	1,320	7,120	438,000	255,304	*1,228,000	* 82,400	342,927
Aug.	3.72	1.30	3	4,730	21	1,140	1,820	112,000	265,843	865,000	* 74,700	256,882
Sept.	7.35	1.25	9	16,900	6	1,100	1,920	114,000	542,271	2,754,590	72,600	464,882
Oct.	4.62	1.28	23	8,620	16	1,260	2,150	132,000	399,718	1,634,000	110,000	421,727
Nov.	2.12	1.56	1	2,750	10	1,620	2,030	121,000	182,428	467,000	108,000	182,455
Dec.	1.84	1.35	15	2,110	30	1,260	1,690	104,000	163,406	295,180	102,000	150,636
Yearly	33.55	‖ .39		475,000		‖ 732	2,700	1,961,800	2,800,899	6,041,720	1,639,000	2,723,300

‖ Estimated * Partly estimated ‡ And other days

SAN FELIPE CREEK 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 which is 1.6 river 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 the gage is 875.05 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 12 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: September 1, 1931 to December 31, 1948.

REMARKS: The flow of this spring-fed creek is greatly modified by municipal diversions at Del Rio 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. 45,000 second-feet on June 14, 1935, with a gage height of 23.20 feet. Min. 2.2 second-feet on December 19, 1934.

Average Flow in Second-Feet

Daily:	Max.	¤ 16,200,	June 14, 1935.	Min.	2.5	Nov. 30, 1934.
Monthly:	Max.	805,	June, 1935.	Min.	8.8	Feb. 1935.
Yearly:	Max.	136,	1935.	Min.	30.7	1934.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	47.7	45.2	15.9	11.3	14.8	¤ 14.0	55.5	52.1	68.7	71.3	68.7	61.4
2	47.7	44.3	14.9	10.2	14.4	¤ 13.0	56.4	52.2	68.8	73.4	67.5	61.3
3	46.9	45.3	14.9	11.0	12.9	¤ 12.0	304	53.1	68.9	72.4	66.4	61.2
4	47.7	45.3	15.3	11.6	10.6	¤ 11.0	*2,440	54.1	69.0	72.4	65.2	60.2
5	47.0	45.4	17.8	11.1	11.8	¤ 10.0	¤ 86.4	56.1	69.1	72.4	65.1	58.1
6	¤ 47.0	44.5	15.9	10.9	11.7	¤ 10.0	¤ 70.4	54.4	68.2	72.4	64.9	56.2
7	¤ 47.0	45.4	15.3	11.2	11.5	¤ 10.0	¤ 60.9	53.6	71.2	73.4	64.7	56.0
8	¤ 46.2	44.6	14.9	10.3	11.2	¤ 10.0	¤ 57.2	54.7	68.4	74.4	65.3	55.0
9	¤ 46.2	43.8	14.3	10.8	11.8	¤ 10.0	* 54.5	54.8	107	74.4	70.9	55.9
10	* 45.3	43.1	13.3	10.8	11.3	¤ 10.0	52.7	56.7	79.4	73.4	71.7	55.1
11	46.2	42.3	14.6	11.2	13.5	¤ 10.5	* 56.3	56.9	78.5	73.4	73.5	55.1
12	46.3	42.3	14.6	12.1	14.3	¤ 10.0	* 59.2	57.0	77.6	72.4	72.4	54.3
13	45.4	39.2	13.3	12.9	15.6	¤ 12.0	* 60.9	57.1	77.7	72.4	69.4	51.7
14	45.4	33.8	13.3	14.1	16.8	¤ 11.5	* 66.6	57.3	76.8	72.4	68.3	49.2
15	45.4	34.5	13.3	13.7	18.7	¤ 11.5	* 69.5	58.3	75.0	71.5	69.1	50.1
16	44.6	33.9	13.3	12.1	15.5	¤ 11.5	66.6	59.3	75.1	74.9	70.0	51.9
17	43.7	23.5	13.3	10.6	13.3	¤ 12.0	64.7	61.4	75.2	75.5	68.8	52.7
18	44.7	11.9	* 12.6	10.1	11.3	¤ 12.0	65.6	62.5	74.3	74.5	66.8	52.8
19	43.8	12.5	11.1	10.3	10.5	* 12.4	61.8	62.6	74.3	73.5	63.9	52.8
20	43.1	13.1	11.1	11.1	8.9	17.1	59.2	62.7	73.3	74.5	62.8	52.1
21	43.1	14.2	13.3	11.1	9.5	22.1	59.2	62.9	72.3	76.4	62.7	49.5
22	43.1	15.4	11.8	11.4	9.6	20.9	57.2	63.8	71.3	88.0	61.8	47.1
23	44.9	15.4	10.8	12.8	28.0	26.9	51.0	65.7	71.3	77.4	60.6	48.8
24	44.9	17.2	10.9	11.7	121	*4,370	49.3	65.0	73.3	75.5	57.7	46.3
25	44.9	16.6	10.5	35.1	163	¤ 186	50.3	64.2	72.3	74.5	57.6	45.5
26	44.1	16.1	10.1	14.7	27.5	¤ 336	49.6	64.3	73.3	76.4	60.3	45.5
27	45.0	19.6	10.2	15.7	24.2	¤ 86.7	49.7	64.5	72.3	77.4	61.1	45.6
28	45.1	16.5	10.2	15.0	18.3	¤ 71.4	48.1	67.3	72.3	76.2	64.6	45.6
29	45.1	16.5	10.6	14.7	16.1	* 61.9	50.9	68.4	71.3	76.0	62.6	44.9
30	43.4		10.3	15.4	15.6	60.1	51.0	68.5	71.3	75.9	61.5	44.1
31	45.2		10.5		14.2		51.1	68.6		72.8		44.2
Sum	1,406.1	881.4	402.2	385.0	707.4	*5,472.5	*4,435.8	1,860.1	2,217.5	2,311.4	1,965.9	1,610.2

Month	Current Year 1948: Extreme Gage Feet High	Low	Extreme Second-Feet High: Day	High	Low: Day	Low	Average Second-Feet	Total Acre-Feet	Period 1931-1948 Acre-Feet: Normal	Maximum	Minimum	Acre-Feet Normal 1938-1948
Jan.	.90	.71	4	51.1	19	35.8	45.4	2,790	3,886	7,070	934	3,582
Feb.	.84	.16	6	47.1	17	4.0	30.4	1,750	2,739	5,490	487	2,474
Mar.	.48	.16	5	20.9	‡23	7.7	13.0	798	2,409	4,190	798	2,072
Apr.	2.55	.15	25	252	17	7.4	12.8	764	2,619	* 6,120	566	2,429
May	5.71	* .14	25	1,210	21	7.0	22.8	1,400	3,598	6,700	1,400	3,381
June	¤19.90		24	¤19,500	‡ 5	ϕ¤ 10.0	*182	* 10,900	6,368	* 47,900	1,110	4,068
July	20.40	.93	4	20,600	‡23	46.8	*143	* 8,800	3,424	* 8,800	1,080	3,404
Aug.	1.17	.94	30	73.3	6	49.3	60.0	3,690	2,968	5,590	838	2,702
Sept.	2.50	1.06	9	240	5	63.4	73.9	4,400	4,320	19,100	872	2,960
Oct.	1.69	1.08	22	132	31	66.0	74.6	4,580	3,919	8,470	1,710	3,941
Nov.	1.21	1.00	11	76.4	24	55.0	65.5	3,900	3,060	5,560	526	2,815
Dec.	1.10	.84	1	63.2	31	41.1	51.9	3,190	3,065	5,820	496	2,735
Yearly	20.40	* .14		20,600		4.0	* 64.7	* 46,962	42,375	98,137	22,202	36,563

¤ Estimated * Partly estimated ϕ Mean daily ‡ And other days

PINTO CREEK NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, and concrete control dam, 0.6 mile below the Del Rio-Eagle Pass highway and 5.5 miles above the 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 the gage is 854.61 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 14 meter measurements during the year, a stable rating curve and a continuous record of gage heights except for the period June 17 to October 7. The recorder was washed away by the flood of June 24 and was not replaced until October 7. During this period the low flows were interpolated between measurements and the high flows were estimated. The peak discharge on June 24 was determined by slope-area computations. Records available: November 1928 to December 31, 1948.

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. 186,000 second-feet on June 24, 1948 with a gage height of 32.0 feet. Min. sometimes dry.

Average Flow in Second-Feet

Daily:	Max.	*28,200,	June 24, 1948.	Min.		sometimes dry.	
Monthly:	Max.	*953,	June 1948.	Min.		sometimes dry.	
Yearly:	Max.	105,	1932.	Min.	1.8		1945.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.3	3.7	3.1	1.3	.2	.2	" 3.8	" 3.1	" .9	" .5	1.2	.6
2	4.3	4.0	3.0	1.2	.1	.1	" 3.8	" 2.9	" .8	" .5	.9	.6
3	4.5	4.0	2.9	1.1	0	0	3.8	" 2.8	" .7	" .4	.9	.6
4	4.5	4.0	2.8	1.1	0	0	*2,000	" 2.6	" .6	" .4	.8	.7
5	4.4	4.1	2.8	1.1	0	0	" 150	" 2.4	" .5	" .3	.7	.8
6	4.4	4.3	2.8	1.1	0	0	" 50.0	" 2.3	" .4	" .3	.4	.9
7	4.3	4.4	2.8	1.1	0	0	" 15.0	" 2.1	" .3	" .2	.3	.9
8	4.1	4.4	2.9	1.1	0	0	" 5.0	" 1.9	" .2	.2	.3	.8
9	4.0	4.2	3.0	1.0	0	0	" 4.0	" 1.7	" .3	.2	.3	.8
10	4.1	4.2	2.9	.9	0	0	" 3.8	" 1.6	" .5	.2	.2	.7
11	4.0	4.3	2.6	.8	10.1	0	" 3.8	* 1.4	" .6	39.7	.2	.7
12	4.0	3.9	2.5	.8	21.5	0	" 3.8	" 1.3	" .8	19.9	.4	.6
13	4.0	3.8	2.5	.6	5.2	0	" 3.8	" 1.2	" .9	6.2	.5	.6
14	3.8	3.8	2.6	.4	.9	0	" 3.8	" 1.1	" 1.0	4.1	1.5	.9
15	3.7	3.8	2.7	.3	.4	0	" 3.8	" 1.0	" 1.2	2.3	1.9	.9
16	3.6	3.9	2.7	.2	.2	0	" 3.8	" 1.0	* 1.3	1.6	1.9	.9
17	3.7	3.9	2.4	.1	0	0	" 3.8	" 1.0	" 1.2	2.4	1.5	.9
18	3.6	3.9	2.4	.1	0	0	" 3.8	" 1.0	" 1.2	2.4	1.0	1.0
19	3.8	3.9	2.3	.1	0	0	" 3.8	" 1.0	" 1.1	1.6	.9	1.0
20	3.8	3.7	2.3	.1	0	0	" 3.8	" 1.0	" 1.1	1.3	.8	.9
21	3.8	3.6	2.2	0	0	0	" 3.8	" 1.0	" 1.0	1.6	.8	1.0
22	3.8	3.5	2.1	21.0	0	0	" 3.8	" 1.0	" 1.0	2.9	.8	1.0
23	3.7	3.4	2.1	9.2	0	0	" 3.8	" 1.0	" .9	3.8	.7	1.0
24	3.6	3.6	2.0	1.1	0	*28,200	" 3.8	" 1.0	" .9	2.9	.7	1.1
25	3.6	3.6	2.0	29.9	18.2	* 309	" 3.8	" 1.0	" .8	2.3	.7	1.0
26	3.7	3.5	1.9	1.7	7.4	* 56.4	" 3.8	" 1.0	" .8	1.6	.7	.9
27	3.7	3.6	1.8	1.1	3.0	" 20.0	" 3.8	" 1.0	" .7	1.2	.7	.9
28	3.7	3.2	1.6	.6	1.1	" 10.0	* 3.8	" 1.0	" .7	.9	.6	1.0
29	3.7	3.1	1.5	.4	.5	" 4.0	" 3.6	" 1.0	" .6	.9	.6	1.0
30	3.7		1.5	.3	.4	" 4.0	" 3.5	" 1.0	" .6	1.1	.6	.8
31	3.7		1.5		.2		" 3.3	" 1.0		1.2		.8
Sum	121.6	111.3	74.2	79.8	69.4	*28,603.7	"2,318.0	" 45.4	" 23.6	105.1	23.5	26.3

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1929-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	2.54	2.49	3	4.6	‡16	3.6	3.9	241	416	2,110	0	213
Feb.	2.58	2.48	‡ 7	4.4	‡29	3.1	3.8	221	399	1,860	0	273
Mar.	2.49	2.39	1	3.2	29	1.4	2.4	147	500	2,500	0	279
Apr.	4.29		22	136	‡20	0	2.7	158	723	3,600	43.0	591
May	4.11		25	96.0	‡ 3	0	2.2	138	2,390	20,500	28.0	1,614
June	32.0		24	186,000	‡ 3	0	*953	*56,700	* 5,070	* 56,700	0	* 6,029
July			4	8,000	31	" 3.3	" 74.8	" 4,600	3,027	30,000	0	4,397
Aug.			1	" 3.1	‡15	" 1.0	" 1.5	" 90.1	2,723	48,700	0	309
Sept.			16	* 1.3	8	" .2	" .8	" 46.8	1,750	17,300	0	375
Oct.	5.40		11	850	‡ 7	" .2	3.4	208	779	4,000	0	284
Nov.	2.95	2.37	16	2.3	‡10	.2	.8	46.6	352	2,150	0	130
Dec.	3.06	2.67	24	1.1	‡ 1	.6	.8	52.2	ϕ 433	ϕ 2,180	ϕ 0	150
Yearly	32.0			186,000		0	* 86.3	*62,648.7	*18,562	76,259.3	1,325.2	*14,644

" Estimated * Partly estimated ‡ And other days ϕ Period 1928-1948

RIO SAN DIEGO 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 Jiménez, 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 above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 3 meter measurements during the year and the weir discharge table. Records available: 1922 to 1948. The records from 1922 to September 1932 are considered doubtful.

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

COMPARATIVE FLOWS FROM RECORDS: ⊕ Momentary Peak: Max. about 75,200 second-feet on September 18, 1941, with a gage height of 20.96 feet. Min., the river was dry on several occasions from April to June 1939.

Average Flow in Second-Feet

Daily:	Max.	23,200,	Sept. 18, 1941.	Min.		sometimes dry.	
Monthly:	Max.	2,380,	Oct. 1932.	Min.	18.7	April	1939.
Yearly:	Max.	526,	1935.	Min.	37.8		1939.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	74.9	52.3	74.9	52.3	52.3	32.8	150	100	52.2	114	227	159
2	74.9	52.3	74.9	52.3	42.0	24.0	63.2	100	63.2	114	245	159
3	87.2	52.3	74.9	52.3	42.0	24.0	129	87.2	63.2	114	245	159
4	87.2	52.3	74.9	52.3	42.0	24.0	10,240	87.2	63.2	114	246	159
5	87.2	52.3	74.9	52.3	42.0	32.8	725	74.9	63.2	114	245	159
6	87.2	63.2	74.9	52.3	42.0	32.8	389	74.9	63.2	114	245	159
7	87.2	63.2	63.2	32.8	42.0	32.8	304	74.9	52.2	100	245	159
8	74.9	63.2	52.3	32.8	42.0	32.8	284	63.2	52.2	100	227	159
9	74.9	63.2	52.3	24.0	42.0	24.0	265	74.9	304	87.2	227	144
10	74.9	63.2	52.3	32.8	42.0	24.0	245	74.9	175	74.8	209	144
11	74.9	63.2	52.3	42.0	24.0	24.0	245	63.2	159	74.8	209	129
12	74.9	52.3	52.3	42.0	32.8	24.0	245	63.2	143	175	209	129
13	63.2	52.3	52.3	42.0	32.8	24.0	346	52.3	143	114	192	114
14	63.2	52.3	52.3	42.0	42.0	24.0	389	52.3	159	87.2	192	101
15	74.9	42.0	52.3	42.0	42.0	24.0	265	63.2	175	87.2	192	100
16	74.9	42.0	52.3	42.0	42.0	24.0	227	63.2	175	63.2	192	100
17	63.2	52.3	52.3	42.0	42.0	24.0	227	63.2	175	63.2	209	100
18	63.2	52.3	52.3	52.3	42.0	16.2	227	63.2	209	52.2	209	87.2
19	63.2	52.3	42.0	52.3	42.0	16.2	227	63.2	227	63.2	209	100
20	63.2	52.3	42.0	42.0	42.0	16.2	227	63.2	245	63.2	209	100
21	74.9	52.3	52.3	42.0	42.0	16.2	227	63.2	245	63.2	209	87.2
22	74.9	52.3	52.3	63.2	42.0	24.0	227	63.2	265	227	192	100
23	74.9	52.3	52.3	52.3	42.0	24.0	209	63.2	265	245	192	100
24	74.9	42.0	52.3	42.0	63.2	229	209	52.3	265	246	192	100
25	74.9	42.0	52.3	52.3	42.0	209	209	52.3	265	265	192	101
26	63.2	87.2	52.3	52.3	42.0	143	209	52.3	265	265	192	114
27	63.2	100	52.3	52.3	42.0	100	175	52.3	209	246	192	114
28	63.2	87.2	42.0	52.3	42.0	74.9	143	52.3	159	246	192	100
29	63.2	74.9	52.3	52.3	32.8	63.2	129	63.2	143	245	175	100
30	63.2		52.3	52.3	32.8	52.3	100	63.2	129	227	159	100
31	63.2		42.0		42.0		100	63.2		227		114
Sum	2,243.0	1,681.0	1,726.6	1,390.1	1,278.7	1,436.2	17,356.2	2,063.0	4,971.6	4,391.4	6,270	3,750.4

Month	Current Year 1948: Extreme Gage Feet High	Low	Extreme Second-Feet High	Day	Low	Day	Average Second-Feet	Total Acre-Feet	Period 1933-1948: Acre-Feet Normal	Maximum	Minimum	Normal 1938-1948 Acre-Feet
Jan.	2.95	2.85	87.2	#	52.3	31	72.4	4,450	7,854	36,430	2,910	5,546
Feb.	4.04	2.82	864	26	42.0	#	58.0	3,330	5,402	25,760	1,970	3,964
Mar.	2.92	2.82	74.9	#	42.0	#	55.7	3,420	4,770	21,500	2,140	3,277
Apr.	3.28	2.76	245	22	24.0	8	46.3	2,760	5,146	* 16,820	1,110	3,609
May	3.35	2.76	284	24	24.0	#	41.2	2,540	*14,185	* 120,200	1,290	7,080
June	5.38	2.72	1,700	24	16.2	#	47.9	2,850	11,130	62,240	1,420	7,593
July	14.24	2.85	*32,100	4	52.3	1	560	34,430	10,629	34,430	1,210	11,263
Aug.	2.99	2.82	100	#	42.0	25	66.5	4,090	7,662	19,950	2,030	6,576
Sept.	4.33	2.82	1,010	9	42.0	#	166	9,860	*16,946	* 84,620	2,120	*15,785
Oct.	3.64	2.85	484	22	52.3	18	142	8,710	⊕22,145	⊕ 146,640	⊕ 1,950	16,033
Nov.	3.28	3.08	245	#	143	30	209	12,440	⊕13,746	⊕ 68,290	⊕ 1,960	11,077
Dec.	3.12	2.95	159	#	87.2	#	121	7,440	⊕ 8,923	⊕ 45,160	⊕ 2,060	6,456
Yearly	14.24	2.72	*32,100		16.2		133	96,320	128,538	* 381,720	27,460	98,259

* Partly estimated ⊕ Period October 1932-1948 # Various days of the month

RIO SAN RODRIGO 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, Coahuila and 11.2 miles above the confluence with the Rio Grande. Zero of the gage is 879.95 feet above mean sea level, U.S.C. & G.S. datum. This stream enters the Rio Grande 735.4 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 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. Records available: 1922 to 1948. The records from 1922 to 1931 are considered doubtful.

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

COMPARATIVE FLOWS FROM RECORDS ⊕: Momentary Peak: Max. 81,200 second-feet on September 7, 1932 with a gage height of 16.08 feet. Min. frequently dry. Flow at this station ceases at a gage height of 0.0 feet.

Average Flow of Second-Feet

Daily:	Max.	27,900,	Sept. 7, 1932.	Min.	frequently dry.
Monthly:	Max.	4,270,	Sept. 1932.	Min.	Dry during July 1939.
Yearly:	Max.	576,	1932.	Min.	10.2 1939.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	37.4	31.4	31.4	16.3	8.1	2.1	8.1	50.2	31.4	64.3	113	87.6
2	37.4	31.4	31.4	16.3	8.1	2.1	16.2	50.2	31.4	71.7	105	87.6
3	37.4	31.4	31.4	16.3	8.1	2.1	26.1	50.2	31.4	64.3	96.0	87.6
4	37.4	31.4	31.4	16.3	8.1	2.1	218	50.2	26.1	64.3	87.6	87.6
5	37.4	31.4	31.4	16.2	8.1	0	152	50.2	26.1	64.3	87.6	87.6
6	37.4	31.4	31.4	16.2	8.1	0	64.3	50.2	26.1	64.3	87.6	79.5
7	37.4	31.4	31.4	16.2	8.1	0	57.2	50.2	21.2	64.3	87.6	79.5
8	37.4	31.4	31.4	16.2	8.1	0	43.8	43.8	21.2	64.3	87.6	79.5
9	37.4	26.1	26.2	12.0	8.1	0	31.4	43.8	371	57.3	87.6	79.4
10	37.4	26.1	26.2	12.0	8.1	0	26.1	43.8	667	57.3	87.6	79.4
11	37.4	31.4	26.1	12.0	8.1	0	21.2	43.8	431	57.2	87.6	79.4
12	37.4	21.2	26.1	12.0	8.1	0	21.2	43.8	311	57.2	96.0	79.4
13	37.4	21.2	26.1	12.0	8.1	0	71.3	43.8	184	57.2	96.0	79.4
14	37.4	21.2	26.1	12.0	5.0	0	434	43.8	123	57.2	96.0	79.4
15	37.4	21.2	26.1	12.0	8.1	0	142	43.8	96.0	57.2	96.0	79.4
16	37.4	26.1	21.2	12.0	5.0	0	79.5	43.8	87.6	57.2	96.0	* 79.4
17	31.4	26.1	21.2	12.0	5.0	0	57.2	43.8	87.6	64.3	96.0	* 79.4
18	31.4	26.1	21.2	12.0	5.0	0	43.8	43.8	79.4	57.2	87.6	* 79.4
19	37.4	31.4	21.2	12.0	4.9	0	43.8	43.8	71.7	57.3	87.6	* 79.4
20	31.4	31.4	21.2	12.0	2.1	0	43.8	37.4	71.7	57.3	87.6	* 79.4
21	31.4	31.4	21.2	12.0	2.1	0	43.8	37.4	71.7	64.3	87.6	* 71.7
22	31.4	31.4	16.3	12.0	2.1	0	43.8	37.4	71.7	79.5	87.6	* 71.7
23	31.4	31.4	21.2	21.2	2.1	31.9	43.8	37.4	71.7	184	87.6	* 64.3
24	31.4	31.4	21.2	16.3	8.1	21.1	43.8	37.4	71.7	256	87.6	64.3
25	31.4	31.4	21.2	12.0	8.1	16.2	43.8	31.4	71.7	270	87.6	64.3
26	31.4	31.4	21.2	12.0	8.1	26.2	43.8	31.4	71.7	270	87.6	64.3
27	31.4	31.4	21.2	12.0	8.1	26.2	43.8	31.4	71.7	242	87.6	64.3
28	31.4	31.4	16.3	12.0	5.0	16.2	43.8	31.4	71.7	206	79.5	64.3
29	31.4	31.4	16.3	12.0	4.9	12.0	43.8	31.4	64.3	184	87.6	64.3
30	31.4		16.3	12.0	2.1	8.1	50.1	31.4	64.3	162	87.6	64.3
31	31.4		16.3		2.1		50.1	31.4		142		64.3
Sum	1,075.4	843.3	748.8	407.5	193.2	166.3	2,095.4	1,283.8	3,498.1	3,275.5	2,721.5	*2,351.4

Month	Current Year 1948: Extreme Gage Feet High	Low	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1932-1948: Acre-Feet Normal	Maximum	Minimum	Normal 1938-1948
Jan.	.30	.26	#	37.4	#	31.4	34.7	2,130	3,693	14,850	171	2,771
Feb.	.26	.20	#	31.4	#	21.2	29.1	1,670	2,611	11,580	555	1,981
Mar.	.26	.16	#	31.4	#	16.2	24.2	1,490	2,417	9,900	576	1,711
Apr.	.23	.10	23	26.1	30	8.1	13.6	808	2,167	6,870	382	1,622
May	.49	.03	25	79.5	#	2.1	6.2	383	5,266	42,330	57.6	2,695
June	.75		23	152	#	0	5.5	330	6,840	41,660	30.0	5,910
July	2.17	.10	14	837	1	8.1	67.6	4,160	3,955	12,170	0	3,966
Aug.	.36	.23	#	50.1	#	26.1	41.4	2,550	4,024	13,710	38.9	4,499
Sept.	2.66	.20	10	1,170	#	21.2	117	6,940	* 23,002	* 253,960	383	9,731
Oct.	1.12	.36	24	284	#	50.1	106	6,500	11,274	81,360	815	7,933
Nov.	.66	.49	1	123	#	79.5	90.7	5,400	5,437	24,450	535	4,504
Dec.	.52	.39	#	87.6	#	57.2	* 75.9	* 4,660	4,522	19,060	131	3,796
Yearly	2.66			1,170		0	51.0	37,021	* 75,208	* 414,310	7,436	51,119

* Partly estimated ⊕ Period 1932-1948 # Various days of the month

RIO GRANDE AT EAGLE PASS, TEXAS

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, U.S.C. & G.S. datum.

RECORDS: Based upon 132 meter measurements during the year, 126 by the Mexican and 6 by the United States Section of this Commission. Computations by shifting channel methods. 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 1948.

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

EXTREME FLOWS: The greatest recorded flow was on September 2, 1932, when the extreme gage height was 49.00 feet and the discharge was 569,000 second-feet. The lowest flow ever recorded was on June 22, 1948, when the extreme gage height was 1.08 feet and the extreme flow 551 second-feet.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,900	1,540	2,290	1,220	911	1,600	3,560	3,110	1,700	1,980	2,960	1,890
2	1,740	1,550	2,010	1,280	865	1,900	4,240	3,190	1,580	1,980	2,830	1,930
3	1,740	1,820	1,780	1,250	816	1,530	3,370	2,950	1,480	1,920	2,480	1,920
4	1,740	1,970	1,660	1,260	749	1,520	38,490	3,190	1,430	1,980	2,350	1,920
5	1,700	1,970	1,550	1,390	713	2,030	107,000	3,710	1,430	2,030	2,350	1,970
6	1,650	1,870	1,480	1,260	710	1,830	54,030	4,060	1,380	2,100	2,550	1,910
7	1,650	1,790	1,500	1,140	682	1,600	13,810	3,350	1,340	1,980	2,550	2,000
8	1,640	1,720	1,600	1,120	682	1,430	9,110	3,110	1,380	1,760	2,290	1,960
9	1,620	1,650	1,610	1,070	682	1,390	8,050	3,030	6,180	1,640	2,180	1,940
10	1,610	1,510	1,710	975	682	1,260	7,170	2,570	9,890	1,590	2,000	1,970
11	1,600	1,550	1,780	897	699	939	5,900	2,240	6,500	1,640	2,000	1,880
12	1,550	1,550	1,710	855	756	925	4,550	2,100	3,110	1,700	2,180	1,900
13	1,530	1,550	1,640	844	1,770	1,010	3,600	1,980	2,440	1,640	2,180	1,920
14	1,510	1,530	1,440	936	1,500	925	3,710	1,860	2,170	1,590	2,180	1,960
15	1,470	1,510	1,410	1,050	1,290	816	3,190	1,750	1,980	1,530	2,410	1,990
16	1,440	1,590	1,410	985	943	713	2,870	1,700	1,920	1,480	2,410	2,010
17	1,480	1,590	1,450	886	925	713	2,640	1,590	2,500	1,920	2,410	2,020
18	1,470	1,630	1,500	855	837	749	2,570	1,480	2,370	1,810	2,480	2,010
19	1,500	1,520	1,450	788	780	756	2,570	1,530	2,370	1,590	2,240	1,890
20	1,490	1,510	1,460	699	710	759	3,350	1,430	2,300	1,760	2,290	1,830
21	1,430	1,610	1,470	749	675	766	3,990	1,340	2,440	1,860	2,480	1,810
22	1,580	1,560	1,435	798	706	614	3,190	1,300	2,500	2,440	2,410	1,740
23	1,580	1,640	1,400	1,020	710	929	2,710	1,340	2,440	4,910	2,480	1,750
24	1,500	1,700	1,410	1,000	1,530	* 13,070	2,440	1,530	3,260	5,090	2,410	1,760
25	1,430	1,620	1,300	1,010	1,720	*346,400	2,570	1,640	3,110	5,900	2,350	1,740
26	1,490	1,620	1,310	1,320	3,640	* 52,970	2,500	1,810	3,350	4,770	2,130	1,730
27	1,440	1,910	1,310	1,050	1,900	* 8,900	2,370	1,700	2,870	4,340	2,160	1,670
28	1,430	2,020	1,280	911	2,580	5,370	3,780	1,530	2,640	4,340	2,130	1,650
29	1,490	2,560	1,290	911	2,270	4,380	4,060	1,480	2,370	3,880	2,100	1,720
30	1,470		1,250	848	1,570	3,960	3,270	1,480	2,170	3,430	2,020	1,710
31	1,560		1,250		1,620		2,870	1,590		3,430		1,660
Sum	48,430	49,160	47,145	30,377	36,623	*461,754	317,530	66,670	82,600	80,010	69,990	57,760

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	2.46	1.97	1	2,050	24	1,330	1,560	96,060	179,355	365,000	96,060	154,559
Feb.	2.82	1.94	29	2,740	20	1,380	1,700	97,510	148,723	254,250	97,510	132,544
Mar.	2.66	1.77	1	2,450	30	1,170	1,520	93,510	145,507	247,440	93,510	124,425
Apr.	2.13	1.25	26	1,530	21	593	1,010	60,250	133,855	219,000	60,250	112,852
May	4.23	1.18	26	5,300	21	614	1,180	72,640	234,693	* 918,000	70,210	184,762
June	46.92	1.08	25	ϕ519,100	22	551	*15,390	* 915,900	273,816	1,005,000	48,710	269,008
July	26.74	3.05	5	*147,300	25	2,240	10,240	629,800	275,125	*1,225,000	89,040	361,130
Aug.	4.00	2.43	#	4,660	#	1,200	2,150	132,200	276,791	* 947,000	86,400	260,066
Sept.	7.55	2.43	9	15,710	#	1,200	2,750	163,800	580,334	3,079,000	69,920	480,620
Oct.	5.18	2.53	23	8,300	16	1,340	2,580	158,700	438,832	1,680,300	108,100	437,505
Nov.	3.71	2.99	1	3,340	30	1,850	2,330	138,800	207,486	512,800	109,000	197,010
Dec.	3.25	2.76	7	2,280	28	1,510	1,860	114,600	178,894	369,760	105,620	155,184
Yearly	46.92	1.08		ϕ519,100*		551	* 3,680	2,673,770*	3,073,411	6,946,510	1,773,520	2,869,665

Various days of the month * Partly estimated ϕ Determined by slope-area computations

RIO ESCONDIDO AT VILLA DE FUENTE, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, located 3.1 miles southwest 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 the gage is 717.78 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 46 meter measurements during the year. Computations by shifting channel methods. Records available: 1922 through 1948. The records from 1922 to September 1932 are considered doubtful.

REMARKS: Diversions and drainage returns modify the flow of this spring-fed stream at this station. 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. 24,000 second-feet on June 29, 1936 with a gage height of 19.13 feet. On September 2, 1932 backwater from the Rio Grande reached a gage height of 9.91 feet at this station. Min. .35 second-feet on November 4, 1934 with a gage height of .75 feet.

Average Flow in Second-Feet

Daily:	Max.	6,710,	June 29, 1936.	Min.	.7	frequently.
Monthly:	Max.	646,	Oct. 1932.	Min.	1.0	Sept. 1945.
Yearly:	Max.	83.2	1935.	Min.	11.0	1943.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.4	12.0	10.6	11.7	10.9	2.5	10.6	5.7	1.1	41.3	31.4	13.8
2	13.4	11.7	10.6	11.7	10.9	2.5	10.6	35.0	1.1	52.6	30.7	16.6
3	13.4	11.7	10.6	11.3	10.9	2.5	420	11.3	1.1	52.6	17.3	33.2
4	13.4	11.7	10.9	11.3	10.9	2.1	431	9.5	1.4	52.3	7.4	38.1
5	13.1	11.7	10.9	11.3	10.6	2.1	1,950	5.7	1.4	52.3	9.2	26.1
6	13.1	11.3	11.3	11.3	10.2	2.1	498	5.3	1.4	52.3	9.5	12.4
7	12.7	11.3	11.3	10.9	9.9	2.1	285	5.7	1.4	27.9	10.3	14.8
8	12.7	11.3	11.7	10.9	9.9	2.1	191	3.9	1.4	18.0	12.4	19.8
9	12.4	11.3	11.7	10.6	9.5	2.1	149	3.2	4,700	18.0	12.7	21.9
10	12.0	11.0	11.7	11.3	9.2	2.8	62.2	2.8	1,370	18.0	12.7	21.2
11	11.7	11.0	12.0	12.4	8.8	2.8	61.1	4.2	406	18.0	14.5	20.5
12	11.7	10.9	12.0	9.9	8.8	2.1	31.8	4.2	170	18.0	16.6	19.8
13	11.3	10.9	12.0	9.5	9.2	2.1	27.2	3.5	109	18.0	18.7	22.2
14	11.3	10.9	12.0	9.9	9.2	1.8	250	3.9	100	18.0	18.4	21.5
15	11.3	10.6	12.4	9.9	9.2	1.8	284	2.8	95.7	15.5	18.0	23.0
16	11.3	10.6	12.4	10.2	9.2	1.8	105	2.8	91.8	15.5	17.7	24.7
17	11.3	10.6	12.0	10.6	9.5	1.8	40.3	2.8	95.7	15.5	18.0	22.6
18	11.3	10.6	11.3	10.9	10.6	1.8	20.5	2.5	91.5	13.1	24.7	11.3
19	11.3	10.9	10.9	10.9	11.3	1.8	13.1	2.1	87.6	13.1	25.4	11.7
20	11.3	10.9	10.6	11.3	11.3	1.8	9.5	2.1	85.8	12.7	26.5	12.4
21	11.7	11.0	10.2	11.3	10.9	1.8	8.5	2.1	84.0	22.2	23.3	13.1
22	11.7	11.0	8.8	11.3	10.9	2.5	6.4	2.1	84.0	24.7	18.0	20.8
23	12.0	11.3	8.5	11.3	10.6	3.2	5.3	1.8	75.2	34.6	13.4	17.3
24	12.0	11.3	8.8	11.3	10.6	3.2	4.6	1.8	75.2	37.4	13.4	12.7
25	12.4	11.3	9.2	11.3	9.5	20.5	4.6	1.8	66.7	35.7	13.1	14.5
26	12.4	11.0	10.2	11.3	7.4	17.0	3.9	1.4	66.7	20.5	12.7	19.8
27	12.7	11.0	12.7	11.3	6.7	12.7	3.9	1.4	59.3	20.1	14.5	16.6
28	12.7	10.9	13.4	10.9	5.3	11.7	8.8	1.4	59.3	17.3	14.5	16.6
29	12.4	10.9	13.8	10.9	4.6	10.6	4.2	1.4	52.6	14.8	14.1	18.4
30	12.4		11.7	10.9	3.9	10.6	4.2	1.1	31.8	14.8	13.8	14.5
31	12.0		11.7		3.2		3.9	1.1		31.8		15.9
Sum	377.8	322.6	347.9	329.6	283.6	136.3	4,908.2	136.4	8,068.2	816.6	502.9	587.8

Month	Current Year 1948: Extreme Gage Feet High	Low	Extreme Second-Feet High: Day	High	Low: Day	Low	Average Second-Feet	Total Acre-Feet	● Period 1932-1948 Acre-Feet: Normal	Maximum	Minimum	Normal 1938-1948
Jan.	2.46	2.46	‡ 1	13.4	‡13	11.3	12.2	749	2,539	15,990	375	1,335
Feb.	2.46	2.46	1	12.0	‡15	10.6	11.1	640	1,473	9,990	179	710
Mar.	2.56	2.43	26	13.8	23	8.5	11.2	690	1,357	6,910	206	951
Apr.	2.53	2.46	11	12.4	13	9.5	11.0	654	1,839	7,510	195	1,426
May	2.56	"2.30	18	13.1	31	" 2.8	9.1	563	3,808	23,850	494	2,201
June	2.85	2.17	25	32.8	‡14	1.8	4.5	270	3,173	19,730	270	1,330
July	10.33	1.67	5	4,340	‡26	3.9	158	9,740	2,299	9,740	106	1,709
Aug.	2.76	1.61	2	190	‡30	1.1	4.4	271	1,535	14,530	77.8	1,823
Sept.	14.60	1.18	9	10,520	‡ 1	1.1	269	16,000	2,663	16,000	57.5	2,482
Oct.	2.03	1.12	31	80.2	7	9.9	26.3	1,620	3,902	39,790	117	1,342
Nov.	1.48	1.05	1	31.4	4	5.3	16.8	998	2,412	25,590	101	755
Dec.	1.87	1.08	3	94.3	5	7.8	19.0	1,170	2,476	20,720	260	925
Yearly	14.60	1.05		10,520		1.1	46.0	33,365	29,476	60,241	7,969	16,989

" Estimated ‡ And other days ● October 1932-1948

RIO GRANDE AT LAREDO, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car. The recorder is located on the downstream side of the first pier from the Mexican end of the railroad bridge between Laredo, Texas, and Nuevo Laredo, Tamaulipas, 884.3 river miles below the American Dam at El Paso, Texas. The cable is located 1.4 miles upstream from the railroad bridge. Zero of the gages at the recorder and at the cable are 351.51 feet and 352.89 feet respectively above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 154 meter measurements during the year. Computations by shifting channel methods. 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 1948. Gage-height records are available for January, February, and March 1914.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. The cable "A" frames were seriously damaged by the flood of June 1948. Subsequent measurements of discharge were made from the highway bridge 3,280 feet below the gage well until October 13 when the cableway was repaired.

EXTREME FLOWS: The greatest recorded flow at this station was on September 3, 1932, when the peak gage reading was 52.20 feet, and the discharge 335,000 second-feet. On June 23, 1948 a minimum flow of 533 second-feet was reached with a gage height of 3.38 feet.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,950	1,560	2,150	1,210	869	1,580	3,570	2,660	1,330	2,310	3,060	2,070
2	1,920	1,650	2,570	1,160	876	1,530	3,640	2,210	1,360	2,090	3,030	2,100
3	1,970	1,770	2,180	1,130	855	1,580	3,960	2,520	1,500	1,880	2,930	2,070
4	1,920	1,800	1,990	1,170	844	1,830	3,640	2,440	1,400	1,840	2,670	2,070
5	1,870	1,950	1,790	1,170	833	1,530	31,110	2,470	1,300	1,870	2,340	2,010
6	1,870	2,090	1,760	1,170	795	1,310	84,400	4,100	1,240	1,900	2,180	2,010
7	1,820	2,060	1,740	1,250	759	1,760	67,800	3,260	1,250	1,860	2,200	2,040
8	1,710	1,970	1,650	1,260	667	1,820	15,220	2,810	1,230	1,820	2,420	2,060
9	1,640	1,940	1,600	1,180	682	1,650	8,620	2,470	5,190	1,810	2,410	2,120
10	1,690	1,830	1,700	1,100	667	1,370	6,780	2,390	45,560	1,750	2,210	2,010
11	1,660	1,780	1,750	1,070	622	1,290	6,000	2,570	22,210	1,700	2,390	1,970
12	1,760	1,740	1,790	989	597	1,030	5,080	2,240	12,500	1,550	2,140	2,040
13	1,710	1,660	1,840	946	632	777	9,070	2,010	4,910	1,420	2,220	2,010
14	1,670	1,680	1,740	943	728	763	4,380	1,870	3,170	1,480	2,380	2,050
15	1,580	1,710	1,630	876	978	858	3,570	1,830	2,740	1,540	2,470	2,090
16	1,580	1,650	1,510	812	1,330	862	3,290	1,730	2,370	1,520	2,460	2,100
17	1,550	1,620	1,390	929	1,170	770	2,670	1,700	2,230	3,110	2,510	2,200
18	1,500	1,600	1,300	989	968	653	2,370	1,620	3,740	2,570	2,510	2,150
19	1,540	1,610	1,370	890	816	632	2,140	1,550	4,130	1,890	2,380	2,100
20	1,540	1,660	1,380	812	826	590	2,090	1,530	2,690	1,870	2,430	2,050
21	1,540	1,600	1,490	735	759	586	2,140	1,470	2,510	1,820	2,340	1,950
22	1,520	1,600	1,440	713	706	569	2,570	1,410	2,420	2,250	2,460	1,890
23	1,470	1,640	1,430	872	657	639	2,720	1,250	2,670	6,670	2,540	1,960
24	1,460	1,670	1,420	745	639	1,150	2,340	1,210	2,560	4,270	2,490	1,920
25	1,630	1,770	1,350	795	1,040	18,190	2,140	1,210	2,570	5,150	2,590	1,920
26	1,580	1,880	1,285	992	2,450	197,000	1,960	1,350	2,990	4,170	2,540	1,870
27	1,580	1,710	1,210	953	2,490	150,100	1,850	1,410	2,910	4,700	2,470	1,870
28	1,580	1,710	1,180	1,040	3,070	10,810	1,870	1,610	2,880	3,920	2,330	1,850
29	1,530	1,900	1,190	1,160	1,810	5,010	1,820	1,520	2,630	3,810	2,210	1,840
30	1,530		1,180	953	2,270	4,910	2,990	1,460	2,530	3,570	2,140	1,740
31	1,570		1,250		2,030		3,300	1,360		3,230		1,730
Sum	51,440	50,810	49,255	30,014	34,435	413,149	295,100	61,240	148,720	81,340	73,450	61,860

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	4.69	4.30	1	2,000	24	1,420	1,660	102,000	180,652	351,700	102,000	168,818
Feb.	4.76	4.36	7	2,110	22	1,550	1,750	100,800	149,349	237,400	99,400	142,336
Mar.	5.12	4.17	2	2,910	27	1,130	1,590	97,700	145,338	223,000	95,700	131,873
Apr.	4.30	3.74	8	1,310	22	685	1,000	59,530	141,221	312,000	59,530	129,645
May	5.77	3.54	27	4,310	12	579	1,110	68,300	266,912	856,000	68,300	246,440
June	47.83	3.38	26	ϕ299,500	23	533	13,770	819,500	308,750	1,357,000	46,850	293,095
July	26.97	4.72	6	104,500	29	1,730	9,520	585,300	289,553	1,250,000	83,570	377,786
Aug.	5.97	4.30	6	4,520	24	1,180	1,980	121,500	285,795	883,000	93,740	300,140
Sept.	17.65	4.30	10	52,270	6	1,200	4,960	295,000	600,573	2,943,000	65,840	499,195
Oct.	7.15	4.46	23	8,550	13	1,420	2,620	161,300	476,903	1,951,000	125,400	474,582
Nov.	5.31	4.82	1	3,140	30	2,090	2,450	145,700	214,614	570,800	114,100	206,964
Dec.	5.02	4.66	17	2,380	31	1,680	2,000	122,700	183,028	352,700	106,700	167,509
Yearly	47.83	3.38		ϕ299,500		533	3,690	2,679,330	3,242,688	7,017,110	1,862,800	3,138,383

ϕ Determined by slope-area computations and confirmed by float measurements made near the crest

RIO SALADO AT CD. GUERRERO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and two reinforced concrete Cipoletti weirs, with a combined capacity of 636 second-feet, located at a 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 the gage is 265.75 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 102 meter measurements during the year and the weir discharge curve. Computations by shifting channel methods for flows greater than 636 second-feet. Records available: 1900-1913 and 1923-1948.

REMARKS: The flow at this station is greatly modified by irrigation diversions and reservoirs.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: 43,800 second-feet on September 7, 1933 with a gage height of 18.86 feet. Min. sometimes dry.

Average Flow in Second-Feet

Daily:	Max. 35,070,	Sept. 7, 1933.	Min.	sometimes dry.		
Monthly:	Max. 10,950,	Oct. 1932.	Min.	dry January and February 1940.		
Yearly:	Max. 1,850,	1932.	Min.	154	1931.	

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	26.5	24.4	35.7	20.5	38.1	66.0	212	1,600	204	183	235	38.1
2	28.6	26.5	35.7	18.4	28.6	48.7	869	565	88.3	169	205	38.1
3	28.6	28.6	33.2	18.4	22.2	38.1	809	182	60.7	156	175	35.7
4	26.5	28.6	31.1	16.6	18.4	31.1	322	1,890	40.6	143	156	35.7
5	26.5	28.6	156	14.5	16.6	24.4	4,100	505	28.6	130	136	38.1
6	26.5	28.6	341	14.5	14.5	18.4	6,070	220	22.2	113	119	38.1
7	24.4	31.1	143	14.5	12.7	14.5	607	143	20.5	97.8	108	40.6
8	24.4	31.1	88.3	18.4	11.3	12.7	558	113	20.5	97.8	97.8	45.9
9	28.6	28.6	69.2	18.4	11.3	11.3	478	75.6	18.4	119	92.9	45.9
10	31.1	28.6	66.0	16.6	9.9	9.9	235	60.0	13,170	92.9	84.0	45.9
11	31.1	28.6	60.0	14.5	8.5	8.5	197	45.9	16,630	79.8	88.3	43.4
12	28.6	26.5	51.6	12.7	8.5	6.7	331	35.7	8,050	88.3	79.8	40.6
13	26.5	24.4	45.9	12.7	8.5	5.3	204	31.1	8,050	102	79.8	40.6
14	24.4	22.2	43.4	11.3	12.7	3.9	108	24.4	9,110	2,080	79.8	43.4
15	22.2	20.5	40.6	11.3	8.5	3.9	108	22.2	3,210	441	79.8	45.9
16	20.5	20.5	40.6	9.9	6.7	2.8	252	20.5	2,390	220	84.0	48.7
17	20.5	20.5	40.6	11.3	5.3	1.8	156	18.4	1,440	381	97.8	88.3
18	20.5	18.4	40.6	9.9	2.8	1.8	97.8	18.4	823	235	84.0	60.0
19	20.5	18.4	38.1	8.5	2.8	.7	69.2	18.4	727	130	72.4	43.4
20	18.4	18.4	35.7	8.5	2.8	0	54.4	22.2	1,330	286	66.0	40.6
21	18.4	20.5	33.2	6.7	1.8	0	40.6	24.4	1,540	220	60.0	38.1
22	18.4	22.2	31.1	8.5	1.8	0	33.2	24.4	957	149	60.0	38.1
23	18.4	20.5	26.5	204	.7	35.7	28.6	24.4	569	1,990	60.0	35.7
24	18.4	20.5	24.4	156	.7	657	33.2	22.2	452	5,330	60.0	35.7
25	20.5	20.5	22.2	57.2	9.9	310	35.7	20.5	420	6,250	57.2	38.1
26	22.2	35.7	22.2	35.7	2,510	798	197	20.5	331	2,450	54.4	38.1
27	22.2	43.4	22.2	143	686	331	143	18.4	295	749	48.7	38.1
28	22.2	40.6	20.5	97.8	235	156	88.3	18.4	360	540	45.9	38.1
29	22.2	38.1	18.4	69.2	313	156	60.0	72.4	235	431	43.4	38.1
30	22.2		18.4	48.7	156	295	45.9	313	197	341	40.6	38.1
31	22.2		18.4		92.9		38.1	331		286		35.7
Sum	732.2	765.1	1,693.8	1,108.2	4,258.5	3,049.2	16,581	6,500.4	70,789.8	24,080.6	2,750.6	1,308.9

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	1.94	1.74	#	31.1	#	18.4	23.6	1,450	14,955	144,110	0	2,595
Feb.	2.10	1.74	27	43.4	#	18.4	26.4	1,520	10,485	98,520	0	1,623
Mar.	4.23	1.74	6	509	#	18.4	54.6	3,360	10,854	95,740	52.0	10,976
Apr.	3.71	1.48	23	341	22	5.3	36.9	2,200	11,824	54,500	56.4	5,911
May	10.30	1.35	26	8,790	#	.7	137	8,450	42,370	* 253,000	3,200	31,211
June	5.77		#	1,350	21	0	102	6,050	37,909	192,000	1,620	29,151
July	10.93	1.87	6	9,080	23	26.5	535	32,890	19,748	100,000	228	13,437
Aug.	6.89	1.74	4	2,750	#	18.4	210	12,890	32,820	260,180	81.0	54,990
Sept.	15.91	1.74	11	23,520	#	18.4	2360	140,400	93,894	600,000	3,310	66,047
Oct.	9.38	2.46	25	6,430	12	75.6	777	47,760	68,660	673,070	1,710	28,454
Nov.	3.41	2.07	1	260	30	40.6	91.7	5,460	23,468	248,590	246	3,774
Dec.	2.69	1.97	16	108	31	33.2	42.2	2,600	16,599	198,160	46.0	2,655
Yearly	15.91			23,520		0	365	265,030	383,586	1,350,260	101,770	250,824

* Partly estimated # Various days of the month

RIO GRANDE NEAR ZAPATA, TEXAS

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 river 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, U.S.C. & G.S. datum.

RECORDS: Based upon 73 meter measurements during the year, 61 by the United States Section and 12 by the Mexican Section of this Commission and continuous record of gage heights. Computations by shifting channel methods. Records available: January 1932 to December 31, 1948.

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

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. The lowest flow recorded was on June 23, 1948, when the extreme gage height was 219.12 feet and the extreme flow 491 second-feet.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,900	1,770	1,970	1,250	1,100	2,000	7,240	4,060	1,610	2,590	3,430	2,160
2	1,970	1,850	2,210	1,260	962	1,660	4,810	3,080	1,470	2,300	3,250	2,180
3	1,920	1,860	2,570	1,270	923	1,600	5,150	2,310	1,380	2,140	3,150	2,170
4	1,970	1,900	2,300	1,230	875	1,570	5,140	3,900	1,450	1,910	3,100	2,150
5	1,930	1,930	2,410	1,260	809	1,770	11,000	2,860	1,390	1,880	2,890	2,170
6	1,910	2,100	2,280	1,260	798	1,610	58,300	2,720	1,290	1,840	2,650	2,180
7	1,900	*2,160	2,030	1,190	782	1,370	87,600	3,890	1,200	1,850	2,480	2,180
8	1,850	*2,140	1,930	1,220	846	1,850	37,200	3,180	1,310	1,850	2,440	2,160
9	1,740	*2,070	1,800	1,250	760	1,860	12,300	2,690	1,610	1,810	2,590	2,150
10	1,720	*1,950	1,750	1,200	737	1,660	7,870	2,300	33,400	1,800	2,580	2,120
11	1,760	*1,880	1,790	1,120	740	1,480	6,520	2,190	58,300	1,700	2,470	2,110
12	1,770	1,870	1,840	1,110	703	1,320	10,400	2,200	26,700	1,650	2,400	*2,120
13	1,820	1,810	1,860	1,050	658	1,200	5,970	2,060	17,300	1,630	2,410	*2,110
14	1,780	1,750	1,940	945	663	894	8,980	1,890	14,700	3,280	2,440	*2,100
15	1,700	1,780	1,810	892	760	749	4,060	1,800	8,460	2,070	*2,520	2,100
16	1,660	1,770	1,680	864	875	857	3,420	1,740	5,000	1,810	*2,550	2,100
17	1,600	1,790	1,550	838	1,470	905	3,410	1,680	3,650	9,690	2,550	2,110
18	1,600	1,750	1,470	888	1,300	855	2,870	1,610	2,910	8,770	2,590	2,110
19	1,610	1,710	1,410	1,020	1,120	746	2,480	1,560	4,330	3,860	2,540	2,100
20	1,620	1,670	1,440	981	899	658	2,230	1,460	4,480	2,380	2,480	2,090
21	1,620	1,690	1,450	856	861	* 596	2,110	1,390	4,080	2,080	2,450	2,090
22	1,620	1,670	1,460	834	788	* 521	2,080	1,410	3,240	1,920	2,340	2,070
23	1,580	1,610	1,440	1,200	716	* 613	2,730	1,460	3,680	7,770	2,340	2,060
24	1,490	1,690	1,430	1,210	646	1,560	2,800	1,300	2,970	13,800	2,470	2,040
25	1,530	1,760	1,450	1,060	701	1,510	2,400	1,230	2,700	12,500	2,470	2,020
26	1,720	1,870	1,440	959	6,520	49,400	2,250	1,200	2,670	8,720	2,530	2,000
27	1,720	1,990	1,420	1,010	3,740	179,000	2,120	1,280	3,040	5,310	2,460	1,980
28	1,660	1,880	1,340	1,200	2,610	85,000	2,050	1,660	3,200	5,070	2,330	1,960
29	1,700	1,800	1,270	1,130	2,760	8,060	2,030	1,760	3,100	4,380	2,230	1,930
30	1,660		1,280	1,300	1,940	5,400	1,940	1,970	2,830	4,240	2,180	1,930
31	1,650		1,270		2,160		2,940	2,070		3,820		1,910
Sum	53,680	53,470	53,290	32,857	41,222	358,274	312,400	65,910	223,450	126,420	77,310	64,660

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1932-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	220.54	220.15	2	1,990	24	1,450	1,730	106,000	193,457	* 484,450	106,000	173,955
Feb.	220.64	220.29	7	2,220	23	1,600	1,840	106,000	159,599	* 361,350	106,000	146,000
Mar.	220.87	219.95	3	2,750	31	1,200	1,720	106,000	163,828	292,000	106,000	155,000
Apr.	220.07	219.46	30	1,370	22	755	1,100	65,200	148,528	233,000	65,200	139,527
May	223.68	219.28	26	13,100	‡14	622	1,330	81,800	302,979	682,000	81,800	311,609
June	257.33	219.12	27	209,000	23	491	11,900	711,000	366,792	1,517,000	59,000	324,091
July	240.69	220.55	7	94,500	30	1,900	10,100	620,000	355,353	1,238,000	92,300	402,391
Aug.	221.82	220.05	4	4,850	26	1,140	2,130	131,000	313,669	* 721,000	108,000	369,818
Sept.	236.39	219.98	11	70,200	7	1,120	7,450	443,000	786,622	2,895,330	76,400	583,673
Oct.	225.75	220.32	17	20,500	13	1,610	4,080	251,000	606,161	2,396,440	135,000	528,091
Nov.	221.29	220.65	1	3,530	30	2,150	2,580	153,000	239,444	748,020	123,000	215,000
Dec.	220.68	220.44	3	2,230	31	1,910	2,090	128,000	200,598	591,380	116,000	172,636
Yearly	257.33	219.12		209,000		491	4,000	2,902,000	3,837,030	8,038,070	2,231,000	3,521,791

‡ Estimated * Partly estimated ‡ And other days

RIO ALAMO 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 above the confluence of the Rio Alamo with the Rio Grande and .6 mile west of Ciudad Mier, Tamaulipas, at a point called "El Paso del Cántaro". This stream enters the Rio Grande 984.6 river miles below the American Dam at El Paso, Texas. Zero of the gage is 187.04 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 9 meter measurements at high flows during the year and the weir discharge tables at low flows. High flow computations by shifting channel methods. Records available: July 1, 1923 to December 31, 1948.

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. 144,800 second-feet on September 11, 1948 with a gage height of 33.56 feet. Min. dry in all years of record except 1934 and 1935.

Average Flow in Second-Feet

Daily:	Max.	87,230,	Sept. 11, 1948.	Min.		frequently dry.
Monthly:	Max.	5,170,	Sept. 1948.	Min.		frequently dry.
Yearly:	Max.	505,	1944.	Min.	16.6	1929.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.1	8.1	4.2	6.0	0	2.5	75.9	178	137	63.2	63.2	33.9
2	13.1	8.1	4.2	6.0	0	1.1	207	47.3	33.9	63.2	59.0	33.9
3	13.1	59.0	2.5	6.0	0	0	40.6	51.2	21.5	59.0	59.0	33.9
4	10.6	27.9	2.5	6.0	0	0	33.9	40.6	10.6	54.7	59.0	33.9
5	10.6	18.7	3,265	6.0	0	0	13.1	10.6	6.0	54.7	59.0	33.9
6	10.6	13.1	1,260	6.0	0	0	8.1	4.2	4.2	54.7	54.7	33.9
7	10.6	13.1	94.3	6.0	0	0	4.2	2.5	2.5	54.7	51.2	33.9
8	10.6	10.6	33.9	6.0	0	0	21.5	1.1	2.5	51.2	51.2	30.7
9	10.6	10.6	24.7	6.0	0	0	8.1	0	554	54.7	54.7	30.7
10	10.6	8.1	15.9	6.0	0	0	4.2	0	40,610	63.2	54.7	30.7
11	10.6	8.1	13.1	4.2	0	0	2.5	0	87,230	54.7	59.0	30.7
12	10.6	8.1	10.6	4.2	0	0	2.5	0	11,510	54.7	59.0	30.7
13	10.6	8.1	10.6	4.2	0	0	2.5	0	3,110	120	63.2	30.7
14	10.6	6.0	10.6	4.2	0	0	1.1	0	4,030	115	63.2	30.7
15	10.6	6.0	10.6	4.2	0	0	0	0	2,190	75.9	63.2	27.9
16	10.6	6.0	10.6	4.2	0	0	0	0	1,950	63.2	63.2	24.7
17	10.6	6.0	8.1	4.2	0	0	0	0	703	323	63.2	24.7
18	10.6	6.0	8.1	2.5	0	0	0	0	480	211	59.0	21.5
19	10.6	6.0	8.1	2.5	0	0	0	0	403	80.5	54.7	21.5
20	8.1	8.1	10.6	2.5	0	0	0	0	611	63.2	51.2	18.7
21	8.1	8.1	10.6	2.5	0	0	0	0	516	63.2	47.3	18.7
22	8.1	8.1	10.6	67.5	0	170	0	0	267	59.0	47.3	18.7
23	8.1	8.1	10.6	929	0	77.7	0	0	198	1,495	43.8	18.7
24	8.1	8.1	13.1	43.8	0	208	0	0	160	222	47.3	18.7
25	8.1	8.1	13.1	10.6	0	75.9	0	0	120	131	43.8	18.7
26	8.1	6.0	10.6	4.2	2,460	15.9	0	0	89.7	94.3	40.6	15.9
27	8.1	6.0	10.6	2.5	1,580	6.0	0	0	71.3	84.8	40.6	15.9
28	8.1	6.0	10.6	1.1	81.6	4.2	0	2.5	71.3	75.9	33.9	18.7
29	6.0	4.2	10.6	1.1	18.7	1,780	0	0	71.3	71.3	33.9	18.7
30	6.0		10.6	0	8.1	1,300	0	837	67.1	71.3	33.9	18.7
31	6.0		10.6		4.2		95.0	1,350		67.1		18.7
Sum	299.8	308.4	4,929.8	1,159.2	4,152.6	3,641.3	520.2	2,525	155,230.9	4,169.4	1,577	791.3

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	1.54	1.44	#	13.1	#	6.0	9.7	595	4,969	34,920	0	1,956
Feb.	2.36	1.41	3	109	29	4.2	10.6	612	3,391	25,550	67.2	702
Mar.	8.50	1.38	5	5,300	#	2.5	159	9,780	3,532	19,830	64.0	2,885
Apr.	7.12		23	3,740	30	0	38.6	2,300	5,849	26,710	86.0	3,623
May	7.71		26	4,520	#	0	134	8,240	15,878	* 137,000	209	10,657
June	7.35		29	3,990	#	0	121	7,220	14,783	83,240	0	12,176
July	3.61		2	600	#	0	16.8	1,030	8,274	37,590	229	4,779
Aug.	5.48		30	2,260	#	0	81.5	5,010	17,407	194,200	0	32,241
Sept.	33.56	1.35	11	144,800*ϕ	9	1.1	5,170	307,900	40,878	307,900	* 135	52,052
Oct.	6.20	1.94	23	2,790	#	51.2	134	8,270	15,579	51,620	0	16,868
Nov.	2.03	1.77	#	63.2	#	33.9	52.6	3,130	4,137	21,940	0	1,963
Dec.	1.77	1.57	#	33.9	#	15.9	25.5	1,570	4,132	15,000	124	2,036
Yearly	33.56			144,800*ϕ		0	490	355,657	138,809	366,826	11,908.7	141,938

* Partly estimated # Various days of the month ϕ Determined by slope-area computations

RIO GRANDE AT ROMA, TEXAS

DESCRIPTION: Water-stage recorder at international bridge between Roma, Texas, and San Pedro, Tamaulipas, 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 the gage is 145.93 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 183 meter measurements during the year from bridge. Computations by shifting channel methods. 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 1948. Gage-height records are available for January, February, and March 1914.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. Backwater from the Rio San Juan sometimes reaches this station.

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. The lowest flow ever recorded was on June 23, 1948 when the extreme flow was 526 second-feet at a stage of -1.21 feet.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,810	1,650	1,810	1,130	1,250	2,410	6,430	4,270	2,350	2,880	3,640	2,180
2	1,920	2,050	1,980	1,120	1,030	2,020	5,510	4,270	1,590	2,620	3,340	2,170
3	2,040	1,980	2,300	1,170	862	1,670	5,090	3,010	1,410	2,280	3,240	2,170
4	1,950	1,900	2,430	1,200	826	1,510	5,540	2,890	1,320	2,000	3,130	2,100
5	1,940	1,820	7,200	1,170	837	1,510	4,910	4,170	1,400	1,930	2,990	2,120
6	1,900	1,960	3,990	1,180	777	1,710	40,960	2,540	1,340	1,950	2,730	2,130
7	1,890	2,180	2,060	1,160	766	1,480	74,870	3,340	1,200	1,950	2,510	2,100
8	1,880	2,270	1,900	1,190	724	1,320	58,270	3,670	1,130	2,030	2,380	2,120
9	1,800	2,200	1,760	1,280	763	1,790	15,200	3,120	1,850	1,950	2,460	2,120
10	1,710	2,040	1,630	1,290	660	1,720	8,720	2,640	44,850	1,920	2,570	1,950
11	1,640	1,930	1,670	1,210	622	1,530	6,570	2,260	160,700	1,850	2,520	2,180
12	1,650	1,870	1,810	1,110	643	1,370	9,040	2,260	61,450	1,760	2,450	2,130
13	1,660	1,870	1,850	1,080	593	1,220	7,630	2,330	24,470	2,070	2,400	2,110
14	1,730	1,830	1,880	996	586	1,090	8,440	2,010	24,440	1,990	2,380	2,150
15	1,710	1,790	1,960	911	572	844	6,110	1,760	18,080	3,300	2,470	2,100
16	1,680	1,790	1,820	851	657	713	3,850	1,640	10,310	1,960	2,560	2,120
17	1,580	1,780	1,680	805	763	731	3,640	1,590	6,570	8,830	2,560	2,210
18	1,520	1,770	1,600	759	1,300	749	3,380	1,500	4,770	14,830	2,580	2,350
19	1,460	1,730	1,550	784	1,230	735	2,870	1,500	4,170	7,590	2,590	2,420
20	1,460	1,680	1,480	922	1,040	660	2,590	1,470	6,180	3,490	2,480	2,310
21	1,550	1,640	1,500	858	844	706	2,340	1,380	5,470	2,560	2,440	2,200
22	1,530	1,670	1,490	731	788	759	2,250	1,320	4,200	2,260	2,330	2,130
23	1,480	1,670	1,450	2,140	717	614	2,310	1,350	3,710	4,280	2,280	2,110
24	1,500	1,640	1,350	1,130	667	1,480	3,120	1,360	3,740	12,220	2,370	2,050
25	1,480	1,760	1,350	1,110	629	1,710	2,880	1,230	3,110	12,330	2,470	1,960
26	1,530	1,780	1,380	992	13,910	20,770	2,450	1,170	2,860	10,660	2,480	1,890
27	1,620	1,880	1,350	908	9,220	105,600	2,360	1,180	3,130	5,470	2,500	1,860
28	1,650	1,950	1,290	1,085	3,570	151,150	2,090	1,250	3,230	5,260	2,340	1,800
29	1,650	1,840	1,200	1,100	3,360	28,530	2,040	1,670	3,360	4,590	2,250	1,700
30	1,680		1,150	1,020	2,740	8,160	2,060	2,870	3,010	4,200	2,190	1,810
31	1,650		1,150		1,980		3,020	3,810		4,030		1,880
Sum	52,250	53,920	59,020	32,392	54,926	346,261	306,540	70,830	415,400	137,040	77,630	64,630

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	.36	- .10	3	2,040	20	1,460	1,690	103,600	207,891	467,400	103,600	173,455
Feb.	.56	0	8	2,270	24	1,600	1,860	107,000	170,977	349,000	107,000	144,373
Mar.	4.53	- .43	5	10,060	30	1,150	1,900	117,100	172,343	325,500	99,000	157,900
Apr.	2.23	-1.02	23	4,340	22	689	1,080	64,250	166,088	285,000	64,250	140,924
May	8.89	-1.28	26	23,340	15	572	1,770	108,900	347,004	706,300	91,320	333,102
June	32.84	-1.21	28	175,200	23	526	11,540	686,800	387,861	1,586,000	53,990	343,054
July	23.46	- .10	8	81,580	31	1,970	9,890	608,000	342,205	1,217,000	94,100	411,618
Aug.	2.43	- .72	5	4,940	27	1,150	2,280	140,500	343,144	‡ 904,000	109,400	396,345
Sept.	33.04	- .82	11	176,900	8	1,080	13,850	823,900	746,646	3,048,000	69,900	647,864
Oct.	9.28	.07	17	22,530	12	1,720	4,420	271,800	582,022	2,372,000	137,700	557,536
Nov.	1.71	.46	1	3,850	30	2,190	2,590	154,000	246,811	736,000	126,800	218,145
Dec.	.62	.10	19	2,490	29	1,700	2,080	128,200	208,804	565,100	114,000	172,164
Yearly	33.04	-1.28		176,900		526	4,570	3,314,050	3,921,796	8,098,000	2,227,000	3,696,480

‡ Estimated

CONTRIBUTIONS FROM RIO SAN JUAN

Above Rio Grande City Station

DESCRIPTION: Contributions from the Rio San Juan all pass through the Marte Gómez Reservoir and reach the Rio Grande between the Roma and the Hidalgo gaging stations. Marte Gómez Dam is located on the Rio San Juan 12.4 river miles above the confluence with the Rio Grande. This confluence is 7.9 river miles above the Rio Grande City gaging station and 1,007.4 river miles below the American Dam at El Paso, Texas. The zero of the reservoir gage is 7.64 feet above mean sea level, U.S.C. & G.S. datum. The flow reported here consisted of small seepage through the bank near the dam which was measured by weir, discharges over the spillway which were determined by the discharge rating curve of the spillway. In addition but not listed below there was an undetermined amount of water from drains which entered the Rio Grande from Mexico.

RECORDS: Based upon meter measurements and weir and spillway discharge curves. Records furnished by the Department of Agriculture and Livestock. Records available: March 10, 1943 to December 31, 1948.

REMARKS: In 1948, from September 11 to December 20, inclusive, 472,800 acre-feet of water passed over the spillway of the dam, with a maximum discharge of 13,000 second-feet and a gage height of 253.02 feet occurring September 17.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.2	7.8	5.7	10.2	12.0	10.6	8.8	13.4	4.9	2,330	2,630	147
2	9.2	7.8	5.6	10.3	12.0	10.6	8.8	13.4	4.9	2,060	2,350	147
3	9.1	7.8	5.7	10.2	12.0	10.6	8.9	13.4	4.9	1,770	2,350	147
4	9.2	7.8	5.6	10.2	12.0	10.6	8.8	13.4	4.9	1,630	2,060	147
5	9.2	8.1	5.7	10.2	12.0	10.6	8.8	13.5	4.9	1,630	1,780	147
6	9.1	8.1	5.6	10.3	12.0	10.6	8.9	13.4	4.9	1,560	1,710	147
7	9.2	8.1	5.7	10.2	12.0	10.6	8.8	13.4	4.9	1,490	1,640	147
8	9.2	8.1	5.6	10.2	12.0	10.6	8.8	13.4	4.9	1,490	1,570	147
9	9.1	8.1	5.7	10.2	12.1	10.6	8.9	13.4	4.9	1,490	1,490	146
10	9.2	7.8	6.0	10.3	12.0	10.6	9.5	13.4	4.9	1,490	1,460	146
11	9.2	7.8	6.0	10.2	12.0	10.6	9.5	13.4	93.2	1,490	1,460	146
12	9.1	7.8	6.0	10.2	12.0	10.6	9.5	13.4	2,050	1,490	1,460	146
13	9.2	7.8	6.0	10.2	12.0	10.6	9.5	13.4	2,620	1,530	1,420	146
14	9.2	7.7	6.0	10.3	12.0	10.6	9.5	13.4	2,900	1,730	1,420	146
15	9.1	7.8	6.0	10.2	12.0	10.2	8.8	13.5	4,590	2,900	1,420	146
16	9.2	7.8	6.0	10.2	12.1	10.2	8.8	13.4	12,150	3,360	1,420	146
17	9.2	7.8	6.0	10.2	12.0	10.2	8.9	13.4	13,000	3,530	1,280	146
18	9.1	7.8	6.0	10.3	12.0	10.2	8.8	13.4	10,740	4,240	1,140	146
19	9.2	7.7	6.0	10.2	12.0	10.2	8.8	13.4	8,330	3,530	1,140	146
20	9.2	7.8	5.7	10.2	12.0	10.2	8.9	13.4	7,770	3,190	858	146
21	9.1	7.8	5.6	10.2	12.0	10.2	8.8	13.4	6,070	2,900	858	4.9
22	9.2	7.8	5.7	10.3	12.0	10.2	8.8	13.4	5,510	2,760	717	4.9
23	9.2	7.7	5.6	10.2	12.0	10.2	8.9	13.4	4,590	3,180	576	4.9
24	9.1	7.8	5.7	10.2	12.1	10.2	8.8	13.4	4,240	7,490	576	4.9
25	9.2	8.1	5.6	10.2	12.0	10.6	8.8	13.5	3,530	7,840	294	4.9
26	9.2	8.1	5.7	10.3	12.0	10.6	8.9	13.4	3,180	7,200	294	4.9
27	9.1	8.1	5.6	10.2	12.0	10.6	8.8	13.4	2,900	6,070	294	4.9
28	9.2	8.1	5.7	9.9	12.0	10.6	8.8	13.4	2,900	4,940	294	4.9
29	9.2	7.8	5.6	9.9	12.0	10.6	8.9	13.4	2,900	4,230	153	4.9
30	9.1		5.7	9.9	12.0	10.6	8.8	13.4	2,620	3,530	153	4.9
31	9.2		5.6		12.1		8.8	13.4		3,040		4.9
Sum	284.2	228.6	178.7	305.8	372.4	314.0	277.1	415.7	102,732.2	97,110	36,267	2,981.9

Month	Current Year 1948: Extreme Gage Feet ## High	Extreme Gage Feet ## Low	Extreme Second-Feet ● High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1943-1948: Acre-Feet ** Average	Maximum	Minimum
Jan.	249.05	248.39	#	9.2	#	9.1	9.2	564	ϕ 16,237	ϕ 46,150	ϕ 254
Feb.	248.69	248.03	#	8.1	#	7.7	7.9	453	ϕ 9,547	ϕ 25,550	ϕ 255
Mar.	248.13	247.70	#	6.0	#	5.6	5.8	354	2,411	7,390	0
Apr.	247.60	244.82	#	10.3	#	9.9	10.2	607	2,176	9,340	0
May	245.21	243.93	#	12.1	#	12.0	12.0	739	1,594	4,030	0
June	244.55	241.90	#	10.6	#	10.2	10.5	623	10,334	* 41,390	0
July	243.37	242.16	#	9.5	#	8.8	8.9	550	12,886	* 66,820	550
Aug	242.19	240.29	#	13.5	#	13.4	13.4	825	108,285	* 557,800	148
Sept.	253.02	241.83	17	13,000	#	4.9	3,420	203,800	147,830	* 653,300	452
Oct.	252.13	250.82	25	7,840	#	1,490	3,130	192,600	139,772	* 333,900	300
Nov.	251.31	250.49	1	2,630	#	153	1,210	71,940	28,502	* 50,270	297
Dec.	250.49	250.43	#	147	#	4.9	96.2	5,910	9,219	38,360	358
Yearly	253.02	240.29		13,000		4.9	660	478,965	488,793	*ϕ1,717,159	ϕ 67,831

● Mean daily ϕ Period 1944-1948 * Deduced from Roma and Rio Grande City discharges # Various days of the month ## Water surface elevations in Marte R. Gómez Reservoir ** Combined with record of Rio San Juan below Marte R. Gómez Dam

RIO GRANDE NEAR RIO GRANDE CITY, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and winch, located about 4 river miles below Rio Grande City, Texas, 3.7 miles northeast of Camargo, Tamaulipas, 7.9 river 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 the gage is at mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 97 meter measurements during the year, 88 by the United States Section and 9 by the Mexican Section of this Commission and a continuous record of gage heights. Computations by shifting channel methods. 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 1948.

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

EXTREME FLOWS: The greatest recorded flow was on September 5, 1932 when the peak stage was 157.4 feet and the flow was 198,800 second-feet.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,830	1,640	1,800	1,140	1,020	2,140	8,960	3,260	3,300	4,930	6,410	2,290
2	1,880	2,930	1,840	1,120	1,060	2,220	7,870	4,130	1,820	4,370	5,770	2,240
3	1,970	*2,260	1,990	1,100	913	1,890	5,620	3,460	1,500	3,930	5,320	2,240
4	1,990	*1,900	2,400	1,130	820	1,550	5,280	2,810	1,380	3,480	5,000	2,210
5	2,020	1,910	4,170	1,120	* 795	1,510	4,980	3,740	1,380	3,140	5,450	2,180
6	2,010	1,950	6,330	1,050	* 755	1,550	17,600	3,240	1,380	3,010	4,210	2,190
7	1,920	2,060	3,180	1,070	* 740	1,590	55,500	2,820	1,310	2,850	3,730	2,170
8	1,940	2,200	2,300	1,020	* 725	1,360	74,800	3,720	1,240	2,840	3,470	2,170
9	1,880	2,230	2,120	985	* 738	1,450	30,600	3,200	1,410	2,860	3,420	2,140
10	1,770	2,110	1,920	1,050	* 732	1,730	11,200	2,740	19,700	2,670	3,370	2,120
11	1,710	2,030	1,790	1,060	* 643	1,610	7,920	2,430	97,500	2,570	3,220	2,080
12	1,720	1,950	1,740	1,010	* 627	1,430	7,520	2,250	124,000	2,520	3,110	2,100
13	1,700	1,890	1,820	976	* 597	1,290	8,740	2,240	56,600	3,240	3,120	2,050
14	1,730	1,850	1,860	950	* 584	1,170	6,790	2,130	32,100	3,170	3,190	2,070
15	1,760	1,810	1,940	897	* 540	1,020	7,280	1,960	25,000	5,170	3,210	2,130
16	1,650	1,780	1,880	846	* 562	* 818	4,260	1,850	22,500	5,350	3,280	2,190
17	1,600	1,730	1,740	816	* 679	* 736	3,480	1,770	20,700	8,310	3,250	2,140
18	1,570	1,710	1,630	* 773	* 913	* 760	3,320	1,690	16,500	20,100	3,130	2,240
19	1,570	1,650	1,550	* 770	* 1,230	* 771	2,910	1,620	14,100	13,000	3,150	2,390
20	1,620	1,680	1,500	* 810	1,190	* 744	2,600	1,550	13,500	7,860	2,920	2,370
21	1,580	1,670	1,470	* 896	956	* 685	2,430	1,490	12,300	5,600	2,820	2,250
22	1,570	1,710	1,470	* 836	* 789	* 1,230	2,300	1,420	10,400	4,870	2,750	2,210
23	1,500	2,540	1,450	1,960	* 779	879	2,300	1,370	8,500	5,680	2,580	2,170
24	1,460	2,390	1,420	1,570	* 778	* 666	2,630	1,410	7,820	15,100	2,500	2,100
25	1,400	1,730	1,350	1,150	* 722	* 1,620	2,950	1,370	6,660	18,800	2,580	2,060
26	1,420	1,750	1,330	1,080	7,080	4,890	2,730	1,280	5,840	17,300	2,590	2,010
27	1,490	1,770	1,330	882	15,900	46,800	2,530	1,280	5,560	12,400	2,640	2,000
28	1,640	1,920	1,320	* 868	5,390	114,000	2,350	1,340	5,740	9,690	2,730	1,990
29	1,620	1,880	1,280	*1,080	3,340	107,000	2,210	1,490	5,760	8,640	2,610	1,960
30	1,620		1,190	968	3,450	26,900	2,200	2,210	5,490	7,570	2,380	1,990
31	1,620		1,180		2,400		2,370	5,810		7,140		1,960
Sum	52,760	56,630	60,290	30,983	57,447	332,009	304,230	73,080	530,990	218,160	103,910	66,410

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	123.90	123.23	6	2,060	26	1,380	1,700	105,000	245,802	521,000	105,000	205,818
Feb.	124.88	123.34	2	3,470	21	1,670	1,950	112,000	195,360	368,690	112,000	161,455
Mar.	128.42	122.70	6	7,690	31	1,160	1,940	120,000	193,831	401,000	108,000	177,909
Apr.	124.78	*121.96	23	2,870	19	* 761	1,030	61,500	184,601	340,000	61,500	160,482
May	133.98	*121.48	27	23,000	15	* 524	1,850	114,000	401,519	833,000	98,900	378,082
June	153.74	*121.68	28	145,000	24	* 599	11,100	659,000	497,852	1,737,000	74,500	438,982
July	147.53	124.48	8	78,700	$30	2,170	9,810	603,000	423,260	1,240,000	105,000	461,091
Aug.	127.88	123.38	31	6,740	27	1,250	2,360	145,000	414,558	1,280,000	121,000	503,091
Sept.	153.50	123.30	12	141,000	9	1,180	17,700	1,053,000	991,067	3,723,800	79,400	855,491
Oct.	134.32	124.77	18	23,100	12	2,470	7,040	433,000	753,007	2,852,270	142,000	698,727
Nov.	128.22	124.75	1	6,770	30	2,330	3,460	206,000	301,501	829,260	138,000	253,455
Dec.	124.81	124.22	20	2,460	31	1,940	2,140	132,000	249,682	625,260	* 131,000	202,273
Yearly	153.74	121.48		145,000		524	5,160	3,743,500	4,852,040	9,554,530	2,643,000	4,496,856

*, Partly estimated

CONTRIBUTIONS FROM RIO SAN JUAN

Below Rio Grande City Station

DESCRIPTION: Contributions from the Rio San Juan all pass through the Marte Gómez Reservoir and reach the Rio Grande between the Roma and the Hidalgo gaging stations. Marte Gómez Dam is located on the Rio San Juan 12.4 river miles above the confluence with the Rio Grande. This confluence is 7.9 river miles above the Rio Grande City gaging station and 1,007.4 river miles below the American Dam at El Paso, Texas. The zero of the reservoir gage is 7.64 feet above mean sea level, U.S.C. & G.S. datum. The portion of such contributions reported below were measured by current meter and were discharged from canals into the Rio Grande at a point about 5 miles below the Rio Grande City gaging station, but in addition and not listed below there was an undetermined amount of water from drains which entered the Rio Grande from Mexico.

RECORDS: Discharge records were furnished by the Department of Agriculture and Livestock. Records available: January 1, 1946 to December 31, 1948. Daily records for 1948 are not available.

REMARKS: In 1948 from April 2 to April 27, from May 11 to May 26, and from June 16 to June 27, a total of ~~88,351~~ 60,884 acre-feet flowed into the Rio Grande at this point to supplement the irrigation of American lands in the Lower Rio Grande Valley.

Month	Current Year 1948								Period 1946-1948		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.							61.1	3,760	7,043	15,960	1,410
Feb.							36.4	2,090	1,050	2,090	0
Mar.							41.7	2,560	2,033	2,560	1,100
Apr.							625	37,140	17,633	37,140	7,100
May							301	18,500	7,810	18,500	0
June							200	11,870	7,470	11,870	0
July							79.5	4,890	7,647	18,050	0
Aug							11.3	686	6,095	15,470	686
Sept.							0	0	300	901	0
Oct.							15.2	932	664	1,060	0
Nov.							49.4	2,950	2,103	3,360	0
Dec.							4.9	302	291	572	0
Yearly							118	85,680	60,139	85,680	40,970

RIO GRANDE AT HIDALGO, TEXAS

DESCRIPTION: Water-stage recorder on the downstream side of the United States end of the international highway bridge between 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 mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on a continuous record of gage heights. The peak discharges shown below are based on rating curve supported by 8 meter measurements during the year. 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 during peaks, 1940 to November 16, 1948.

REMARKS: On July 28, 1941 the zero of the gage was changed to mean sea level, U.S.C. & G.S. 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. Another gage (Weather Bureau) at this bridge has a zero elevation of 79.03 feet. When the river at this station reaches a 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 Granjeño and Jardín de Flores at stages about 3.5 feet lower.

EXTREME FLOWS: In September 1932 the peak stage was 104.88 feet, with a flow of 83,870 second-feet.

Mean Daily Gage Height in Feet — 1948

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	81.01	80.94	81.08	78.44	79.81	81.73	99.81	* 81.32	83.87	85.78	86.48	
2	81.04	81.04	80.99	78.85	79.44	80.87	92.35	* 81.60	83.54	85.24	85.86	
3	81.02	81.64	80.93	80.04	‼ 77.95	80.72	88.10	* 83.03	81.69	84.96	85.30	
4	81.09	81.93	81.06	80.51	* 77.59	80.38	86.56	* 83.00	80.82	84.32	84.95	
5	80.80	81.63	81.61	79.47	‼ 77.38	79.71	85.92	* 82.40	80.97	84.10	84.70	
6	80.70	81.31	84.30	78.75	78.08	80.01	85.93	* 82.69	80.20	83.52	84.57	
7	80.78	81.34	84.86	78.88	79.09	* 78.99	95.19	83.26	79.68	* 83.11	84.42	
8	80.91	81.35	83.38	79.06	79.11	‼ 78.62	98.74	82.95	79.45	* 83.00	83.86	
9	80.84	81.43	82.34	80.44	78.96	* 78.59	100.03	83.28	80.82	82.84	83.38	
10	80.80	81.50	81.78	80.84	77.86	* 79.37	98.86	83.03	82.25	83.09	*83.16	
11	80.96	81.39	81.49	81.04	* 77.43	80.63	92.02	82.50	95.91	82.83	*82.95	
12	80.62	81.34	81.11	80.17	77.89	80.82	88.22	82.12	99.41	82.54	*82.80	
13	80.39	81.30	81.02	79.65	78.64	80.60	88.00	81.62	101.22	82.61	*82.86	
14	80.45	81.16	81.04	79.36	79.50	79.63	88.05	81.57	101.60	82.83	83.19	
15	80.70	81.15	81.11	79.28	79.80	* 79.05	87.33	81.64	100.24	83.03	*82.94	
16	80.79	81.14	80.97	80.40	79.81	78.53	87.03	81.22	97.10	84.07	*82.84	
17	80.73	80.98	80.97	80.64	79.07	79.09	85.36	80.78	94.64	85.62	#	
18	80.81	80.75	80.96	80.46	78.75	79.82	84.78	80.63	92.83	89.44		
19	80.71	80.86	80.76	79.12	78.73	79.76	84.07	80.43	91.10	90.68		
20	80.28	80.90	*80.89	* 78.31	79.82	79.66	83.58	80.32	89.98	88.58		
21	80.28	80.84	*80.99	* 78.24	80.67	* 79.05	* 83.20	80.32	89.59	86.74		
22	80.35	80.87	*80.78	* 78.54	80.68	* 79.14	* 82.66	81.18	89.09	85.81		
23	80.28	81.08	*79.96	80.18	80.26	* 78.77	* 82.15	81.46	88.31	85.26		
24	80.53	81.49	*79.86	80.86	78.97	* 79.67	* 82.13	80.60	87.67	86.19		
25	80.78	81.77	79.94	81.02	79.44	80.44	* 82.60	* 79.70	87.40	90.05		
26	80.81	81.23	79.92	79.62	79.88	80.90	* 82.90	* 79.78	86.80	90.59		
27	80.57	80.90	80.05	* 78.60	86.22	87.67	* 82.51	80.85	86.15	89.88		
28	80.94	80.97	80.20	* 78.22	88.01	96.73	* 82.14	81.07	85.94	88.30		
29	81.01	81.14	*79.45	* 78.64	84.52	99.06	* 81.76	81.13	85.82	87.67		
30	81.02		*78.81	79.62	83.28	100.50	* 81.36	81.01	85.83	87.26		
31	80.95		78.53		82.47		* 81.33	80.89		86.87		
Sum												

Month	Current Year 1948								Period		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Normal	Maximum	Minimum
Apr.		* 78.10			21						
May		77.26			6						
June	100.83	78.50	30	54,900	‡ 9						
July	100.30		9	51,600							
Sept.	101.75		14	57,800							
Yearly											

‼ Estimated * Partly estimated ‡ And other days # Record discontinued except for periods of high flow.

RIO GRANDE AT LAS PALMAS, TAMAULIPAS

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 147 meter measurements during the year, 143 by the Mexican and 4 by the United States Section of this Commission. Computations by shifting channel methods. Records available: gage heights from January 13 to October 31, 1945 and daily discharges from November 1, 1945 to December 31, 1948.

REMARKS: Reservoirs, diversions, and drainage returns modify the flow at this station.

EXTREME FLOWS: The greatest flow of record was 40,960 second-feet at a stage of 82.48 feet on September 14 and 15, 1948. The lowest flow recorded was 14.5 second-feet at a stage of 61.68 feet on May 12, 1948.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,680	1,590	1,730	352	851	2,040	36,730	1,150	1,780	4,800	7,560	2,040
2	1,580	1,650	1,670	353	890	1,540	19,780	1,150	3,000	4,380	6,640	1,860
3	1,570	1,760	1,640	660	547	1,290	8,090	1,880	2,110	3,960	5,610	1,730
4	1,560	2,140	1,500	1,060	160	1,290	5,400	2,480	1,250	3,440	5,160	1,670
5	1,550	2,080	1,680	964	77.7	1,010	4,590	2,100	1,030	2,960	5,010	1,890
6	1,365	1,880	2,930	540	104	840	3,780	1,830	904	2,520	4,700	1,940
7	1,350	1,700	4,560	306	392	720	21,290	2,240	516	2,180	4,480	1,660
8	1,430	1,780	3,710	381	720	357	33,230	2,275	424	2,010	4,060	1,520
9	1,460	1,820	2,850	893	653	266	36,370	2,240	385	1,770	3,470	1,480
10	1,410	1,860	2,310	1,400	403	287	36,370	2,360	901	1,870	3,160	1,470
11	1,470	1,860	1,990	1,470	66.4	833	19,630	1,990	22,320	1,820	3,040	1,500
12	1,440	1,780	1,730	1,185	19.4	1,200	8,550	1,810	34,040	1,630	2,950	1,770
13	1,290	1,770	1,540	819	74.9	1,250	6,390	1,380	38,490	1,630	2,960	1,890
14	1,160	1,770	1,560	724	519	911	6,750	1,240	40,610	1,660	3,080	1,550
15	1,300	1,700	1,590	646	823	519	5,900	1,300	40,960	1,990	3,130	1,610
16	1,370	1,740	1,660	904	901	280	6,070	1,240	*37,790	2,200	2,960	1,470
17	1,380	1,680	1,640	1,320	763	227	4,310	936	*29,980	4,380	2,820	1,560
18	1,320	1,550	1,590	1,240	512	749	3,470	720	*23,630	10,490	2,780	1,590
19	1,280	1,470	1,550	862	413	946	2,930	675	*18,190	17,940	*2,840	1,870
20	1,160	1,570	1,380	399	544	950	2,470	593	*14,370	13,140	*2,840	2,090
21	1,090	1,580	1,270	223	1,240	565	2,270	583	*13,280	8,370	*2,920	1,900
22	1,010	1,530	1,280	204	1,400	287	1,930	752	*11,870	6,000	*2,870	1,830
23	971	1,610	992	562	1,280	228	1,600	1,290	*10,100	5,010	*2,610	1,670
24	978	1,750	858	1,170	872	396	1,480	1,180	* 8,400	5,010	*2,460	1,780
25	1,200	2,180	911	1,320	855	1,050	1,540	519	* 7,730	12,960	*2,420	1,870
26	1,360	1,960	989	1,120	929	1,300	1,930	337	* 6,960	16,140	2,370	2,070
27	1,260	1,560	964	622	4,340	6,640	1,870	717	* 5,930	15,330	2,260	2,120
28	1,280	1,530	1,020	336	11,120	27,050	1,550	1,240	* 5,230	11,620	2,570	1,720
29	1,550	1,630	992	171	5,580	30,940	1,320	1,250	* 5,090	9,320	2,510	1,340
30	1,690		593	505	3,460	34,780	1,180	1,280	* 5,010	8,690	2,240	1,330
31	1,650		389		2,690		1,080	968		* 7,880		1,330
Sum	42,164	50,480	51,068	22,711	43,199.4	120,741	289,850	41,705	*392,280	*193,100	104,480	53,120

Month	Current Year 1948: Extreme Gage Feet High	Low	Extreme Second-Feet High: Day	High	Low: Day	Low	Average Second-Feet	Total Acre-Feet	Period 1946-1948: Acre-Feet Average	Maximum	Minimum
Jan.	65.75	64.67	1	1,730	24	897	1,360	83,630	129,410	172,100	83,630
Feb.	66.34	65.16	4	2,220	19	1,390	1,740	100,100	105,063	123,000	92,090
Mar.	69.39	63.32	7	4,770	31	371	1,650	101,300	80,727	101,300	63,240
Apr.	65.32	62.66	11	1,510	29	127	757	45,050	73,033	116,300	45,050
May	73.29	61.68	28	12,710	12	14.5	1,390	85,690	227,497	389,400	85,690
June	81.50	63.06	30	36,020	17	179	4,020	239,500	311,967	431,100	239,500
July	81.99	66.01	10	⊕ 39,200	31	1,050	9,350	574,900	261,063	574,900	61,390
Aug	67.91	64.24	4	2,530	26	302	1,350	82,720	209,853	466,800	80,040
Sept.	82.48	64.27	#	* 40,960	9	330	*13,080	* 778,100	474,800	* 778,100	322,700
Oct.	75.33	66.83	19	* 19,070	12	*1,560	* 6,230	* 383,000	331,153	525,400	85,060
Nov.	70.73	66.01	1	7,770	30	2,160	3,480	207,200	ϕ 146,092	ϕ 207,200	ϕ 92,170
Dec.	66.04	64.86	20	2,140	29	1,260	1,710	105,400	ϕ 118,325	ϕ 151,100	ϕ 103,000
Yearly	82.48	61.68		* 40,960		14.5	3,840	2,786,590*	2,468,983	*2,786,590	1,974,600

⊕ A maximum flow of 38,100 second-feet at a gage height of 81.76 occurred on July 1. * Partly estimated
ϕ Period 1945-1948 # Various days of the month

RIO GRANDE FLOODWAY DISCHARGES IN THE LOWER RIO GRANDE VALLEY

In The United States

During floods water is diverted from the Rio Grande at two points to enter the United States floodway system. These are Mission Inlet and Hackney Lake Inlet, approximately 15 and 4 river miles respectively, above the Rio Grande gaging station at Hidalgo. The Mission Inlet and Hackney Lake Inlet branches converge about 5 miles northeast of Hidalgo to form the Main Floodway which runs eastward to approximately 3 miles southwest of Mercedes where the flow enters the Gulf of Mexico through the North Floodway, which also serves as a drainage channel, or by spilling into the Arroyo Colorado Floodway at high flows. Mission Inlet flows are measured at the North Floodway South of McAllen Station, Hackney Lake Inlet flows are measured at the South Floodway South of McAllen Station, and North Floodway flows are measured near Sebastian. Arroyo Colorado Floodway flows are measured near La Feria. The maximum discharge during 1948 of the Arroyo Colorado was 3,370 second-feet which occurred on September 15 at a gage height of 37.75 feet.

Mission

North Floodway South of McAllen, Texas - 1948

Date	Mean Sec.-Ft.	Date	Mean Sec.-Ft.	Date	Mean Sec.-Ft.
June 30	327	July 10	# 114	Sept. 13	1,550
July 1	2,450	July 11	# 85.0	Sept. 14	5,450
July 2	1,570	July 12	# 8.3	Sept. 15	2,360
July 3	797			Sept. 16	1,500
July 4	221			Sept. 17	830
July 5	13.5			Sept. 18	350
				Sept. 19	350
				Sept. 20	177
				Sept. 21	55.7
				Sept. 22	39.5
				Sept. 23	32.0
				Sept. 24	8.3
Total	5,378.5	Total	# 207.3	Total	12,702.5

Period	Maximum Gage in Feet	Maximum Discharge Date	Maximum Discharge Sec.-Ft.	Total Acre-Feet
June 30 - July 5	93.20	July 1	3,300	10,700
July 10 - 12	ϕ 83.97	July 10	# 200	# 411
September 13 - 24	94.74	Sept.14	6,040	25,200
Year	94.74		6,040	36,311

Hackney

South Floodway South of McAllen, Texas - 1948

Date	Mean Sec.-Ft.	Date	Mean Sec.-Ft.	Date	Mean Sec.-Ft.
June 30	285	July 9	196	Sept. 13	5,650
July 1	2,940	July 10	634	Sept. 14	11,000
July 2	59.5	July 11	8.4	Sept. 15	3,820
July 3	12.7			Sept. 16	87.6
				Sept. 17	2.9
Total	3,297.2	Total	838.4	Total	20,560.5

Period	Maximum Gage in Feet	Maximum Discharge Date	Maximum Discharge Sec.-Ft.	Total Acre-Feet
June 30 - July 3	98.10	July 1	5,000	6,540
July 9 - 11	95.81	July 10	1,200	1,660
September 13 - 17	101.57	Sept.14	11,700	40,800
Year	101.57		11,700	49,000

Estimated ϕ Due mainly to backwater of South Floodway flows entering Main Floodway

North Floodway near Sebastian, Texas

The channel of the North Floodway in the vicinity of Sebastian serves as a drainage channel as well as a floodway. The discharges for the first six months were based on 9 current meter measurements and rainfall records. The records for the last six months were based on 26 current meter measurements and a continuous record of gage heights. Computations by shifting channel method.

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet Day	Extreme Second-Feet High	Extreme Second-Feet Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1940-1948 #: Acre-Feet Average	Acre-Feet Maximum	Acre-Feet Minimum
Jan.			27	#ϕ 80.0	‡14	*ϕ 52.7	# 57.0	# 3,500	3,246	7,450	1,400
Feb.			3	#ϕ 180	‡24	*ϕ 66.8	# 80.3	# 4,620	3,129	6,010	1,610
Mar.			7	#ϕ 70.0	31	#ϕ 48.4	# 59.7	# 3,670	3,455	5,380	1,880
Apr.			1	#ϕ 45.6	30	#ϕ 2.0	# 23.2	# 1,380	2,900	5,900	# 1,380
May			27	#ϕ 350	‡ 1	0	# 41.5	# 2,550	5,812	24,200	2,290
June	28.52		30	41.3	‡10	*ϕ 6.2	* 10.1	* 602	3,916	9,090	* 602
July	35.74	28.35	3	1,180	30	36.4	179	11,000	3,543	11,000	865
Aug.	30.23	28.03	30	114	‡27	26.8	35.5	2,180	2,439	7,400	605
Sept.	40.88	28.30	16	10,100	8	32.2	1,020	60,700	25,762	125,700	1,400
Oct.	32.90	29.58	18	450	11	92.0	165	10,200	3,950	10,200	136
Nov.	30.09	28.82	13	146	6	63.5	104	6,200	2,783	6,200	861
Dec.	30.00	28.66	5	145	28	55.7	99.3	6,100	3,490	6,100	1,830
Yearly	40.88			10,100		0	155	112,702	64,425	158,550	28,412

Estimated * Partly estimated ϕ Mean daily # Record began October 1940 ‡ And other days

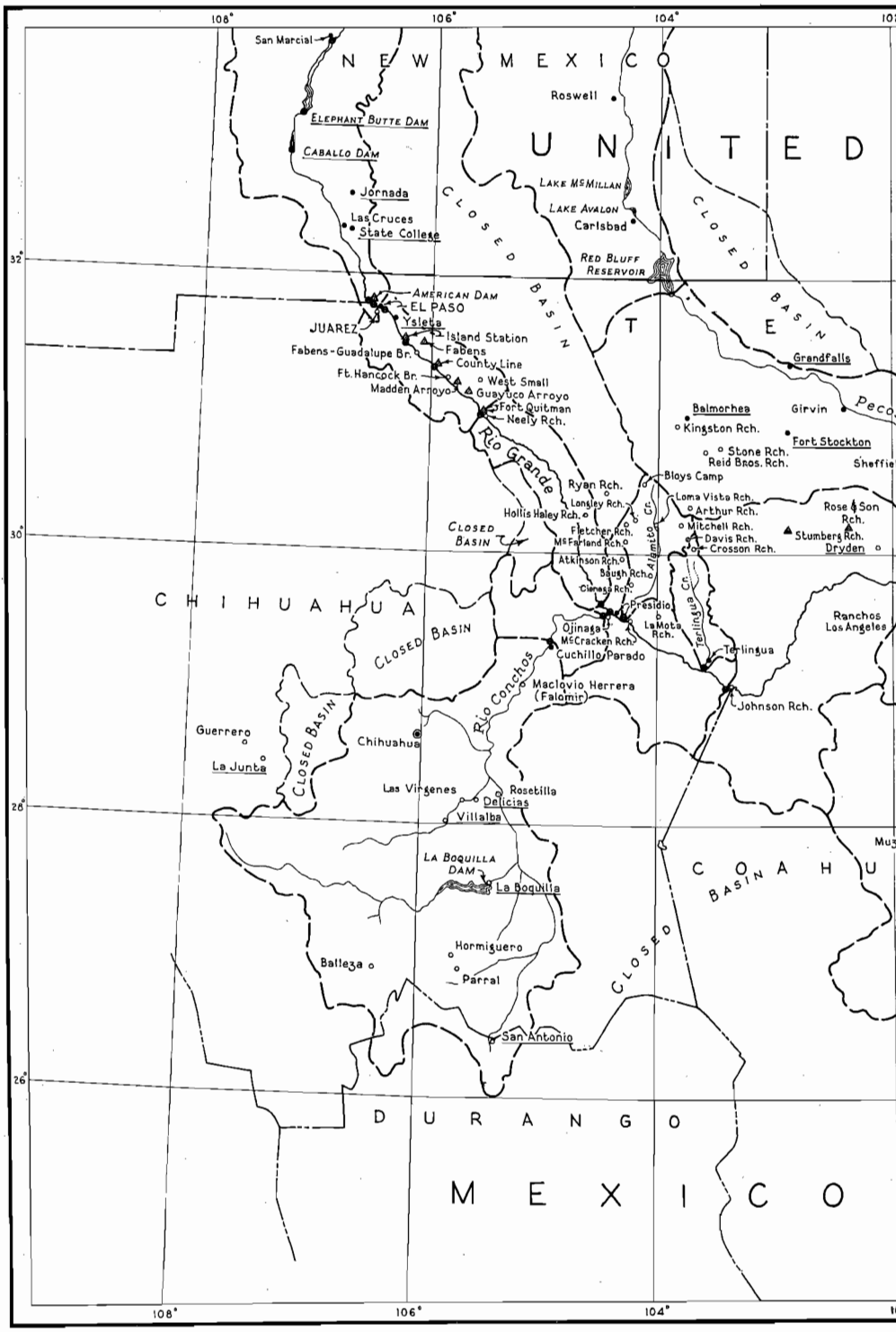
In Mexico

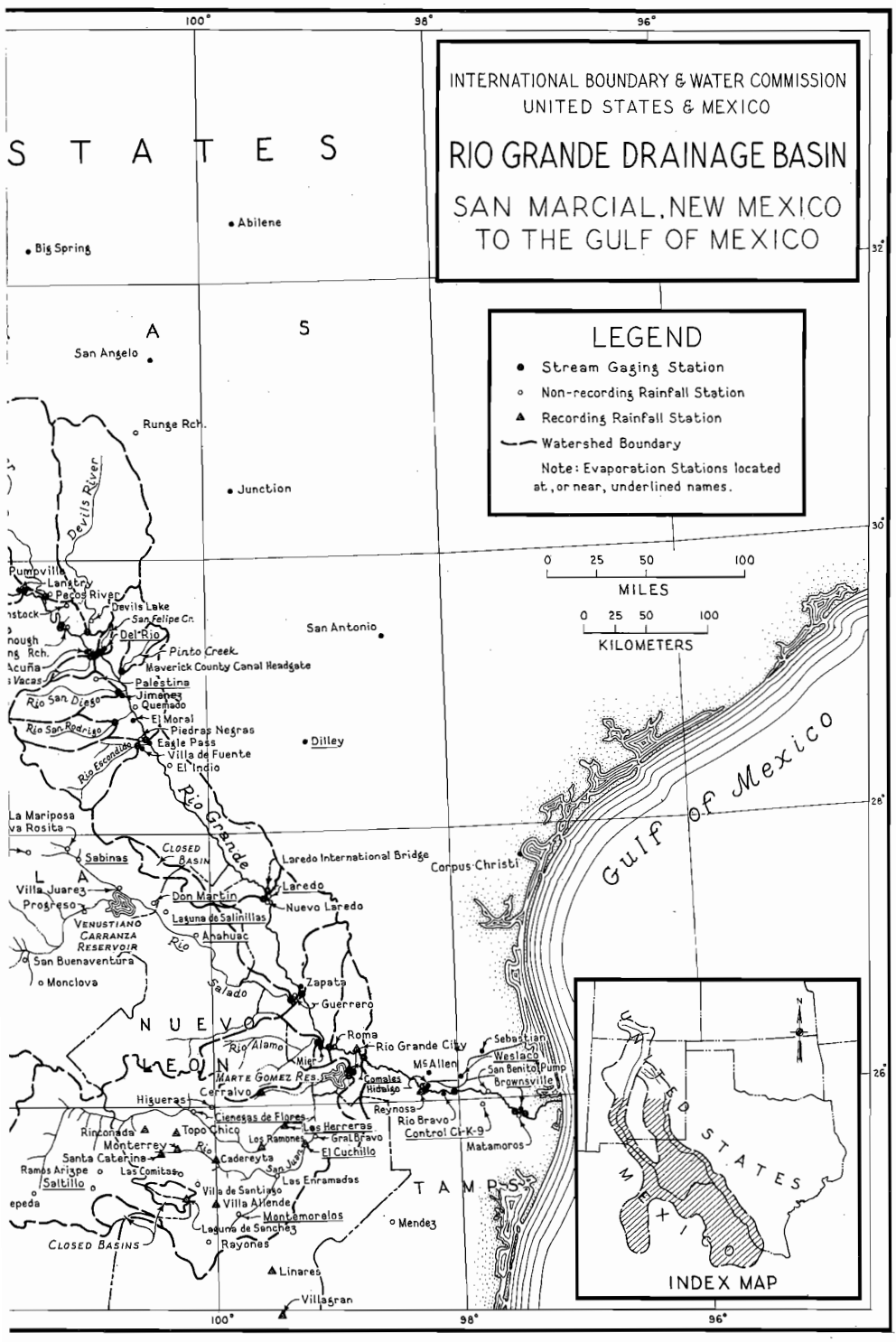
From July 8 to 13 and September 13 to 16 the river overflowed at two places between Reynosa and Retamal Canal and at one place between Retamal Canal and Rio Rico. The total volume of this overflow was approximately 35,900 acre-feet.

There are several regular floodways on the Mexican side which divert excess Rio Grande floodwater to the Gulf of Mexico. The following information is presented concerning such flood flows during 1948:

Retamal Canal - Information on the flow through this canal is shown on page 57.

Floodway No. 3 - During September approximately 8,000 acre-feet were discharged through this floodway.


108°
106°
104°
32°
30°
28°
26°
N E W M E X I C O
U N I T E D
T E
C H I H U A H U A
C O A H U I L A
D U R A N G O
M E X I C O
San Marcial
Elephant Butte Dam
Caballo Dam
Jornada
Las Cruces
State College
Roswell
Lake McMillan
Lake Avalon
Carlsbad
Red Bluff Reservoir
Closed Basin
American Dam
El Paso
Ysleta
Juarez
Island Station
Fabens
Fabens-Guadalupe Br.
County Line
Ft. Hancock Br.
West Small
Madden Arroyo
Guayuco Arroyo
Fort Quitman
Neely Rch.
Rio Grande
Grandfalls
Balmorhea
Girvin
Kingston Rch.
Fort Stockton
Stone Rch.
Reid Bros. Rch.
Sheffie
Bloys Camp
Ryan Rch.
Loma Vista Rch.
Arthur Rch.
Rose & Son Rch.
Lonsley Rch.
Hollis Haley Rch.
Mitchell Rch.
Stumberg Rch.
Fletcher Rch.
Davis Rch.
McFarland Rch.
Crosson Rch.
Dryden
Atkinson Rch.
Baush Rch.
Cienega Rch.
Presidio
Alamito Cr.
Terlingua Cr.
La Mota Rch.
Ojinaga
McCracken Rch.
Cuchillo Parado
Terlingua
Ranchos Los Angeles
Rio Conchos
Maclovio Herrera (Falomir)
Johnson Rch.
Guerrero
La Junta
Chihuahua
Las Virgenes
Rosetilla
Delicias
Villalba
La Boquilla Dam
La Boquilla
Hormiguero
Parral
Balleza
San Antonio


INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
RIO GRANDE DRAINAGE BASIN
SAN MARCIAL, NEW MEXICO
TO THE GULF OF MEXICO
LEGEND
Stream Gaging Station
Non-recording Rainfall Station
Recording Rainfall Station
Watershed Boundary
Note: Evaporation Stations located at, or near, underlined names.
0 25 50 100
MILES
0 25 50 100
KILOMETERS
INDEX MAP
UNITED STATES
MEXICO
Gulf of Mexico
Abilene
Big Spring
San Angelo
Runge Rch.
Junction
San Antonio
Dilley
Devils River
Pumpville
Langtry
Pecos River
Devils Lake
San Felipe Cr.
Del Rio
Pinto Creek
Maverick County Canal Headgate
Palestina
Jimenez
Quemado
El Moral
Piedras Negras
Eagle Pass
Villa de Fuente
El Indio
Rio San Diego
Rio San Rodrigo
Rio Escondido
Rio Grande
La Mariposa
Sabinas
Closed Basin
Laredo International Bridge
Laredo
Nuevo Laredo
Corpus Christi
Villa Juarez
Progreso
Don Martin
Laguna de Salinillas
Venustiano Carranza Reservoir
Anahuac
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Brownsville
Marte Gomez Res.
Comales
Hidalgo
Cerralvo
Higueras
Cienegas de Flores
Reynosa
Rio Bravo
Control Ci-K-9
Matamoros
Rinconada
Topo Chico
Monterrey
Los Ramones
Las Herreras
Gral Bravo
El Cuchillo
Santa Catarina
Rio Cadereyta
Ramos Arizpe
Las Comitas
Saltillo
Villa de Santiago
Villa Allende
Las Enramadas
Tamps.
Montemorelos
Laguna de Sanchez
Mendez
Closed Basins
Rayones
Linares
Villagran

RIO GRANDE AT MATAMOROS, TAMAULIPAS

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 the present gage is 15.26 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based upon 183 meter measurements during the year, 174 by the Mexican and 9 by the United States Section of this Commission. The river bottom shifts greatly at this station. Computations by shifting channel methods. Records available: 1901 to 1913; 1923 to December 1948.

REMARKS: Reservoirs, diversions, and drainage returns modify the flow at this station. 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 36,320 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. In 1930 the river at this station was dry for a few days in March and April.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	911	1,270	1,590	74.2	5.7	2,210	25,000	431	823	4,840	6,990	812
2	929	1,050	1,490	47.3	3.5	1,490	25,110	480	788	4,520	5,930	674
3	678	1,240	1,280	28.2	12.7	1,020	16,460	438	1,230	4,270	4,770	533
4	600	1,540	1,170	24.0	77.7	682	6,710	392	1,345	3,920	3,990	399
5	833	1,720	1,080	27.5	33.2	480	4,060	420	1,080	3,260	3,450	512
6	625	1,880	1,340	75.9	9.9	189	3,050	561	848	2,770	3,420	731
7	413	1,860	2,550	72.0	5.3	40.6	3,850	516	473	2,500	3,530	646
8	344	1,770	4,450	39.2	3.5	13.4	17,090	561	323	1,980	3,520	540
9	349	1,750	3,990	21.5	2.5	5.7	24,540	675	357	1,620	2,890	385
10	381	1,680	3,030	8.5	2.8	1.4	24,900	685	371	1,530	2,120	290
11	396	1,650	2,440	9.9	9.2	1.1	26,240	671	1,500	1,560	1,570	452
12	657	1,770	1,980	56.1	22.2	.7	19,110	724	17,730	1,470	1,330	586
13	692	1,745	1,770	92.9	8.5	.7	7,810	614	23,700	1,430	1,300	554
14	392	1,700	1,750	57.6	4.9	55.0	5,050	512	25,640	1,420	1,370	554
15	278	1,700	1,660	30.0	3.2	152	4,870	371	26,700	1,430	1,880	544
16	172	1,650	1,380	17.6	2.8	28.3	4,270	350	27,190	1,680	1,950	367
17	248	1,430	1,200	8.1	2.5	5.3	4,200	315	27,580	2,130	1,830	234
18	403	1,190	1,380	7.1	2.8	2.5	3,710	251	26,380	3,850	1,860	268
19	558	1,150	1,600	108	15.5	1.8	3,230	315	21,650	13,420	1,840	533
20	516	1,070	1,420	87.6	11.3	1.8	2,810	294	15,820	16,000	2,080	692
21	494	1,150	1,080	53.7	11.3	1.8	3,350	290	12,680	12,500	2,300	417
22	271	1,300	1,050	30.7	5.3	10.6	2,120	271	11,440	6,250	2,360	427
23	139	1,480	833	14.8	4.2	7.1	1,840	288	10,420	5,120	2,100	434
24	117	1,530	480	8.5	73.1	2.1	1,620	339	8,930	4,770	1,710	455
25	159	1,660	301	8.5	97.5	1.8	1,490	392	7,730	6,280	1,270	621
26	357	1,770	206	54.7	152	1.8	1,300	392	7,130	13,560	1,310	1,220
27	798	1,910	223	74.9	147	1.8	755	403	6,460	15,930	1,400	1,230
28	1,100	1,690	294	49.5	2,400	4,700	717	526	5,510	13,880	1,300	805
29	1,140	1,490	342	19.4	8,090	18,470	625	530	5,090	9,990	1,260	579
30	1,230		259	8.5	4,980	23,025	537	597	5,010	8,690	1,070	291
31	1,310		138		3,180		448	812		8,120		199
Sum	17,490	44,795	43,756	1,216.4	19,380.1	52,603.3	246,872	14,416	301,928	180,690	73,700	16,984

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	2.69	- .39	31	1,310	23	109	564	34,690	206,037	490,800	34,690	159,656
Feb.	3.71	1.90	7	1,920	20	1,060	1,540	88,850	144,231	328,300	28,470	110,055
Mar.	6.79	- .10	8	4,660	31	105	1,410	86,790	110,940	240,800	18,240	88,207
Apr.	- .10	-1.48	19	118	18	5.7	40.5	2,410	105,574	317,800	2,410	73,744
May	9.55	-1.64	29	8,760	‡ 9	2.5	625	38,440	270,122	721,100	34,630	235,694
June	19.42	-1.87	30	24,610	13	* .4	1,750	104,300	362,506	1,180,500	2,580	299,115
July	20.54	2.36	11	ϕ 26,420	31	424	7,960	489,700	316,678	756,600	22,940	305,836
Aug.	3.48	.36	31	946	18	251	465	28,590	279,571	833,700	12,290	267,313
Sept.	20.73	.66	17	27,720	8	323	10,060	598,900	610,883	1,363,200	24,740	600,327
Oct.	13.25	3.74	20	16,920	13	1,370	5,830	358,400	574,294	1,408,500	28,150	550,201
Nov.	9.15	2.49	1	7,420	30	971	2,460	146,200	261,146	827,500	26,820	194,649
Dec.	3.25	.10	26	1,360	31	123	548	33,690	199,710	594,200	33,690	136,474
Yearly	20.73	-1.87		27,720		* .4	2,770	2,010,960	3,441,692	6,579,500	1,392,980	3,021,271

* Partly estimated ‡ And other days ϕ A maximum flow of 25,180 second-feet at a gage height of 20.05 feet occurred on July 2.

RIO GRANDE AT LOWER BROWNSVILLE, TEXAS

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 river miles upstream from the Gulf of Mexico and 1,191.0 river miles below the American Dam at El Paso, Texas. Zero of the gage is at mean sea level, U.S.C. & G.S. datum. An auxiliary water-stage recorder located at the El Jardín pumping plant was used during periods of low flow.

RECORDS: Based upon 46 meter measurements during the year, 41 by the United States Section and 5 by the Mexican Section of this Commission and a continuous record of gage heights. Computations by shifting channel methods. Records available: January 1934 to December 1948.

REMARKS: Reservoirs, diversions, and drainage returns, modify the river flow at this station. During floods, a portion of the upstream river flow 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. Zero flow has frequently occurred at this station.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,000	1,150	1,410	84.8	0	2,160	23,900	358	580	4,580	7,940	806
2	953	972	1,350	52.5	0	1,350	24,400	356	572	4,350	7,180	654
3	740	1,040	1,180	25.5	0	857	17,600	282	1,040	4,150	6,110	492
4	559	1,280	1,060	36.8	* 4.5	551	6,940	9.6	1,520	3,880	5,100	282
5	732	1,480	951	32.7	0	281	3,960	130	1,140	3,250	4,480	234
6	655	1,810	1,070	46.4	0	25.0	2,950	538	619	2,660	4,220	566
7	412	1,770	1,980	50.6	0	.5	3,310	466	283	2,330	4,130	597
8	288	1,670	3,740	26.4	0	0	15,500	327	36.2	2,070	3,970	495
9	213	1,610	3,860	34.4	0	0	22,100	600	16.4	1,820	3,460	298
10	419	1,520	3,170	21.1	0	0	24,200	596	44.8	1,740	2,520	141
11	523	1,460	2,510	14.7	0	.3	24,700	468	397	1,740	1,860	109
12	562	1,700	1,960	* 29.8	0	0	20,700	554	16,300	1,660	1,410	157
13	606	1,650	1,700	‡ 32.6	0	0	8,940	446	22,200	1,620	1,260	367
14	373	1,550	1,650	‡ 15.5	0	0	5,260	252	23,800	1,590	1,270	427
15	174	1,570	1,570	* 8.3	0	2.0	5,040	74.3	25,100	1,600	1,790	482
16	114	1,510	1,370	‡ 7.9	0	0	4,140	17.7	25,600	1,700	1,910	257
17	153	1,320	1,120	‡ 7.8	0	.3	4,130	13.9	26,200	1,970	1,740	136
18	311	1,070	1,210	‡ 8.2	1.9	0	3,580	0	25,700	3,360	1,680	132
19	536	958	1,390	‡ 8.9	14.3	0	2,930	‡ .2	22,000	11,400	1,660	431
20	469	837	1,350	* 14.7	8.9	0	* 2,530	0	16,400	14,200	1,840	648
21	366	886	1,010	* 9.4	0	0	* 2,010	3.0	14,300	11,000	2,030	320
22	262	996	897	* 2.2	0	0	* 1,550	4.3	11,600	8,390	2,070	305
23	128	1,200	772	0	0	0	* 1,200	3.9	10,400	6,860	1,980	320
24	74.8	1,300	448	0	15.8	0	1,040	3.8	8,870	6,010	1,700	354
25	95.2	1,430	258	0	2.2	0	861	8.3	7,520	6,670	1,270	550
26	265	1,610	178	0	5.6	0	750	5.8	6,750	11,800	1,180	1,060
27	674	1,820	171	0	0	0	585	1.6	6,050	13,300	1,280	1,110
28	991	1,680	221	0	1,290	3,350	596	3.9	5,160	12,200	1,210	818
29	1,040	1,350	246	0	7,100	17,100	543	3.7	4,770	9,900	1,140	595
30	1,090		233	0	4,920	22,200	490	9.7	4,710	8,900	975	281
31	1,160		175		3,160		421	169		8,560		94.0
Sum	15,938	40,199	40,210	*571.2	16,523.2	47,877.1	236,856	5,705.7	289,678.4	175,260	80,365	13,518.0

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1934-1948: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum	Acre-Feet Normal 1938-1948
Jan.	13.15	10.08	31	1,170	24	71.3	514	31,600	171,447	299,000	31,600	152,882
Feb.	14.35	12.29	6	1,860	20	810	1,390	79,700	121,413	237,000	24,400	106,473
Mar.	17.51	10.06	7	4,090	31	130	1,300	79,800	94,660	199,000	18,600	84,200
Apr.	10.06		1	129	‡22	0	19.0	1,130	84,129	242,000	1,130	69,748
May	20.50		29	7,600	‡ 1	0	533	32,800	253,940	717,000	29,900	225,827
June	30.50		30	23,400	‡ 7	0	1,600	95,000	331,692	*1,161,000	1,380	289,762
July	31.50	13.06	11	25,000	31	388	7,640	470,000	307,433	759,000	15,500	291,955
Aug.	14.07		10	696	‡ 4	0	184	11,300	230,087	679,000	6,000	252,218
Sept.	31.73	10.90	17	26,400	9	7.5	9,660	575,000	571,220	1,337,000	21,300	579,118
Oct.	25.52	15.40	20	14,800	14	1,540	5,650	348,000	509,113	*1,427,000	21,700	536,973
Nov.	21.30	13.22	1	8,280	30	876	2,680	159,000	190,393	614,000	21,500	187,445
Dec.	13.90	10.67	‡26	1,190	31	50.3	436	26,800	149,107	341,000	26,800	130,255
Yearly	31.73			26,400		0	2,630	1,910,130	3,014,634	6,526,000	1,256,500	2,906,856

‡ Estimated * Partly estimated ‡ And other days

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

In Thousands of Acre-Feet

Data are presented below for all storage reservoirs in the Rio Grande Basin that exceed 15,000 acre-feet in capacity. The monthly figures represent the water in storage on the last day of each month, in thousands of acre-feet. The capacities indicated are at spillway level. Storage figures greater than the capacity indicate that the water surface was above spillway level.

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 Secretary of the Bluewater-Toltec Irrigation District; Elephant Butte, Caballo, Alamogordo, McMillan, and Avalon from the United States Bureau of Reclamation; Red Bluff from Red Bluff Water Power Control District; Willacy from the Willacy County Water Control and Improvement District No. 1; Boquilla, Colina, and Rosetilla from Rio Conchos Agriculture and Electric Power Company; Francisco I. Madero from Ministry of Hydraulic Resources of Mexico; Centenario and San Miguel, Venustiano Carranza (formerly called Don Martín), Marte R. Gómez, Culebrón, Villa Cárdenas, and Palito Blanco from the Department of Agriculture and Livestock of Mexico.

In The United States

Month	Rio Grande (Capacity 51.1)		Continental (Capacity 26.7)		Santa Maria (Capacity 43.6)		Terrace (Capacity 17.7)		Mountain Home (Capacity 20.1)	
	1948	#Normal 1927-1948	1948	#Normal 1928-1948	1948	#Normal 1928-1948	1948	#Normal 1925-1948	1948	#Normal 1924-1948
Jan.	20.7	14.0	2.6	5.0	4.9	7.2	5.6	2.8	7.3	4.6
Feb.	22.4	15.3	3.0	5.0	5.5	7.9	5.7	3.2	8.4	5.0
Mar.	24.2	16.7	4.0	5.1	5.8	9.3	6.0	3.6	8.4	5.3
Apr.	30.5	16.6	8.9	5.4	7.5	11.2	10.6	4.2	9.6	6.0
May	45.8	25.3	20.7	8.1	24.3	16.4	17.7	7.6	13.4	8.6
June	50.4	27.1	26.7	8.7	34.0	18.9	15.3	9.0	5.5	8.4
July	29.0	15.7	16.8	6.6	30.4	12.8	6.3	5.7	5.3	6.1
Aug.	11.7	6.6	4.8	4.7	20.8	5.7	2.0	2.9	2.0	3.8
Sept.	11.7	6.3	4.8	4.9	16.1	5.2	0.6	2.4	0.5	3.3
Oct.	12.0	7.8	4.8	4.5	15.9	5.6	0.5	2.6	0.7	3.4
Nov.	13.4	11.2	5.1	4.6	15.8	6.5	0.9	2.2	1.2	3.8
Dec.	15.1	12.8	5.1	5.0	15.8	7.1	1.3	2.5	1.5	4.1
Avg.	23.9	14.6	8.9	5.6	16.4	9.5	6.0	4.1	5.3	5.2
Max.	50.4	51.8	26.7	26.7	34.0	42.1	17.7	17.7	13.4	16.4
Min.	11.7	0	2.6	0	4.9	0	0.5	0	0.5	0

Month	Sanchez (Capacity 103.2)		Costilla (Capacity 15.7)		El Vado (Capacity 200.3)		Bluewater (Capacity 43.5)		Elephant Butte (Capacity 2,197.6)	
	1948	#Normal 1926-1948	1948	#Normal 1922-1948	1948	Normal 1935-1948	1948	#Normal 1927-1948	1948	Normal 1915-1948
Jan.	8.7	12.4	6.3	3.8	6.0	52.1		6.1	435.6	1,027.8
Feb.	8.9	12.5	6.7	4.1	7.3	53.4		7.2	417.3	1,027.9
Mar.	9.3	13.2	8.8	4.7	20.4	59.4		11.7	395.2	1,015.4
Apr.	12.0	15.1	8.9	6.0	95.8	117.5	12.5	15.3	409.3	1,022.2
May	19.7	21.0	13.3	8.7	203.5	176.6	10.2	13.1	484.3	1,163.2
June	20.5	19.7	12.1	7.7	202.6	165.6	8.4	10.3	761.8	1,218.4
July	9.0	13.7	7.9	4.5	184.2	135.0	6.8	8.7	673.5	1,155.2
Aug.	4.1	10.5	5.0	2.9	157.8	100.0	5.7	7.4	588.6	1,078.8
Sept.	2.5	11.0	3.9	2.4	144.8	79.1	4.8	7.2	542.9	1,034.8
Oct.	3.1	11.8	3.7	2.7	140.9	72.0	4.6	6.7	506.8	1,025.8
Nov.	3.9	11.7	4.0	3.1	142.7	62.4	4.4	6.6	493.3	1,025.8
Dec.	4.8	11.7	4.3	3.5	144.0	59.3	4.3	6.3	492.0	1,030.0
Avg.	8.9	13.7	7.1	4.5	120.8	94.4		8.9	516.7	1,068.8
Max.	20.5	62.4	13.3	15.1	203.5	203.5		47.1	ϕ 762.3	ϕ 2,302.8
Min.	2.5	1.6	3.7	0	6.0	2.3		0	ϕ 374.7	3.3

Some months missing ϕ Daily extreme

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

In Thousands of Acre-Feet

In The United States

Month	Caballo (Capacity 346.0)		Alamogordo (Capacity 132.2)		McMillan and Avalon (Capacity 43.5)		Red Bluff (Capacity 310.0)		Willacy (Capacity 25.0)		Total in United States Reservoirs (Capacity 3,576.2)	
	1948	#Normal 1938-1948	1948	#Normal 1938-1948	1948	#Normal 1908-1948	1948	#Normal 1936-1948	1948	#Average 1939-1948	1948	Estimated Normal
Jan.	88.5	202.4	25.9	62.4	6.1	31.2	30.1	141.5	18.3	15.4	666.6	1,588.7
Feb.	154.2	205.5	32.2	66.7	8.1	31.5	34.3	145.4	18.1	14.7	732.1	1,605.3
Mar.	173.6	184.1	37.0	56.3	6.7	29.6	36.3	142.8	17.0	13.7	752.7	1,570.9
Apr.	151.9	147.6	2.4	46.1	6.4	20.8	15.0	120.2	4.3	13.1	785.6	1,567.3
May	162.6	132.9	16.6	61.5	3.8	24.4	22.1	136.8	4.5	13.2	1,062.5	1,817.4
June	132.5	104.6	36.9	54.0	18.7	23.1	32.8	151.4	3.9	13.8	1,362.1	1,840.7
July	78.3	71.7	13.4	52.0	8.1	18.8	21.1	134.2	16.0	14.6	1,106.1	1,655.3
Aug.	26.5	43.3	7.4	52.1	5.9	17.1	10.0	116.8	12.7	13.8	865.0	1,466.4
Sept.	23.7	36.5	6.6	49.2	3.0	19.3	16.0	113.3	15.5	15.4	797.4	1,390.3
Oct.	53.3	71.7	7.5	53.4	1.7	22.2	21.8	117.0	13.3	15.0	790.6	1,422.2
Nov.	71.5	110.3	12.9	50.9	3.9	24.0	24.8	121.6	15.8	14.4	813.6	1,459.1
Dec.	99.5	150.1	19.0	55.1	5.6	28.2	28.2	127.1	16.1	16.2	856.6	1,519.0
Avg.	101.3	121.7	18.2	55.0	6.5	24.2	24.4	130.7	13.0	14.4	882.6	1,575.2
Max.	ϕ188.4	ϕ 346.6	37.0	156.3	18.7	85.5	36.3	327.5	18.3	22.0	1,362.1	
Min.	ϕ 51.7	ϕ 0.1	2.4	1.7	1.7	0	10.0	10.0	3.9	3.9	666.6	

In Mexico

Month	La Colina (Capacity 21.9)										Rosetilla (Capacity 15.4)	
	1940	1941	1942	1943	1944	1945	1946	1947	1948	Average 1940-1948	1940	1941
Jan.	18.3	17.8	18.4	14.5	16.4	18.2	18.5	18.6	18.0	17.6	15.0	14.9
Feb.	18.5	18.0	18.6	17.5	18.5	17.6	18.6	18.5	15.9	18.0	14.9	15.0
Mar.	16.4	15.5	17.6	17.0	18.9	19.1	17.5	17.5	18.6	17.6	14.8	14.6
Apr.	17.8	18.3	18.3	19.5	17.5	18.0	18.7	18.1	19.2	18.4	13.7	14.6
May	18.1	18.0	16.9	19.5	17.9	20.4	19.7	18.3	17.9	18.5	15.3	10.5
June	17.0	16.7	17.3	19.6	19.1	18.2	17.0	18.1	18.9	18.0	15.2	14.6
July	19.1	16.9	18.7	18.9	17.8	17.9	20.1	18.4	19.2	18.6	14.2	12.9
Aug.	14.6	14.2	19.9	18.3	19.1	18.7	18.5	18.3	18.7	17.8	13.2	14.5
Sept.	15.0	20.0	20.0	18.7	18.8	16.4	17.5	17.2	18.7	18.0	14.5	19.3
Oct.	17.3	18.0	18.7	17.9	18.1	17.8	18.3	18.5	18.3	18.1	13.6	15.5
Nov.	16.6	17.3	17.8	17.9	17.9	18.2	18.1	18.4	18.4	17.8	12.8	15.2
Dec.	16.6	18.2	14.8	17.6	17.3	18.1	18.7	18.1	16.6	17.3	14.5	15.5
Avg.	17.1	17.4	18.1	18.1	18.1	18.2	18.4	18.2	18.2	18.0	14.3	14.8
Max.	19.1	20.0	20.0	19.6	19.1	20.4	20.1	18.6	19.2	20.4	15.3	19.3
Min.	14.6	14.2	14.8	14.5	16.4	16.4	17.0	17.2	15.9	14.2	12.8	10.5

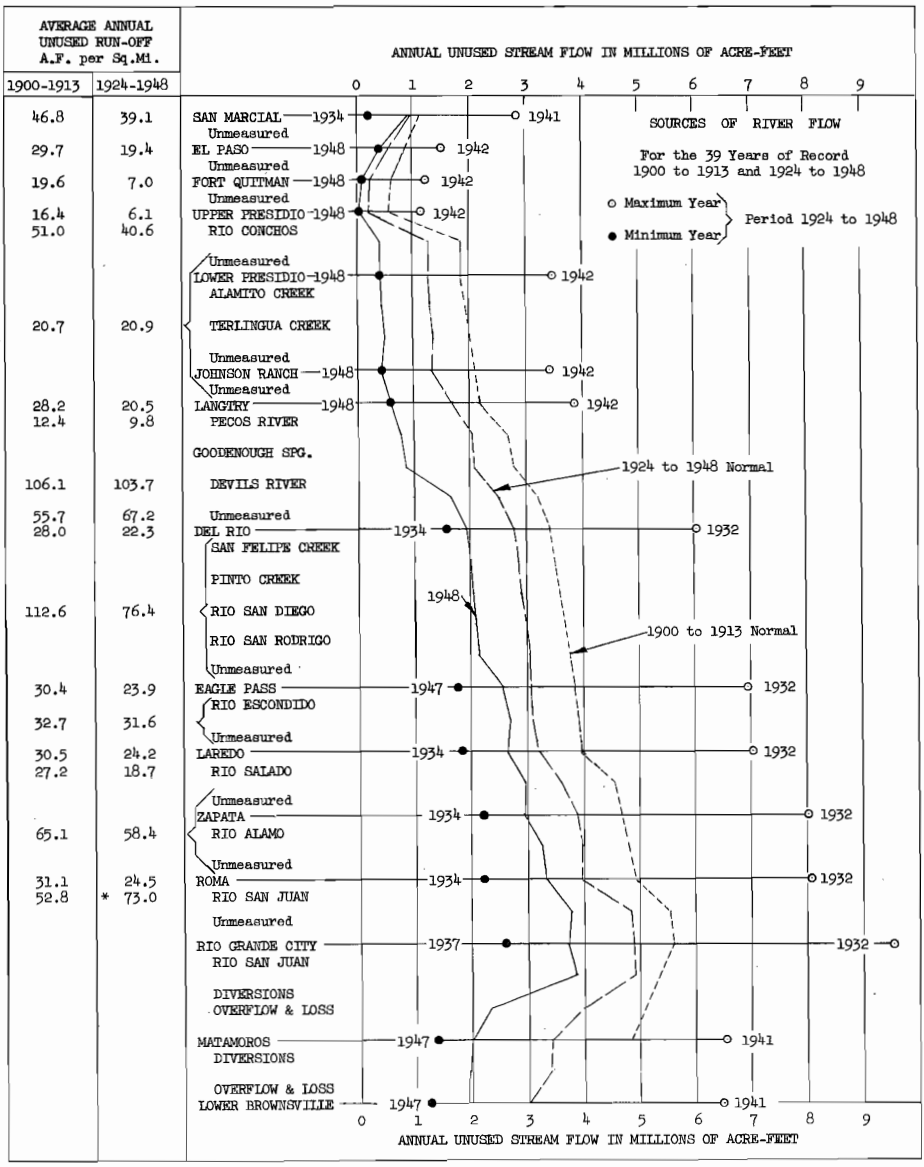
Month	Rosetilla (Capacity 15.4)								Boquilla (Capacity 2,116.0)		Madero (Capacity 344.6)	
	1942	1943	1944	1945	1946	1947	1948	Average 1940-1948	1948	Normal 1914-1948	⊕ 1948	
Jan.	12.6	14.7	4.7	12.3	15.2	14.4	15.2	13.2	1,210.4	1,526.8		
Feb.	14.8	14.5	13.5	12.9	14.1	14.5	15.8	14.4	1,177.0	1,495.5		
Mar.	14.9	14.8	5.2	15.2	14.7	15.4	15.3	13.9	1,092.4	1,445.6		
Apr.	13.4	12.9	3.9	14.2	15.3	14.8	14.6	13.0	1,001.1	1,383.2		
May	15.2	3.7	3.6	11.2	10.0	14.4	14.9	11.0	907.0	1,318.6		
June	9.5	14.9	11.9	14.6	13.3	14.5	13.5	13.6	821.8	1,229.2		
July	11.3	11.8	12.5	14.1	12.5	14.1	12.8	12.9	778.2	1,265.3	2.6	
Aug.	19.4	12.0	7.5	11.6	9.8	15.8	13.7	13.1	788.3	1,437.5	2.0	
Sept.	18.0	16.1	16.0	15.0	11.9	12.6	13.6	15.2	780.5	1,596.5	1.4	
Oct.	17.3	13.6	12.2	13.3	15.0	13.5	14.7	14.3	745.4	1,589.0	11.3	
Nov.	15.2	12.8	12.7	0.4	14.2	15.7	13.6	12.5	700.3	1,550.3	14.8	
Dec.	15.0	14.7	14.8	13.0	13.0	14.6	13.2	14.3	672.2	1,533.3	17.7	
Avg.	14.7	13.0	9.9	12.3	13.2	14.5	14.2	13.4	889.6	1,447.6		
Max.	19.4	16.1	16.0	15.2	15.3	15.8	15.8	19.4	1,210.4	2,224.5	17.7	
Min.	9.5	3.7	3.6	0.4	9.8	12.6	12.8	0.4	672.2	37.6	1.4	

Month	Centenario and San Miguel (Capacity 19.9)		Venustiano Carranza (Capacity 1,123.0)		Marte Gomez (Capacity 876.4)		⊕ Culebron (Capacity 104.2)		Palito Blanco (Capacity 124.0)		Total in Mexican Reservoirs (Capacity 4,745.4)	
	1948	Normal 1934-48	1948	Normal 1930-48	1948	*Average 1943-48	1948	Normal 1939-48	1948	Average 1942-48	1948	‡Estimated Normal
Jan.	16.0	13.0	576.1	424.1	798.5	443.8	53.0	59.5	13.7	37.6	2,700.9	2,536.6
Feb.	13.6	12.6	540.1	409.8	785.6	425.7	56.6	52.4	14.3	32.8	2,618.9	2,461.2
Mar.	7.9	9.4	511.3	386.5	774.2	341.4	54.2	40.2	14.4	26.6	2,488.3	2,281.2
Apr.	4.5	7.6	492.6	373.4	676.9	332.9	15.2	30.2	6.5	15.0	2,230.6	2,173.7
May	3.7	9.2	433.2	359.4	668.8	349.0	22.0	40.4	0	10.7	2,067.5	2,116.8
June	2.7	8.1	385.6	355.2	600.7	337.4	35.7	53.8	0	16.2	1,878.9	2,031.5
July	8.8	8.1	395.3	349.2	593.4	320.7	66.0	48.6	14.7	20.2	1,891.0	2,046.2
Aug.	8.4	9.1	362.6	351.5	565.1	398.5	32.2	50.3	11.7	23.6	1,802.7	2,303.4
Sept.	10.2	11.7	425.5	410.3	910.4	481.0	87.6	63.4	17.3	27.6	2,265.2	2,625.1
Oct.	16.3	13.3	466.0	435.5	914.5	526.8	88.1	69.8	20.2	43.1	2,294.8	2,721.2
Nov.	19.2	12.2	474.2	448.4	878.0	520.0	73.2	61.6	20.0	43.7	2,211.7	2,681.3
Dec.	16.6	12.5	473.3	450.7	874.8	528.9	72.3	62.1	19.2	43.2	2,175.9	2,680.0
Avg.	10.7	10.6	461.3	396.2	753.4	417.2	54.7	52.7	12.7	28.4	2,218.9	2,388.2
Max.	19.2	20.6	576.1	1,163.4	914.5	914.5	88.1	108.1	20.2	104.6	2,700.9	
Min.	2.7	0.6	362.6	0.7	565.1	ϕ 2.1	15.2	13.1	0	0	1,802.7	

⊕ Includes Villa Cárdenas * Storage in Marte Gómez began March 10, 1943 ϕ Daily extreme # Some months missing
⊕ Storage in Madero began July 25, 1948 ‡ Figures for July through December include Madero storage

SOURCES OF RIVER FLOW

The graph and the column of figures on this page each represent data on the annual yield of drainage areas tributary to various stream gaging stations in the Rio Grande Watershed. The graphic values being for the entire tributary area while the column figures are reduced to the yield from one average square mile of the tributary area. Because there were no reservoirs of consequence on the area from 1900 to 1913 the figures in the first column are the same as those in the graph for that period except that the column figures have been reduced to a per-square-mile basis. Because some large reservoirs began storing water between 1913 and 1924 large volumes of unused run-off were not permitted to pass on downstream as unused stream flow until later years when the impounded water was released and added to the stream flow. Elephant Butte and La Boquilla reservoirs illustrate this. Reservoirs which began storing water after January 1, 1924 were on December 31, 1948 retaining large volumes of run-off water which had not yet passed downstream as stream flow. Caballo and Marte Gómez reservoirs illustrate this. The column figures below for the period 1924 to 1948 differ from the corresponding graphic values because of such adjustments between unused run-off and unused stream flow incident to changes of reservoir storage.



* Includes Rio San Juan above and below Rio Grande City

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

DESCRIPTION: An open channel rating station in a concrete-lined canal with two water-stage recorders located 396 and 2,350 feet, respectively, below the head gates at the American Dam near El Paso, Texas. Zero of gages at both recorders is 3,712.09 feet above mean sea level, U.S.C. & G.S. datum. Measurements are made at the downstream end of the first covered section of this canal.

RECORDS: Based on 51 meter measurements during the year and a continuous gage height record. Computations by shifting channel methods. Records available: June 2, 1938 to December 31, 1948.

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 Juárez, Chihuahua. Operation began June 2, 1938. Water from this canal discharges into the Franklin Canal from which water 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.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 1,840 second-feet on March 27, 1944. Min., sometimes dry.

Average Flow in Second-Feet

Daily:	Max.	1,510,	Aug. 13, 1945.	Min.		sometimes dry.		
Monthly:	Max.	1,210,	Aug. 1943.	Min.	0.1	Jan.	1946.	
Yearly:	Max.	748,	1943.	Min.	477		1948.	

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	132	144	94.3	283	585	467	1,020	520	719	241	228	190
2	128	102	90.8	65.0	642	692	1,020	989	795	277	222	188
3	125	101	84.9	174	884	776	955	1,050	684	280	219	194
4	40.4	101	82.4	370	829	839	973	962	692	284	210	195
5	0	120	83.2	778	821	615	1,120	751	781	314	196	183
6	0	110	87.5	653	804	406	941	625	845	373	195	180
7	0	107	91.9	769	720	640	918	638	737	349	201	179
8	0	106	89.3	970	624	641	896	693	796	362	198	178
9	0	107	87.5	922	609	630	950	1,050	835	239	189	169
10	0	103	86.8	849	584	628	998	1,040	790	147	192	174
11	0	103	88.5	880	488	537	1,030	1,060	607	154	194	177
12	0	100	87.9	902	451	509	1,160	1,010	568	142	193	175
13	0	108	91.6	838	403	489	1,150	1,030	710	124	191	171
14	0	102	87.6	835	450	559	1,070	1,200	545	116	190	177
15	0	104	87.9	765	534	532	1,120	1,190	499	142	188	236
16	0	102	89.9	567	672	459	1,080	1,240	454	248	186	273
17	0	99.9	89.2	690	758	446	1,170	1,150	422	281	182	309
18	0	99.1	117	692	652	713	1,180	1,110	500	273	179	277
19	68.3	99.1	322	711	675	995	1,230	994	501	276	276	235
20	114	100	367	670	611	1,080	1,240	802	628	288	277	213
21	107	103	428	719	693	1,050	1,190	792	358	281	300	219
22	108	102	714	835	631	1,010	1,070	858	287	268	309	221
23	107	97.6	652	828	600	941	1,220	871	249	258	247	200
24	109	96.7	491	803	757	967	1,220	820	217	250	216	196
25	105	99.5	538	885	624	1,000	985	831	198	251	214	193
26	103	111	803	841	622	* 962	1,160	824	172	253	206	205
27	99.1	101	970	715	579	* 864	839	959	173	248	201	208
28	71.5	95.2	989	716	514	* 809	919	1,090	236	239	198	204
29	100	96.1	903	718	483	1,010	894	1,120	188	239	191	206
30	143		732	610	433	1,030	612	1,190	154	236	191	202
31	156		700		423		532	937		234		199
Sum	1,816.3	3,020.2	10,227.2	21,053	19,155	22,296	31,862	29,396	15,340	7,667	6,379	6,326

Month	Current Year 1948: Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948 #: Acre-Feet Normal	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	5.97		30	237	‡ 4	0	58.6	3,600	2,411	8,110	8.5
Feb.	5.61	4.77	1	185	2	64.8	104	5,990	11,840	19,500	5,170
Mar.	10.37	3.73	29	1,160	4	73.4	330	20,300	36,955	50,100	20,300
Apr.	10.75		12	1,470	‡ 1	0	702	41,800	56,790	70,900	41,800
May	8.90	6.06	3	957	13	356	618	38,000	49,530	69,000	38,000
June	10.98	6.00	21	1,480	6	347	743	44,200	53,900	65,700	44,200
July	10.40	6.75	24	1,460	30	488	1,030	63,200	60,582	70,700	42,600
Aug	10.26	6.84	31	1,420	1	501	948	58,300	61,955	74,600	44,000
Sept.	8.79	4.46	1	942	30	144	511	30,400	43,900	63,100	30,400
Oct.	6.34	3.98	9	410	14	103	247	15,200	24,018	39,000	13,100
Nov.	6.12	4.16	22	355	15	111	213	12,700	13,852	21,000	5,630
Dec.	5.87	4.00	17	321	31	88.0	204	12,500	14,145	25,500	8,440
Yearly	10.98			1,480		0	477	346,190	429,878	541,610	346,190

The normal, maximum, and minimum discharges for January through May are for the period 1939-1948. ‡ And other days * Partly estimated

DIVERSIONS FROM THE RIO GRANDE INTO THE ACEQUIA MADRE
Near Juárez, Chihuahua

DESCRIPTION: Water-stage recorder and bridge for meter measurements located about 260 feet below the canal intake at the International Dam at Juárez, Chihuahua which is 2.1 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 113 meter measurements during the year, 83 by the Mexican and 30 by the United States Section of this Commission. Computations by shifting channel methods. Records available: 1938-1948.

REMARKS: In 1948, 58,670 acre-feet were distributed to 17,025 acres of land irrigated in the first unit under the canal. The remainder of the water from this canal was used, together with drainage water (which entered the canal at the lower end of the first unit), to irrigate lands farther down the canal.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 480 second-feet on July 21, 1944 with a gage height of 6.00 feet. Min. dry through winter months.

Average Flow in Second-Feet

Daily:	Max.	339,	May 10, 1942.	Min.		dry several months each year.
Monthly:	Max.	283,	May 1938.	Min.		dry several months each year.
Yearly:	Max.	116,	1942.	Min.	76.3	1941.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				98.2	113	211	175	194	184	80.2		
2				122	149	171	168	218	158			
3				86.2	141	172	173	206	158			
4				93.9	137	154	175	220	174			
5				95.0	141	145	174	203	176			
6				80.2	138	158	164	205	175			
7				85.8	135	158	173	209	160			
8				92.9	136	160	171	208	164			
9				91.1	147	161	169	209	169			
10				87.2	146	167	170	201	164			
11				87.2	143	161	172	202	166			
12				103	141	159	170	209	178			
13				91.1	132	158	164	201	187			
14				96.1	140	156	166	204	176			
15				96.4	186	159	165	205	196			
16				93.6	225	156	166	199	191			
17				98.2	234	161	171	200	184			
18				85.8	237	156	169	194	181			
19				86.5	239	159	167	188	187			
20				84.8	247	166	170	191	200			
21				89.0	245	155	171	194	188			
22				93.9	246	166	171	198	183			
23				83.7	249	165	191	202	184			
24				76.3	249	169	180	192	181			
25				79.8	248	160	178	189	175			
26				75.2	243	155	170	188	186			
27				74.2	235	157	171	201	191			
28				68.5	235	174	190	191	203			
29				75.9	243	164	184	180	195			
30				72.4	260	165	172	205	193			
31					251		156	250				
Sum				2,644.1	6,011	4,878	5,326	6,256	5,407	80.2		

Month	1938-48 Average Rainfall Inches		Current Year 1948 Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1938-1948 Acre-Feet Normal	Maximum	Minimum
Jan.	.45	.11		0		0	0	0	0	0	0
Feb.	.27	.35		0		0	0	0	0	0	0
Mar.	.31	.03		0		0	0	0	2,152	5,540	0
Apr.	.21	.08	12	227	1	0	88.1	5,240	7,326	11,720	5,240
May	.45	.25	30	276	1	71.3	194	11,920	13,533	17,380	11,200
June	.85	1.08	1	249	21	53.7	163	9,680	10,782	15,700	9,650
July	1.24	1.19	28	324	25	126	172	10,560	10,274	15,170	7,910
Aug.	1.35	.91	31	315	27	67.1	202	12,410	9,596	12,410	5,200
Sept.	1.15	.61	1	238	1	131	180	10,720	8,163	12,380	2,240
Oct.	.99	.47	1	205	‡ 2	0	2.6	159	118	328	0
Nov.	.35	T		0		0	0	0	0	0	0
Dec.	.65	.90		0		0	0	0	0	0	0
Yearly	8.27	5.98		324		0	83.6	60,689	61,944	83,930	55,320

‡ And other days

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

Near Eagle Pass, Texas

DESCRIPTION: 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 (capacity 9,000 kva) returns to the river about 32.2 miles below the point of diversion. The Maverick Canal Extension begins at the hydroelectric plant about 9 miles north of Eagle Pass, Texas. The water-stage recorder is located on a wooden pile bridge about 1 mile below the power plant. Meter measurements are from the bridge.

RECORDS: Based on 22 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records of canal discharge began April 1, 1939 and extend to December 31, 1948.

REMARKS: Irrigation from this canal extension began in June 1938. From this canal extension in 1948, 13,640 acres of land were irrigated north and south of Eagle Pass. Some waste water from this canal extension reaches the river below the Eagle Pass gaging station.

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 297 second-feet on November 4, 1944. Min., sometimes dry.

Average Flow in Second-Feet

Daily:	Max.	255,	Nov. 4, 1944.	Min.		sometimes dry.	
Monthly:	Max.	214,	Aug. 1948.	Min.	‡ 18.7	March,	1939.
Yearly:	Max.	179,	1948.	Min.	62.1		1939.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	172	160	160	214	182	185	178	220	203	‡ 165	141	182
2	175	159	166	214	172	183	131	201	204	‡ 158	134	187
3	174	153	173	215	160	180	119	206	199	‡ 152	154	187
4	180	141	176	218	183	195	* 123	194	202	* 175	182	191
5	178	139	172	213	188	200	‡ 160	213	202	176	187	193
6	178	140	172	216	187	131	‡ 160	218	193	176	186	192
7	179	138	182	216	185	‡ 88.7	‡ 160	222	199	183	178	199
8	178	143	178	214	186	‡ 86.0	‡ 160	223	192	182	181	200
9	175	140	177	217	196	‡ 78.4	‡ 160	217	161	186	175	201
10	176	138	176	217	200	195	‡ 160	213	104	188	179	205
11	176	141	187	221	165	219	‡ 160	218	105	184	201	197
12	169	141	193	215	153	216	‡ 160	219	108	180	189	202
13	169	143	185	218	172	216	‡ 160	218	107	179	182	206
14	169	144	194	218	183	221	‡ 160	220	119	182	169	202
15	167	147	194	218	186	222	‡ 160	226	166	184	150	204
16	167	145	206	214	188	225	‡ 160	201	165	182	119	201
17	166	170	214	212	187	230	‡ 160	209	164	182	118	203
18	167	187	216	219	184	216	‡ 160	214	169	189	143	203
19	156	178	217	215	184	219	‡ 160	212	‡ 149	186	172	197
20	172	181	214	214	189	215	* 193	216	‡ 142	182	193	200
21	177	180	214	211	203	219	185	220	‡ 110	182	167	200
22	171	181	212	214	203	217	183	218	‡ 104	174	177	210
23	173	173	212	169	206	211	187	216	‡ 103	142	177	198
24	168	177	213	143	174	194	193	211	‡ 118	129	178	185
25	173	178	209	164	139	181	200	214	‡ 117	129	179	165
26	177	180	209	163	131	93.0	193	212	‡ 122	130	179	172
27	178	182	211	185	130	82.0	197	204	‡ 127	130	172	163
28	178	181	213	197	151	106	210	206	‡ 137	134	178	160
29	176	169	215	189	167	127	216	215	‡ 142	134	178	158
30	178		214	185	166	215	217	214	‡ 154	136	176	155
31	170		214		180		223	212		141		151
Sum	5,362	4,629	6,088	6,138	5,480	5,366.1	*5,348	6,622	* 4,487	5,132	5,094	5,869

Month	1924-48 Average Rainfall Inches		Current Year 1948 Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1939-1948 Acre-Feet Normal	Maximum	Minimum
Jan.	.95	.06	21	203	19	117	173	10,600	7,980	10,600	‡ 2,140
Feb.	.71	.78	18	212	10	116	160	9,180	7,146	10,600	‡ 2,120
Mar.	.85	.09	17	233	13	136	196	12,100	7,881	12,100	‡ 1,150
Apr.	1.59	.99	11	233	23	125	205	12,200	7,705	12,200	3,430
May	3.27	1.53	24	210	26	116	177	10,900	6,600	10,900	2,840
June	2.38	2.98	15	242	9	‡ 66.1	179	10,600	7,085	10,600	3,750
July	1.79	3.39	29	254	ϕ 6	86.6	* 173	* 10,600	8,246	* 11,900	4,510
Aug.	1.72	.34	1	258	22	95.1	214	13,100	8,015	13,100	3,480
Sept.	2.87	4.72	8	231	ϕ27	70.5	* 150	* 8,900	7,433	10,800	4,600
Oct.	1.70	2.57	‡10	225	ϕ 1	68.3	166	10,200	8,671	11,800	5,130
Nov.	.76	.63	11	232	7	86.4	170	10,100	9,045	11,500	4,170
Dec.	1.11	.19	13	249	18	95.6	189	11,600	9,270	11,700	4,280
Yearly	19.70	18.27		258		‡ 66.1	179	130,080	95,077	130,080	44,950

‡ Estimated * Partly estimated ‡ And other days ϕ Date of minimum estimated

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

The total diversion of 1,043,600 acre-feet to this area was made almost entirely by pumping from the river to irrigate 589,520 acres. Diversions were actually measured for 91% of the acreage. Diversions to the remainder were estimated. Measurements in general were made by Venturi Meters, by open channel rating stations, and Deflection Meters developed by this Commission, although a small part was measured by plant efficiency and power input. There is some re-use of drainage water within the area. Drainage water which escapes from the area does not return to the Rio Grande. In addition to the irrigated area, there were 36,663 acres of dry-farmed land within the area. More than one crop per year is often grown on some of the land.

Average Flow in Second-Feet

Daily ó:	Max.	4,100,	June 28, 1948.	Min.	0.8	Dec. 25, 1938.
Monthly:	Max.	2,610,	July 1946.	Min.	25.2	June 1930.
Yearly:	Max.	1,590,	1947.	Min.	653,	1941.

Mean Daily Discharge in Second-Feet 1948 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,050	811	714	1,580	580	2,040	3,860	1,850	1,970	1,050	851	2,380
2	1,240	602	930	1,220	1,150	2,050	3,500	2,910	1,930	958	1,000	2,560
3	1,110	147	855	458	2,270	1,910	2,320	2,900	2,100	635	1,300	2,610
4	956	172	1,030	998	1,700	2,030	2,050	2,990	1,770	1,480	1,380	1,800
5	1,540	130	368	2,390	1,350	2,280	2,630	2,920	1,280	1,820	1,180	1,160
6	1,670	253	70.6	2,040	425	1,990	3,240	2,950	2,590	1,640	749	2,310
7	1,610	167	59.5	1,830	56.5	2,620	3,350	2,550	2,370	1,470	446	2,480
8	1,360	50.9	150	1,270	322	2,190	3,060	2,120	2,450	1,480	1,690	2,440
9	1,640	231	372	365	594	2,040	3,090	2,860	1,290	1,220	2,040	2,370
10	1,250	271	324	934	1,530	742	2,370	3,140	227	882	1,900	2,320
11	1,050	220	435	1,620	1,240	378	1,620	2,990	256	1,600	2,090	1,760
12	1,680	185	567	2,860	951	884	2,780	3,050	726	1,440	2,030	1,490
13	1,580	197	267	2,670	292	1,730	2,890	3,190	919	890	1,560	2,540
14	1,630	272	64.5	2,380	251	2,650	2,790	2,910	936	1,050	827	2,530
15	1,780	112	653	1,610	630	2,450	2,820	2,440	903	1,040	1,520	2,360
16	1,450	602	929	500	925	1,960	2,850	3,130	1,040	728	1,650	2,240
17	1,040	817	698	922	1,700	630	1,960	2,860	1,280	146	1,700	2,140
18	955	1,020	563	1,590	1,750	347	1,590	2,710	787	60.0	1,410	1,520
19	1,430	789	673	2,730	1,690	580	2,100	2,500	235	85.2	1,140	1,320
20	1,380	786	958	2,480	740	1,120	1,900	2,290	133	191	874	2,280
21	1,580	489	473	2,050	778	2,120	2,340	1,840	242	200	691	2,130
22	1,560	121	1,450	1,380	853	1,910	2,430	882	263	397	1,420	2,240
23	1,480	168	1,670	431	1,560	1,650	2,440	1,060	631	320	1,620	1,860
24	1,020	145	1,580	1,340	2,260	665	2,070	2,650	721	131	1,830	1,030
25	739	346	1,360	2,050	1,870	584	1,880	2,480	792	842	1,180	410
26	626	257	1,290	2,940	919	1,360	2,480	1,860	498	978	2,070	808
27	506	465	1,100	2,970	1,020	2,830	2,840	511	1,270	961	1,570	1,780
28	190	299	954	2,370	1,540	4,100	2,820	760	701	831	1,260	2,660
29	158	20.7	2,030	777	1,360	3,120	2,760	751	832	530	2,390	2,530
30	189		1,980	472	986	3,590	2,590	1,460	749	241	2,560	2,290
31	633		1,720		2,140		1,830	1,990		153		2,020
Sum	36,082	10,145.6	26,287.6	49,227	35,432.5	54,550	79,250	71,504	31,891	25,449.2	43,928	62,368

Month	1922-48 Average Rainfall Inches**	Current Year 1948		# Extreme Second-Feet High	Day	Low	Day	Average Second-Feet	Total Acre-Feet	Period 1922-1948 Acre-Feet Normal	Maximum	Minimum	Acre-Feet Normal 1938-1948
Jan.	1.56	.85		1,780	15	158	29	1,160	71,600	39,781	71,600	7,700	42,007
Feb.	1.04	2.84		1,020	18	20.7	29	350	20,100	61,637	134,000	6,960	62,224
Mar.	1.20	1.10		2,030	29	59.5	7	848	52,100	87,034	156,000	14,100	93,294
Apr.	1.29	.30		2,970	27	365	9	1,640	97,600	75,064	125,000	29,300	87,903
May	3.45	3.67		2,270	3	56.5	7	1,140	70,300	67,763	135,000	4,510	81,373
June	2.73	1.10		4,100	28	347	18	1,820	108,000	62,656	129,000	1,500	76,644
July	1.89	1.45		3,860	1	1,590	18	2,560	157,000	70,843	161,000	10,000	108,701
Aug.	2.24	2.41		3,190	13	511	27	2,310	142,000	77,043	142,000	19,100	98,215
Sept.	4.69	7.23		2,590	6	133	20	1,060	63,300	54,677	129,000	8,020	71,677
Oct.	2.19	3.43		1,820	5	60.0	18	821	50,500	58,429	131,000	21,400	71,607
Nov.	1.27	.27		2,560	30	446	7	1,460	87,100	59,756	128,000	11,500	85,105
Dec.	1.76	.01		2,660	28	410	25	2,010	124,000	46,196	124,000	10,400	71,951
Yearly	25.31	24.66		4,100		20.7		1,440	1,043,600	760,879	1,148,200	472,500	950,701

ó Period 1938-1948 # Mean daily ** Lower Rio Grande Area on U.S. side from Rio Grande City to the Gulf

DIVERSIONS FROM THE RIO GRANDE INTO THE RETAMAL CANAL

Near Rio Bravo, Tamaulipas

DESCRIPTION: Water-stage recorder and cable with car located .87 mile below Canal head gate. Zero of the gage is .85 foot above mean sea level, U.S.C. & G.S. datum. The head gate is about 1,000 feet from the Rio Grande. This canal diverts from the Rio Grande at a point about 24 river miles below the Hidalgo-Reynosa Bridge near Hidalgo, Texas, and 1,108.8 river miles below the American Dam at El Paso, Texas.

RECORDS: Based upon 164 meter measurements during the year. Computations by shifting channel methods. Records available: September 1939 to December 1948.

REMARKS: Retamal Canal has a capacity of about 7,000 second-feet. It empties into Culebrón Reservoir, which in turn discharges into Villa Cárdenas Reservoir from which a canal leads to Palito Blanco Reservoir. These reservoirs are used for irrigation purposes. During Rio Grande floods, floodwater may escape from Villa Cárdenas via Floodway No. 1 to the Gulf of Mexico. In 1948 123,552 acres with irrigation facilities were cultivated under Retamal Canal, of which 63,753 acres were irrigated with 78,150 acre-feet of water

COMPARATIVE FLOWS FROM RECORDS: Momentary Peak: Max. 6,990 second-feet on September 12, 1944, with a gage height of 76.31 feet. Min. sometimes dry.

Average Flow in Second-Feet

Daily:	Max.	6,920,	Sept. 12, 1944.	Min.	sometimes dry.
Monthly:	Max.	3,280,	Sept. 1944.	Min.	sometimes dry.
Yearly:	Max.	700,	1944.	Min.	232, 1943.

Mean Daily Discharge in Second-Feet 1948 —— Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	285	262	279	0	138	424	6,220	266	413	1,040	1,220	266
2	274	282	266	0	142	328	3,740	262	720	943	1,180	222
3	276	307	266	70.3	67.5	254	1,790	424	459	855	1,090	188
4	273	396	233	138	3.5	246	1,280	604	247	752	897	187
5	275	378	276	112	0	182	1,140	530	199	660	773	229
6	247	328	522	40.6	0	143	1,050	410	192	579	727	268
7	* 251	305	1,010	0	39.9	123	3,740	501	119	519	717	193
8	* 253	326	703	0	103	48.4	5,260	526	97.1	491	657	158
9	* 249	341	523	154	103	27.2	6,430	498	92.2	431	558	154
10	238	329	410	289	54.7	43.8	6,250	533	167	442	491	153
11	237	315	364	300	0	171	3,190	427	2,940	431	484	153
12	227	324	327	179	0	266	1,800	367	5,190	385	487	198
13	200	352	263	101	4.9	245	1,400	273	6,600	381	477	235
14	180	323	248	72.4	58.3	135	1,540	260	6,780	399	494	167
15	204	289	228	62.2	94.3	77.7	1,470	280	6,640	473	491	141
16	* 213	274	258	138	92.2	0	1,650	274	6,500	505	438	144
17	* 230	261	276	223	60.7	0	1,190	226	4,840	848	388	157
18	* 242	233	268	183	36.7	120	901	187	3,670	1,780	410	164
19	* 245	214	249	87.2	0	139	706	166	2,840	2,770	442	214
20	194	225	207	3.9	37.1	124	618	148	2,410	2,275	431	264
21	164	238	191	0	199	74.9	569	145	2,250	1,410	441	220
22	171	243	198	0	226	0	487	173	2,040	1,010	417	206
23	183	269	127	45.6	172	0	410	308	1,890	894	334	189
24	172	304	94.6	167	80.5	72.0	385	246	1,710	911	291	227
25	209	392	104	235	85.8	191	396	109	1,580	2,150	309	283
26	231	353	121	177	105	252	470	83.3	1,430	2,630	342	288
27	230	284	117	55.8	618	1,010	470	143	1,250	2,380	305	260
28	240	260	125	0	1,760	4,590	413	234	1,120	1,810	346	200
29	267	264	114	0	964	5,230	329	244	1,080	1,500	344	137
30	268		38.8	0	632	5,050	268	251	1,070	1,410	303	131
31	265		0		519		244	220		1,290		132
Sum	7,193	8,671	8,406.4	2,834	6,397.1	19,567	55,806	9,318.3	66,535.3	34,354	16,284	6,128

Month	1922-48 Average Rainfall Inches **	Current Year 1948 Rainfall Inches	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	● Period 1939-1948 Acre-Feet Average	Maximum	Minimum
Jan.	1.56	.85	1	297	24	161	232	14,270	14,961	25,790	2,090
Feb.	1.04	2.84	4	410	19	201	299	17,200	9,188	17,200	85.1
Mar.	1.20	1.10	7	1,090	31	0	271	16,670	8,267	20,100	0
Apr.	1.29	.30	11	313	‡ 1	0	94.5	5,620	8,482	28,590	0
May	3.45	3.67	28	2,000	‡ 5	0	206	12,690	21,911	40,780	4,490
June	2.73	1.10	29	5,470	‡16	0	652	38,810	30,903	82,400	1,590
July	1.89	1.45	9	6,500	31	240	1,800	110,700	28,958	110,700	360
Aug.	2.24	2.41	4	614	26	79.5	301	18,480	30,745	96,180	138
Sept.	4.69	7.23	14	6,920	9	83.0	2,220	132,000	69,458	195,100	0
Oct.	2.19	3.43	19	2,900	13	367	1,110	68,140	64,475	124,600	14,160
Nov.	1.27	.27	1	1,270	30	284	543	32,300	17,638	32,300	3,370
Dec.	1.76	.01	1	289	29	125	198	12,150	13,526	21,080	3,070
Yearly	25.31	24.66		6,920		0	660	479,030	318,512	508,160	168,290

‡ And other days * Partly estimated ** Lower Rio Grande Valley Area on the U.S. Side, Rio Grande City to the Gulf

● Record began Sept. 1, 1939

MUNICIPAL WATER USES

In Acre-Feet

Tabulated below are yearly and monthly amounts of water pumped from the Rio Grande or tributaries into the municipal distribution systems of several towns along the border. The municipal and industrial water supply for the El Paso area in Texas and Juárez in Chihuahua came from wells (See Outfalls from Wells, page 10, 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.

In The United States

Month	El Paso (Pop. 130,000 ***)				Del Rio (Pop. 15,500 ***)			
	1948	Period 1943-1948			1948	Period 1939-1948		
		Average	Maximum	Minimum		Normal	Maximum	Minimum
Jan.	150.3	54.0	150.3	0	127.6	88.8	127.6	45.5
Feb.	651.6	169.7	651.6	0	121.2	90.6	121.6	52.9
Mar.	812.8	380.4	812.8	63.4	211.9	132.3	211.9	75.5
Apr.	640.5	510.2	640.5	363.6	246.8	146.8	246.8	97.9
May	779.8	547.7	779.8	430.3	259.1	167.4	259.1	95.0
June	755.5	649.9	755.5	536.3	305.0	193.9	305.0	119.0
July	766.9	688.2	766.9	538.1	261.1	217.6	296.1	137.2
Aug.	831.8	628.4	831.8	514.4	327.9	204.0	327.9	79.8
Sept.	685.6	521.9	685.6	207.7	235.7	169.6	235.7	93.1
Oct.	762.2	474.0	762.2	193.4	174.9	124.6	232.9	76.4
Nov.	547.2	376.4	636.1	176.8	146.5	109.9	214.8	62.7
Dec.	818.3	413.1	818.3	139.8	160.0	97.0	160.0	61.0
Yearly	8,202.5	5,413.9	8,202.5	4,049.5	2,577.7	1,738.5	2,577.7	1,016.5

Month	Eagle Pass (Pop. 12,000 ***)				Laredo (Pop. 55,000 ***)			
	1948	Period 1939-1948			1948	Period 1939-1948		
		Normal	Maximum	Minimum		Normal	Maximum	Minimum
Jan.	63.1	51.3	63.5	38.9	348.4	267.0	370.1	148.2
Feb.	53.7	53.4	62.7	44.0	297.4	273.0	366.4	186.4
Mar.	88.2	68.0	88.2	54.5	410.7	349.4	473.8	162.4
Apr.	92.6	72.0	92.6	60.3	544.3	384.8	544.3	145.5
May	90.0	70.8	90.0	55.0	607.0	413.1	607.0	194.6
June	104.3	81.4	108.0	40.0	660.7	444.8	660.7	199.7
July	120.5	99.9	120.5	77.3	601.4	479.7	638.8	209.1
Aug.	131.3	96.9	131.3	75.4	667.6	491.3	667.6	285.3
Sept.	77.4	78.0	90.5	49.6	389.0	399.3	601.1	274.6
Oct.	69.1	64.1	92.1	41.0	404.8	363.1	459.9	207.6
Nov.	63.1	58.7	99.9	47.8	375.0	323.0	417.8	182.6
Dec.	70.4	57.3	70.4	46.2	395.8	294.6	395.8	168.9
Yearly	1,023.7	851.8	1,023.7	756.1	5,702.1	4,483.1	5,874.9	2,450.6

Month	Roma (Pop. 1,500 ***)				Rio Grande City (Pop. 2,600 ***)				Brownsville (Pop. 32,000 ***)			
	1948	Period 1939-1948			1948	Period 1939-1948			1948	Period 1939-1948		
		Normal	Maximum	Minimum		Normal	Maximum	Minimum		Normal	Maximum	Minimum
Jan.	5.9	6.3	14.3	2.4	25.7	20.9	36.7	14.7	318	160.8	318	60.3
Feb.	4.7	6.3	12.9	2.4	20.1	20.1	29.5	14.8	304	156.4	304	62.0
Mar.	7.2	6.0	9.5	2.0	25.9	26.3	35.4	19.9	372	184.4	372	96.9
Apr.	10.7	6.6	10.7	2.7	36.1	29.7	36.2	18.8	461	205.5	461	95.8
May	11.9	7.6	14.3	2.2	37.9	32.2	38.4	21.1	516	220.9	516	84.2
June	10.5	7.6	13.8	2.2	35.9	29.7	35.9	19.4	561	233.1	561	95.4
July	11.7	8.4	14.3	3.0	38.1	33.7	49.7	17.1	590	262.8	590	121.5
Aug.	12.3	7.8	14.3	3.5	38.5	35.8	54.0	18.5	589	254.2	589	101.7
Sept.	7.4	6.8	13.8	2.5	33.0	30.1	40.7	17.1	436	212.1	436	84.8
Oct.	9.1	5.9	9.5	2.9	30.8	28.3	37.9	19.0	446	208.8	446	90.3
Nov.	7.2	5.5	9.2	2.6	30.5	24.8	35.4	15.9	409	195.0	409	86.7
Dec.	8.0	5.0	9.5	2.3	33.3	22.8	36.0	13.9	445	194.4	445	62.8
Yearly	106.6	79.8	135.5	44.3	385.8	334.4	402.2	218.0	5,447	2,488.4	5,447	1,071.0

In Mexico

Month	Nuevo Laredo (Pop. 53,000 ***)				Guerrero (Pop. 1,786 **)				Matamoros (Pop. 15,699 **)			
	1948	Period 1939-1948			1948	Period 1943-1948			1948	Period 1942-1948		
		Normal	Maximum	Minimum		Average	Maximum	Minimum		Average	Maximum	Minimum
Jan.	212.5	141.9	218.2	94.4	5.0	4.9	5.5	4.3	81.7	77.1	85.3	" 68.4
Feb.	179.8	141.4	233.3	97.2	5.2	4.6	5.2	4.3	75.9	72.1	77.1	64.0
Mar.	235.4	179.1	288.3	108.6	5.8	5.5	6.3	5.0	80.9	81.9	90.6	" 68.5
Apr.	281.2	200.9	298.7	132.7	6.1	6.4	7.3	5.6	82.9	81.1	92.6	" 68.4
May	302.0	211.8	314.2	122.8	7.5	7.5	8.0	7.1	90.0	86.0	100.3	" 68.4
June	282.5	212.8	337.4	129.6	7.8	8.1	8.5	7.8	90.9	86.2	103.6	" 68.5
July	283.4	234.7	367.7	115.2	8.8	9.2	10.1	8.8	" 91.9	91.9	116.2	" 68.4
Aug.	324.4	243.0	355.3	117.9	9.6	10.4	11.3	9.6	" 90.7	90.7	104.8	" 68.4
Sept.	263.6	202.8	294.9	113.0	8.5	8.4	9.0	7.3	100.8	86.3	100.8	" 68.5
Oct.	260.6	192.8	278.2	105.8	8.5	7.9	8.8	6.5	109.0	91.8	117.4	" 68.4
Nov.	232.0	168.9	260.4	99.3	6.8	6.4	7.3	4.9	110.8	84.8	110.8	66.8
Dec.	244.2	158.2	247.9	96.3	5.0	5.5	6.3	5.0	114.6	83.8	114.6	70.0
Yearly	3,101.6	2,288.3	3,357.4	1,504.7	84.6	84.8	87.5	82.4	1,120.1	1,013.7	1,131.2	* 821.1

* Partly estimated ** 1940 Census *** 1948 Estimate " Estimated

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES AND DIVERSIONS

Water samples for the stations reported were taken in small-necked bottles by two methods.

A. By lowering an open bottle in one or more verticals in the cross section, being careful to approach, but not to strike bottom, thus securing an integrated sample at all depths.

B. By sampling at the surface of the stream, one bottle at the mid-point, and one bottle at each side, one sixth of the stream width from the water's edge. A coefficient of 0.908 is then applied to the average of the three bottles.- From Technical Bulletin No. 382, 1933, U.S. Department of Agriculture.

The gravimetric percentages of dried silt were determined by two methods:

1. By determining the silt in a monthly composite composed by using from each sample a quantity proportional to the river flow represented by that sample. (One filtering, drying, and weighing each month.)

2. By determining the silt in each sample. (One filtering, drying, and weighing for each sample.)

For ease of comparison the assumption is made that 1,452 tons of silt will occupy one acre-foot in a reservoir, which is equivalent to saying that one cubic foot of silt thus situated would weigh 66.7 pounds.

Month	1948							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
Rio Grande at El Paso										Period 1947-1948
Jan.	10,567,000	358	21	.00339			.25			
Feb.	8,844,000	474	10	.00536			.33			
Mar.	30,288,000	7,150	23	.02360			4.9			
Apr.	70,142,000	48,700	27	.06950			33.5			
May	67,570,000	91,900	30	.13600			63.3			
June	81,326,000	69,700	30	.08570			48.0			
July	101,597,000	69,000	27	.06790			47.5			
Aug.	97,559,000	82,500	30	.08460			56.8			
Sept.	56,868,000	33,800	30	.05940			23.3	23.4	23.4	23.3
Oct.	25,652,000	3,130	25	.01220			2.2	1.6	2.2	1.0
Nov.	18,180,000	1,850	27	.01020			1.3	1.0	1.3	.80
Dec.	18,018,000	3,100	26	.01720			2.1	1.3	2.1	.45
Yearly	586,611,000	411,662	306	.0702			283.48			
Samples by U.S. Section, Method A, Analysis by U.S. Section, Method 1										
Rio Conchos at Cuchillo Parado, Chihuahua										Period 1945-1948
Jan.	51,111,000	0	14	0	0	0	0	0	0	0
Feb.	58,660,000	0	12	0	0	0	0	0	0	0
Mar.	63,534,000	0	14	0	0	0	0	0	0	0
Apr.	15,968,000	0	13	0	0	0	0	0	0	0
May	23,089,000	40,900	13	.1770	2.1380	0	28.2	7.0	28.2	0
June	24,849,000	6,510	13	.0262	.4970	0	4.5	32.6	126	0
July	40,832,000	208,000	15	.5090	3.2790	0	143	278	890	0
Aug.	26,946,000	19,900	14	.0737	.3030	0	13.7	165	599	4.8
Sept.	39,042,000	33,300	14	.0852	.7820	0	22.9	416	1,190	.32
Oct.	49,135,000	20,200	13	.0412	.1630	0	13.9	356	997	0
Nov.	55,480,000	5,220	13	.0094	.0266	0	3.6	.90	3.6	0
Dec.	38,755,000	0	14	0	0	0	0	0	0	0
Yearly	487,401,000	334,030	162	.0685	3.2790	0	229.8	1,255.50	1,891.9	229.8
Samples by Mexican Section, Method B, Analysis by Mexican Section, Method 2										
Rio Grande at Langtry										Period April 1944-1948
Jan.	76,617,000	4,180	5	.00545			2.9	8.4	11.4	2.9
Feb.	86,429,000	7,310	7	.00846			5.0	5.8	8.9	3.3
Mar.	82,574,000	3,940	3	.00477			2.7	4.9	6.4	2.7
Apr.	47,056,000	2,900	4	.00616			2.0	18.3	66.4	1.1
May	52,075,000	252,000	9	.48400			174	152	448	3.7
June	61,416,000	278,000	7	.45200			191	248	929	2.8
July	79,647,000	319,000	6	.40100			220	1,129	4,483	60.9
Aug.	74,625,000	698,000	6	.93500			481	665	1,721	4.7
Sept.	59,785,000	120,000	7	.20000			82.6	1,774	3,280	82.6
Oct.	86,062,000	208,000	6	.24200			143	1,308	3,261	48.3
Nov.	84,752,000	51,700	6	.06100			35.6	27.5	58.6	12.6
Dec.	70,360,000	10,800	7	.01530			7.4	16.1	46.8	5.7
Yearly	861,398,000	1,955,830	73	.22700			1,347.2	5,357.0	ϕ 8,155.6	ϕ 1,347.2
Samples by U.S. Section, Method A, Analysis by U.S. Section, Method 1										ϕ Period 1945-1948
Pecos River										Period June 1943-1948
Jan.	18,007,000	220	14	.00122			.15	.44	.74	.15
Feb.	17,697,000	195	15	.00110			.13	.54	.86	.13
Mar.	16,498,000	558	15	.00338			.38	.59	1.0	.29
Apr.	12,934,000	720	14	.00557			.50	.49	1.1	.19
May	16,711,000	784	18	.00469			.54	5.5	21.7	.54
June	12,017,000	1,550	18	.01290			1.1	5.0	15.7	.62
July	57,275,000	33,400	18	.05840			23.0	17.6	67.1	.19
Aug.	10,683,000	834	17	.00781			.57	.45	.83	.18
Sept.	14,346,000	1,260	17	.00881			.87	2.0	8.5	.15
Oct.	17,390,000	584	13	.00336			.40	38.3	176	.22
Nov.	15,980,000	486	15	.00304			.33	.39	1.2	.05
Dec.	18,096,000	1,010	13	.00558			.70	.52	1.3	.04
Yearly	227,634,000	41,601	187	.01830			28.67	71.82	ϕ 199.36	ϕ 17.09
Samples by U.S. Section, Method A, Analysis by U.S. Section, Method 1										ϕ Period 1944-1948

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES AND DIVERSIONS

Month	1948							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

Rio Grande at Eagle Pass

Period 1934-1948

Jan.	130,552,000	4,790	28	.00367			3.3	24.1	124	.07
Feb.	132,520,000	13,500	28	.01020			9.3	15.2	32.1	2.6
Mar.	127,088,000	5,530	30	.00435			3.8	26.9	188	3.8
Apr.	81,887,000	11,300	26	.01380			7.8	51.4	204	3.0
May	98,724,000	134,000	29	.13600			92.3	612	4,220	17.7
June	1,244,741,000	6,298,000	23	.50600			4,340	1,124	4,340	4.3
July	855,994,000	3,638,000	29	.42500			2,510	1,315	7,840	12.0
Aug.	179,721,000	327,000	31	.18200			225	1,078	5,310	14.8
Sept.	222,663,000	181,000	29	.08110			125	2,906	10,800	13.0
Oct.	215,681,000	203,000	24	.09410			140	1,186	5,820	24.0
Nov.	188,671,000	76,800	25	.04070			52.9	92.3	305	12.3
Dec.	155,702,000	29,900	25	.01920			20.6	24.2	84.1	1.1
Yearly	3,633,944,000	10,922,820	327	.30100			7,530.0	8,455.1	20,842.8	1,768.3

Samples by Mexican Section, Method A, Analysis by U.S. Section, Method 1

Rio Alamo

Period 1934-1948

Jan.	808,000	0	7	0	0	0	0	3.2	21.8	0
Feb.	832,000	0	6	0	0	0	0	.04	.58	0
Mar.	13,295,000	133,000	8	1.0020	.506	0	91.6	10.9	91.6	0
Apr.	3,124,000	6,500	8	.2080	.259	0	4.5	24.9	227	0
May	11,204,000	104,000	7	.9260	.713	0	71.6	48.2	230	2.2
June	9,806,000	60,400	7	.6160	.200	0	41.6	67.5	471	0
July	1,403,000	1,120	7	.0797	.200	0	.77	21.8	92.8	0
Aug.	6,805,000	26,200	9	.3850	.215	0	18.0	203	1,610	0
Sept.	418,460,000	4,247,000	6	1.0150	1.120	0	2,920	303	2,920	1.5
Oct.	11,247,000	12,300	8	.1090	.242	0	8.5	101	558	0
Nov.	4,251,000	0	7	0	0	0	0	1.0	5.2	0
Dec.	2,134,000	0	7	0	0	0	0	1.5	16.1	0
Yearly	483,369,000	4,590,520	87	.9500	1.120	0	3,156.57	786.04	3,156.57	154.5

Samples by Mexican Section, Method B, Analysis by Mexican Section, Method 2

Rio Grande at Roma

Period March 1929-1948

Jan.	140,822,000	4,310	31	.00306			3.0	40.9	169	.41
Feb.	145,351,000	11,500	29	.00792			7.9	24.5	121	.83
Mar.	159,099,000	139,000	31	.08710			95.7	133	1,830	1.3
Apr.	87,324,000	13,600	30	.01560			9.4	247	1,340	.76
May	148,068,000	352,000	31	.23800			242	1,249	5,230	15.4
June	933,382,000	4,714,000	32	.50500			3,250	1,564	7,220	10.6
July	826,280,000	3,561,000	31	.43100			2,450	1,387	9,070	11.1
Aug.	190,935,000	95,600	31	.05030			65.8	1,342	3,720	34.7
Sept.	1,119,785,000	3,460,000	31	.30900			2,380	3,826	18,000	13.4
Oct.	369,359,000	635,000	30	.17200			437	2,165	9,240	89.2
Nov.	209,266,000	49,200	30	.02350			33.9	153	660	4.8
Dec.	174,222,000	26,800	29	.01540			18.5	54.6	319	1.0
Yearly	4,503,923,000	13,062,010	366	.29000			8,993.2	11,986.0	30,839	2,314.0

Samples by Mexican Section, Method A, Analysis by U.S. Section, Method 1

Retamal Canal

Period 1943-1948

Jan.	19,392,000	7,100	13	.0366	.0610	.0135	4.9	5.0	10.1	1.8
Feb.	23,378,000	4,020	12	.0172	.0340	.0080	2.8	1.7	2.8	.2
Mar.	22,661,000	3,510	14	.0155	.0200	.0070	2.4	1.9	5.9	.1
Apr.	7,637,000	955	13	.0125	.0190	.0030	.7	24.1	113	0
May	17,247,000	40,500	10	.2350	.4760	.0090	27.9	89.0	184	1.1
June	52,742,000	334,000	13	.6340	.8130	.0034	230	189	400	.3
July	150,393,000	960,000	17	.6380	1.2260	.1200	661	185	661	12.1
Aug.	25,121,000	24,400	13	.0972	.1100	.0790	16.8	182	615	2.6
Sept.	179,354,000	1,374,000	18	.7660	.9260	.0372	946	370	946	0
Oct.	92,607,000	88,400	14	.0955	.2870	.0160	60.9	414	1,530	6.5
Nov.	43,897,000	29,000	13	.0661	.1150	.0130	20.0	9.3	20.0	3.6
Dec.	16,519,000	876	14	.0053	.0120	.0010	.6	2.8	5.9	.6
Yearly	650,948,000	2,866,761	164	.4403	1.2260	.0010	1,974.0	1,473.8	1,974.0	326.5

Samples by Mexican Section, Method B, Analysis by Mexican Section, Method 2

Rio Grande at Las Palmas

Period 1946-1948

Jan.	113,665,000	18,200	13	.0160	.0264	.0057	12.5	59.6	149	12.5
Feb.	136,045,000	27,600	12	.0203	.0422	.0110	19.0	25.7	45.9	12.1
Mar.	137,702,000	20,800	14	.0151	.0204	.0074	14.3	8.6	14.3	4.8
Apr.	61,228,000	11,000	13	.0179	.0264	.0044	7.6	85.0	242	5.9
May	116,465,000	285,000	13	.2450	.5270	.0076	196	1,048	2,010	196
June	325,464,000	2,031,000	14	.6240	1.0790	.0044	1,400	2,187	2,880	1,400
July	781,382,000	5,306,000	17	.6790	1.2400	.1200	3,650	1,298	3,650	102
Aug.	112,422,000	129,000	12	.1150	.1250	.0999	88.8	942	2,550	88.8
Sept.	1,057,471,000	8,248,000	7	.7800	.8220	.0464	5,680	3,001	5,680	1,210
Oct.	520,572,000	# 503,000	0	# .0966			# 346	1,900	5,300	54.2
Nov.	281,620,000	204,000	13	.0723	.1250	.0209	140	88.7	140	46.1
Dec.	143,185,000	10,200	11	.0071	.0146	.0030	7.0	17.4	33.8	7.0
Yearly	3,787,221,000	16,793,800	139	.4434			11,561.2	10,661.0	12,529.2	7,894.5

Samples by Mexican Section, Method B, Analysis by Mexican Section, Method 2

Estimated

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES — 1948

The following chemical analyses are from composites made up periodically from independent water samples composed by taking from each sample an amount of water proportional to the volume of river flow represented by that sample. This compositing and the determination of the electrical conductivity of the individual water samples was done by the United States Section of the International Boundary and Water Commission. The chemical analyses were made by the Rubidoux Laboratory of the United States Department of Agriculture at Riverside, California.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are (HCO_3 plus CO_3), 30.5; Cl, 35.5; SO_4, 48; Ca, 20; Mg, 12.16; Na, 23; NO_3, 62. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5.

Electrical conductivity, reported in the following tables as ECx10⁶ @ 25°C, is the same relative measure of the total salt concentration in the water samples, as was specific electrical conductance expressed in previous issues of this Bulletin as Kx10⁵ @ 25°C. (See Circular No. 232, U.S. Department of Agriculture, July 1932). Both expressions are definite statements of an important physical property of the water solution and the following relationship exists between them: Kx10⁵ @ 25°C multiplied by 10 equals ECx10⁶ @ 25°C.

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	Mean ECx10⁶ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Rio Grande at Caballo Dam															
Sampling by Bureau of Reclamation															
Jan.	31	1.05	121	1,260	.25	7.8	64	25	2.62	2.06	8.29	5.85	3.80	3.20	T
Feb.	29	1.13	150	1,330	.26	7.9	60	25	3.48	2.16	8.33	6.40	4.10	3.53	T
Mar.	31	.96	59,400	1,060	.14		50	26	3.66	1.58	5.32	3.20	4.72	2.73	T
Apr.	30	.85	102,000	956	.18	8.1	48	22	3.61	1.39	4.55	2.85	4.73	2.18	T
May	31	.81	63,500	887	.14	8.2	47	20	3.29	1.36	4.16	2.74	4.46	1.85	.01
June	30	.78	88,900	859	.13	8.1	48	20	3.12	1.28	4.07	2.70	4.15	1.67	T
July	31	.70	106,000	785	.13	8.1	47	20	2.90	1.19	3.66	2.65	3.68	1.60	.01
Aug.	31	.60	87,000	645	.14	7.8	41	18	2.84	.91	2.66	2.80	2.57	1.20	.01
Sept.	30	.65	32,800	743	.05	8.2	42	24	3.21	1.06	3.15	3.10	2.60	1.84	.03
Oct.	31	1.24	9,150	1,440	.18	8.1	58	25	4.27	2.16	8.84	7.00	4.37	3.90	.07
Nov.	30	1.13	8,010	1,340	.19	8.0	55	25	4.25	1.98	7.76	6.43	4.14	3.55	T
Dec.	31	1.10	5,790	1,310	.25	8.1	56	24	3.92	1.99	7.64	6.40	3.95	3.20	T
Mean ⊕	ϕ366	ϕ.759	562,821	843	.138		47	21	3.20	1.25	3.95	2.91	3.81	1.82	.008
Period Average		.715	598,000	787			44	18	3.33	1.18	3.54	2.77	3.86	1.46	
Tons of Constituents, 1948									64,700	15,300	91,600	89,500	185,000	65,100	
Average Tons Period 1931-1948									75,900	16,500	92,500	96,000	211,000	58,900	
Rio Grande at Leasburg Dam															
Sampling by Bureau of Reclamation															
Jan.	4	1.23	1,650	1,310	.21	8.0	47	25	5.43	1.89	6.42	3.75	6.61	3.50	.02
Feb.	4	1.25	1,780	1,350	.16	7.9	47	26	5.35	1.98	6.39	3.66	6.88	3.63	.02
Mar.	18	.96	45,200	1,040	.10	8.1	47	25	4.02	1.47	4.93	3.05	4.96	2.61	T
Apr.	30	.90	98,100	1,010	.15	7.0	46	23	4.00	1.43	4.64	3.62	4.56	2.40	T
May	31	.87	62,500	959	.14	8.0	46	20	3.74	1.43	4.48	3.00	4.79	1.96	.02
June	30	.86	86,900	908	.12	8.1	48	20	3.34	1.36	4.34	2.82	4.46	1.87	.03
July	31	.76	106,000	843	.13	7.8	49	21	2.95	1.20	4.02	2.65	3.90	1.70	.04
Aug.	31	.71	96,600	766	.09	7.8	46	20	2.96	1.14	3.49	2.81	3.41	1.58	.03
Sept.	30	.69	38,200	752	.11	7.9	42	22	3.31	1.17	3.24	2.95	3.31	1.78	.03
Oct.	31	.84	8,570	962	.17	8.0	46	25	3.90	1.37	4.44	3.22	4.16	2.52	.01
Nov.	30	.84	6,330	942	.19	7.8	44	23	3.91	1.35	4.09	3.15	4.14	2.20	.01
Dec.	31	.90	6,010	1,010	.12	8.0	45	23	4.14	1.42	4.57	3.36	4.48	2.40	.01
Mean ⊕	ϕ301	.811	ϕ557,840	889	.123	7.77	47	.21	3.41	1.30	4.13	2.97	4.13	1.94	.023
Period Average		.772	801,000	842			.44	20	3.59	1.25	3.86	2.90	4.13	1.76	
Tons of Constituents, 1948									63,900	14,800	88,800	84,700	185,000	64,300	
Average Tons Period 1931-1948									78,300	16,600	96,800	96,200	216,000	67,800	
Rio Grande at El Paso															
Sampling by U.S. Section															
Jan.	21	1.80	14,000	1,980	.25		60	33	5.90	2.25	12.00	5.06	8.73	6.95	.03
Feb.	10	1.78	11,600	1,990			61	35	5.70	2.23	12.35	4.65	8.76	7.12	T
Mar.	23	1.28	28,600	1,380			54	28	4.76	1.76	7.59	3.69	6.49	4.05	.03
Apr.	27	1.16	59,700	1,230			51	25	4.57	1.63	6.49	3.51	5.93	3.23	.02
May	30	1.14	56,700	1,260	.19	8.1	53	28	4.17	1.72	6.69	3.20	5.98	3.50	.03
June	30	1.03	61,600	1,150	.17	7.8	56	29	3.31	1.58	6.33	2.50	5.56	3.30	.11
July	27	.94	70,300	1,050	.21	7.7	58	29	2.73	1.52	5.78	2.07	5.21	3.02	.04
Aug.	30	.99	71,100	1,090	.19	8.1	56	29	3.28	1.50	5.99	2.75	4.89	3.16	.04
Sept.	30	1.13	47,200	1,260	.23	8.0	57	32	3.61	1.70	7.10	3.00	5.65	4.00	.03
Oct.	25	1.51	28,500	1,630	.26	7.8	61	35	4.30	2.08	10.02	3.20	7.64	5.80	.01
Nov.	27	1.52	20,400	1,690	.30	7.9	61	35	4.39	2.17	10.35	3.30	7.85	6.10	.01
Dec.	26	1.52	20,200	1,700	.25	8.0	60	34	4.79	2.06	10.20	3.66	7.80	5.92	.02
Mean ⊕	ϕ306	1.14	ϕ 489,900	1,250			56	30	3.76	1.68	6.98	2.95	5.87	3.75	.041
Period Average		1.11	643,000	1,220			52	30	4.44	1.62	6.63	3.51	5.47	3.80	
Tons of Constituents, 1948									44,200	12,000	94,200	52,800	166,000	78,100	
Average Tons Period 1930-1948									70,000	15,500	120,000	84,300	207,000	106,000	

ϕ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions T Trace

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES —1948

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	Mean ECx10⁶ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Rio Grande at Fort Quitman — Sampling Jointly by Both Sections															
Jan.	6	3.52	29,300	4,000	.36		63	58	10.52	4.56	25.52	4.39	12.88	23.86	.03
Feb.	6	3.89	19,500	4,370	.38	7.9	63	60	11.68	4.95	27.73	4.35	13.36	27.00	.03
Mar.	4	5.50	11,300	6,080	.57	8.3	64	65	15.21	7.58	40.73	4.49	17.94	41.56	.03
Apr.	6	6.82	10,400	7,410	.65	7.8	66	67	17.62	9.58	51.94	4.48	21.51	52.85	.01
May	6	5.45	11,600	5,970			67	69	13.04	7.54	41.56	2.41	17.15	42.86	.02
June	8	3.01	22,700	3,520			65	62	8.39	3.89	23.25	3.18	10.62	22.31	.02
July	4	7.06	27,400	7,660	.69	7.7	67	69	16.12	9.76	53.44	2.18	22.26	55.44	.04
Aug.	6	6.79	34,500	7,580	.78	7.9	67	69	16.51	9.83	52.76	3.04	21.81	54.50	T
Sept.	6	4.91	30,200	5,500	.57	7.9	66	66	12.64	6.68	36.99	2.90	16.67	37.58	.01
Oct.	6	3.70	39,600	4,210	.44	7.9	63	59	10.93	4.75	26.72	4.30	13.30	25.15	.03
Nov.	6	3.22	38,000	3,680	.39	7.7	64	58	9.10	4.17	23.37	3.30	12.29	21.52	.03
Dec.	6	3.39	37,600	3,830	.41	7.9	62	57	10.48	4.31	24.45	4.65	12.45	22.32	.03
Mean ⊕	ϕ 70	4.14	ϕ 312,100	4,670			64	62	11.42	5.51	30.73	3.74	14.42	29.92	.025
Period Average		2.28	547,000	2,590			61	55	7.40	2.97	15.99	3.54	8.42	14.52	
Tons of Constituents, 1948									23,400	6,870	72,400	11,700	71,000	109,000	
Average Tons Period 1930-1948									48,400	11,800	120,000	35,200	132,000	168,000	
Rio Grande at Upper Presidio — Sampling by U.S. Section															
Jan.	5	3.72	17,200	4,210	.43		64	59	10.63	4.83	27.31	3.55	14.24	25.62	T
Feb.	4	4.18	10,700	4,670	.49		63	60	12.47	5.35	29.83	3.65	15.45	28.85	T
Mar.	5	5.90	1,700	6,150	.62	7.9	54	60	22.56	8.34	35.65	3.87	23.06	39.64	T
Apr.	5	6.81	555	6,980	.65	7.8	53	61	26.33	9.86	40.58	3.26	26.56	47.02	T
May	2	7.92	28.5	8,040	.75	7.9	54	63	29.22	11.88	47.73	1.90	31.38	55.55	.02
June	5	1.05	3,860	1,200	.18	7.7	60	42	3.56	1.13	7.15	2.84	4.07	5.00	.06
July	1	1.25	810	1,240		7.7	38	12	6.94	.80	4.78	2.45	8.94	1.60	.02
Aug.	1	.42	1,070	505		8.0	61	42	1.50	.40	2.93	1.24	1.60	2.06	.03
Sept.	4	1.24	3,600	1,500			61	42	4.41	1.18	8.61	3.64	4.70	6.04	.09
Oct.	2	2.91	10,900	3,330	.43	7.8	64	59	8.19	3.67	21.48	2.38	11.31	19.70	.03
Nov.	4	3.50	17,000	4,010			64	59	9.87	4.42	25.87	2.86	13.62	23.73	.03
Dec.	5	3.36	19,400	3,800	.43	7.9	65	58	9.35	4.30	24.82	3.37	12.76	22.65	.01
Mean ⊕	ϕ 43	2.74	ϕ 86,823.5	3,110			63	57	8.10	3.42	19.80	3.00	10.57	17.98	.028
Period Average		1.93	471,000	2,180			59	51	6.53	2.44	12.99	3.11	7.72	11.13	
Tons of Constituents, 1948									7,000	1,790	19,600	3,950	21,900	27,500	
Average Tons Period 1935-1948									43,400	9,840	99,100	31,500	123,000	131,000	
Rio Conchos at Cuchillo Parado — Sampling by Mexican Section															
Jan.	11	.90	33,800	964		8.0	43	12	4.41	1.17	4.29	3.39	5.32	1.22	.04
Feb.	12	.82	35,400	865	.23	8.0	47	12	4.19	1.08	3.63	3.25	4.72	1.14	.03
Mar.	13	.74	34,600	775	.14	7.9	41	12	3.71	1.99	3.22	2.95	4.03	1.00	.03
Apr.	13	1.00	11,800	1,080	.19	8.0	52	22	3.96	1.18	5.54	2.65	5.71	2.34	.03
May	13	.98	16,700	1,020	.17	7.9	49	17	4.06	1.16	4.94	2.65	5.87	1.70	.03
June	15	.96	17,500	993	.19	7.9	49	16	3.85	1.20	4.84	2.49	5.99	1.60	.03
July	14	.78	23,400	826	.23	7.8	45	13	3.63	.88	3.65	2.40	4.82	1.04	.05
Aug.	13	.77	15,300	829	.25	7.9	52	16	3.09	.83	4.32	2.30	4.63	1.35	.04
Sept.	13	.90	25,900	930	.36	8.0	44	14	4.21	1.13	4.20	2.55	5.67	1.40	.05
Oct.	12	.85	30,700	885	.22	7.9	45	14	3.90	1.09	4.06	2.65	5.22	1.30	.04
Nov.	13	.79	32,200	849	.24	8.0	41	12	4.03	1.11	3.64	3.10	4.62	1.10	.04
Dec.	14	.91	26,000	929	.20	8.1	45	14	4.06	1.20	4.31	3.10	5.28	1.32	.04
Mean ⊕	ϕ156	.846	ϕ 303,300	890		7.95	44	14	3.96	1.08	4.02	2.87	5.01	1.27	.038
Period Average		.717	408,000	756			42	13	3.53	.900	3.16	2.62	4.09	.959	
Tons of Constituents, 1948									38,700	6,410	45,100	42,700	117,000	22,000	
Average Tons Period 1946-1948									54,800	8,460	56,300	61,900	152,000	26,300	
Rio Conchos near Ojinaga, Chihuahua — Sampling by U.S. Section															
Jan.	5	.96	37,600	1,020	.17	7.9	45	15	4.58	1.29	4.73	3.67	5.57	1.65	.03
Feb.	5	.86	37,200	922	.17		44	15	4.04	1.13	3.99	3.03	4.96	1.38	.03
Mar.	5	.77	36,000	819	.19	7.9	42	13	3.79	1.01	3.48	3.03	4.22	1.12	.01
Apr.	5	.97	12,100	1,050	.15	7.9	48	22	4.10	1.28	4.97	2.75	5.63	2.35	.01
May	5	1.07	16,700	1,120	.20	8.0	48	19	4.52	1.28	5.31	2.47	6.67	2.10	.01
June	6	.94	18,100	970	.20	7.8	48	16	3.85	1.18	4.69	2.69	5.50	1.62	.04
July	6	.87	28,400	903	.19	7.7	40	13	4.52	.94	3.58	2.15	5.84	1.16	.04
Aug.	5	.93	20,800	989	.25	8.1	44	16	4.51	1.02	4.42	2.80	5.66	1.60	.03
Sept.	5	.90	24,600	946	.33	8.1	40	13	4.74	1.07	3.88	2.75	5.71	1.30	.09
Oct.	4	.95	33,800	986	.19	7.9	45	16	4.39	1.14	4.59	3.00	5.76	1.65	.04
Nov.	4	.86	38,400	911	.15	7.8	43	13	4.27	1.11	4.03	3.23	4.94	1.20	.03
Dec.	3	1.01	32,200	1,040	.25	8.0	45	16	4.51	1.31	4.73	3.40	5.75	1.75	.03
Mean ⊕	ϕ 58	.905	ϕ 335,900	954	.199		44	15	4.30	1.13	4.24	2.99	5.37	1.48	.033
Period Average		.588	590,000	631			38	14	3.25	.783	2.46	2.55	3.02	.896	
Tons of Constituents, 1948									43,500	6,930	49,200	46,000	130,000	26,500	
Average Tons Period 1935-1948									88,900	13,000	77,200	106,000	198,000	43,400	
Terlingua Creek — Sampling by U.S. Section															
Jan.	3	1.43	303	1,410	.16		53	3	5.62	1.48	8.04	3.17	11.76	.40	.09
Feb.	3	1.41	233	1,390	.14		54	2	5.16	1.44	7.84	2.61	11.59	.35	.08
Mar.	3	1.39	221	1,370		8.0	55	3	4.81	1.47	7.83	2.35	11.49	.50	.07
Apr.	3	1.40	189	1,370	.08	7.9	56	3	4.86	1.47	7.98	2.52	11.72	.38	.11
May	3	.49	656	485			58	4	1.71	.37	2.90	2.03	2.73	.20	.05
June	5	.46	1,760	457			58	4	1.69	.31	2.71	2.34	2.14	.20	.06
July	5	.44	5,280	436		7.8	58	4	1.61	.29	2.59	2.23	2.04	.19	.06
Aug.	5	.57	758	565			58	4	2.09	.38	3.36	2.89	2.65	.24	.07
Sept.	5	.48	835	475			58	4	1.75	.32	2.82	2.43	2.23	.21	.06
Oct.	3	.93	294	927		7.8	57	3	3.30	.87	5.55	2.60	6.91	.31	.10
Nov.	3	1.38	168	1,380			57	3	4.92	1.29	8.27	3.88	10.29	.46	.14
Dec.	2	1.40	193	1,390	.19	7.9	54	3	5.28	1.46	7.88	3.03	11.49	.38	.11
Mean ⊕	ϕ 43	.507	ϕ 10,890	502			57	4	1.85	.36	2.97	2.33	2.63	.21	.06
Period Average															
Tons of Constituents, 1948									1,080	128	2,000	2,080	3,690	218	
Average Tons Period															

ϕ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions T Trace

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Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	Mean ECx10⁶ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Rio Grande at Johnson Ranch (Sampling by U.S. Section)															
Jan.	5	1.23	51,200	1,360	.22		51	28	5.01	1.63	6.95	3.35	6.65	3.92	.01
Feb.	3	1.10	49,100	1,190	.17	8.0	50	26	4.47	1.47	5.99	2.80	6.11	3.14	.02
Mar.	4	.86	39,000	943	.19	8.0	53	22	2.96	1.19	4.66	1.79	5.13	1.94	.03
Apr.	4	.98	13,100	1,070			53	22	3.36	1.35	5.28	2.04	5.82	2.20	.03
May	4	1.16	18,100	1,260			55	23	4.22	1.39	6.68	1.91	7.66	2.92	.03
June	5	1.02	24,100	1,080			48	19	4.66	1.09	5.37	2.54	6.50	2.18	.06
July	6	.79	34,000	849	.14	7.8	50	17	3.45	.70	4.16	2.59	4.39	1.40	.09
Aug.	5	.84	27,100	863			36	11	4.69	.84	3.08	2.30	5.52	1.00	.04
Sept.	3	.96	28,600	994		8.0	42	15	4.92	.95	4.28	2.65	6.16	1.55	.07
Oct.	4	.87	34,700	929	.22	8.0	47	22	3.84	1.06	4.38	2.50	4.93	2.10	.04
Nov.	4	1.09	53,700	1,170			47	22	4.83	1.34	5.52	3.15	6.21	2.65	.04
Dec.	5	1.28	48,600	1,400	.26	7.9	53	33	4.93	1.68	7.39	3.10	6.49	4.65	.03
Mean ⊕ Period Average	ϕ 52	1.01	ϕ 421,300	1,090			49	23	4.29	1.23	5.29	2.64	5.84	2.51	.041
Tons of Constituents, Average Tons Period	1948								48,700	8,470	68,900	45,600	159,000	50,400	
Rio Grande at Langtry (Sampling by U.S. Section)															
Jan.	5	.98	55,300	1,080			46	24	4.19	1.69	5.04	3.30	5.07	2.75	.03
Feb.	7	‡.96	‡ 61,100	1,050			46	25	‡ 4.11	‡ 1.66	‡ 4.94	‡ 3.23	‡ 4.97	‡ 2.70	‡.03
Mar.	4	.82	49,900	897	.20	8.1	43	20	3.69	1.48	3.95	2.85	4.42	1.85	.03
Apr.	4	.76	26,300	817	.11	7.9	41	18	3.40	1.49	3.40	2.92	3.86	1.54	.04
May	9	.65	24,900	719	.13	8.1	40	19	2.93	1.30	2.85	2.95	2.81	1.40	.07
June	7	.77	34,800	839	.08	7.8	39	17	3.90	1.11	3.25	2.90	4.21	1.48	.05
July	6	.78	45,700	813	.17	8.0	43	16	3.40	1.21	3.51	2.85	4.04	1.31	.06
Aug.	6	.73	40,100	758	.11	7.7	36	12	3.94	1.04	2.79	2.80	4.04	.90	.04
Sept.	7	.73	32,100	817	.26	7.8	41	18	3.65	1.19	3.30	2.80	3.87	1.50	.09
Oct.	6	.74	46,800	805	.22	8.1	44	22	3.49	1.11	3.62	2.50	4.01	1.81	.04
Nov.	6	.98	61,200	1,070			44	22	4.62	1.47	4.79	3.31	5.31	2.39	.06
Dec.	7	1.05	54,400	1,130	.22	7.9	48	28	4.21	1.70	5.54	3.11	5.20	3.28	.04
Mean ⊕ Period Average	ϕ 74	.840 .808	ϕ 532,600 851,000	911 892			43 47	21 25	3.84 3.55	1.38 1.18	3.99 4.13	2.97 2.52	4.39 4.22	1.95 2.19	.047
Tons of Constituents, Average Tons Period	1948 1945-1948								66,300 102,000	14,500 20,600	79,100 136,000	78,100 110,000	182,000 290,000	59,600 111,000	
Pecos River (Sampling by U.S. Section)															
Jan.	14	4.39	57,900	4,880	.26		60	62	10.91	9.28	30.36	2.81	16.70	31.58	.04
Feb.	15	4.17	54,200	4,670	.27	8.0	61	63	9.69	8.87	29.32	2.10	15.48	30.10	.04
Mar.	15	4.01	48,500	4,440	.26	7.9	60	62	9.63	8.46	27.62	2.35	14.84	28.70	.03
Apr.	14	3.98	37,900	4,390	.25	7.8	61	63	8.92	8.59	27.31	2.04	14.76	28.21	.04
May	18	3.45	42,400	3,910	.25	8.1	60	62	8.29	7.42	24.06	2.25	12.87	24.80	.04
June	18	3.10	27,400	3,540	.21	7.6	60	62	7.32	6.59	21.27	1.95	11.52	21.85	.05
July	18	.73	30,800	865		7.8	49	48	2.77	1.39	4.04	1.96	2.24	4.09	.17
Aug.	16	2.28	17,900	2,720			58	60	5.91	5.09	15.43	2.25	8.47	15.93	.09
Sept.	16	1.97	20,900	2,310	.23	8.0	57	58	5.62	4.25	13.23	2.45	7.14	13.25	.08
Oct.	13	2.72	34,800	3,090	.22	7.9	58	59	7.44	5.76	18.17	2.75	9.99	18.75	.06
Nov.	15	3.02	35,600	3,430	.27	7.8	59	60	7.90	6.51	20.45	2.75	11.08	21.00	.08
Dec.	15	3.91	52,000	4,400	.26	7.9	60	61	9.89	8.49	27.33	2.85	14.90	28.05	.04
Mean ⊕ Period Average	ϕ187	2.75 4.11	ϕ 460,300 1,520,000	3,110 4,320			59 54	61 55	7.05 13.00	5.84 8.11	18.69 25.24	2.32 2.51	10.13 18.30	19.24 25.51	.082
Tons of Constituents, Average Tons Period	1948 1935-1948								32,200 131,000	16,200 49,600	97,900 292,000	16,100 38,500	111,000 442,000	155,000 455,000	
Goodenough Spring (Sampling by U.S. Section)															
Jan.	2	.34	2,830	411			12	8	2.75	1.02	.51	3.35	.52	.34	.10
Feb.	2	.35	2,610	382	.05	8.0	14	10	2.60	.98	.58	3.15	.52	.41	.09
Mar.	2	.41	3,150	453			14	10	3.09	1.16	.68	3.74	.62	.49	.09
Apr. ‡	0	.41	3,060	489	.03	8.2	12	9	3.45	1.08	.61	4.10	.53	.45	.11
May	2	.41	2,960	489	.03	8.2	12	9	3.45	1.08	.61	4.10	.53	.45	.11
June	2	.41	2,880	489	.03	8.2	12	9	3.45	1.08	.61	4.10	.53	.45	.11
July	2	.41	3,230	481		7.8	11	8	3.63	1.05	.55	4.10	.57	.40	.11
Aug.	4	.39	3,020	498	.07	8.1	10	10	3.55	1.09	.54	4.05	.55	.50	.11
Sept.	2	.26	1,840	338		8.1	15	11	1.87	1.09	.53	2.45	.52	.40	.13
Oct.	2	.37	3,020	435		8.2	12	11	2.94	1.11	.56	3.45	.54	.50	.11
Nov.	2	.39	3,050	476	.05	7.9	10	8	3.65	1.00	.50	4.12	.50	.40	.14
Dec.	4	.37	2,730	454	.04	8.0	11	9	3.24	1.03	.54	3.81	.52	.42	.11
Mean ⊕ Period Average	ϕ 26	.377 .307	ϕ 34,380 35,300	450 366			12 15	9 11	3.14 2.22	1.06 .952	.57 .545	3.71 2.73	.54 .498	.43 .395	.110
Tons of Constituents, Average Tons Period	1948 1946-1948								7,810 6,960	1,600 1,810	1,630 1,960	14,000 13,000	3,220 3,740	1,890 2,190	
San Felipe Creek (Sampling by U.S. Section)															
Jan.	3	.28	781	351			13	12	2.38	.74	.46	2.69	.30	.42	.14
Feb.	4	.33	578	372		7.8	22	20	1.95	.93	.82	2.05	.84	.74	.12
Mar.	5	.38	303	441	.09	8.0	19	15	2.57	1.05	.85	2.85	.71	.68	.19
Apr.	5	.48	367	572	.05	8.0	14	13	4.02	1.04	.84	4.28	.77	.76	.15
May	0														
June	4	.34	3,710	346			18	12	2.67	.63	.72	2.67	.63	.49	.16
July	3	.29	2,550	388			10	10	2.75	.56	.37	2.80	.27	.38	.22
Aug.	5	.37	1,370	437	.08	7.8	9	9	3.46	.75	.43	3.65	.30	.40	.20
Sept.	4	.29	1,280	392	.05	8.0	12	12	2.33	.74	.45	2.85	.28	.45	.17
Oct.	5	.41	1,880	480	.04	8.0	8	8	4.01	.76	.41	4.30	.27	.40	.20
Nov.	5	.42	1,640	492	.04	7.8	8	9	3.97	.75	.42	4.26	.32	.45	.16
Dec.	4	.36	1,150	437	.10	8.0	11	10	3.33	.81	.50	3.65	.37	.48	.17
Mean ⊕ Period Average	ϕ 47														
Tons of Constituents, Average Tons Period															

ϕ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions ‡ Estimated

CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES — 1948

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	Mean ECx10⁶ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Rio Grande at Eagle Pass (Sampling by Mexican Section)															
Jan.	28	1.14	110,000	1,330	.15	8.0	50	41	4.19	2.29	6.52	2.85	4.88	5.35	.06
Feb.	28	1.12	109,000	1,290	.18	7.9	51	41	3.95	2.26	6.55	2.49	5.05	5.20	.06
Mar.	30	1.09	102,000	1,260	.20	8.0	50	40	3.89	2.25	6.20	2.53	4.84	5.04	.04
Apr.	26	1.01	60,900	1,170	.14	7.8	52	46	3.02	2.22	5.64	1.53	4.34	5.14	.09
May	29	.82	59,600	977	.16	7.7	49	40	2.99	1.83	4.55	2.25	3.44	3.80	.08
June	22	.25	229,000	301	.12		33	24	1.61	.44	1.00	1.42	.84	.74	.06
July	26	.41	258,000	480		7.9	30	23	2.61	.66	1.40	2.35	1.16	1.05	.10
Aug.	31	.75	99,200	831	.12	7.7	39	26	3.84	1.22	3.18	2.80	3.26	2.15	.14
Sept.	29	.65	106,000	754	.20	7.9	39	31	3.17	1.31	2.92	2.58	2.52	2.30	.11
Oct.	24	.76	121,000	874	.16	8.0	41	31	3.75	1.47	3.60	2.85	3.13	2.70	.10
Nov.	25	.81	112,000	917	.16	7.9	44	33	3.63	1.54	4.13	2.75	3.47	3.15	.09
Dec.	25	.96	110,000	1,110	.15	8.0	47	37	3.85	1.99	5.14	2.90	3.96	4.15	.09
Mean @	ϕ323	.552	ϕ1,476,700	642			41	32	2.71	1.04	2.60	2.15	2.13	2.03	.082
Period Average		1.07	3,082,000	1,210			47	40	4.50	1.90	5.70	2.40	4.84	4.78	
Tons of Constituents, 1948									197,000	46,000	217,000	238,000	372,000	262,000	
Average Tons Period 1938-1948									352,000	90,100	512,000	286,000	907,000	662,000	
Rio Salado (Sampling by Mexican Section)															
Jan.	15	3.69	5,350	3,390	1.13	7.8	44	28	12.93	9.03	17.09	2.00	26.58	10.96	T
Feb.	13	4.30"	6,540	3,950			44	28	15.07	"10.52	19.91	2.33	30.97	12.77	.05
Mar.	16	3.70	12,400	3,400	1.12	7.8	44	28	13.37	8.91	17.28	2.07	26.66	10.95	.03
Apr.	15	4.08	8,980	3,720	1.32	7.8	45	28	14.28	9.62	19.43	2.04	29.25	12.16	.04
May	19	1.54	13,000	1,560	.52	7.8	43	26	6.22	3.08	7.00	1.60	10.46	4.30	.07
June	14	3.07	18,600	2,880	1.04	7.6	44	27	11.17	6.56	14.15	1.91	21.36	8.46	.09
July	15	.57	18,700	635	.18	7.7	36	20	3.04	.86	2.21	1.85	3.14	1.27	.09
Aug.	15	1.02	13,100	1,090	.37	7.6	41	24	4.48	2.01	4.49	1.70	6.59	2.60	.05
Sept.	13	.36	50,500	455	.15	7.8	28	18	2.46	.63	1.20	1.75	1.81	.80	.06
Oct.	18	.55	26,300	639	.13	7.8	36	24	2.92	1.12	2.25	1.80	2.92	1.50	.09
Nov.	14	1.11	6,060	1,200	.41	7.8	38	26	5.18	2.45	4.66	2.65	6.46	3.30	
Dec.	13	2.55	6,630	2,560	.80	7.6	45	30	9.37	6.24	12.54	2.15	17.51	8.58	
Mean @	ϕ180	.702	ϕ 186,160	769			37	23	3.52	1.40	2.89	1.80	4.23	1.83	
Period Average		.905	237,000	947			40	27	4.29	1.69	3.92	1.94	5.28	2.68	
Tons of Constituents, 1948									25,400	6,140	24,000	19,800	73,200	23,400	
Average Tons Period 1935-1948									30,600	7,340	32,100	21,100	90,300	33,900	
Rio Grande at Roma (Sampling by Mexican Section)															
Jan.	31	1.15	119,000	1,310	.16	7.9	49	39	4.23	2.34	6.38	2.85	5.05	5.10	.04
Feb.	29	1.18	126,000	1,350	.17	7.9	53	42	3.88	2.36	6.93	2.35	5.42	5.56	.04
Mar.	31	1.14	133,000	1,280	.20	8.0	50	39	4.12	2.27	6.28	2.41	5.43	4.95	.04
Apr.	30	1.14	73,200	1,290	.23	7.9	51	39	3.87	2.49	6.50	2.25	5.51	5.05	.16
May	31	.90	98,000	1,050	.19	7.9	49	38	3.41	1.75	4.91	1.90	4.28	3.90	.09
June	32	.36	248,000	400			34	22	2.03	.61	1.39	1.84	1.29	.89	.10
July	31	.46	277,000	494			33	22	2.61	.75	1.64	2.31	1.53	1.13	.13
Aug.	31	.80	112,000	894	.24	7.8	43	30	3.56	1.36	3.74	2.27	3.78	2.70	.11
Sept.	31	.36	297,000	404			34	23	2.10	.56	1.34	1.83	1.30	.96	.04
Oct.	31	.71	193,000	827	.18	7.8	43	32	3.29	1.31	3.52	2.20	3.21	2.60	.09
Nov.	30	.76	117,000	930	.15	7.7	43	32	3.77	1.50	3.92	2.80	3.44	2.94	.09
Dec.	29	.97	124,000	1,150	.19	7.7	47	37	3.99	2.04	5.28	2.72	4.40	4.25	.07
Mean @	ϕ367	.579	ϕ1,917,200	657			41	30	2.76	1.05	2.69	2.13	2.40	2.00	.083
Period Average		#.821	#2,489,000	881			47	37	3.21	1.33	4.07	2.19	3.28	3.17	
Tons of Constituents, 1948									249,000	57,500	279,000	293,000	520,000	320,000	
Average Tons Period 1944-1948									271,000	68,000	394,000	281,000	664,000	473,000	
Rio Grande at Las Palmas (Sampling by U.S. Section)															
Jan.	30	1.12	93,700	1,290	.15		48	39	4.22	2.30	6.06	2.89	4.98	5.02	.03
Feb.	29	1.19	119,000	1,380	.20	8.1	52	42	4.12	2.34	6.96	2.53	5.30	5.74	.04
Mar.	30	1.15	116,000	1,300	.23	7.9	51	40	4.13	2.20	6.61	2.39	5.30	5.20	.04
Apr.	30	.97	43,700	1,130	.25	7.8	49	37	3.73	1.98	5.58	2.50	4.57	4.20	.03
May	31	.93	79,700	1,000	.25	8.3	51	38	3.13	1.68	4.91	1.90	4.10	3.70	.03
June	30	.46	110,000	527		7.9	38	26	2.32	.85	1.91	2.27	1.53	1.34	.10
July	29	.45	259,000	502	.09	7.9	32	25	2.52	.75	1.52	2.25	1.39	1.25	.12
Aug.	31	.90	74,400	1,020	.26	7.6	45	34	3.99	1.55	4.56	2.45	4.19	3.46	.06
Sept.	30	.44	335,000	537	.19	8.0	39	24	2.43	.71	1.98	2.00	1.83	1.25	.06
Oct.	31	.63	228,000	742	.20	7.9	43	32	3.12	1.02	3.10	2.20	2.71	2.35	.04
Nov.	28	.74	153,000	886	.21	7.8	42	33	3.70	1.35	3.71	2.70	3.13	2.95	.06
Dec.	30	1.05	111,000	1,240	.24	7.8	48	40	4.17	2.07	5.77	2.78	4.50	4.90	.05
Mean @	ϕ359	.627	ϕ1,722,500	730			43	32	2.96	1.11	3.01	2.26	2.56	2.29	.069
Period Average		.694	1,691,000	806			46	34	3.07	1.18	3.56	2.22	2.95	2.67	
Tons of Constituents, 1948									222,000	50,500	259,000	258,000	460,000	304,000	
Average Tons Period 1946-1948									204,000	47,600	271,000	224,000	469,000	314,000	
North Floodway near Sebastian, Texas (Sampling by U.S. Section)															
Jan. thru June	9	4.23	69,000	4,650	2.73	7.7	62	64	10.16	8.05	29.17	1.95	15.31	30.40	.04
July and Aug. excl. July 3-9	8	2.55	14,600	2,900		8.1	58	55	7.61	4.58	16.86	3.73	9.39	16.40	.04
July 3-9"	0	.45	3,360	502	.09	7.9	32	25	2.52	.75	1.52	2.25	1.39	1.25	.12
Sept. and Oct. excl. 9/15-19	7	2.61	74,100	2,970	1.66	7.9	56	57	8.42	4.71	16.75	3.50	9.31	17.15	.08
9/15-19"	0	.44	18,700	537	.19	8.0	39	24	2.43	.71	1.98	2.00	1.83	1.25	.06
Nov. and Dec.	9	4.25	52,300	4,700	2.87	7.8	59	60	11.99	7.96	29.24	4.00	15.92	29.50	.09
Mean @	ϕ 33	2.06	ϕ 232,060	2,320		7.91	57	56	6.37	3.77	13.34	2.69	7.56	13.33	.068
Period Average		1.92	125,000	2,150			56	54	5.87	3.52	12.20	2.54	7.40	11.81	
Tons of Constituents, 1948									19,600	7,030	47,000	12,600	55,700	72,400	
Average Tons Period 1941-1948									10,400	6,730	24,800	6,850	31,400	37,000	

" Estimated # Period 1943-1948 T Trace ** Percent of total cations *** Percent of total anions @ Weighted mean
ϕ Total

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1948

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

El Paso

January		March		April		May		June		July		August		September		October		November	
2	1,950	2	2,020	9	1,180	14	1,390	14	1,350	16	1,020	19	1,120	20	1,160	24	1,790	30	1,740
5	1,920	3	2,030	10	1,220	15	1,320	15	1,310	17	1,020	21	1,140	21	1,280	25	1,650	December	
6	1,950	4	2,020	11	1,200	16	1,250	16	1,340	20	953	22	1,160	22	1,640	27	1,800	1	1,740
7	1,950	5	2,030	12	1,190	17	1,220	17	1,390	21	1,020	23	1,160	23	1,560	28	1,670	2	1,740
8	1,980	6	2,040	13	1,200	18	1,250	18	1,300	22	1,090	24	1,170	24	1,750	29	1,810	3	1,760
9	1,970	8	2,040	14	1,180	19	1,230	19	1,070	23	996	25	1,190	25	1,710	November		5	1,820
12	1,960	9	2,040	15	1,210	20	1,170	20	1,050	24	1,080	26	1,150	26	1,780	1	1,810	7	1,780
13	1,980	10	2,040	16	1,300	21	1,130	21	1,020	25	1,030	27	1,070	27	1,670	2	1,850	8	1,880
14	1,970	11	2,040	17	1,250	22	1,180	22	1,090	26	1,020	28	1,010	28	1,740	3	1,700	9	1,860
15	1,990	12	2,050	18	1,260	23	1,240	23	1,060	27	1,120	29	1,020	29	1,640	4	1,710	11	1,760
16	1,990	15	2,070	19	1,220	24	1,210	24	1,070	28	1,120	30	1,060	30	1,740	5	1,760	12	1,780
19	1,990	16	2,070	20	1,270	25	1,210	25	1,080	30	1,250	31	1,030	October		8	1,700	13	1,880
20	1,960	17	2,070	21	1,260	26	1,220	26	1,040	31	1,380	September		1	1,660	9	1,840	14	1,790
21	1,970	18	2,070	23	1,210	27	1,250	27	1,090	August		1	937	2	1,740	10	1,750	15	1,860
22	1,970	19	1,570	24	1,260	28	1,270	28	1,070	1	1,320	2	1,090	3	1,790	12	1,790	16	1,510
23	1,980	22	1,300	26	1,230	29	1,320	29	1,120	2	1,170	3	1,180	4	1,800	13	1,860	17	1,490
26	1,980	23	1,230	27	1,280	30	1,320	30	1,070	3	982	4	1,130	5	1,710	14	1,870	18	1,410
27	2,030	24	1,270	29	1,280	31	1,370	July		4	953	5	1,160	6	1,590	15	1,700	20	1,640
28	2,030	25	1,280	30	1,340	June		1	1,000	5	1,200	6	1,130	7	1,460	16	1,850	21	1,630
29	2,040	26	1,210	May		1	1,390	2	1,010	6	1,160	7	1,200	8	1,550	17	1,700	22	1,590
30	2,040	29	1,160	1	1,350	2	1,310	3	1,070	7	1,260	8	1,090	9	1,440	18	1,910	23	1,670
February		30	1,180	2	1,330	3	1,170	4	1,030	8	1,140	9	1,060	10	1,450	19	1,690	24	1,790
2	1,930	31	1,190	3	1,250	4	1,200	5	1,000	9	1,200	10	1,110	11	1,500	20	1,420	25	1,750
3	1,960	April		4	1,210	5	1,280	6	1,050	10	1,010	11	1,150	12	1,560	21	1,440	26	1,730
4	1,970	1	1,190	5	1,200	6	1,290	7	1,050	11	1,090	12	1,310	13	1,650	22	1,340	27	1,720
5	1,910	2	1,210	7	1,260	7	1,250	9	1,040	12	1,000	13	1,160	14	1,650	23	1,530	28	1,710
6	1,950	3	1,230	8	1,280	8	1,270	10	1,010	13	1,110	14	1,210	15	1,680	24	1,620	30	1,810
9	1,990	4	1,210	9	1,310	9	1,270	11	1,050	14	1,040	15	1,280	16	1,540	25	1,650	31	1,800
10	1,980	5	1,210	10	1,360	10	1,270	12	1,090	15	977	16	1,340	18	1,800	26	1,610		
11	1,980	6	1,240	11	1,340	11	1,340	13	1,030	16	1,030	17	1,440	20	1,660	27	1,720		
12	2,000	7	1,250	12	1,380	12	1,380	14	989	17	1,060	18	1,210	21	1,760	28	1,710		
13	2,030	8	1,190	13	1,400	13	1,340	15	1,030	18	1,070	19	1,320	22	1,630	29	1,690		

Fort Quitman

January		February		March		April		June		July		August		September		September		November	
3	4,130	11	4,330	17	6,200	29	7,840	2	1,980	7	6,650	18	6,460	18	5,130	27	3,840	30	3,740
5	3,950	14	4,430	24	6,530	May		2	1,980	10	7,950	25	6,380	22	6,410	30	3,980	December	
14	3,820	18	4,270	April		5	8,770	2	1,980	14	8,770	28	8,760	October		November		1	3,850
17	3,700	21	4,620	2	6,340	12	7,790	9	3,580	21	7,820	September		6	6,300	3	3,740	8	3,920
20	4,030	25	4,970	9	7,290	15	8,050	12	6,310	August		1	6,620	12	4,350	10	3,950	15	3,790
30	4,580	March		10	7,470	19	7,980	16	6,700	4	5,560	2	8,130	13	4,270	17	3,590	18	3,850
February		3	5,830	19	7,910	26	7,600	23	6,310	11	8,330	9	4,310	20	3,900	20	4,210	22	3,890
4	3,880	10	5,930	27	7,970	30	7,370	30	8,530	17	6,600	15	5,380	20	3,920	24	3,180	29	3,690

Upper Presidio

January		February		March		April		May		June		August		October		November		December	
3	4,350	7	4,560	6	5,820	10	6,810	1	7,700	12	1,920	21	505	23	2,880	5	3,980	3	3,490
10	4,470	14	4,280	13	6,140	17	7,120	8	8,360	26	940	September		30	3,720	12	4,010	10	3,800
17	4,120	21	4,780	20	6,430	24	7,290	June		July		11	1,540			19	4,060	17	4,000
24	4,000	28	5,310	27	6,690	30	7,720	4	1,300	31	1,220	11	1,520			26	4,000	24	3,880
31	4,210			31	6,690			4	1,290	31	1,230	18	902					31	3,880
								5	1,100			25	2,020						

Rio Conchos at Cuchillo Parado

January		February		March		May		June		July		August		September		October		December	
1	936	16	825	29	737	3	1,050	11	985	16	862	11	1,010	15	967	27	871	1	964
2	928	18	875	31	793	5	1,080	14	993	17	550	13	973	17	946	29	828	3	816
5	1,010	20	801	April		7	1,100	14	971	17	549	16	837	20	830	November		6	883
7	924	23	840	2	916	10	1,140	16	973	19	978	18	1,030	22	794	1	779	8	926
9	976	25	764	5	1,010	12	1,150	18	973	21	911	20	886	24	807	3	819	10	772
14	1,010	27	794	7	882	14	595	21	695	23	547	23	1,050	27	839	5	912	13	853
16	1,080	March		9	1,040	17	986	21	690	23	560	25	1,120	October		8	775	15	947
21	1,020	1	838	12	1,240	19	980	23	987	23	555	27	1,090	4	844	10	841	17	1,000
23	978	3	725	14	1,250	21	1,040	25	964	26	751	30	1,260	6	988	12	865	20	988
28	842	5	729	16	1,110	24	1,080	28	1,040	28	862	September		8	1,030	15	833	22	1,010
30	875	8	827	19	1,040	26	1,030	30	1,140	30	940	1	1,240	11	1,070	17	798	24	1,050
February		12	706	21	1,190	28	1,020	July		August		3	1,200	13	1,040	19	752	27	999
2	994	15	780	23	1,170	31	977	2	954	2	687	6	1,240	15	1,050	22	800	29	983
4	961	17	767	26	1,110	June		5	998	2	706	8	1,280	18	866	24	785	31	994
6	913	19	720	28	1,090	2	1,040	7	941	2	685	9	964	20	862	26	868		
9	910	22	781	30	1,110	4	972	9	1,010	4	640	10	828	22	886	29	971		
11	897	24	725			7	996	12	1,020	6	771	13	1,100	22	897				
13	903	26	702			9	969	14	1,010	9	991	13	1,100	25	649				

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Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rio Conchos at Ojinaga, Chihuahua

January		February		March		April		May		June		July		September		October		November	
4	1,070	12	883	18	816	22	1,080	28	1,040	29	1,090	31	845	8	1,260	15	1,000	30	886
12	1,060	16	943	24	777	29	1,170	June		July		August		14	988	22	879	December	
14	1,020	25	867	31	780	May		3	1,100	5	1,140	2	901	19	1,010	29	990	7	1,020
21	978	29	865	April		2	1,090	4	1,010	15	1,030	10	957	24	845	November		21	1,050
29	950	March		2	896	11	1,160	8	1,010	21	945	17	1,000	28	794	1	944	28	1,050
February		3	796	7	970	17	1,050	15	1,060	24	850	24	1,050	October		9	869		
2	935	12	875	15	1,160	23	1,160	22	592	28	728	31	1,130	8	1,080	23	897		

Terlingua Creek

January		February		April		May		June		July		August		September		October		November	
2	1,380	23	1,420	2	1,390	24	1,340	10	1,340	12	1,430	2	488	2	1,390	11	1,360	20	1,410
13	1,420	March		15	1,410	June		16	1,440	16	416	8	1,410	8	1,360	19	667	December	
23	1,410	2	1,350	24	1,440	3	624	21	1,010	20	1,450	12	1,430	14	1,390	26	1,410	11	1,400
February		11	1,360	May		3	621	28	406	27	929	19	1,420	20	1,390	November		20	1,400
2	1,360	22	1,400	1	1,340	3	622	July				26	1,410	26	410	2	1,350		
10	1,360			18	1,390	10	1,340	5	1,240							13	1,370		

Johnson Ranch

January		February		March		May		June		July		August		October		November		December	
1	1,140	10	1,250	22	953	11	1,500	9	1,360	25	555	26	994	2	1,040	1	1,600	1	1,420
6	1,410	13	1,250	April		17	1,430	20	1,210	26	728	September		10	1,090	5	1,280	10	1,380
11	1,440	21	1,060	1	852	25	1,200	27	1,010	August		1	1,010	18	1,020	11	1,250	15	1,250
23	1,490	March		9	1,070	28	1,160	July		2	728	13	1,180	25	847	20	993	19	1,460
30	1,250	1	1,010	14	1,190	June		4	1,130	8	831	25	786					29	1,500
		6	960	19	1,250	2	918	10	1,220	14	915								
		18	864			2	913	21	1,210	21	1,190								

Boquillas

April		April		April		April		May		May		May		June		June		June	
5	957	15	1,110	20	1,240	27	1,230	3	1,270	12	1,360	18	1,470	5	906	5	909	5	892
12	821																		

Maravillas

April		April		April		April		April		May		May							
7	935	13	579	16	1,090	21	1,210	28	1,180	13	1,360	19	1,410						

Jones Ranch			Spring on the United States Side 700 ft. Below Jones Ranch			Spring on Mexican Side 700 ft. Below Jones Ranch			
June		June		June		February		February		March		March		
3	1,040	10	1,170	17	1,120	13	798	26	794	18	796	19	805	4	768	25	810	

Aqua Verde

February		February		March		March		April		April		May		May		June		July	
2	1,200	23	1,120	8	931	26	898	9	798	30	943	14	897	31	1,060	14	996	2	610
9	1,020	27	647	12	913	29	926	16	884	May		17	896	June		22	968		
14	1,080	March		15	814	April		19	699	3	896	21	964	5	979	25	1,000		
16	1,120	1	1,010	19	879	2	837	23	887	7	835	24	283	7	1,023	28	944		
20	1,150	5	982	22	928	5	957	26	933	11	854	28	685	11	841				

Langtry

January		February		April		May		June		July		September		October		November		December	
2	1,040	17	1,060	7	837	16	824	14	845	19	985	1	697	6	823	4	1,140	1	964
5	1,000	19	1,070	13	818	20	831	17	944	26	659	5	700	8	850	4	1,170	2	1,020
12	1,050	23	1,090	20	758	24	892	21	1,150	August		9	347	13	809	11	926	8	1,130
17	1,080	29	944	27	836	27	525	29	1,020	2	771	14	724	18	821	17	1,050	14	1,200
20	1,150	March		May		30	587	July		5	682	20	724	21	886	17	1,060	18	1,120
February		4	981	2	845	June		1	930	10	796	22	970	28	786	25	1,080	22	1,040
2	1,190	12	888	7	797	3	420	5	910	17	754	30	823					30	1,230
4	1,160	19	876	8	730	3	413	13	724	20	685								
6	990	27	854	12	817	7	869	15	659	25	847								

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

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Pecos River near Comstock

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
January		February		March		April		June		July		August		September		October		November	
2	4,620	11	4,880	20	4,530	30	3,930	2	3,930	2	2,930	1	2,710	8	2,600	14	3,090	23	3,610
4	4,390	13	4,690	22	4,640	May		4	4,010	4	2,980	3	2,740	9	2,950	18	2,940	25	3,640
6	4,670	15	4,780	24	4,420	1	4,180	6	3,250	5	330	5	2,760	9	2,580	20	3,480	27	3,910
8	4,780	17	4,860	26	4,610	3	4,140	8	3,670	5	351	7	2,730	10	1,230	22	2,690	29	3,700
12	5,110	19	4,860	28	4,610	5	4,060	10	4,110	6	568	9	2,790	12	715	24	1,790	December	
14	5,010	21	4,830	30	4,640	7	4,070	12	4,010	8	1,620	11	2,730	14	1,280	26	2,820	1	3,800
16	5,190	23	4,780	April		9	4,020	14	4,210	8	1,530	13	2,650	16	2,040	28	2,450	3	3,580
18	4,900	25	4,600	3	4,600	11	3,910	16	4,140	10	1,130	15	2,730	18	2,310	30	2,590	5	4,060
20	5,060	27	3,530	5	4,580	12	2,970	18	4,120	12	1,240	17	2,750	20	2,430	November		7	4,040
22	5,030	29	4,780	7	4,580	13	1,530	20	3,880	14	1,700	19	2,740	22	2,420	1	2,810	9	4,260
24	4,760	March		9	4,580	15	1,870	22	3,530	16	2,090	21	2,750	24	2,490	3	3,000	11	4,220
26	5,140	2	6,550	11	4,560	17	3,190	24	3,530	18	2,210	23	2,650	26	2,920	5	3,230	13	4,500
28	4,900	4	4,020	13	4,580	19	3,930	25	1,490	20	2,380	25	2,560	28	3,050	7	3,280	17	4,660
30	4,900	6	3,290	15	4,390	21	5,820	25	1,640	22	2,400	27	2,540	30	3,290	9	3,470	19	4,770
February		8	3,240	17	4,350	23	5,500	26	3,010	24	2,520	29	2,650	October		11	3,440	21	4,420
1	4,540	10	4,290	19	4,370	25	3,880	28	3,030	26	2,650	31	2,590	2	4,390	13	3,500	23	4,720
3	4,780	12	4,150	21	4,390	25	3,740	29	1,900	28	2,730	September		4	4,650	15	3,480	25	4,770
5	4,760	14	4,240	23	4,210	27	4,740	30	2,350	30	2,660	2	2,390	6	4,300	17	3,450	27	4,580
7	4,650	16	4,420	25	4,310	29	3,730					4	2,490	8	4,070	19	3,510	29	4,660
9	4,600	18	4,440	27	4,090	31	4,130					6	2,510	12	3,410	21	3,690	31	4,620

Goodenough Spring

January		February		May		June		August		September		October		November		December	
15	401	18	460	19	481	10	482	13	482	15	301	24	353	25	441	15	462
29	478	March		19	481	July		13	474	15	288	24	330	25	473	15	464
February		15	420	June		14	474	30	478	15	476	24	351			29	469
17	303	29	484	10	485	14	478	30	478	24	348					29	470

San Felipe Creek

January		February		March		April		June		August		Spetember		October		November		December	
16	463	21	411	24	575	26	542	29	388	4	496	4	475	2	510	3	506	3	453
23	472	27	437	31	563	28	470	July		10	308	11	477	9	515	8	506	8	495
30	486	March		April		June		21	495	17	496	18	275	14	402	13	497	15	501
February		5	462	6	569	2	541	24	505	23	488	18	274	21	594	20	504	29	498
6	269	11	511	12	541	12	509	28	514	28	494	25	343	27	509	27	471		
13	272	18	558	19	561	19	532					25	360						

Eagle Pass

January		February		March		April		May		July		August		September		October		November	
1	1,270	6	1,370	12	1,350	15	1,170	21	906	3	808	5	847	7	797	16	881	23	974
2	1,290	7	1,330	13	1,030	16	1,150	22	1,050	4	258	6	810	8	861	17	862	24	991
3	1,290	8	1,350	14	1,300	17	1,120	24	1,130	5	240	7	908	9	672	19	839	26	987
4	1,260	9	1,300	15	1,270	18	1,090	25	692	6	287	8	900	10	606	20	831	27	1,040
5	1,270	10	1,250	16	1,170	19	1,100	26	775	7	361	9	827	11	494	21	875	29	1,030
7	1,250	11	1,230	17	1,170	20	1,160	27	858	8	584	10	774	12	716	22	1,010	30	1,030
8	1,280	12	1,270	18	1,210	21	1,210	28	850	9	553	11	820	13	907	23	1,080	December	
9	1,280	13	1,240	19	1,160	23	1,170	30	1,020	10	515	12	858	14	928	24	1,040	1	966
10	1,270	14	1,260	20	1,090	24	1,130	31	964	11	815	13	759	15	766	25	654	2	943
11	1,280	15	1,250	21	1,100	25	1,100	June		12	802	14	758	16	671	26	820	3	1,040
12	1,270	16	1,250	22	1,180	26	1,140	1	999	13	1,250	15	839	17	681	27	779	4	930
13	1,280	17	1,340	23	1,200	29	1,070	2	951	14	819	16	865	18	600	28	729	6	1,020
14	1,290	18	1,330	24	1,160	30	1,050	3	1,050	15	720	17	858	19	634	29	845	7	1,000
15	1,300	19	1,350	25	1,190	May		4	1,030	16	744	18	753	20	710	30	762	8	1,070
16	1,360	20	1,350	26	1,170	1	1,180	5	659	17	779	19	825	21	709	November		9	1,070
17	1,360	21	1,350	27	1,180	2	1,140	6	632	18	785	20	871	22	816	1	765	10	984
19	1,380	23	1,330	28	1,200	3	1,150	7	663	19	733	21	884	23	743	2	756	11	1,070
20	1,340	24	1,330	29	1,210	4	1,150	8	891	20	800	22	841	24	884	3	729	13	1,100
21	1,360	25	1,290	30	1,210	5	1,110	9	891	21	805	23	854	25	877	4	786	14	1,160
22	1,340	26	1,340	31	1,230	6	1,130	10	1,070	22	809	24	852	26	824	5	767	15	1,260
23	1,390	27	1,300	April		7	1,130	11	1,070	23	933	25	814	27	903	6	792	16	1,250
24	1,390	28	1,250	1	1,180	8	1,160	12	1,060	24	871	26	790	28	958	8	958	17	1,190
26	1,420	29	1,250	2	1,140	9	1,160	13	1,010	25	916	27	769	30	975	9	980	18	1,200
27	1,420	March		3	1,140	10	1,130	14	1,080	26	896	28	826	October		10	883	21	1,200
28	1,430	1	1,250	4	1,140	11	1,120	15	1,110	27	837	29	819	1	978	11	916	22	1,210
29	1,430	2	1,560	5	1,120	12	1,120	16	1,110	28	814	30	853	2	806	12	959	23	1,190
30	1,420	3	1,530	6	1,140	13	1,080	17	1,080	29	841	31	841	3	912	13	985	24	1,180
31	1,420	4	1,530	7	1,100	14	1,260	18	1,100	30	796	September		4	910	15	876	27	1,180
February		5	1,500	8	1,100	15	1,250	19	1,090	31	996	1	791	10	993	16	948	28	1,160
1	1,430	6	1,510	10	1,180	16	804	20	1,130	August		2	800	11	1,010	17	937	29	1,180
2	1,310	7	1,490	11	1,230	17	803	21	1,150	1	939	3	739	12	903	18	980	30	1,180
3	1,370	9	1,120	12	1,170	18	840	23	838	2	834	4	811	13	845	19	981	31	1,180
4	1,310	10	1,370	13	1,170	19	856			3	789	5	809	14	981	20	972		
5	1,340	11	1,420	14	1,250	20	905			4	865	6	809	15	935	22	1,010		

Laredo

June		June		June		June		June		June		June		July		July	
25	748	26	281	26	259	26	226	26	215	27	208	27	246	1	518	4	826
25	357	26	234	26	250	26	219	26	213	27	212			2	681	5	815
25	612	26	244	26	227	26	214	27	209	27	234			3	615		

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1948

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rio Salado

January		February		March		May		June		July		August		September		October		November	
1	3,700	16	3,960	29	3,480	5	3,600	9	4,720	14	570	23	485	20	460	24	963	30	2,020
2	3,730	18	4,100	31	3,750	7	3,710	10	4,720	16	472	25	464	22	863	24	358	December	
5	3,850	20	4,200	April		10	3,670	14	4,840	19	455	27	448	24	487	25	221	3	1,970
7	3,840	23	4,330	1	3,840	12	3,090	16	4,890	21	343	30	410	27	868	26	234	6	2,120
9	3,730	25	4,370	2	3,960	14	3,020	17	4,940	23	353	31	435	29	1,010	26	238	8	2,260
12	3,340	27	4,410	5	4,200	17	3,000	21	5,150	26	636	31	438	30	785	27	268	10	2,410
14	3,250	29	4,450	7	4,330	19	3,010	23	5,210	28	959	September		October		29	408	13	2,540
16	3,320	March		9	4,440	21	3,480	24	2,760	30	1,390	1	656	1	746	31	579	15	2,640
19	3,170	1	4,510	12	4,510	24	3,080	24	2,720	31	1,470	3	611	4	911	November		17	1,660
21	3,100	3	4,550	14	4,550	25	1,580	26	1,230	August		6	955	6	1,080	1	654	20	3,010
23	3,030	5	4,150	16	4,580	25	1,570	26	1,230	1	2,190	8	1,290	8	1,120	3	831	22	3,020
26	3,050	6	3,320	19	4,620	25	1,330	29	4,180	1	2,190	10	700	11	1,210	5	879	24	3,090
28	3,140	8	2,620	21	4,650	25	1,330	30	3,550	2	1,020	10	718	13	1,320	8	1,060	27	3,310
30	3,280	10	4,240	23	4,370	25	1,200	July		4	771	10	705	14	1,970	10	1,160	29	3,300
31	3,280	12	4,430	23	4,370	27	810	1	2,800	4	771	10	518	14	1,970	12	1,230	31	3,280
February		13	4,130	26	2,520	28	600	2	1,050	6	574	10	518	15	1,720	15	1,320		
1	3,280	15	2,930	27	2,740	31	588	2	630	9	548	11	415	18	352	17	1,380		
2	3,350	17	2,080	28	2,520	June		4	932	12	580	12	378	18	343	19	1,530		
4	3,560	18	2,030	30	3,250	1	1,620	4	687	14	569	12	271	20	328	22	1,660		
6	3,660	22	2,600	May		2	3,060	6	287	16	561	13	275	22	425	24	1,760		
11	3,730	24	2,910	1	3,390	4	3,850	9	425	18	559	13	275	23	540	26	1,800		
13	3,810	26	3,210	3	3,700	7	4,610	12	1,160	20	529	20	458	23	533	29	1,970		

Zapata

June		June		June		June		June		July		July		August		September		September	
3	936	8	886	26	415	27	231	28	263	7	377	28	854	17	972	7	865	14	366
5	936	9	988	26	561	27	231	28	277	8	279	August		24	938	11	362	21	827
6	1,100	10	976	26	343	27	224	30	433	13	611	3	902	31	809	11	342	28	761
7	1,340	11	1,090	27	234	27	229			20	1,060	10	856			11	329		

Chapeño

June		June		June		June		June		June		June		June		June			
3	1,020	4	901	5	1,090	6	1,020	7	1,040	8	1,350	9	954	10	993	11	946		

Roma

January		February		March		April		June		July		August		September		October		December	
1	1,210	8	1,350	17	1,580	24	1,250	1	857	6	298	14	846	20	599	28	652	4	1,090
2	1,210	9	1,360	18	1,640	25	1,600	2	956	7	298	15	871	21	816	29	875	5	1,080
3	1,230	10	1,380	19	1,590	26	1,680	3	930	8	329	16	840	22	745	30	942	6	1,090
4	1,220	11	1,360	20	1,370	27	1,600	4	1,020	9	298	17	952	23	769	31	949	7	1,110
5	1,230	12	1,330	21	1,280	28	1,220	5	900	11	359	18	993	24	776	November		8	1,110
6	1,260	13	1,330	22	1,280	29	1,460	6	1,130	12	404	19	956	25	601	1	795	9	1,090
7	1,270	14	1,360	23	1,190	30	1,590	7	986	13	444	20	958	26	602	2	730	10	1,090
8	1,270	15	1,400	24	1,200	May		8	1,040	14	598	21	969	27	685	3	781	11	1,110
9	1,300	16	1,420	25	1,180	1	1,500	9	1,360	15	626	22	937	28	730	4	806	12	1,100
10	1,290	17	1,410	26	1,170	2	1,430	10	918	16	638	23	893	29	777	5	810	13	1,090
11	1,300	18	1,410	27	1,220	3	1,350	11	987	17	555	24	930	30	800	6	743	14	1,090
12	1,310	19	1,410	28	1,270	4	1,320	12	957	18	499	25	952	October		7	871	15	1,090
13	1,320	20	1,370	29	1,250	5	1,330	13	1,040	19	645	26	973	1	824	8	835	16	1,100
14	1,300	21	1,330	30	1,240	6	1,340	14	1,090	20	848	27	967	2	901	9	807	17	1,100
15	1,330	22	1,350	31	1,220	7	1,330	15	1,020	21	962	28	1,060	3	919	10	838	18	1,100
16	1,320	23	1,330	April		8	1,330	16	1,010	22	1,120	29	964	4	940	11	870	19	1,150
17	1,330	24	1,330	1	1,220	9	1,300	17	1,090	23	1,210	30	947	5	941	12	834	20	1,180
18	1,370	25	1,300	2	1,240	10	1,270	18	1,120	24	1,020	31	666	6	922	13	863	21	1,160
19	1,310	26	1,290	3	1,220	11	1,260	19	1,170	25	944	September		7	915	14	831	23	1,180
20	1,350	27	1,310	4	1,220	12	1,240	20	1,200	26	923	1	738	8	854	15	839	24	1,180
21	1,360	28	1,310	5	1,240	13	1,240	21	1,130	27	898	2	831	9	944	16	924	25	1,240
22	1,330	29	1,340	6	1,230	14	1,200	22	774	28	883	3	846	10	998	17	973	26	1,310
23	1,320	March		7	1,270	15	1,190	23	748	29	855	4	879	11	1,050	18	1,040	27	1,300
24	1,310	1	1,390	8	1,250	16	1,170	24	784	30	870	5	898	12	1,020	19	1,010	28	1,260
25	1,310	2	1,350	9	1,270	17	1,170	25	743	31	870	6	913	13	1,030	20	1,010	29	1,280
26	1,310	3	1,400	10	1,260	18	1,190	26	1,220	August		7	908	14	1,040	21	1,010	31	1,310
27	1,350	4	1,370	11	1,270	19	1,160	26	1,220	1	822	8	887	15	1,020	22	1,050		
28	1,390	5	787	12	1,280	20	1,200	27	282	2	965	9	889	16	1,240	23	1,030		
29	1,390	6	778	13	1,280	21	1,240	28	237	3	1,350	10	422	17	1,590	24	1,080		
30	1,380	7	1,320	14	1,280	22	1,260	28	238	4	1,130	11	311	18	725	25	995		
31	1,420	8	1,750	15	1,290	23	1,260	29	445	5	874	12	382	19	706	26	1,000		
February		9	1,530	16	1,290	24	1,260	30	394	6	812	12	313	20	645	27	1,030		
1	1,390	10	1,430	17	1,270	25	1,240	July		7	854	13	370	21	555	28	1,050		
2	1,290	11	1,470	18	1,310	26	929	1	534	8	863	14	372	22	663	29	1,050		
3	1,350	12	1,330	19	1,280	27	774	2	488	9	991	15	337	23	790	30	1,030		
4	1,440	13	1,240	20	1,290	28	927	3	672	10	893	16	459	24	576	December			
5	1,340	14	1,590	21	1,330	29	984	4	725	11	876	17	428	25	912	1	1,000		
6	1,320	15	1,520	22	1,320	30	749	5	604	12	859	18	447	26	416	2	1,060		
7	1,320	16	1,580	23	847	31	759	6	755	13	863	19	503	27	415	3	1,050		

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1948

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rancherios Drain

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 19	1,780	June 20	1,380	June 21	1,960

Los Fresnos Drain

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 19	644	June 20	668	June 21	681

Ground Water at Sam Fordyce Gravel Pit 2 Mi. West of Rio Grande City

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
May 14	1,960	June 4	2,730	June 5	2,760

Rio Grande City

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 4	1,030	June 6	1,000	June 8	1,180	June 10	1,390	June 14	1,150	June 16	1,200	June 18	1,180	June 20	1,320
5	1,140	7	1,210	9	1,040	11	979	15	1,160	17	1,190	19	1,210	21	1,310

Puertecitos Drain

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 19	681	June 20	669	June 21	711

Esterito Drain

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 19	807	June 20	674	June 21	774

Anzalduas

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
June 15	935	June 16	995	June 17	1,040	June 18	1,090	June 19	1,190	June 20	1,030	June 21	981

Mercedes

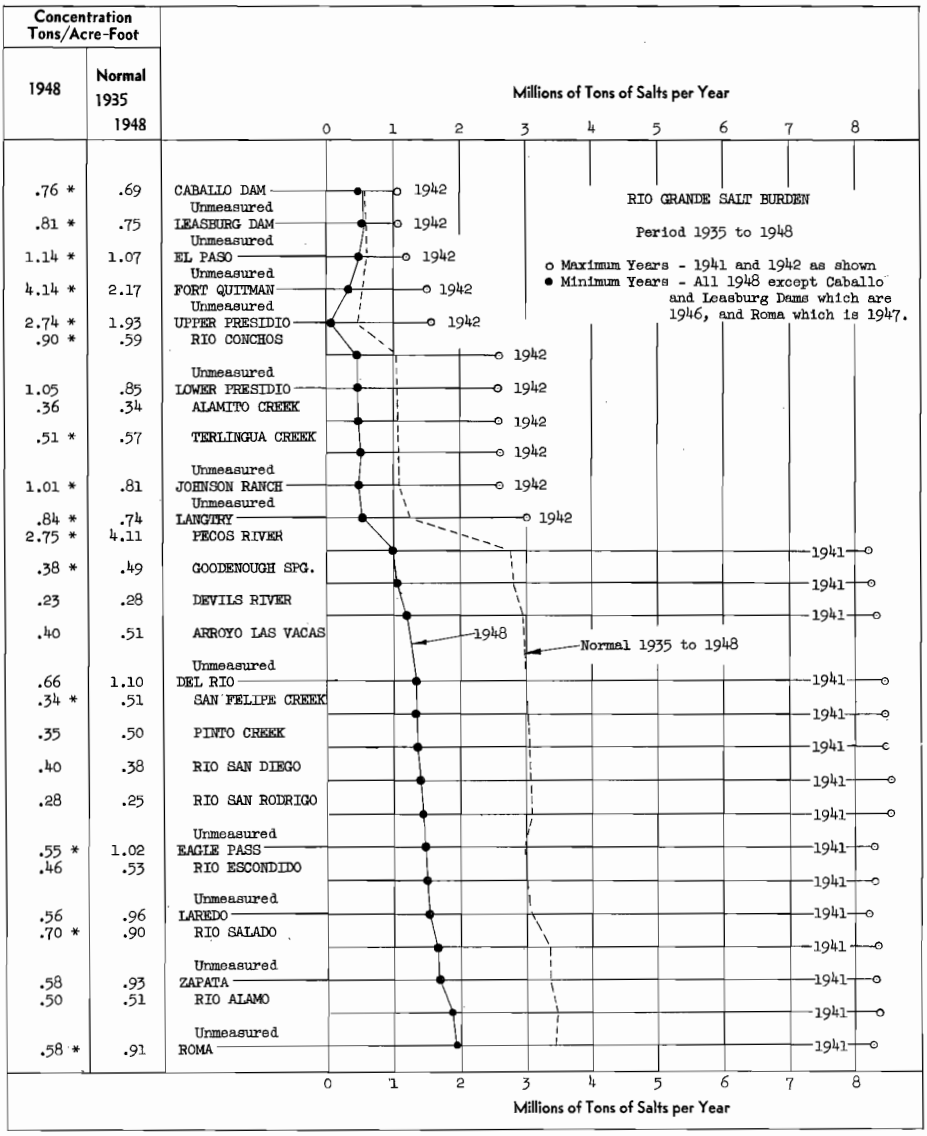
Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
January 1	1,180	February 9	1,430	March 19	1,550	April 26	1,110	June 2	968	July 5	499	August 12	873	September 16	416	October 23	738
2	1,180	10	1,400	20	1,610	27	1,260	3	1,010	6	611	13	1,000	16	426	24	674
3	1,190	11	1,400	21	1,590	28	1,060	4	927	7	685	14	964	17	421	25	676
4	1,200	12	1,410	22	1,620	29	1,020	5	842	8	701	15	1,040	18	502	26	686
5	1,220	13	1,420	23	1,670	30	954	6	867	9	385	16	969	19	559	27	696
6	1,230	14	1,450	24	1,710	May		7	874	9	372	17	1,010	20	556	28	566
7	1,250	15	1,450	25	1,650	1	1,100	8	964	10	358	18	966	21	572	29	504
8	1,240	16	1,440	26	1,470	2	1,340	9	1,010	10	357	19	962	22	615	30	513
9	1,270	17	1,390	27	1,340	3	1,820	10	1,000	11	377	20	973	23	615	31	697
10	1,250	18	1,380	28	1,310	4	1,800	11	1,040	12	383	21	906	24	643	November	
11	1,280	19	1,400	29	1,250	5	1,700	12	1,100	13	365	22	993	25	726	1	689
12	1,300	20	1,440	30	1,280	6	1,680	13	1,100	14	389	23	954	26	714	3	814
13	1,280	21	1,420	31	1,260	7	1,580	14	1,200	17	505	24	1,040	27	755	4	838
14	1,320	22	1,400	April		8	1,540	15	1,360	18	607	25	1,070	28	766	5	811
15	1,340	23	1,400	1	1,270	9	1,610	16	1,090	19	654	26	1,040	29	708	6	753
16	1,330	24	1,410	2	1,270	10	1,550	17	969	20	693	27	1,120	30	684	7	842
17	1,260	25	1,360	3	1,300	11	1,540	18	954	21	688	28	1,110	October		8	817
18.	1,270	26	1,330	4	1,380	12	1,510	19	987	22	736	29	1,110	1	706	10	812
19	1,290	27	1,410	5	1,310	13	1,490	20	1,100	23	651	30	1,030	2	732	11	831
20	1,380	28	1,110	6	1,190	14	1,460	21	1,090	24	637	31	1,080	3	765	12	910
21	1,360	29	1,340	7	1,170	15	1,360	22	1,160	25	685	September		4	791	13	864
22	1,360	March		8	1,160	16	1,290	23	1,170	26	740	1	962	5	810	14	876
23	1,330	1	1,340	9	1,220	17	1,150	24	1,080	27	904	2	1,010	6	860	15	908
24	1,290	2	1,310	10	1,100	18	1,100	25	993	28	1,030	3	1,060	7	840	16	996
25	1,330	3	1,310	11	1,170	19	1,070	26	1,010	29	1,140	4	814	8	916	17	883
26	1,320	4	1,310	12	1,160	20	1,040	27	1,040	30	1,150	5	781	9	942	18	913
28	1,310	5	1,290	13	1,060	21	1,010	27	1,110	31	1,030	6	769	10	987	19	944
29	1,280	6	1,360	14	1,010	22	1,140	28	1,100	August		7	795	11	971	20	943
30	1,250	7	1,280	15	1,060	23	1,100	28	342	1	991	8	848	12	962	21	978
31	1,310	8	1,080	16	1,010	24	1,120	29	339	2	991	9	842	13	980	22	1,060
February		9	717	17	1,030	25	1,010	29	316	3	972	10	876	14	962	23	1,040
1	1,320	10	735	18	1,050	26	984	30	337	4	960	11	916	15	1,010	24	1,040
2	1,360	11	891	19	1,060	27	995	30	312	5	946	12	500	16	1,070	25	1,030
3	1,340	12	1,190	20	1,070	28	992	July		6	942	12	387	17	1,040	26	1,040
4	1,330	14	1,540	21	1,050	29	641	1	329	7	980	13	388	18	920	27	1,130
5	1,360	15	1,520	22	1,090	30	726	2	390	8	1,290	14	374	19	795	28	1,180
6	1,370	16	1,530	23	1,020	31	844	2	381	9	1,290	14	372	20	740	29	1,120
7	1,270	17	1,470	24	1,030	June		3	406	10	993	15	389	21	638	30	1,100
8	1,440	18	1,340	25	1,080	1	1,030	4	447	11	997	15	383	22	670		

North Floodway near Sebastian, Texas

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
January 14	4,210	March 15	6,730	May 28	1,420	July 12	2,360	August 2	3,640	September 7	2,380	October 5	4,490	November 2	5,230	December 6	4,650
February 5	4,200	25	5,580	June 11	4,730	19	2,850	9	2,960	21	1,000	12	4,490	8	5,840	13	3,950
24	6,030	April 6	5,450			26	3,630	16	2,960	28	3,750	19	2,630	15	5,170	20	4,840
		22	5,680					23	2,100			26	5,710	22	4,800	27	4,700
								30	1,890					29	3,910		

RIO GRANDE SALT BURDEN

The term "salt" as used herein means total dissolved solids. The concentrations, in tons per acre-foot, for 1948, which are marked by an asterisk (*) are based upon the chemical analyses shown on preceding pages of this bulletin. Those not asterisked are based either on chemical analyses reported in previous Water Bulletins, or have been arrived at by deduction. The normal concentrations shown for the period 1935 to 1948 are the weighted means of the values determined for the 14-year period indicated.



SANITARY ASPECTS OF WATER QUALITY

The United States and Mexican sections of this Commission, the Federal Department of Public Health of Mexico, and the Texas State Department of Health co-operate in the joint sanitary water sampling program along the Rio Grande with some co-operation from the United States Public Health Service. All analyses below have been made under the "Rules of Laboratory Procedure" as approved by the participating agencies, and which conform with the procedures set out in the manual, "Standard Methods for the Examination of Water and Sewage" - Ninth Edition (1946), prepared by the American Public Health Association and the American Water Works Association. These analyses were made in the laboratories of the El Paso Water Plant, the Laredo Water Plant, and the Cameron County Health Unit. Analyses for Biochemical Oxygen Demand (B.O.D.) and for Dissolved Oxygen (D.O.) were made for only a part of the samples. Dissolved Oxygen (D.O.) is expressed as a percent saturation at sea level elevation.

FRANKLIN CANAL AT WATER PLANT

Date 1948	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)	Date 1948	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)
Jan. 22		2.9	930	5,000	Aug. 3	84.9	2.0	2,300	15,000
Feb. 5			3,600	400	10	83.7	1.8	3,600	11,500
12	102	3.5	6,200	750	17	83.3	1.8	38,000	250,000
19	91.5	1.8	1,100	3,550	24	80.5	1.6	9,400	11,100
26	87.8	2.6	2,300	2,450	31	74.2	1.6	2,300	18,500
Mar. 4	90.6	2.7	1,100	7,100	Sept. 7	80.9	1.5	1,100	18,800
11			540	800	14			3,400	78,000
18	75.5	0.6	620	6,100	21			11,000	
25	88.1	3.4	2,300	18,000	28			6,200	27,700
Apr. 8		1.9	2,300		Oct. 5	92.7		23,000	60,000
15	87.9	1.9	1,600		12	97.7	0.9	6,200	5,400
23	89.5	1.8	2,300	2,000	19		0.3	11,000	26,100
27	90.3	1.7	2,300	950	26	86.0	7.8	5,500	2,100
May 4	86.4	1.4	3,600	6,150	Nov. 2	92.6	2.1	24,000	19,500
11		1.4	620	7,500	9		2.0	2,300	3,500
18	80.6	1.4	24,000	1,500	16	90.6	2.3	2,300	12,000
25	89.5	1.8	5,500	14,400	23		2.9	2,300	
June 1	80.4	1.4	2,300	115,000	30		2.0	2,600	10,500
8	79.8	0.7	24,000	5,800	Dec. 7		2.3	3,600	4,400
15	81.7	1.4	2,300	4,250	14		1.6	3,600	9,000
22	83.9	1.6	2,300	500	21		2.9	3,600	13,000
29	84.3	1.8	2,300		28		1.8	24,000	1,500
July 6	92.6	1.4	1,100	4,500					
13	79.8	1.7	2,300	8,000					
20	79.8	1.2	6,200	9,850	Total	2,748.9	82.6	297,310	831,300
27	79.8	1.4	2,300	9,150	Average	85.9	2.0	6,190	19,330

RIO GRANDE AT YSLETA-ZARAGOZA BRIDGE

Date 1948	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)	Date 1948	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)
Jan. 8	62.3	11.1			July 20	65.7	4.7	1,600,000	445,000
15	64.0	9.2	1,100,000	200,000	27	48.9		1,100,000	640,000
22	68.9	10.6	620,000	50,000	Aug. 3	68.2	4.5	1,100,000	2,500,000
Feb. 5			1,600,000	1,000,000	10	74.5	3.5	62,000	270,000
12	56.9	14.0	1,100,000	150,000	17	68.2	5.5	360,000	610,000
19	38.7	13.0	620,000	820,000	24	70.7	4.5	230,000	480,000
26	4.51	33.0	24,000,000		31	62.1	4.5	360,000	320,000
Mar. 4	34.4	15.4	3,400,000	5,200,000	Sept. 7	64.5		360,000	340,000
11	64.6	8.0	230,000	100,000	14	82.1		230,000	460,000
18	46.2	30.0	11,000,000	5,600,000	21	84.6		1,100,000	
25	58.7	10.0	360,000	96,000	28			7,000,000	2,800,000
Apr. 1	74.2		110,000	10,500	Oct. 5	77.4		230,000	300,000
8	83.4	6.5	210,000		12	66.5	3.5	1,100,000	420,000
15	60.8	6.1	940,000	33,000	19		7.43	3,500,000	1,100,000
23	71.4	5.1	360,000	100,000	26	73.4	18.4	230,000	2,070,000
27	66.7	6.2	340,000	160,000	Nov. 2	69.8	14.0	2,400,000	4,200,000
May 4	61.2	4.7	360,000	355,000	9	81.0	9.3	360,000	1,950,000
11	64.6	5.5	230,000	140,000	16	62.9	13.4	14,000,000	80,000
18	69.2	6.8	360,000	160,000	23	78.3	8.8	340,000	
25	64.5	4.6	360,000	720,000	30	56.5	30.0	14,000,000	50,000
June 1	57.8	5.9	2,400,000	900,000	Dec. 7	73.3	10.8	210,000	130,000
8	59.5	4.9	1,300,000	440,000	14	39.5	21.0	3,800,000	3,000,000
15	74.7	5.35	360,000	265,000	21	72.6	2.8	160,000	90,000
22	64.4	7.3	360,000	450,000	28	74.8	7.0	230,000	190,000
29	69.3	7.3	1,100,000						
July 6	72.0	2.1	54,000	110,000	Total	3,085.21	409.18	107,296,000	39,864,500
13	56.8	2.9	360,000	360,000	Average	64.3	9.5	2,146,000	885,900

SANITARY ASPECTS OF WATER QUALITY

RIO GRANDE AT LAREDO WATER PLANT

Date 1948	Coliform Organisms per 100 c. c.	Date 1948	Coliform Organisms per 100 c. c.	Date 1948	Coliform Organisms per 100 c. c.	Date 1948	Coliform Organisms per 100 c. c.	Date 1948	Coliform Organisms per 100 c. c.
Jan. 2	1,100	Mar. 23	620	June 11	1,100	Aug. 31	1,100	Nov. 19	1,100
6	360	26	1,100	15	3,800	Sept. 3	2,400	23	1,100
9	940	30	1,600	18	3,800	7	620	26	2,400
13	620	April 2	1,100	22	1,100	10	140,000	30	3,800
16	1,600	6	2,400	25	3,800	14	24,000	Dec. 3	360
20	230	9	3,800	29	70,000	17	5,000	7	2,400
23	2,400	13	7,000	July 2	14,000	21	3,800	10	360
27	160	16	3,800	6	140,000	24	2,400	14	110
30	110	20	1,100	9	38,000	28	1,100	17	360
Feb. 3	620	23	3,800	13	11,000	Oct. 1	1,600	21	360
6	230	27	2,400	16	14,000	5	1,100	24	280
10	620	30	2,400	20	3,800	8	2,400	28	2,400
13	230	May 4	1,100	23	2,400	12	1,600	31	34
17	620	7	1,100	27	2,400	15	940		
20	620	11	2,400	30	3,800	19	7,000		
24	620	14	2,400	Aug. 3	1,600	22	7,000		
27	2,400	18	3,800	6	7,000	26	22,000		
March 2	7,000	21	2,400	10	7,000	29	24,000		
5	7,000	25	2,400	13	2,400	Nov. 2	6,200		
9	2,400	28	9,400	17	2,400	5	3,600		
12	620	June 1	1,100	20	360	9	14,000		
16	2,400	4	3,800	24	620	12	3,800	Total	730,024
19	2,400	8	2,400	27	2,400	16	3,800	Average	6,950

RIO GRANDE 9.1 MILES BELOW LAREDO R.R. BRIDGE

Jan. 6	2,300	Mar. 23	24,000	May 25	38,000	July 20	24,000	Oct. 5	140,000
20	38,000	30	70,000	June 1	22,000	27	70,000	12	240,000
27	6,200	Apr. 13	140,000	8	140,000	Aug. 10	140,000	26	38,000
Feb. 10	24,000	20	70,000	15	70,000	17	22,000	Nov. 30	11,000
17	70,000	27	70,000	22	240,000	31	38,000	Dec. 7	38,000
Mar. 2	140,000	May 4	22,000	29	70,000	Sept. 7	6,200	21	38,000
9	70,000	11	140,000	July 6	70,000	21	70,000		
16	38,000	18	70,000	13	140,000	28	38,000	Total	2,697,700
								Average	70,990

RIO GRANDE AT MERCEDES PUMPS

Jan. 5	62	Mar. 1	2,300	May 3	1,600	July 19	11,000	Dec. 6	130
12	110	8	2,100	10	1,100	26	3,600	13	620
19	23	15	360	17	6,200	Aug. 2	110	20	940
26	130	22	1,100	24	6,200	9	36		
Feb. 2	160	29	2,100	June 7	620	Nov. 8	2,300		
9	230	Apr. 5	210	28	240,000	15	1,100		
17	160	19	360	July 7	55,000	22	1,100	Total	350,347
24	93	26	3,600	12	5,500	29	93	Average	10,010

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES — 1948

The daily rainfall records tabulated below have not been published elsewhere. For each station there is indicated the source of the record and the type of rain gage in use. The general location of each station is shown on the map of the watershed, pages 46 and 47 of this bulletin.

American Dam Near El Paso

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																															.01	.14	.45
Feb.				.20	.24																			.05	.09	.17			.06	.07		.71	.37
Mar.																															.02	.02	.39
Apr.																					.01	.05										.06	.27
May																																0	.27
June	.89	.01				.01	.01					.14							.10													1.16	.90
July							.05								T				.19	*.22		.17	.60				.67	.09				1.99	1.33
Aug.												.84				.05												.03	.14			1.04	1.21
Sept.																.02	T								.13	.05						.20	.95
Oct.									.02					.01				.01	.02	T							.02				.09	.17	.74
Nov.																																0	.89
Dec.													.07	.14										T	.29	.12						.62	.50
																															Period 1938-1948	Total 1948	6.11	7.67

Island Station

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.	.01																															.02	.32
Feb.				.09	.24																				.02	.06			.01			.41	.29
Mar.																															.01	.01	.34
Apr.	.03																				.02	.01										.06	.18
May																			.02												.07	.09	.52
June	.66						.03												.01													.70	.48
July						.10													.02	.58	.02	.08	.08				.38				.01	1.27	.90
Aug.												1.44																				1.44	1.31
Sept.								.82	.02																.19	.04						1.07	1.12
Oct.								.02	.10					.35	.04			.02		.08								.02				.63	1.02
Nov.																																0	.33
Dec.													.21	.09										.02	.36	.03						.71	.52
																															Period 1939-1948	Total 1948	6.41	7.33

Fabens - Guadalupe Bridge, Texas

Standard gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																																.04	.37
Feb.						.30																			.10	.03			.04			.43	.33
Mar.																															.06	.06	.44
Apr.																					.20											.20	.32
May																			.05													.05	.51
June	.10	.88					.10					.05																				1.13	.65
July			.05																	.03	.20		.05				.56					.89	.60
Aug.											.80	.20																				1.00	1.74
Sept.								.80																	.36							1.16	1.30
Oct.														.05				.09		.07							.18					.39	1.34
Nov.																																0	.30
Dec.													.35												.30							.65	.61
																															# Period Average 1940-1948	Total 1948	6.00	8.51

County Line

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.			.02																									.02				.04	.46
Feb.				.05	.07																											.12	.21
Mar.																															.04	.04	.37
Apr.																					.14	.04										.18	.34
May																					.01										.12	.13	.33
June	.74																			.08												.82	.65
July					.12														.01	.02	.29	.20	.10	.24			.36					1.34	.95
Aug.	.01		.29								.04	.33																				.67	1.55
Sept.							.03									.04				.02					.18							.21	1.06
Oct.								.04	.12	.01				.21	.54	.06	.03											.02				1.03	1.07
Nov.																																0	.31
Dec.														.13	.10								.01	.01	.34	.03						.62	.55
																															Period 1938-1948	Total 1948	5.20	7.85

Fort Hancock Bridge, Texas

Standard gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																			.02										.11			.13	.47
Feb.					.10																			T	.20	T						.30	.32
Mar.																															.02	.02	.34
Apr.																						.13										.13	.33
May																										.11						.11	.66
June	.08	.98																		.21												1.27	1.21
July				.03		.05											.01					.07	.07									.23	.91
Aug.												.23																				.23	1.19
Sept.									.24								.04															.28	1.19
Oct.	T								.23						.03		.23	.04	.01									.02				.56	1.31
Nov.																																0	.26
Dec.														.35											T	.45	.03					.83	.71
																															Period Average 1940-1948	Total 1948	4.09	8.90

Madden Arroyo Highway (U. S. 80) Bridge, Texas

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																				.08												.08	.37
Feb.					.05																				.03	.06						.14	.14
Mar.																		.02													.06	.08	.19
Apr.																					.09	.04										.13	.46
May																			.12			.23									.06	.41	.46
June	.60											.51			.02					.13												1.26	.81
July								.02														.12										.14	.76
Aug.										.02	.23	.21			.02														.05		.53	1.30
Sept.								1.55										.02														1.57	1.36
Oct.								.07	.12					.02		.33				.03								.02				.59	1.66
Nov.																																0	.80
Dec.													.16	.23											.51							.90	.72
																															# Period Average 1941-1948	Total 1948	5.83	8.43

West Small, Texas

C. E. Chandler

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
Jan.																												.30				.30	.43
Feb.																											.10					.10	.32
Mar.																																0	.24
Apr.																			.35													.35	.34
May																									.80						.92	1.72	.78
June	.85																			.30												1.15	.55
July			.40																			.93	.70									2.03	1.67
Aug.																													.70			.70	1.87
Sept.								.25																								.25	1.63
Oct.														.52																		.52	2.01
Nov.																																0	.33
Dec.													.65												.55							1.20	.87
																															# Period Average 1940-1948	Total 1948	8.32	11.64

Some months missing * Partly estimated

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES — 1948

Guayuco Arroyo Highway (U. S. 80) Bridge, Texas

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																			.03	.11									.05			.19	.42
Feb.				.06	.02																			.02	.03	.02						.17	.17
Mar.	.02																	.01													.05	.08	.20
Apr.																					.05	.02		.02								.09	.21
May																						.05		.03	.05						.53	.44	.44
June	.67											.38								.05							.03					1.13	.65
July			.05						.13			.05					.02			.20		.08	.01								.02	.56	1.47
Aug.	.24									.06	.11	.08													.02				.86			1.37	1.57
Sept.								1.59																								1.59	1.68
Oct.								.08	.12	.02				.06		.27	.05	.01		.03							.02	.03				.69	1.56
Nov.																																0	.26
Dec.													.16	.18											.60							.94	.70
																															# Period Average 1940-1948	Total 1948	7.25	9.33

Fort Quitman

Recording gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																		.01		.10												.11	.37
Feb.				.09	.02																					.10						.21	.27
Mar.																															.03	.03	.30
Apr.																					.25											.25	.34
May																					.01	.05									.35	.41	.53
June	1.29																			.10												1.39	.84
July									.04						.04							.05									.01	.14	1.40
Aug.	.10										.03	.07			.04														.25			.49	1.27
Sept.								1.28																								1.28	1.28
Oct.								.11	.26	.02						.13	.04	.02	.01	.12												.71	.91
Nov.																																0	.30
Dec.													.16	.12											.36							.64	.53
																															# Period 1937-1948	Total 1948	5.66	8.54

Neely Ranch, Texas

Standard gage — Mrs. Tom Neely

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
Jan.																			.28													.28	.39
Feb.			.14																							.15						.29	.14
Mar.																																0	.22
Apr.																				.13												.13	.09
May													.19																		T	.19	.55
June	2.50																															2.50	.92
July				.22																		.16	.43									.81	1.53
Aug.																																0	1.44
Sept.								3.70																								3.70	2.12
Oct.								.48									.40															.88	1.15
Nov.																																0	.18
Dec.													.20												.70							.90	.64
																															Period Average 1941-1948	Total 1948	9.68	9.35

Hollis Haley Ranch - (Formerly Decker Bros.*)

Standard gage — S. C. S.

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
Jan.																																	1.30
Feb.																																	
Mar.																																0	.40
Apr.																																	
May																					.15		.10			.30						.55	1.51
June																																	.53
July																																	1.37
Aug.																																	1.35
Sept.																																	1.86
Oct.																																	.26
Nov.																																	
Dec.																																	.25

* Name changed September, 1947 — # Period Average 1945-1948

Ryan Ranch

Standard gage — S. C. S.

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
Jan.																																	.68
Feb.																																	.23
Mar.																																0	.29
Apr.																					.20	.70										.90	.56
May																						.05		.16	.24							.45	1.23
June																				.18					.42							.60	1.22
July																.38							.10					.25	.20	.90		1.83	2.73
Aug.								.18																					1.18		.14	1.50	2.91
Sept.									.07																							.07	2.05
Oct.																																	1.69
Nov.																																	.47
Dec.																																	.67
																															# Period Average 1941-1948		14.49

D. O. Atkinson Ranch

Standard gage — S. C. S.

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
Jan.																																	.50
Feb.				.03																												.03	.02
Mar.																																0	.18
Apr.																				.16		.30										.46	.25
May																					.25		.10	.70	.35						.55	1.70	1.28
June																				.15			.40	1.00	.35							1.90	2.34
July															.99							.90				.61						2.50	3.39
Aug.								.62																								.62	2.72
Sept.																																	1.06
Oct.																																	1.02
Nov.																																	.55
Dec.																																	.64
																															# Period Average 1943-1948		13.93

Bloys Camp

Standard gage — S. C. S.

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
Jan.																																	.56
Feb.			.32																													.32	.71
Mar.																																0	.14
Apr.																					.16											.16	.36
May													.11											.19	.10						2.00	2.40	2.05
June																			.40						.50							.90	2.23
July										.55													.86	.10					.95		2.46	2.88
Aug.																									.35							.35	3.42
Sept.																																	3.23
Oct.																																	2.19
Nov.																																	.49
Dec.																																	.76
																															# Period Average 1941-1948		19.02

Kerr Mitchell Ranch

Standard gage — S. C. S.

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
Jan.																																	.51
Feb.																																	0
Mar.																																0	.16
Apr.																						1.00										1.00	.79
May																															.70	.70	1.23
June																					.31											.31	1.39
July															.49								.50							1.46		2.45	2.02
Aug.																.67																.67	2.53
Sept.																					.30											.30	2.09
Oct.								.28							.31	.62						.50										1.51	1.85
Nov.																																	.27
Dec.																																	.74
																															# Period Average 1941-1948		13.58

Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES --1948

Loma Vista Ranch

Standard gage — S. C. S.

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
Jan.																																	.98
Feb.																																	.26
Mar.																																0	.27
Apr.									.59												.97											1.56	.93
May																								.96							.35	1.31	1.44
June																				.37					.85							1.22	1.95
July									.81					.21								1.08			.35				.45	.50		3.40	2.26
Aug.															.75																	.75	1.77
Sept.																																	2.93
Oct.															.71		.81					.21										1.73	1.78
Nov.																																	.35
Dec.																																	.90
																																∮ Period Average 1941-1948	15.79

Cole Longley Ranch - (J. L. Thomas*)

Standard gage — S. C. S.

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
Jan.																																	
Feb.																																	
Mar.																																0	.21
Apr.																						.18										.18	.34
May																															1.30	1.30	2.15
June																																	.44
July															.50								.50									1.00	1.92
Aug.																																	1.46
Sept.																																	1.36
Oct.									.65							.60						.50										1.75	1.72
Nov.																																	
Dec.																																	.61
																																∮ Period Average 1946-1948	

* Name changed October, 1948

H. T. Fletcher Ranch

Standard gage — S. C. S.

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
Jan.																																	1.01
Feb.		T		T	.04																					.02						.06	.10
Mar.																																0	.88
Apr.									T							T				T	T	.30										.30	.61
May														T							T	T	.10	T	.25							.35	1.36
June			1.43						T	T		T		.19					.02	.02	.45	.27			1.02							3.40	1.62
July									.30			.06	T	T	.07						1.05	T	.18			T				.88		2.54	2.44
Aug.																																	4.13
Sept.							T		T		T									.19	T											.19	1.64
Oct.								.67			T					.24	.60				.50	.25								.03		2.29	1.82
Nov.											T		T									T										T	.38
Dec.													T	T										.06	.07							.13	.51
																																∮ Period Average 1939-1948	15.90

McFarland Ranch

Standard gage — S. C. S.

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
Jan.																																	.88
Feb.																																	.25
Mar.																																0	.34
Apr.																				.52												.52	.92
May																							.30									.30	1.59
June														.20					.60	.40												1.20	.97
July																														1.25		1.25	2.89
Aug.															.15																.59	.74	3.12
Sept.									.27																							.27	2.51
Oct.								.41									.86															1.27	1.97
Nov.																																	.34
Dec.																																	.99
																																∮ Period Average 1941-1948	16.97

B. H. Davis Ranch

Standard gage — S. C. S.

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
Jan.																																	.74
Feb.																																	.36
Mar.																																0	.31
Apr.																						.67										.67	.64
May															.74							.60	.18		.42						.74	2.68	1.51
June			1.12							.38										.34					.25							2.09	2.23
July						.15							.48		.80																	1.43	2.62
Aug.	.52													.85																		1.37	2.68
Sept.																																	2.56
Oct.							.17			.21					.38		.68				.71											2.15	1.05
Nov.																																	.45
Dec.																																	.77
																																∮ Period Average 1940-1948	15.92

Crosson Ranch

Standard gage — S. C. S.

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
Jan.																																	.53
Feb.																																	.37
Mar.																																0	.28
Apr.																						.68										.68	.49
May															.62							.30	.42		.47						.75	2.54	1.60
June			.18																.31	.32	.48			.34	.18							2.01	2.32
July			.33												.48											.58	1.69	.24	.30			3.62	2.77
Aug.																																	2.81
Sept.																																	2.92
Oct.							.21				.35					1.57	.35				.42											2.90	.99
Nov.													.22		.84																	1.06	.68
Dec.																																	.78
																																∮ Period 1933-1948	16.54

A. L. Baugh Ranch

Standard gage — S. C. S.

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
Jan.																																	1.09
Feb.																																	0
Mar.																																0	.23
Apr.																																	.15
May																																	1.07
June																				.17	.20	.30			.47							1.14	1.36
July														.33									.32					.60			.15	1.40	2.18
Aug.																																	2.69
Sept.																																	2.00
Oct.																	.97															.97	1.32
Nov.																																	.47
Dec.																																	.69
																																∮ Period Average 1942-1948	13.45

McCracken Ranch

Standard gage — S. C. S.

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
Jan.																				.18												.18	.63
Feb.																																	.12
Mar.																																0	.12
Apr.																				.40	.47											.87	.67
May																							.10	.08							.16	.34	1.16
June																					.70			.42		.30						1.42	1.32
July															.23							.39							.15	.85		1.62	2.59
Aug.									.20																		.11				.24	.55	2.45
Sept.								1.50												.17				.10								1.77	2.10
Oct.															.47	.33						.70										1.70	1.82
Nov.													.13																			.13	.38
Dec.																																	.81
																																∮ Period Average 1941-1948	14.13

∮ Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES — 1948

H. M. Greenwood (Cienega Ranch)

Standard gage — S. C. S.

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
Jan.																											.15					.15	.65
Feb.																																	.16
Mar.																																0	.12
Apr.																						1.76										1.76	1.00
May																						.17								.49		.66	1.50
June			.14						.14												.30			.55	.17							1.30	1.75
July														.37														.30		.57		1.24	2.57
Aug.																																	2.56
Sept.								.48																								.48	3.26
Oct.								.16							.61		.14				.77											1.68	1.95
Nov.															.22																	.22	.36
Dec.																																	.94
																																♯ Period Average 1941-1948	16.80

C. L. Arthur Ranch

Standard gage — S. C. S.

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
Jan.																				.30						.34						.64	1.62
Feb.																																	
Mar.																																0	.23
Apr.																					.80											.80	
May																								.28	1.10						.70	2.08	2.36
June																			.43			.15		.30								.88	1.74
July									.20																							.20	1.55
Aug.									.60			.40														.36			.15			1.51	1.53
Sept.																					1.05											1.05	1.81
Oct.									.22								.67					.75										1.64	
Nov.																																	
Dec.																									.30							.30	.47
																																♯ Period Average 1946-1948	

Johnson Ranch, Texas

Standard gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.																				.09												.09	.57
Feb.		T																														T	.15
Mar.																																0	.12
Apr.																						.21										.21	.50
May																								.17		.06			.93			1.16	1.04
June																					T		.14									.14	.96
July			.20	.10			.12																	.02					.40			.84	1.25
Aug.																	.04								T							.04	.74
Sept.	.26								.18		.27																					.71	1.53
Oct.																	T	.29			.52		.09	.19								1.09	.76
Nov.												T	.06		.04																	.10	.30
Dec.																										.05						.05	.41
																																♯ Period 1933-1948 Total 1948 4.43	8.33

Steve Stumberg Ranch

Recording gage — S. C. S.

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
Jan.																				.30						.40						.30	.88
Feb.																																.40	.22
Mar.																																0	.20
Apr.																				.10												.10	.34
May																						2.40					1.20					3.60	2.46
June																									.35							.35	1.09
July																																	3.01
Aug.			.30																								2.25					2.55	1.33
Sept.									1.10																							1.10	2.02
Oct.														.20	.40		.10															.70	1.20
Nov.													.20																			.20	.64
Dec.																																	1.18
																																♯ Period Average 1943-1948	14.57

Dryden, Texas

Standard gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.								T											.01	.15			.01			.01						.18	.69
Feb.			.02	.01	T		.01		T																	.78						.82	.47
Mar.																																0	.45
Apr.																						.10			.09							.19	.79
May												.01	.05										.14			.05						.25	2.21
June																									.13		.07					.20	.86
July		.01	.01			.41	.05						.03																			.51	1.38
Aug.																.08												.03	.37	.04	T	.52	1.56
Sept.									.11	.08	.02																					.21	1.67
Oct.									.02								.55				.16	.49	.23						T			1.45	1.22
Nov.													.05		.03																	.08	.48
Dec.														T									T		.38		.01					.39	.65
																																♯ Period 1931-1948 Total 1948 4.80	12.43

Pumpville, Texas

Standard gage — C. Cash

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
Jan.		.08	.03	.07		.05	.07												.06							.07						.13	1.19
Feb.				.03				.08																		.19						.49	.27
Mar.																																.11	.72
Apr.												.02										.18		.21								.41	.20
May											.45	.07											.32	.90								1.74	2.17
June																									T							T	.34
July		T	.05			.10							.07																			.22	.14
Aug.																T											T	T	.40		T	.40	1.18
Sept.								1.60		.25																						1.85	2.14
Oct.								.06	.07							.25	.07			.02	1.40	.30										2.17	2.20
Nov.											.06	T	.10	T																		.16	.13
Dec.																								.08	.10							.18	.96
																																♯ Period Average 1946-1948 Total 1948 7.86	11.64

Reid Bros. Ranch

Standard gage — S. C. S.

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
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.33	---	---	---	---	---	---	---	---	.10	---	---	.43	1.45
Jan.																										.40						.40	.27
Feb.																															.15	.15	.36
Mar.									.05												.40	.18										.63	1.02
Apr.																									.65		.94			.55	.10	2.24	2.17
May																			.20						.30	.65	.95					2.10	2.00
June																					.40		1.10									2.00	2.25
July						.50																							.45			.45	2.55
Aug.								.30												.25												.55	3.08
Sept.								.44									.55					.20										1.19	1.54
Oct.																																0	.48
Nov.																									.60							.60	.91
Dec.																																	
																																♯ Period Average 1941-1948 Total 1948 10.74	18.08

Stone Ranch

Standard gage — S. C. S.

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
Jan.																																	
Feb.																																	
Mar.																																	
Apr.																																	
May																																	
June																																	
July																																	
Aug.																																	
Sept.																																	
Oct.																																	
Nov.																																	
Dec.																																	

No record received

♯ Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES — 1948

Pecos River

Standard gage — I. B. & W. C.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches	Normal or Average
Jan.		.02			.01				.02						.02									.06		.77			.01			.07	1.09
Feb.		.02	.03	.01	.03				.85												.02											.93	.64
Mar.				.02	.04																			.45								.33	.77
Apr.													.01									.40										.86	1.36
May											.97		.29										.27		.78							2.31	1.94
June		.07																					.05	.26				.52				.90	1.79
July			.71	.02		.81																										1.54	1.34
Aug.																.08													.94			1.02	1.97
Sept.									1.33	.23									.05													1.61	2.10
Oct.									.09	.05											.15	.26	.22								.01	.78	1.23
Nov.												.02	.15																			.17	.96
Dec.															.21			.02							.05							.28	.82

ǂ Period 1938-1948 Total 1948 10.80 15.61

Goodenough Spring Ranch

Visual gage — Lathan

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
Jan.																																0	1.12
Feb.																							T	.20	T	T	.50					.70	.35
Mar.																																0	1.20
Apr.																																	
May																																0	1.05
June																														1.50		1.50	1.50
July																																	3.60
Aug.																																	.75
Sept.																																	
Oct.																																.34	.38
Nov.													.34																			0	.75
Dec.																																	

ǂ Period Average 1946-1948

Comstock, Texas

Standard gage — George Humphreys

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
Jan.																																0	.92
Feb.				.02																			.05		.02	.35			.03			.47	.56
Mar.								.50																								.50	.92
Apr.											.18											.30		.61								.91	1.56
May																								.14								.32	2.11
June																								1.90				.31				2.21	1.64
July		.53	.69	.09		.80				.32																						2.43	.92
Aug.	T															.25													.64			.89	2.77
Sept.								2.20	T	.18							.16		.12													2.66	1.97
Oct.									.63							.34					.44	.13										1.54	1.68
Nov.													.42																			.42	.62
Dec.														.10																		.10	1.03

ǂ Period Average 1939-1948 Total 1948 12.45 16.70

J. F. Runge Ranch

Standard gage — S. C. S.

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
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.10	---	---	---	---	---	---	---	---	---	---	---	.10	.86
Jan.																																.50	.68
Feb.																												.50				.20	1.01
Mar.																										.20						2.20	1.36
Apr.		.50																				.60			1.10							2.90	2.34
May											1.60															1.30						1.40	1.66
June					.20						.30															.90							
July	.45			1.60		1.40				1.00																						3.00	1.74
Aug.																																1.45	2.37
Sept.																						1.90										1.90	3.18
Oct.																1.50						.33										1.83	2.00
Nov.																.25																.25	.65
Dec.																									.25							.25	1.23

ǂ Period Average 1941-1948 Total 1948 15.98 19.08

Devils Lake, Texas

Standard gage — Central Power & Light Co.

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
Jan.																																0	.89
Feb.																							.15	.30		.53			.05			1.03	.97
Mar.																																0	.81
Apr.																						.30			.58							.88	1.42
May				.36																												.36	1.89
June										*.60													1.98	2.00								4.58	1.90
July				.78	.62		.60			.60																						2.60	.85
Aug.																												.60				.60	1.66
Sept.									1.57		.25																					1.82	1.67
Oct.																	.30				.76	.53										1.59	1.46
Nov.													.42																			.42	.85
Dec.																																0	.76

* Dates not known; records lost in flood, June 23-24.

ǂ Period Average 1939-1948 Total 1948 13.88 14.71

Maverick County Canal Headgate

Standard gage — Gate Tender

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
Jan.																																	
Feb.																																	
Mar.								.06																								.06	
Apr.																							.78		.75							1.53	
May																									.73							.73	
June																							.63	.55	.95	.25						2.38	
July	1.25	.75	.76	3.30	.26	.05	.12																									6.49	
Aug.																																0	
Sept.									.26	1.84	.69											.19										2.98	
Oct.																	.85				.30	.52	.39									2.06	
Nov.												.20	.02	.27																		.49	
Dec.													.06				.01								.05							.12	

Lat. 29° 10' Long. 100° 46' Elev. 870 Feet

Quemado, Texas

Standard gage — Walter P. Cox

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
Jan.		T			T	T	.01	T		T	T						.04								.02	.01						.08	1.01
Feb.	.14	.02	T	.01	T	.03	.02																.02	.07	.08	.03	.15					.57	.69
Mar.	T			T	.11			.06	T																							.17	.59
Apr.																						.63	.33									.96	1.85
May											.05	T												1.73	.01							1.77	3.19
June										.04													.88			T						.92	1.88
July	.30	.20	3.88	.17		.22					.06	T	.24								T											5.07	1.33
Aug.		.12														.02							.08	T						.07		.23	1.35
Sept.									2.80	3.40			.39				.25		.05													6.50	3.73
Oct.								T	T		.12						.57				.83	.47	.50									2.49	1.57
Nov.											.26		T	.05					T				.05	T								.67	.77
Dec.																																.06	.73

ǂ Period Average 1941-1948 Total 1948 19.49 18.69

El Indio, Texas

Standard gage — W. C. Smith

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
Jan.																																0	1.09
Feb.		.10										.10									.11					.10						.21	.42
Mar.																																0	.62
Apr.																							.75									.75	1.02
May																							.05		.75							.80	3.80
June																							.45	.21								.66	1.85
July		.91	1.32																													2.23	.90
Aug.															.23																	.23	2.44
Sept.		3.50	.71														4.50															8.71	3.33
Oct.								.20									.10				.70	.01									T	1.01	1.16
Nov.				.17		.40																										.57	.64
Dec.																																0	.85

ǂ Period Average 1941-1948 Total 1948 15.57 17.90

ǂ Some months missing

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES — 1948

Laredo Water Plant

Standard gage — Laredo Water Plant

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
Jan.																											.05					.05	1.05
Feb.	.81	.17	.03		.32	.02	.03	.03													.25											1.34	.75
Mar.						.02																										.34	.78
Apr.																						.66			.33							.99	1.15
May												.06													.08	.79						.93	2.56
June																								.42	.02	.03	.01			.61		1.09	2.21
July	.01	.29		.02							.25	.03																		.42	.39	1.41	1.50
Aug.	.02																												.03			.05	1.55
Sept.								.20	.36	1.85	.52		.14			.05	.10	.01	.60	.05		.28			.01							4.15	3.14
Oct.																	1.05				.39	.40	.01									1.85	1.73
Nov.											.22	.02	.42	.02																		.68	.81
Dec.																.01																.01	1.14

Period 1930-1948 Total 1948 12.87 18.37

Laredo, Texas, International Bridge 1941

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.			T																						T	T	T	1.17			.07	1.24
Feb.	.08					.50		.05	.05												.14	.41	.02		T	.05	T					1.30
Mar.							.61						T				T	.50		.02	.05	.05			.21			.10				1.54
Apr.																	.02					.05			.13	.23	.39	1.03		.77		2.62
May																		.23		.70	.10	.09	T							.30	.12	1.54
June				.83								.60									.75	.45	2.49		.06	.42						5.60
July					.58							T																				.58
Aug.																										T	T		.82			.82
Sept.										2.07							.04										.48					2.59
Oct.	.09		.04									.18			.04													T				.35
Nov.																					.20	.05				T	T					.25
Dec.								.22		.05	.13	.02			.05	.05				.07		.13										.72

Lat. 27° 30' Long. 99° 29' Elev. 420 Feet — Total 1941 19.15

Laredo, Texas, International Bridge 1942

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.					.04		.15	T							.10																	.29
Feb.			T						.12	.25	.03		.45										T									.85
Mar.				.35	T																											.35
Apr.							T														.29	.06										.35
May				.05	.40			.35	.03										1.39	1.40				.23								3.85
June																										.12						.12
July		.76	1.20	.35	.07	3.20		1.09															T									6.67
Aug.							.17											.27	.19												.22	.85
Sept.	.40				2.07		.22	4.30				T	T																			6.99
Oct.					.94	.05													T	.07												1.06
Nov.																																0
Dec.																					.09	T		T								.09

Total 1942 21.45

Laredo, Texas, International Bridge 1943

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.				.18		.07	.07	.35	.51		.04	.10																				1.32
Feb.	.08		T	.22																												.30
Mar.		T												T									T			.70						.70
Apr.																.05		T		T	.20											.23
May						.18		T														T						.15			.76	1.09
June				.03			T	T						.35				.35	T													.73
July										.37		1.33	.33																			2.03
Aug.																																0
Sept.		2.02				.65			.55	.05							.16								.10	.30	.40	.08		1.31		5.62
Oct.		.45	T							.56																						1.01
Nov.			T												.03																	.03
Dec.			1.05	.06			.03	.05		T	T			.05	.07									.02				T				1.33

Total 1943 14.39

Laredo, Texas, International Bridge 1944

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.	.60	.16						.03				.17																	.03	.04	.02	1.05
Feb.	.17											T	.15							.06	.03	.02	.01	T								.62
Mar.									.54		T					T	1.03	.18	.25				.01									2.01
Apr.			.33						.21																							.54
May		T	T		.52																T			.04	.13			1.47				2.16
June						T	.95				T								.14											.05		1.14
July	T	T		.02		T																										.02
Aug.						.07															T	.83		.24	.25	.42		.52	1.52	T		3.85
Sept.							T	.12																	.32		.49	.02				.95
Oct.								.15																								.15
Nov.					.67	.02											.82	.15			.34				.19	.08						2.27
Dec.		.04	.09	.84	.12	T																						.10	.06			1.25

Total 1944 16.01

Laredo, Texas, International Bridge 1945

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.					T									.52	T		.02	T	T		.02	T			.03							.59
Feb.	.08	.03			.02							1.18								.11	.05											1.47
Mar.		.13							.02					T																		.15
Apr.	.40																			2.08	.62											3.10
May										T																						T
June			.02																1.12		.67	T										1.81
July	T			T											1.25			T		.22		T		.15								1.62
Aug.							.03																.08		.01	.02			T	T	.01	.15
Sept.		.06												.45															.19	.07		.77
Oct.	T	.12	.02	.19	.39			.28	.52	1.16	.01	T																				2.69
Nov.										T	T																					T
Dec.											.08			.04	.04			.06	T			T										.22

Total 1945 12.57

Laredo, Texas, International Bridge 1946

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.										.09	T	.12	.01	.35	.02	T						T	.13						T	.13	.01	.86
Feb.			.02					T				T						.01							T		T					.03
Mar.							T					.03										T					T					.03
Apr.											T	.02				T	.51	.55				T	.72						T	T	1.80
May	.20				1.10	.02	T		.05											.49	.55	T					.58			.35		3.34
June										1.44		.41										.44	.80	.10								3.19
July			T																				.02									.02
Aug.		.23																								.05	2.22	.03				2.33
Sept.		.15								2.12				T		.06		.97							.58	3.17	.44			.09		5.46
Oct.				T	.15										.29	.20																2.72
Nov.																		T	T			T					.08					.08
Dec.														T					.01	.02					.01						.06	.10

Total 1946 20.16

Laredo, Texas, International Bridge 1947

Standard gage — U. S. Weather Bureau

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Inches
Jan.	.24	.73			T	.11	.01	.01	.35	.37	.01	T	T	T	T		.18	.02	T													2.03
Feb.																											T	T				T.
Mar.							.03										T															.03
Apr.													2.20													.74	.07					3.01
May										.30	.08	T			T		.35		.02	.19			.03		.71				T			1.68
June																T		.04			.93			.23		.46						1.66
July													.63						T										T	.10	.63	T	1.36
Aug.	.02	2.18	1.11	.69	.52	T					T	T					.15			T	.56	T			.20	.16						5.59
Sept.			.02																													.02
Oct.																													1.77			1.77
Nov.										T			T	T			.50	.01		T	.03	.04				.21						.79
Dec.					T				T	T	.07	.01	.35		.30														T		T	.73

Total 1947 18.67

RAINFALL ON THE UNITED STATES SIDE OF RIO GRANDE WATERSHED

INCHES —1948

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
Laredo, Texas, International Bridge 1948 — Standard gage — U. S. Weather Bureau																																	
Jan.							T				T	T	T		T				T	T						T						0	.92
Feb.	T	1.05	.06	.01	.01	T	.06	.03	.01			T								T	.16	.09	.05	T			T					1.53	.76
Mar.		.54			.22	.10		T	.02	T	.07	T																				.95	.72
Apr.																							.94		.33							1.27	1.62
May												T	T											T	.10	1.01				T		1.11	1.84
June																									.17							.17	1.80
July	1.93	.11	.57	.08								.30																			.71	3.70	2.00
Aug.																																0	1.72
Sept.					.10				.21	.22	1.29			.39			.69		.48		.17		.21									3.72	3.26
Oct.																	.81	.47			.12	.21	.39									2.00	1.47
Nov.												.22	.37	.14																		.73	.52
Dec.																																0	.56
	Period Average 1941-1948 — Total 1948																															15.18	17.19

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
Roma, Texas — Standard gage — I. B. & W. C.																																	
Jan.																																0	1.19
Feb.	2.50	.20																					.73									3.43	.88
Mar.					1.70	.20																										1.90	1.19
Apr.																						1.20			.11							1.31	1.15
May																								.02		2.10						2.12	1.86
June																						1.74		.10					1.80			3.64	3.02
July																																0	1.14
Aug.																												.38		1.45	.62	2.45	2.67
Sept.									4.00	4.30	.10		T	1.70				.34														10.44	3.64
Oct.							.36										.78															1.14	2.07
Nov.																																0	.37
Dec.																																0	.54
	# Period Average 1941-1948 — Total 1948																															26.43	19.72

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
Rio Grande City, Texas — Recording gage — I. B. & W. C.																																	
Jan.																.04		T													.03	.07	.98
Feb.	2.04	.93				.02															.04	.04	.55			T						3.62	.79
Mar.				.09	1.83																											1.92	1.09
Apr.																						.45			.02							.47	1.07
May													.42											.30		2.07						2.79	1.47
June																					.81								1.03			1.84	2.86
July																																0	.41
Aug.		.03							2.04	4.84	.61		.53			.44											.26	.17	.02	.22	1.14	2.18
Sept.																.68		.48	.26													9.44	2.88
Oct.							.02	.03				.45			T	.05	1.49					.02										2.04	1.53
Nov.												.02	.08	.08																		.18	.45
Dec.																		.01				T										.01	.91
	# Period Average 1939-1948 — Total 1948																															23.52	16.62

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
San Benito Pump — Standard gage — Plant Operator																																	
Jan.																																.98	1.64
Feb.	1.03	.57																					.68			.95	.03					2.28	.68
Mar.		.03				.34																.28										.65	1.16
Apr.																																0	1.21
May														.14										3.00	.13	.32						3.59	2.93
June																																0	2.63
July	.71	.05	.60				.28											.28		1.43												3.35	1.97
Aug.						.04																								1.13	.24	1.41	2.10
Sept.		.09							.14	1.06	.94			1.45				1.18	.06													4.92	3.95
Oct.											.18							2.91														3.09	1.75
Nov.																												.28				.28	.72
Dec.																																0	1.83
	# Period 1933-1948 — Total 1948																															20.55	22.57

Some months missing

AVERAGE RAINFALL ON SUBDIVISIONS OF THE RIO GRANDE WATERSHED

IN INCHES —1948

Watershed	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
El Paso to Fort Quitman	1948	.13	.43	.04	.10	.31	1.32	1.45	1.11	.75	.57	T	1.10	7.31
	Total	35.88	29.38	27.39	23.40	31.95	64.18	185.73	155.49	112.43	73.32	37.04	50.91	827.50
	Normal	.46	.38	.35	.30	.41	.82	2.38	1.99	1.44	.94	.47	.65	10.59
	Totals and Normals for the 78 Years, 1871-1948, inclusive													
Fort Quitman to Upper Presidio	1948	.16	.17	T	.26	.33	1.81	1.48	.57	1.38	2.03	.25	.86	9.24
	Total	29.10	20.16	20.87	29.44	48.64	95.64	258.34	199.43	158.69	77.12	32.97	46.63	1,017.03
	Normal	.37	.26	.27	.38	.62	1.23	3.31	2.56	2.03	.99	.42	.60	13.04
	Totals and Normals for the 78 Years, 1871-1948, inclusive													
Pecos River Sheffield to Pecos River Station	1948	.27	1.27	.09	.61	1.48	1.22	2.05	.53	.93	1.28	.34	.45	10.46
	Total	57.06	69.64	66.73	155.73	136.02	193.36	153.26	167.27	194.21	145.58	79.38	85.11	1,481.35
	Normal	.73	.89	.86	2.00	1.74	2.48	1.96	2.14	2.49	1.84	1.02	.83	18.98
	Totals and Normals for the 78 Years, 1871-1948, inclusive													
Devils River	1948	.12	.94	.36	1.36	1.82	8.07	3.12	.65	3.25	1.43	.52	.25	21.89
	Total	53.94	47.79	92.94	141.52	204.79	213.09	141.80	170.15	234.67	168.92	137.81	87.92	1,695.34
	Normal	.69	.61	1.19	1.81	2.63	2.73	1.82	2.18	3.01	2.17	1.77	1.13	21.74
	Totals and Normals for the 78 Years, 1871-1948, inclusive													
United States Side below Rio Grande City	1948	.85	2.84	1.10	.30	3.67	1.10	1.45	2.41	7.23	3.43	.27	.01	24.66
	Total	99.17	80.20	90.55	102.10	228.17	192.10	143.62	181.30	340.85	187.14	111.16	105.08	1,861.44
	Normal	1.27	1.03	1.16	1.31	2.93	2.46	1.84	2.32	4.37	2.40	1.43	1.35	23.87
	Totals and Normals for the 78 Years, 1871-1948, inclusive													

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES-1948

The daily rainfall records tabulated below have not been published elsewhere. For each station there is indicated the source of the record and the type of rain gage in use. The general location of each station is shown on the map of the watershed, pages 46 and 47 of this bulletin.

La Junta, Chih.

Standard gage — Hydraulic Resources

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
Jan.																																0	.87
Feb.			.07	1.03																				.65	.14							1.89	.48
Mar.																																0	.29
Apr.																																0	.09
May																	T	.10		.17											.04	.31	.33
June	T				.06	.41	.03	.01				T							.48					.09	.07				.06			1.21	1.39
July	T		T		T	.09	.01	.01	.06	.01	.33				.30	.12	.04		T	.21	.02	.20	.83	1.03		.20	.51	.36	.12	1.22	.75	6.42	5.06
Aug.								.06	.92	.47	.17		T	.20	.05	.01									.10	.79			.35	.08		3.20	5.24
Sept.					.04	.16		.01	.35	T	.04		T		.94	.16	.17	.01		T				T	.24		.08			T		2.20	2.15
Oct.							.58	1.30				.03	.19			.07	.67	T														2.84	1.39
Nov.																						.19										.19	.42
Dec.				.06									.74		.02	.04	.86	.36	.02	.04			.09	.31	.07	.02			.02			2.65	.88

Period 1925-1948 Total 1948 20.91 18.59

Guerrero, Chih.

Standard gage — Hydraulic Resources

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
Jan.																			.04	.08												.12	.48
Feb.				1.02																				.06	T							1.08	.43
Mar.																				T												T	.22
Apr.																	T	.08														.08	.17
May												T						.26	T	T											T	.26	.28
June		.06	.19		.14	.37	.47	T	.08	.07	T								.02	1.45				.16	.04			.01	.01	T		3.07	1.58
July		.30		T	T	.12	.06	T		.04	.06	T		T	.53	.18				T	.30	.84		.09	.04	.11	.04		.02	.81		3.54	4.33
Aug.	.10		.23			T	.02		.20	.02		.79	.01		.35	.39									T	.22	.21		.12	.55		3.19	4.94
Sept.					.27	T	.14			.10	.02				.18	1.02	.37	.94		.11	T			T	.31		T					3.46	3.58
Oct.						.61	.29	T				.09	.79	.19		.67	.25	T														2.89	1.27
Nov.										.20	T		T									T										.20	.60
Dec.				T									.41	.02	T	T	.21	.24	T				T	.22	T							1.10	.77

Period 1903-1948 Total 1948 18.99 18.45

Balleza, Chih.

Standard gage — Meteor. Serv. of Mex.

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
Jan.											T					.08																.08	.25
Feb.					.08																											.08	.52
Mar.																																0	.05
Apr.														T	T	T				T	.08	T										.08	.27
May													T	T			T	.04			T	T										.04	.19
June	.08	.39	T	T	.20	.20	T	T				T							T	T	.82		T	.08	.12		.08					1.97	1.22
July	T	T											T	.12	.12	.08				.39		T	.63	.79	.04	.87	.39	.16	.67	.31		4.57	4.36
Aug.	.71	.16	.20					T	T	T	T	T	T	.39	.59	.39	T								.55	T	.28		T	.16		3.43	4.77
Sept.	.12							T	.19	.16	T	T	.16	T	.08				.12				T	T	T							.83	3.76
Oct.	T						.08						T		.04		.15	T				T	.08	T								.35	.79
Nov.											.04	.39																				.43	.72
Dec.			T										.20	T										T								.20	.40

Period 1903-1948 Total 1948 12.06 17.30

Parral, Chih.

Standard gage — Meteor. Serv. of Mex.

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
Jan.											T	T																				T	.15
Feb.				T	T																	T										T	.20
Mar.																																0	.15
Apr.									T						.86				T		T	.16										1.02	.12
May												.08	T	.14				.04	.41			T					T					.67	.36
June	.02	T		T	.18	.04		T	T			T							T	T	.61	.01		.49	.51		.01					1.87	1.69
July		T	.59			.04				.55				.23		T		T			.04	.39	.12	T		.04	.67	.16	.04	.08		2.95	4.19
Aug.	.87	.18	.08					.04				T	.33	.12		.19									.06		.08	T	T			1.95	4.08
Sept.								.51	2.36	.18	T	.19	.71	.12						T												4.07	4.07
Oct.							.08				T	.08		T		T	.20	T			.90	.20	.08									1.54	1.29
Nov.										T	T	.10	T																			.10	.69
Dec.		T										.01	T											T								.01	.50

Period 1903-1948 Total 1948 14.18 17.47

La Boquilla, Chih.

Standard gage — Rio Conchos Hydroelec. Co.

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
Jan.																																0	.33
Feb.																																0	.16
Mar.																																0	.19
Apr.																					.03	.09										.12	.19
May												.02	.34						.12												.04	.52	.67
June	.05		.06			.06																.05	.10		.33		.02					.69	1.51
July	.02					.06				.22				.12		.01						.01	1.20	.03		.76	.06	.94		.39		3.82	2.92
Aug.	.06							.17			1.10	.01		.16		.08																1.58	3.01
Sept.								.04	.59	.67		.40	.89	.03	.01					.74												3.37	3.13
Oct.							.02	.26				.15				.12	.50				.05			T								1.10	1.02
Nov.										.05	.05	.04		.01																		.15	.43
Dec.			T										.26	.02										.07								.35	.41

Period 1910-1948 Total 1948 11.70 13.97

Rosetilla, Chih. 1940

Standard gage — Rio Conchos Hydroelec. Co.

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
Jan.																						.47										.47	
Feb.								.07																								.07	
Mar.																								1.57								1.57	
Apr.																																0	
May											.01			.06								.25										.32	
June										1.16										.26	.12	.33	1.09						.84			3.80	
July																.84		.39			.11	.09		.23		.13		.12	.03	.04		1.98	
Aug.					.17	.34		.15			.32	.37														.09			.12	.17	.06	1.81	
Sept.	.15					.09																										.24	
Oct.												.49											.03									.52	
Nov.				.11			.79	.22																								1.12	
Dec.										.02	.22																					.24	

Total 1940 12.14

Rosetilla, Chih. 1941

Standard gage — Rio Conchos Hydroelec. Co.

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
Jan.	.03										.21																				.62	.86	
Feb.				.26	.17																											.43	
Mar.																																0	
Apr.																									.18			.04				.22	
May														.09	.13	.08	.22					.21	.02				.15		.12			1.02	
June																		.33	.15					.03	.11					.96		1.60	
July		.04	.08				.05	.47	.05	.04			.11	.06						.19		.17	.10	.07		.17	.06		.33	.03		8.02	
Aug.		.07		.05		.12	.10	.04		.32	.05		.53				.03					.12		.32		.53		.21	.22	1.23		3.94	
Sept.	.54	.43			.07	.02	.35	.03				.04		.09	.84	1.47	1.14		.97		.47	.27								.02	.18		6.91	
Oct.	.57								1.27	1.12	.10	.03											.03	.22								3.34	
Nov.																									.17							.17	
Dec.							.12			.03																						.15	

Total 1941 20.66

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES-1948

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
Rosetilla, Chih. 1942 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.																																0	
Feb.										.08																						.08	
Mar.																																0	
Apr.																																0	
May																							.12									.12	
June	.89		.19																													1.08	
July		.19					.03										.23		.82	.44	.03	.03									.87	2.64	
Aug.	.22	.17	.07				.54	.04	.28	.14			.04		.24	1.12	.17	.03	.22	.02		.32	.62		.23		.12	.23				4.82	
Sept.				.43	.42	.62											.58	.27	.07			.26							.03			2.68	
Oct.	.18							.21	.05		.12																					.56	
Nov.			.32	.03																												.35	
Dec.																																0	
																															Total 1942	12.33	
Rosetilla, Chih. 1943 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.				.75		.25	.75	.08																								1.83	
Feb.																																0	
Mar.																																0	
Apr.																																0	
May																												.04				.04	
June							.20								.08	.23						.08						.03	1.50	1.10		3.22	
July	.30	.10	.10						.03	.06		.05		.02		.48		.04	.30	.11			.10				.13			.58		1.72	
Aug.										.25									.06							.43						1.17	
Sept.		.05																			.07	.25	1.10	.95	.28							2.95	
Oct.									.05	.30	.12																					.47	
Nov.																									.06	.10						.16	
Dec.			.20	.15			.25	.15															.10								.28	1.13	
																															Total 1943	12.69	
Rosetilla, Chih. 1944 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.																							.05			.03						.08	
Feb.																																0	
Mar.																	.03															.03	
Apr.																																0	
May																																0	
June							.10															.32		.06	.47							.95	
July					.04	.02	1.02		.87	.29			.04			.03					.04	.02	.27									2.64	
Aug.						.12	.03	.10					.38	.10	.02		.01	.38	.01					.18		.05		.04	.32			1.74	
Sept.	.12	.02		.03		.34	.85																		.50	.51		.03				2.40	
Oct.																																0	
Nov.																		.04	.39													.43	
Dec.																											.71					.71	
																															Total 1944	8.98	
Rosetilla, Chih. 1945 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.																		.08														.08	
Feb.																																0	
Mar.																																0	
Apr.																			.03													.03	
May																																0	
June																	1.20	.08														1.28	
July	.67	1.75	.10		.21	.02	.46	.16			.12		.05	.05	.12	.06																3.77	
Aug.											.15											.15	.04					.25				.39	
Sept.									.03													.17			.06		.09					.35	
Oct.	.60	.02		.43	.88	.03	.31	.07	.05																							2.39	
Nov.																																0	
Dec.																																0	
																															Total 1945	8.49	
Rosetilla, Chih. 1946 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.						.72	.19					.07	.25				.07															1.30	
Feb.																																0	
Mar.																								.15								.15	
Apr.																																0	
May																																0	
June	.04																.11	.23	.03		.06	.91			.54	.09	.06					2.07	
July			.11	.06	.28		.06													.07					.29	.09						.90	
Aug.		.08		.03	.24			.15					.12	.06													.22	1.02	.40	1.32		3.64	
Sept.	.09			.02													.25		1.47	.01					.18		.03					2.05	
Oct.						1.83														.12												1.95	
Nov.																																0	
Dec.									.16	.26																				.10	.40	.92	
																															Total 1946	12.98	
Rosetilla, Chih. 1947 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.	.33							.20	.07							.55	.01															1.16	
Feb.																																0	
Mar.																	.20															.20	
Apr.																																0	
May																									.20							.20	
June													.43										.20									.63	
July															.25															.10	.20	.55	
Aug.					.04								.33	.24			.70	.90	.33			.25		.07	.30	.25	.70					4.11	
Sept.							.02		1.30			.25																				1.57	
Oct.						.18															.07											.25	
Nov.																	.20															.20	
Dec.		.30	.05									T																				.35	
																															Total 1947	9.22	
Rosetilla, Chih. 1948 — Standard gage; Rio Conchos Hydroelec. Co.																																	
Jan.																																0	.64
Feb.	.05																															.05	.07
Mar.																																0	.22
Apr.																						.20										.20	.05
May													.10																			.10	.20
June	.22		.21																						.10							.53	1.68
July						.15				.02					.10	.06					.06	.60	.22		.07	.13	.93	.07		.33		2.74	2.11
Aug.									.15			.56			.70											.05	.19		.19			1.34	2.37
Sept.								.04	.02	.02			.30								.20											.58	2.19
Oct.							.03	.15				.20	T				.30					.15	.25									1.08	1.17
Nov.											.12	.05	.10																			.27	.30
Dec.													.20											.15								.35	.43
	Lat. 28° 14' Long. 105° 19' Elev. 3,780 feet																										Period 1940-1948				Total 1948	7.24	11.63
Villalba, Chih. — Standard gage; Hydraulic Resources																																	
Jan.																			.12	T												.12	.48
Feb.	T			T																												T	.14
Mar.									T						T																	0	.02
Apr.																					.05	T										.05	.07
May													T																			T	.11
June	.04			.06	.27							T										.02										.32	.78
July	.20	.04	.05			.01			.10	.03				.14	.67	1.00						.13	.26	.08		.12	.01	.04		.25	T	3.11	3.16
Aug.	.02	T					.03		.26		.29	.03	T	.33	.03	.04									.03		.04		.01			1.11	2.78
Sept.									.59	.08		.01		.05						1.21					.06							2.00	2.81
Oct.							T	.37				.22	.04		.09	.61	.54	.04	T		.17		T	T								2.08	1.68
Nov.										.04	.04	.25	.02	T																		.35	.29
Dec.												T	.10					T						.08	.02							.20	.48
																											# Period 1940-1948				Total 1948	9.41	12.80

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES–1948

Standard gage — **Las Vírgenes, Chih.** — Hydraulic Resources

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
Jan.																			.04													.04	.34
Feb.																				T												T	.04
Mar.																																0	.02
Apr.									T						T						.09	.21										.30	.10
May													.12						.08		.08									T		.28	.13
June	.08	T	.09	T	.73														T			.10			T							1.00	1.06
July									T	.19				T		.09		T				.09	T	T				.09		.23		.69	2.36
Aug.								.10			T		.23	.19	.13										T							.65	2.42
Sept.									.17	.04		.24		.01							.07											.53	1.52
Oct.							T	.04					.16		.41	.36	.07	T				.09										1.13	.90
Nov.										T	.09	.26	T																			.35	.25
Dec.										T		T	.07																			.07	.61

Period 1943-1948 Total 1948 5.04 9.75

Standard gage — **Hormiguero, Chih.** — Meteor. Serv. of Mex.

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
Jan.																																0	.49
Feb.																																0	.26
Mar.																																0	.12
Apr.															T						.19	.16										.35	.18
May												T		.27				.10	.04													.41	.47
June	.16	T			.18	.06		.06												.18				.62	.43		.12					1.03	2.01
July		.16	1.22				.08			.53				.14	.04				.04			1.26	.71			.04	1.10	.35	.08	.16		5.91	5.58
Aug.	.75	T	.10					T	T			T		.10	.06	.18	.33										.27	.04	.39		.02	2.24	5.75
Sept.	T							1.46	1.66	.08	.18	.55	.79	T					T	.08												4.80	5.50
Oct.							1.00	.08			T	.14	T		T	T	.29				1.22	.27	.24	.16								3.40	1.97
Nov.											.06	.12	.04	T																		.22	.57
Dec.												.10	.06	T																		.16	.72

Period 1923-1948 Total 1948 19.32 25.42

Standard gage — **Delicias, Chih.** — Hydraulic Resources

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
Jan.																			.24	T												.24	.49
Feb.	.04																															.04	.14
Mar.																																0	.12
Apr.									T												T	.71							.26			.97	.20
May													.06								T								T			.06	.23
June	T				.08							T									T											.08	1.18
July			T			.04			.01	.42				T		.18						.06				T	.01			.02	.27	1.01	2.51
Aug.		T						.01	.03	T			T	T	.02	.01								T			T		T			.07	2.41
Sept.							T	.08	.09	.08	T	.08	.06	T						T					T							.39	2.18
Oct.							.10	.57			T		.96		T	.07	.10					T			.08							1.58	1.01
Nov.										.10	.14	.08	.13																			.45	.34
Dec.													.12	T										.09	T							.21	.49

Period 1933-1948 Total 1948 5.40 11.10

Standard gage — **San Antonio, Durango** — Hydraulic Resources

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
Jan.												.10			.53															T		.63	.57
Feb.				T																												0	.04
Mar.																																T	.04
Apr.									.10						.04						.06	T										.20	.24
May					T							T	.04	T	T			T	.25												.05	.34	.18
June	.67	T	T		T	T	T	T	T													.04	T	T	.25		.65					1.61	2.42
July		.73	.65	1.20						T		T	T	.18	.12	T		T			.79	T	.33	T		T	.37	T	.35	T		4.72	4.78
Aug.	T	.33						.14		T	.22			T	T	T	.10										.07	T				.86	3.05
Sept.	T								1.75	2.05	T	1.08	.53	T																		5.41	4.66
Oct.	T						.30					.29			.26	.18	.37			T	.26	.29		.06	T							2.01	1.59
Nov.											T	.14	T	T																		.14	.19
Dec.													.10	T																		.10	.22

Period 1943-1948 Total 1948 16.02 17.98

Standard gage — **Maclovio Herrera (Falomir), Chih.** 1947 — Meteor. Serv. of Mex.

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
Oct.												.01									.02											.03	
Nov.																	.09															.09	
Dec.			.24									.15																		T		.39	

Standard gage — **Maclovio Herrera (Falomir), Chih.** 1948 — Meteor. Serv. of Mex.

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
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.10	---	---	---	---	---	---	---	---	---	---	---	---	---	.10	.42
Jan.																																.10	.42
Feb.	.02																															.02	.16
Mar.																																0	.28
Apr.																					.22											.22	.30
May																																0	.76
June	1.18		.13																	.10												1.41	2.11
July				T									.37		.27	.35						.10						.10				1.19	3.43
Aug.											.09		.04																			.13	4.68
Sept.										.08																						.08	6.13
Oct.								T								.51					.43											.94	.90
Nov.											.01			.55																		.56	.16
Dec.													.09											.10								.19	1.70

Period 1924-1948 Total 1948 4.84 21.03

Standard gage — **Ojinaga, Chih.** — Meteor. Serv. of Mex.

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
Jan.																			.31													.31	.21
Feb.																																0	.18
Mar.																																0	.19
Apr.																					.02											.02	.21
May												.05										.02	T	T	T							.07	.34
June																				.47	.16	.43			T							1.06	.82
July				T												T				T		.02				.02		T		.01		.05	.99
Aug.								T						T														T		T		T	1.42
Sept.									T										T													T	1.32
Oct.							T	T							.16	T	.71			.39		T	.16									1.12	1.04
Nov.										T		T	.39	T																		.39	.45
Dec.													.16	.08									T	T								.24	.43

Period 1906-1948 Total 1948 3.56 7.80

Standard gage — **Rancho Los Angeles, Coah.** 1942 — R. Escandón

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
May																		1.69					.80									2.49	
June					.01	.22			.06						.04																	.33	
July	2.20	.08																														2.28	
Aug.																.81	.09					.58		.09						2.82		4.39	
Sept.	.69		.06					.38											1.15	.10												2.38	
Oct.		.27			.55								.08	.11			.17		.25													1.43	
Nov.			.18																													.18	
Dec.																				.60												.60	

Lat. 29° 30' Long. 101° 41' Elev. 1,800 Feet

Standard gage — **Rancho Los Angeles, Coah.** 1943 — R. Escandón

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
Jan.					.30																											.30	
Feb.																																0	
Mar.																								.40								.40	
Apr.							.55								.25																	.80	
May																				.90	.82								.32			2.24	
June																																0	
July																																0	
Aug.																																0	
Sept.																							.75			1.45				.85		3.05	
Oct.																																0	
Nov.		.82																							.15		.93					1.90	
Dec.					.83				.18																							1.01	

Total 1943 9.70

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES–1948

Standard gage — **Rancho Los Angeles, Coah.** 1944 — E. Escandón

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
Jan.	.70											.09																				.79	
Feb.																		.25						.20								.45	
Mar.																	.65	.20														.85	
Apr.																																0	
May																				.55					.90		.95					2.40	
June																																0	
July																																0	
Aug.																							.45			.85	.50	1.00				2.80	
Sept.						1.25	.10																			1.75						3.10	
Oct.																																0	
Nov.																		.55														.55	
Dec.																																0	
																															Total 1944	10.92	

Standard gage — **Rancho Los Angeles, Coah.** 1945 — E. Escandón

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
Jan.																	.37															.37	
Feb.												.80																				.80	
Mar.												2.35																			1.46	3.81	
Apr.																																0	
May																																0	
June																																0	
July	1.30			.84																												2.14	
Aug.																																0	
Sept.																						.52						.80		.43		1.75	
Oct.			1.15					1.05																								2.20	
Nov.																																0	
Dec.																																0	
																															Total 1945	11.07	

Standard gage — **Rancho Los Angeles, Coah.** 1946 — E. Escandón

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
Jan.																																0	
Feb.							.75							.25																		1.00	
Mar.																																0	
Apr.																				.90		.17										1.07	
May	1.00			1.69		.39	.92																									4.00	
June																			.25		.54	.30	5.36	.52			1.25					8.22	
July																																0	
Aug.																																0	
Sept.																													1.15			1.15	
Oct.							1.16	.22																								1.38	
Nov.											.40																					.40	
Dec.																																0	
																															Total 1946	17.22	

Standard gage — **Rancho Los Angeles, Coah.** 1947 — E. Escandón

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
Jan.	.95								.55							.50	1.75															3.75	1.04
Feb.																		.28														0	.45
Mar.																																.28	1.06
Apr.																																0	.37
May										.60				.15									.76									1.51	2.11
June													.50						.15													.65	1.53
July																																0	.74
Aug.		1.48	.20							.20		1.13										.15			1.07							2.90	1.68
Sept.																																1.33	2.13
Oct.																																0	.84
Nov.																																0	.50
Dec.				.20		.10							.15																			.45	.34
																															# Period 1942-1947 Total 1947	10.87	12.79

Standard gage — **Palestina, Coah.** — * Hydraulic Resources

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
Jan.																																0	1.26
Feb.				.20																					.39							.59	.71
Mar.																																0	.83
Apr.																						.79		.39								1.18	1.35
May																																0	3.22
June																						.39	.79	.91								2.09	2.13
July	.39	.28	4.92									.98																				6.57	2.44
Aug.																															.22	.22	2.89
Sept.								1.06		1.65							.79	.06														3.56	3.37
Oct.									T		.87					1.46				.39	2.16	.63										5.51	1.39
Nov.											.20		.31	T																		.51	.84
Dec.													T	T	T									.12								.12	1.13
																															# Period 1931-1948 Total 1948	20.35	20.96

Standard gage — **Piedras Negras, Coah.** — Meteor. Serv. of Mex.

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
Jan.											.01								.02						T	.02	T					.05	.84
Feb.	.15	.08	.02	T	.02	.05	.02	.15										T				.08		.02	.12	.08			.06			.38	.79
Mar.	.02				T			.02																							T	.04	.93
Apr.																							.79	T	.04							.83	1.64
May				.14				T			.04	T		T										T	.03	.03						1.65	5.02
June										T														.25	.20	T	T		T	.65		1.10	2.65
July	.09	.11	.18	.40	.01						.26		.05	.29								T		T							.01	1.40	1.31
Aug.	.08				T				4.26	.99	.07					.03								T					.05		T	.16	1.66
Sept.											T						1.11		.14													6.57	2.90
Oct.								T				.03					.30			T		.86	1.07	T					T			2.86	1.84
Nov.											.20		.70	.01	.05																	.96	1.05
Dec.														T		T		T					.02					.03				.05	.95
																															# Period 1907-1948 Total 1948	16.05	19.58

Standard gage — **Múzquiz, Coah.** ♦ — Meteor. Serv. of Mex.

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
Jan.										No	records		available		for	January,		February,		March,		and	April.										.94
Feb.																																	.46
Mar.																																	1.08
Apr.																																	1.00
May											T	.69											.14	.47		T		T				1.30	3.44
June																				T	.14	.55	.20	T	.25	T		T		.20		1.34	3.27
July	2.20	.79	.20	.24		.45	T		T			.06	1.81	T																.20		5.95	2.17
Aug.	.19												T		.12																	.31	2.94
Sept.								1.50	3.94	3.17	.20								.78	T	T	T			T							9.59	5.19
Oct.							T				.71						.53	.49			.71	.82	.18									3.44	2.37
Nov.										T	T	.16		T																		.16	1.35
Dec.																																0	1.13
																															# Period 1923-1948		25.34

Standard gage — **Nueva Rosita, Coah.** — Meteor. Serv. of Mex.

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
Jan.												T													T						T	T	.84
Feb.	T	T		T	T	T	T										T				T		T	T	T							T	.47
Mar.				T			T																									T	.40
Apr.																						.75										.75	1.15
May											T	.12											T	T	.08							.20	2.73
June																						.90				.08			T	T		.98	2.14
July	.31	1.73	.67		T	T				.79		.99	.08				T														.59	5.16	1.74
Aug.	.28															.39											T	T	.43	T	T	1.10	1.71
Sept.								2.20	1.46	1.65	T	T	T			T	.08	T	1.26	T			T		T	T						6.65	2.33
Oct.											.08	T				.08	.08			.58	.79	.79										2.40	1.54
Nov.											T	T																				T	.59
Dec.													T	T			T															T	.77
																															# Period 1925-1948 Total 1948	17.24	16.41

Some months missing * Record for January, March, and April from Meteorological Service of Mexico ♦ In former years this station was erroneously reported as being in the state of Chihuahua.

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES—1948

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
Sabinas, Coah. (Standard gage / Hydraulic Resources)																																	
Jan.																															T	T	.96
Feb.																																0	.91
Mar.																																0	.75
Apr.																						.65		T								.65	1.26
May							T				.06	T	T										.04	.04	T							.14	3.16
June										T											T	1.04	.32	T		.06				T		1.42	2.51
July	.26	2.40	.24	.33		T						.51	.24				T															3.98	1.46
Aug.		T	.20	.16	T	T										T											T	.93	.27	T	T	1.56	2.29
Sept.								3.43	.63	2.13			.04	.08		.35		T		.47	T	T										7.13	3.96
Oct.																1.46	T				.53	1.77	.57	T								4.31	1.82
Nov.											T																					T	.52
Dec.												T	T	.12	.29	.08	T						T		T							.49	.59
																																# Period 1922-1948 Total 1948 19.68	20.21
Progreso, Coah. (Standard gage / Hydraulic Resources)																																	
Jan.												T				.17	T															.17	.87
Feb.	.01	T	T		.02	.01																										.04	.20
Mar.				.47	.20																											.67	.19
Apr.										T												.33		.01					T			.34	1.51
May											T												.44	.13	T							.57	1.91
June																						2.05	.68	T						1.14		3.87	1.58
July	.25	.29	T	T						T		T	T			T						T									1.14	1.68	.64
Aug.	T			T	T											T												T	.01	T	.02	.03	2.94
Sept.								.38	1.30	2.09	.11	T	.05	.83		.10			.27	T				T	T							5.33	4.00
Oct.							T				.10					.26	.50				.27	3.96	1.14									6.23	2.74
Nov.										T	.22			.04	.15								T									.41	.33
Dec.													T	T	T	T	T							T								T	.69
																																# Period 1943-1948 Total 1948 19.34	17.60
San Buenaventura, Coah. (Standard gage / Meteor. Serv. of Mex.)																																	
Jan.												T														T	.08			.05		.13	.75
Feb.	T	T					T	.06													T											.06	.40
Mar.				.19	.14																											.33	.24
Apr.									.17													.29							T			.46	.43
May												T													.18					.07		.25	1.37
June																						.14	.92			.05						1.11	1.69
July	.47	3.78	T			.24	T					.62				.61						.09										5.81	1.83
Aug.																													T	T	T	T	2.03
Sept.									1.63	1.28	.14	T	.14	.17				T			.17	.28										3.81	2.25
Oct.							.09				T							T			.25	.82	1.00	.03								3.46	1.33
Nov.										T	.06			.25																		.33	.53
Dec.																	T															T	.77
																																# Period 1926-1948 Total 1948 15.75	13.62
Monclova, Coah. (Standard gage / Meteor. Serv. of Mex.)																																	
Jan.																.02										T	.02					.04	.49
Feb.	.08	T	.02					.07													.02											.19	.46
Mar.					.23																											.23	.33
Apr.									.11													.40									.11	.51	.57
May												T	T											.06		T	.10					.27	1.52
June																						.03	T			.14		.04		.45		.66	1.21
July	.20	.03		T			.95				.03	.07																				1.28	1.69
Aug.		T					T									T											T	T	.04	.25		.29	1.72
Sept.									1.24	2.06	.68		.03	.13	.03				T	.20	.08											4.45	3.06
Oct.							T	T				.28				.27	.53				1.36	1.49	.05									3.98	1.26
Nov.											.19	T			T	.11																.30	.59
Dec.														T			T	T														T	.59
																																# Period 1897-1948 Total 1948 12.20	13.49
Gral Cepeda, Coah. (Standard gage / Hydraulic Resources)																																	
Jan.				.11								T			T	.30	T													.09	.50	.63
Feb.	.22																															.22	.50
Mar.			T	.09	.24																											.33	.26
Apr.										T	T	T										.09							T			.09	.38
May			T		T		.04			T		.34	.09										T	.23	.09			T	T			.79	.81
June											T								T		.09	T	.11	.93	.40		.08	T		.46		2.07	2.46
July	.09	.46	.07	T			.03			T		.22	.13	T	.10		.48					T	T		.15			T	.23	T		1.96	4.06
Aug.							.13	.18	T							T											.20	.07	.11	.33	T	1.02	3.12
Sept.	T								2.32	.90	T	1.50	1.00	.17	T				T	T	1.88			.28								8.05	3.36
Oct.							T	T	.32	T	.77		T			.06	.07				.45	.11	.05									1.84	1.34
Nov.											.07	T													.03							.10	.58
Dec.														T	.03	T																.03	.67
																																# Period 1926-1948 Total 1948 17.00	18.17
Villa Juárez, Coah. 1947 (Standard gage / Hydraulic Resources)																																	
Jan.												No record for January, April, and May 1947.																				0	
Feb.																																0	
Mar.					T												T															T	
Apr.																																	
May																																	
June												.31	.09		T				T				.79	T								1.19	
July																																0	
Aug.	.23	.14	.05	.09	.03	T							.24						T	.02	.05	T	.02	.03	T							.90	
Sept.												4.72				T					2.76											7.48	
Oct.							.16											.56									T	.08				.80	
Nov.												T	.16		T		.12		T	.08	.06	.18			.31	T				.06		.89	
Dec.					.04					T		T	T	.45																		.49	
Villa Juárez, Coah. 1948 (Standard gage / Hydraulic Resources)																																	
Jan.												No record for January, 1948																				1.23	
Feb.	T				T	T	T	T															T									T	.16
Mar.		.63																														.63	.25
Apr.																						.22										.22	.59
May																							.30	T								.30	1.49
June																						2.58	.65	T								3.23	1.57
July	T	T				T				T			T									T										T	.31
Aug.		.27														.16										T				T		.33	2.23
Sept.								T	3.03	1.62			T	.20		.12			1.32						.43							6.72	4.23
Oct.												T				.61	.57			.40	1.08	1.08										3.74	2.85
Nov.											.23	.12	T	T	.04																	.39	.58
Dec.													T																			T	.37
																																# Period 1943-1948	15.86
Don Martín, Coah. (Standard gage / Hydraulic Resources)																																	
Jan.																.01										T		.02				.03	.97
Feb.	.14		.04	.08	.19		.09														.02											.56	.54
Mar.				.67	.04	T																										.71	.62
Apr.																						.94										.94	1.22
May																							T	.45	.03							.48	2.14
June											.01										T	1.04	.24		.56				.75	.16		2.76	1.93
July	.01									.24	.18																				.02	.43	1.14
Aug.		.78														T																.80	2.00
Sept.								1.40	1.51	2.39	T	T	.02	.48	T	.32		.04	.63		T				.10	T						6.91	2.96
Oct.							T	T			T	.57	T			.47	.57			.21	.59	2.03										4.44	1.64
Nov.		T	T								.26	.80	.03	.03	.06	T																.58	.63
Dec.																							T	T								T	.86
																																# Period 1927-1948 Total 1948 18.64	16.65

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES-1948

Lag. de Salinillas, N. L.

Standard gage — Hydraulic Resources

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
Jan.												T				T									.02		T					.02	.97
Feb.	.35	.02	.02	.02	.02	.01	.08	T											.08	.02	.12		.02	.02								.78	.49
Mar.				1.06	.08						T																					1.14	.69
Apr.																						.79										.79	.97
May											.02												.02	.63	.12							.79	2.44
June																						.17	.49		.18	.02		T	.04	.16		1.06	1.63
July	.04	T	.16			.08					.02																			.05		.35	.74
Aug.																.04																.04	4.15
Sept.							.04	.04	1.14	2.60	.06	T	.16	.06		.33		.02	.79		T											5.24	2.75
Oct.							.02	.01			.10	.41				.22	.18			.74	.32	2.14	.02		.01	T						4.17	1.32
Nov.											.49	.31	.24	.02	.02																	1.08	.35
Dec.																.02						.01										.03	.35

Period 1940-1948 Total 1948 15.49 17.25

Anahuac, N. L.

Standard gage — Hydraulic Resources

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
Jan.																										.06						.06	.94
Feb.	.45	.02			.06	.04	.06													.06	.15	.04										.88	.49
Mar.				.88	.16	.02																										1.06	.73
Apr.																						.98										.98	1.10
May													.04											.35								.39	2.66
June																							.24			1.61				.98		2.83	1.61
July	1.06		3.63								.43																					5.79	1.27
Aug.		.49																									.41			.22		1.12	2.09
Sept.									2.76	1.57	.37		.08	.08		.08		.12	.12						.43							5.61	3.28
Oct.					.11			.06								1.22	.35			.47	.12	3.66	.04	.04								6.07	1.38
Nov.											.19	.10	.06	.08	.04																	.47	.32
Dec.																																0	.95

Period 1933-1948 Total 1948 25.26 17.02

Nuevo Laredo, Tamps.

Standard gage — Meteor. Serv. of Mex.

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
Jan.																								T	T	T					.15	.15	.82
Feb.	.84	.06	T	.02	.01	.06	.02											T	.09	T	.07											1.17	.78
Mar.	.66			.24				.05		.05	.06																					1.06	.64
Apr.																						.71		.23								.94	1.05
May																								.15	1.05							1.20	2.36
June																							.26							1.39		1.65	1.84
July	.15	1.28	.18								.58																			.60		2.79	1.44
Aug.																											.98					.98	1.15
Sept.				.08				.21	.27	.75				.55	T	.76		.68				.35			.04							3.69	2.77
Oct.																.66	.53			.19	.16	.39										1.93	1.36
Nov.											.22	.33	.18	.01																		.74	.87
Dec.															.02																	.02	1.10

Period 1909-1948 Total 1948 16.32 16.38

Guerrero, Tamps.

Standard gage — Meteor. Serv. of Mex.

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
Jan.						T				T		T				T			T						T	T	T				T	T	.86
Feb.	1.31	.04	T		T	.04	T	.02								T				.09	T	.05										1.55	.64
Mar.				1.21	.39		T		T		.03																					1.63	1.04
Apr.																					T	.64		T								.64	.91
May				T							T	T	T							T			T	.46	3.25				T			3.71	3.16
June																					T		.96					.21		T		1.17	1.43
July	T										T	T																		T		T	1.47
Aug.																								T					.26	.12		.38	2.69
Sept.								T	2.34	2.80	.09	.06	1.69	.30				.35				T										7.65	3.12
Oct.							.33	.05		T	T	.16			1.85	T	1.26			T		T	T									1.85	1.69
Nov.											.12	.20	.08		.25																	.65	.61
Dec.															T	.13	T															.13	1.28

Period 1936-1948 Total 1948 19.34 18.90

Saltillo, Coah.

Standard gage — Hydraulic Resources

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
Jan.																.18	.02										T					.20	.64
Feb.	.43	.03						.06																								.52	.52
Mar.				.07	.18							.03																				.28	.37
Apr.										.05	T											.87										.92	.74
May				.41	.01		.02															T		.47	.62							1.53	1.02
June																				.04		.61	.26	1.04			.04	.33	.06	.62		3.00	2.13
July	.06	.17		.04		.09	.21	.31				.17	.15	T		.13	.21		.19		.76	.10								.03		2.62	2.78
Aug.								.45								.17													.21	.41		1.24	2.50
Sept.									2.01	.49	.06	.35	1.81	.13	.01					.04	.36	.06										5.32	2.60
Oct.														.35	.02	.08				.12	.56	.10	T		T	.60	T	.04				1.87	1.28
Nov.											.12	.03													.12							.27	1.00
Dec.																.06																.06	.66

Period 1886-1948 Total 1948 17.83 16.24

Ramos Arizpe, Coah.

Standard gage — Meteor. Serv. of Mex.

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|T|---|---|.31|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|.31|.53
Feb.	.22																															.22	.36
Mar.					T																											T	.30
Apr.										.12												T							T			.12	.45
May				.19			T				.10													T	.12			T				.41	.75
June																			T		.10	.41	.06	T			T	.85	.20	.41		2.07	1.20
July	T	.02	T				T				.12	.41	.04	T			T				.12	1.10							T	T	.16	1.97	1.53
Aug.	.16								.12								.16													.51	.69	1.44	1.50
Sept.										2.28	.24	T	1.22	.67	.04	.04			T			.27	.24				.08					5.08	1.79
Oct.										.08	.10	.16					.08	.14				.86	T									1.42	.62
Nov.											.10	.16																				.26	.51
Dec.																T																T	.59

Period 1907-1948 Total 1948 13.30 10.13

Rinconada, N. L.

Standard gage — Hydraulic Resources

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|.02|---|---|---|---|---|---|---|---|---|---|---|---|---|.05|.04|---|---|---|.11|.43
Feb.	.45							.43														.03										.91	.71
Mar.				.14	.11					.03	.01																					.29	.14
Apr.																						.31										.31	.91
May			.14	.16	T																		T		T					T		.30	.38
June																				.17	.13	T	.12	T	.24	.27	.12	.70	.14	.20		2.09	1.11
July	.24	.17					T	.20				.45				T		.15				T							.39	T		1.56	.68
Aug.							T							T															1.58	1.00		2.58	3.19
Sept.	.02							T	.96	.36	.87	.24	.04	T	T						1.38	T				.85	T	T				4.72	2.40
Oct.							T	.04	.01	T	.10	T				.08	.04	T	T	.17	.35	T										.79	1.18
Nov.					T		T				.14	.02	.05									T								.01		.22	.30
Dec.																	T					T										T	.17

Period 1944-1948 Total 1948 13.90 11.60

Santa Catarina, N. L.

Recording gage — Hydraulic Resources

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|.08|---|---|---|---|---|---|---|---|---|---|---|---|---|---|.20|.28|1.53
Feb.	T	.02							.02		.02								.01	.02	.02								T			.07	.32
Mar.				.41	.26																											.71	.27
Apr.												.02									.21									.01		.24	.83
May				.28	.07								.14								.38											.87	.66
June																					.13	.34	.10	.06				.35	.49	.13		1.60	2.74
July	.24	.09	.02				.98										.01															1.33	1.73
Aug.	.02															T	.04	.04									.24	.73	1.22	.97	.28	3.47	4.30
Sept.	.05								2.62	.49	.02	.82	.08	.04							T		.17									4.37	3.38
Oct.								.03	.03	.31	.23		.60			.02	.11			.04	.21	.22									T	1.80	1.85
Nov.											.04																					.04	.48
Dec.																																0	.94

Period 1937-1948 Total 1948 14.78 19.83

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES–1948

Topo Chico, N. L.

Recording gage — Hydraulic Resources

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
Jan.																	T													T	T	T	.63
Feb.	.09	.11					T												.06	.08	.09	T										.43	.44
Mar.				.49	.26					.16	T																					.91	.52
Apr.																					.61											.61	1.21
May										.33	.17	.06										1.18										1.74	1.15
June																										.17	.25	.16	1.58	.08		2.24	2.80
July	.16	3.94			.04	.12																										4.26	1.75
Aug.															.47											1.30	.49		1.24	.79		4.29	3.84
Sept.									4.24	.56		1.32	.60	.37		.26																7.35	5.00
Oct.						T				.52		.43					T	.28	T	.59	1.13							T				2.77	2.60
Nov.																																0	.94
Dec.																																0	.79

Period 1939-1948 Total 1948 24.60 21.69

Monterrey, N. L.

Standard gage — Hydraulic Resources

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
Jan.										T		T				.04										T	T	.02				.06	.69
Feb.	.19	.06	T					.03												.06	.01	.02							T			.37	.62
Mar.				.34	.30		T			.14	.02				T	T				T	T						T			T	.80	.73
Apr.							T	T			.47	T	T				.17	T										T	.06			.70	1.21
May				.37							1.51	.70	.54			.17		T					.20	T		.07		T	.02			3.58	1.69
June																					.02	.01	.03	.20	.02			1.30	.41	.04		2.03	2.99
July	1.31	1.59				.02	.15				T	T			T		.02			T									T	T	T	3.09	2.65
Aug.	T				T											.29		.28									T	.71	.21	1.12	.17	2.78	3.28
Sept.	T							T	4.50	.15		.02	1.77	.18	.24				.20													7.06	5.82
Oct.							.03	.24	.04	T	.41	.73	1.20			.10	.63		T	.41	1.60	.49						T	.01			5.89	3.38
Nov.											.04	.03	.02	.03	.03																	.15	1.39
Dec.																																0	.82

Period 1896-1948 Total 1948 26.51 25.23

Ciénaga de Flores, N. L.

Recording gage — Hydraulic Resources

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
Jan.						T				T							T									.08						.08	1.73
Feb.	.16	.12	.08			.08		T												.14	.10	.14										.82	.65
Mar.				.61	.41					T																						1.02	.68
Apr.																						.62										.62	1.11
May				.42							1.21	.41	.42							.10					.23	.42						3.21	2.39
June																								.54	T	.14		.74	3.56	.21		5.19	3.06
July	.55	.39				.34	1.51																							.15		2.94	2.12
Aug.		.10														.08	T											.13	.30	1.20		1.81	4.64
Sept.								.17	3.44	.85			1.42	.25	.10			.11	.13					.17	.15	.09						6.88	5.89
Oct.							T	.15	.14	.09	.10					.13	.09		.09	.22	1.44	.25						.10				2.80	1.94
Nov.											.16	.15	.10	.15	.16																	.72	.88
Dec.																																0	.89

Period 1938-1948 Total 1948 25.69 25.38

Cadereyta, N. L.

Standard gage — Hydraulic Resources

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
Jan.										.02					.01	.02									.01	.01		T	.04		.06	.17	.90
Feb.	.12					.04														.16		.09										.41	1.01
Mar.				1.52	.47					.30																						2.29	1.32
Apr.																						.19								.01		.20	1.90
May				.36							.62	.29	.06										.04			.02		.02		.04		1.45	2.39
June																							.21		.10	.02		.01	.40	.04		.78	3.98
July		1.08				.11	1.16										.03													.04		2.44	2.67
Aug.	.06	.04														.45	.58	.20									.20	.52	2.06	1.20		5.31	3.61
Sept.								.91	3.46			.01	2.37	.64					1.41						.30	.35						9.45	4.71
Oct.								.01	.01	.03	.86	.07	.18	.06			.09		.05	.21	.67	1.33										3.59	3.03
Nov.											.01		.03	.19	.13																	.36	1.42
Dec.																		.03								.02						.05	.85

Period 1904-1948 Total 1948 26.50 27.79

Villa de Santiago, N. L.

Standard gage — Hydraulic Resources

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
Jan.																.08										T				T	T	.08	1.00
Feb.	T	.04				T		.04														.04						.04				.16	.94
Mar.				.98	.45	T				.18	T																.12					1.73	1.03
Apr.						T					T										T	.35										.35	1.66
May			T	.55	.57	.14	T	T			1.13	.08	.39			.10							.16		.08	.06			.26	T	3.52	3.09
June											.20								T				.16	.48	.04			T	.08	.10		1.06	5.44
July	1.84	.49				.35	.11			T						T																2.79	3.30
Aug.	.20					T										1.53	.20	.10									.57	1.93	2.05	.61		7.19	5.49
Sept.									1.93	1.75	.22	.02	.06	1.81	.28	.04			.79		T	.35		.92	.06	.35						8.56	9.24
Oct.							.39	T		.20	.16	4.74	3.42	.06			T	T		.04	1.11	1.12										11.24	5.31
Nov.											T	T																				T	1.53
Dec.																									.08							.08	1.08

Period 1923-1948 Total 1948 36.76 39.11

Villa Allende, N. L.

Standard gage — Hydraulic Resources

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
Jan.				T	T					T		T			T	T									T	T	T	T				T	1.12
Feb.	T	T	T	T	T	T		.18												.10		.44										.72	.84
Mar.		T		.98	.35	T	T			.47										T	T					T	T					1.80	1.11
Apr.										T	T		T	T								T						T				T	2.03
May				2.43	T	.47	T	T			1.83	T	T			T	T	T				.43	T	T	T	T	T	T	T	T		5.16	3.43
June																				T	T	T	.63		1.26	T	T	T	T	.20		2.09	5.97
July	1.40	.87				T			T			T				T	T											T	T	T		2.27	2.97
Aug.	T				.79	T										.57											.11	T	5.38	.52	7.37	5.46
Sept.	T							.71	2.13	.20	T	T	2.41	T	.44		T		.84					1.30	1.61	.63						10.27	7.65
Oct.							.58	T	T	T	2.69	3.82	2.58	.47	T		.34	T	T		1.68	1.15		T	T							13.11	5.97
Nov.									T	T	T	T	T																			T	1.54
Dec.														T		T	T							.18	T	T						.18	1.15

Period 1938-1948 Total 1948 42.97 39.04

Rayones, N. L.

Standard gage — Hydraulic Resources

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
Jan.																															T	T	.52
Feb.																																0	.48
Mar.			T	.17	.47															.14												.78	.33
Apr.												.06										.59										.65	.68
May				.68	.14			.15			.43														.34		.34	T			.08	2.16	1.46
June																					.21	.11			.21			T	T			.53	2.38
July							T				.44	.01						.17														.62	1.28
Aug.	.60				.40												.50										.95		3.16	.44		6.05	3.65
Sept.									1.25	.43			.39	.17				.24			.22	T			.26							2.96	3.01
Oct.																		.94	.45													1.39	1.79
Nov.																																0	.41
Dec.																																0	.32

Period 1926-1948 Total 1948 15.14 16.31

Los Ramones, N. L.

Recording gage — Hydraulic Resources

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
Jan.														T											T							T	.95
Feb.	.28	.04	T		T															.06	T	.33										.71	.63
Mar.			.02	.82	.14					.04																						1.02	.66
Apr.																						.20								T		.20	2.17
May				.39							1.18	.10	T												T							1.67	2.04
June																					.95						.39	.55		T		1.89	3.43
July	.28	T				T	T				T					.02	.08	.04				T								.82		1.24	2.14
Aug.		.08			T								1.66	1.10	T													.71	.35	1.54		2.68	4.28
Sept.	.55							T	4.92				T					T		.39	.04					T						8.66	4.37
Oct.							.08				2.36						.71				.08	.79										4.02	2.45
Nov.											T	T	.06	T																		.06	.37
Dec.																T	T									T						T	.39

Period 1939-1948 Total 1948 22.19 23.88

* Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES–1948

Montemorelos, N. L.

Standard gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.							T					T			T	T									T	.08	.08	.04				.20	.94
Feb.	.04	.08	.19		T	.04	T	.12												.10	.04	.04	T									.65	.87
Mar.			T	1.06	.55	T				.22	T	T								T							T					1.83	1.08
Apr.							T															.43										.43	2.12
May			T	.26	T	.96					1.31	.03	.26			2.36							.07	T	T	.28		.56		T		6.11	2.88
June																					2.96								T	.76		3.72	4.07
July	1.43	.81									.04						.29									.10						2.67	2.29
Aug.	T	.19						.13	1.37	.08	.08	.07	2.94	.35	.22	.49	.10										.50	1.58	1.02	1.90	T	5.78	4.03
Sept.	T							.04	T	.04	1.69	.20	2.99	.13	T	T	.13	T	T	.13	2.46	1.58	T	T	.96	.47	T					8.31	5.14
Oct.							.22						.05	T	T										T							9.61	3.33
Nov.						T									T		T					T			T	.04	T					.05	1.74
Dec.																																.04	1.08

Period 1904-1948 Total 1948 39.40 29.57

Las Comitas, N. L.

Standard gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.												.08				.24												.01				.33	.49
Feb.	.16																															.16	.32
Mar.				.40	.43																											.83	.34
Apr.											.04											.67										.71	.95
May				.31			.01		.01				.43										.01	.03	.01			.02				.83	.82
June																				.02	.20	.43	.10	.73	.80	.76		.04	.09	.13		3.32	3.38
July	.31					.19	.08				.03	.05				.05	.33			.02								.25	.02		.06	1.39	1.69
Aug.		.07			.48											.09			.01								.33	.71	1.38	.98	.13	3.98	4.74
Sept.	.09								3.07	.28	.01	.74	.11						.03		.04	.09				.24	.37					5.07	5.20
Oct.							.01		.03	.07	.07	.05	.19			.13					.10	.23	.07	.01	.02							.98	2.11
Nov.												.02																				.02	.44
Dec.															.01																	.01	.66

Period 1940-1948 Total 1948 17.63 21.14

Las Enramadas, N. L.

Standard gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.																																0	1.14
Feb.																				T	T	.26										.26	.62
Mar.			T	.43	.24					T										T												.67	.62
Apr.																						.18										.18	1.37
May				.77	T						1.75	2.18											T			.91		T		.49		6.10	3.44
June																					1.44		T					T	.12	T		1.56	3.69
July	.20					.12	.20					.75										.86								.39		2.52	2.62
Aug.					T																							.22	1.20	T		1.42	3.33
Sept.	.43							T	4.03	.20			2.15	5.26						.57												12.64	5.35
Oct.												.65	T	.26							.65	1.06										2.62	2.30
Nov.											T	T	.08	T																		.08	.68
Dec.															T																	T	.85

Period 1926-1948 Total 1948 28.05 25.99

El Cuchillo, N. L.

Standard gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.				T			T	T															T			T					.02	.02	1.25
Feb.	.30	.06	T	T	T	T														T		.05	T									.41	.45
Mar.			.02	.54	.12	T	T														.06			T								.74	.43
Apr.												1.38										.73										2.11	1.14
May				.19							.77	.19	.26										.06		1.25	.06						2.78	1.88
June																					.70	T	.13						2.22	.02		3.07	2.56
July		.02					.74					.40					.11			.01											.91	2.19	1.79
Aug.		T			.16				7.88	T																		1.12	.98	.95		3.21	3.07
Sept.											.01	.17	.57	.71				.11														9.49	4.10
Oct.							.28	T			.09	T					.23				.20	2.12										2.98	2.21
Nov.											T	T	.04	T												T						.04	.34
Dec.			T												T		T			T	T					.04	.01					.05	.48

Period 1938-1948 Total 1948 26.99 19.90

Gral Bravo, N. L.

Standard gage — Meteor. Serv. of Mex.

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 or Inches	Normal or Average
Jan.					T										T						T										T	T	.87
Feb.	T					T		.20	T	T												.78							T			.98	.37
Mar.				1.18				T		T										T												1.18	.60
Apr.				T							.79										1.57	T										2.36	1.22
May			T							.79	T	T													2.77	T						3.56	2.82
June																					.83	T	T					1.69	T			2.52	2.85
July			.88			.80						.41	.20	.06	T		T													2.60		4.98	2.80
Aug.			.65	T		.41									T	T	T										.30	.20	3.20			4.74	2.37
Sept.									2.38		T	T					.40															2.78	3.66
Oct.						T	T		.79	T			T			.41	T			3.16	.80	T										5.16	1.56
Nov.			T	T						T	T					.20	.52	.09														.61	.89
Dec.	T																															T	.94

Period 1906-1948 Total 1948 28.84 20.93

Laguna de Sánchez, N. L.

Recording gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.												T				.33												T				.33	.81
Feb.	.23																					.10										.33	.53
Mar.			.30	.68																												.98	.34
Apr.										.14	.06	T										.23										.43	1.38
May			T	.63	T	T	T						T			.77							.12	T	.27	.26	T		T		T	2.05	1.65
June											T										.18	T	.27	1.73	.20	T		.80	T	.26		3.44	3.81
July	.39					.26	.14					1.17				.37	T												T	.39	T	2.72	3.41
Aug.		.16			.81		.28									.22	.12	.10									1.53	1.41	.79	.98	.14	6.54	5.82
Sept.	.49							T	3.40	.65	.26	.57	.71	.14				T				.55			.79	.22						7.78	6.12
Oct.							T			.51	.18	T	.76		T	.14	T	.10			.27	.67	.18			.12						2.93	2.86
Nov.											.18	T																				.18	.44
Dec.																																0	.58

Period 1941-1948 Total 1948 27.71 27.75

Higueras, N. L.

Standard gage — Meteor. Serv. of Mex.

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 or Inches	Normal or Average
Jan.						.10				.08		T			T										.12			.12			.08	.50	.91
Feb.	.27	.05	T			.01														.12	.02	.12			.05				T			.64	.59
Mar.				1.02	.40					.10																						1.52	.59
Apr.									T													.45							T	.18		.63	1.18
May				.11						T	1.54	.75	.18										.01		.06	.85		T				3.50	1.80
June																				T	.14		.79	.19	1.50	1.92		.51	.73	.04		5.82	2.83
July	.19	.32					.26									T	.10					.08								1.21		2.25	2.35
Aug.	.10	.63			.06	.09										.56	.26											.30	T	.48	.24	2.63	3.27
Sept.	.02							.22	3.62			T	1.04	1.38	.30			.29	.31	.27				.18	T	.27						7.90	4.05
Oct.							.04	.02	.06		.58					.13			T	T	.43	1.11	.03									2.40	1.63
Nov.											.06	.03	.07	.09	.08										T							.33	.92
Dec.															T	T									T	T	.09					.09	.80

Period 1906-1948 Total 1948 28.21 21.10

Cerralvo, N. L.

Recording gage — Hydraulic Resources

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 or Inches	Normal or Average
Jan.						.18									.02										.01	.01	T				.11	.33	1.05
Feb.	.65	.01			.01	.02														.08	.01	.23	T									1.01	.52
Mar.				2.22	.34					.01	.01																					2.58	.76
Apr.												.13										.73			.01							.87	1.42
May				.04		1.07					1.52	.10	.21										.12		1.04	.20						4.30	3.83
June																						.19	.53	.03	.03			.18	.85	T		1.81	3.58
July	.11	.40										.12					.17															.80	1.63
Aug.													.88	.53														.39	.28	2.59		3.26	3.92
Sept.	.01							T	11.50	.42	.02							.09	.05	.02					.04							13.56	6.58
Oct.							.13	.04	T		.33	.28				.33				T	.63	.83	T									2.57	2.56
Nov.												T																				T	.45
Dec.																									.01							.01	.94

Period 1938-1948 Total 1948 31.10 26.84

Some months missing

RAINFALL ON THE MEXICAN SIDE OF RIO GRANDE WATERSHED

INCHES–1948

Los Herreras (La Tableta), N. L.

Recording gage — Hydraulic Resources

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
Jan.															T	T									T						.09	.09	.98
Feb.	.47	.05																				.43										.95	.44
Mar.			.06	.79	.23																											1.08	.74
Apr.																						1.20		T								1.20	1.54
May				.79		.10					.26	.68	.30										.14		2.83	.14			.04			5.28	3.21
June																					1.92		1.09					1.63	.79			5.43	3.93
July	T	.05				1.09						.07				.19	.03			.15										.11	T	1.67	1.41
Aug.		.94																										T	.94	1.70	.01	3.59	3.25
Sept.	.01	.01							9.89	.02	.03	.16	.91	.72	T			.20	T	.02		T										11.97	4.73
Oct.						.15	T				.18	.06	T				.53			T	.04	1.26										2.22	2.32
Nov.											T	.01	.01	T																		.02	.43
Dec.															T											.04						.04	.63

Period 1939-1948 Total 1948 33.54 23.63

Linares, N. L.

Recording gage — Hydraulic Resources

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
Jan.			T	T								.16				T									T	.02	.02		T			.20	1.04
Feb.	.20	.07	T			T	.18													.05	.15	.10										.75	.88
Mar.			.01	.35	.88	.02				.27	.04									.02	T				T							1.59	1.04
Apr.																						.44								T		.44	2.41
May			T	.50	T	1.06					1.22	.01	.04			T		T					T	T		.35	.01			.08	.04	3.31	3.56
June																					T								.06	.13		.19	3.93
July	.54	.27				T										.01	.21													.26	T	1.29	3.28
Aug.		T			.28											.93	.09	.04			.05					T		.08	.47	1.14	.04	3.12	3.24
Sept.								.12	7.48	.47	.02	1.30	3.25	.15	.05		T		.01	.10		.01			.21	.06						13.23	6.62
Oct.							.11	.15			1.70	.12	.72			T	.35			.14	1.04	.07										4.40	5.02
Nov.											T	.06	T		T												T					.06	1.35
Dec.																			T							.02						.02	1.06

Period 1900-1948 Total 1948 28.60 31.43

Villagrán, Tamps.

Recording gage — Hydraulic Resources

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
Jan.				.01						.03		T				T	T											.04				.08	.45
Feb.	.08	T	.01					.02												.04	.16	.23			.02				T			.56	.87
Mar.				1.45	.10	T				.14	.04									T												1.73	.68
Apr.										.14												.98										1.12	1.92
May			.06	1.24	.16	.16		.35			1.84		.04	T				T	T					.04	T	T	.63		.16	.31	.16	4.55	5.41
June												.35																	T	2.52		2.87	5.21
July	.24						.14									1.57	.10														1.97	4.02	2.36
Aug.	.24				.12											.16	.36	T						T				.12	.98	.30	.08	2.36	7.28
Sept.								T	8.27	T	.04	.63	1.50	.04	.04		.10	.12	T	.79	.04	.02		.35	.47	.86						13.27	6.70
Oct.							1.34	.10		.10	2.21	1.14	1.81	1.22	.02	.02	.39	T		.12	1.65	.06	.04									10.22	4.04
Nov.												.03		.08	.06																	.17	1.03
Dec.															.02											.04						.06	.25

Period 1939-1948 Total 1948 41.01 36.20

Méndez, Tamps.

Standard gage — Hydraulic Resources

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
Jan.						T																					T					T	1.46
Feb.	.59	T						T													T	.16										.75	.64
Mar.	T			.32	T					T	T																					.32	.71
Apr.																						.44										.44	1.26
May				T							5.44												.17		.53							6.14	3.99
June																					T		T						.41	.16		.57	3.27
July	.26																															.26	.97
Aug.		.14																									.22	.49	.66	1.67		3.18	4.00
Sept.								T	.79	1.57		.08	.12	.59				.26				T										3.41	3.72
Oct.									.16	T	.16	.55	.12	.49			.66				T	T										2.14	1.57
Nov.												.08	.08														T					.16	.30
Dec.																									T	T						T	.66

Period 1939-1948 Total 1948 17.37 22.55

Campamento Comales, Tamps.

Recording gage — Hydraulic Resources

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
Jan.															.02											T						.02	.99
Feb.	2.62	.06				.05														.05	.03	.61	.06									3.48	.62
Mar.																																1.64	.88
Apr.																						.29										.29	1.38
May			.05	1.34	.25																				.28	.06						.34	2.06
June																					.84		T					.06	.89			1.79	2.41
July	.03																														.04	.07	1.01
Aug.				.10												.03													1.91	1.75		3.79	3.26
Sept.								.02	4.96	4.06	.12	T	.17			.18		.22	.01													9.74	3.18
Oct.							.22				.02	.02					.97					.14	.09									1.46	1.84
Nov.												.01	T	T																		.01	.48
Dec.						T										T	T									T	T					T	1.00

Period 1938-1948 Total 1948 22.63 19.11

Reynosa, Tamps.

Recording gage — Hydraulic Resources

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
Jan.				T														T						T	T	T					.65	.65	1.52
Feb.					T	T	T														T	.50										.50	.47
Mar.	T		.18	.76																												.94	.67
Apr.																				T	T	.31										.31	.56
May					T						T						T		T					.88	.55							1.43	3.04
June																					T							.59	T	T		.59	2.16
July	.38	.08															T	T														.46	1.54
Aug.																							.22					.37	.84			1.43	2.02
Sept.																																	3.11
Oct.																																	1.59
Nov.																																	.70
Dec.																																	.94

No record available for September, October, November, and December.

Period 1941-1948 Total 1948 18.32

Control (C I-K-9), Tamps.

Standard gage — Hydraulic Resources

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
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.20	---	---	---	---	---	---	.58	---	---	---	.16	---	---	.94	1.84
Jan.																																.83	.76
Feb.	.24																				.59	.59										.87	.44
Mar.	.28																															.0	.67
Apr.																																4.06	3.67
May					.08						.16							.22						3.19	.41			.22				.22	2.40
June																																	
July			.39														.79			.32												1.50	1.17
Aug.			.79																									.98	.12			1.89	3.78
Sept.														.59	.83		.31						.67				.16					2.56	4.04
Oct.												.16			.08																	.24	1.84
Nov.												.65					1.65															2.28	1.08
Dec.																																0	.69

Period 1942-1948 Total 1948 15.39 22.38

Matamoros, Tamps.

Standard gage — * Hydraulic Resources

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
Jan.							T									.04		.05	T	T					.58	.38	.01		.06			1.12	1.69
Feb.	.04	.75	.04			T		T				T									.18	.02	.41	T								1.45	.97
Mar.		T		.07	.02			.04	T		T		T									.35						T				.48	1.07
Apr.													.17	T						T					.02							.02	1.51
May				T								.77		T		T	T	.05						.12	.19	.73						2.03	2.97
June								T													.01	T							T	.27		.28	3.45
July	.02		T							.71	T	T					.50	.39		T	.01											1.63	2.21
Aug.		.24	.16			T	.12				.10							.37									.06	.36	1.88	.89	.02	4.10	2.06
Sept.		.04						.30	1.52	1.80	1.23			.14			1.58	.02		.04	.02	.01		.29	.50							7.49	5.11
Oct.									T		.10	.09	.28		.16		.68					.02	.10	.01						T		1.44	2.86
Nov.	T								T		T	T	.02	.02	T	T												.06				.10	1.50
Dec.													T	T		.01			T						.10		T					.11	1.91

Period 1912-1948 Total 1948 20.25 27.27

Some months missing * Record for October, November, and December from Meteorological Service of Mexico

EVAPORATION IN THE RIO GRANDE BASIN
IN INCHES

Two general types of land pans are being used for observing evaporation in the Rio Grande Basin below San Marcial, New Mexico.

1. Standard "Class A" pan of the Weather Bureau - Circular pan 4 feet in diameter and 10 inches deep, made of 22-gage galvanized iron, set on wooden platform with top of pan 18 inches above ground. Water in pan kept 7 to 9 inches deep. Measurements by micrometer hook gage. This type of pan is used at Jornada, Elephant Butte Dam, Caballo Dam, State College, Ysleta, Balmorhea (Weather Bureau), Grandfalls, Fort Stockton, Del Rio, Dilley, and Laredo for all of which the Weather Bureau furnished the records. This type of pan is also used at Dryden where it is maintained by the U.S. Section of the International Boundary and Water Commission. At Mexican stations the pans are of this type; however, the pan at La Boquilla is made of copper, set upon concrete pillars, with the water kept 5 to 8 inches deep, and the pan at Palestina is set on a platform 3 feet above the ground, with the water kept 4 to 9 inches deep. The records for Mexican stations are furnished by the Meteorological Service of Mexico and the Ministry of Hydraulic Resources.

2. Standard B.P.I. pan - Circular pan 6 feet in diameter and 24 inches deep, made of 22-gage galvanized iron, set in ground with top of pan 4 inches above ground. Water in pan kept 16 to 18 inches deep. Measurements by micrometer hook gage. This type of pan is used at Balmorhea (A. & M. College).

A variation of this type is used at Weslaco where the pan is 8 feet in diameter, set with the top about 9 inches above ground and with the water kept 12 to 18 inches deep.

The exposure of the water in these pans to wind is very different with respect to the rim of the pan and also with respect to surroundings. For example, the pan at Elephant Butte Dam is on top of a desert hill while the pan at Weslaco is in an irrigated orchard with large trees within about 30 feet of the pan. The area around the pan at Dryden is flat and bare for more than 100 feet on all sides, whereas the pan at Palestina has mesquite brush on three sides just outside a fence of horizontally spaced boards.

In The United States

Month	Elephant Butte Dam, N. M.		Caballo Dam, N. M.		Jornada, N. M.		State College, N. M.		Ysleta, Texas	
	1948	Normal 1933-48	1948	Average 1942-48	1948	Normal 1938-48	1948	Normal 1924-48	1948	Normal 1939-48
Jan.	3.64	3.19	3.02	3.19	2.74	2.52	3.23	2.96	3.12	2.93
Feb.	4.52	5.10	5.32	5.35	5.08	4.19	4.22	4.47	4.47	4.62
Mar.	9.28	8.76	8.49	8.86	7.04	7.31	7.32	7.60	8.15	8.45
Apr.	14.02	12.29	14.20	12.44	10.06	10.41	11.46	9.85	12.20	11.09
May	16.51	15.23	14.75	15.64	11.39	13.06	14.16	11.81	13.45	13.40
June	15.98	17.03	15.58	16.96	12.08	14.43	14.22	12.95	14.17	13.68
July	15.20	14.45	13.82	13.96	11.41	12.67	14.09	11.81	12.91	12.37
Aug.	14.66	12.73	14.08	12.16	10.29	10.74	12.77	10.25	12.12	10.64
Sept.	12.17	10.07	11.61	10.29	8.52	8.64	9.90	8.28	9.42	8.57
Oct.	7.84	7.89	7.50	7.32	5.12	6.02	6.90	6.17	6.67	6.19
Nov.	5.59	5.03	5.44	4.97	3.36	3.67	4.60	3.94	4.87	3.94
Dec.	4.52	3.30	3.69	3.07	2.28	2.32	2.97	2.66	4.57	3.03
Total	123.93	115.07	117.50	114.21	89.37	95.98	105.84	92.75	106.12	98.91

Month	Dryden, Texas		Balmorhea, Texas Texas A. & M.		Balmorhea, Texas Weather Bureau		Grandfalls, Texas	
	1948	Average 1944-1948	1948	Normal 1926-1948	1948	Average 1940-1948	1948	Average 1940-1948
Jan.	3.84	3.98	2.02	2.30	2.51	2.42	3.11	3.37
Feb.	5.14	5.75	2.63	3.21	3.30	3.72	4.77	5.03
Mar.	11.02	10.33	5.61	5.14	7.18	6.32	10.13	8.64
Apr.	14.69	13.06	7.48	6.38	9.99	8.25	14.30	12.01
May	17.23	14.24	8.98	7.52	11.01	9.39	14.04	13.10
June	19.19	16.18	9.70	8.15	12.36	10.03	17.46	13.99
July	16.59	15.94	9.32	7.90	10.57	9.92	15.79	13.65
Aug.	16.93	16.18	8.67	7.13	11.42	9.14	15.78	12.78
Sept.	11.76	11.52	6.78	5.42	8.56	6.80		9.22
Oct.	6.71	6.94	4.19	4.16	5.53	5.06		7.01
Nov.	6.93	5.46	3.80	2.90	4.56	3.36		4.52
Dec.	5.47	4.32	2.80	2.07		2.45		3.00
Total	135.50	123.90	71.98	62.28		76.86		106.32

EVAPORATION IN THE RIO GRANDE BASIN IN INCHES

In The United States

Month	Fort Stockton, Texas		Del Rio, Texas		Dilley, Texas		Laredo, Texas		Weslaco, Texas	
	1948	Average 1940-1948	1948	Average 1946-1948	1948	Normal 1928-1948	1948	Average 1946-1948	1948	Normal 1932-1948
Jan.	2.95	3.33	3.54	2.82	3.47	2.79	4.43	3.59	2.35	2.30
Feb.	4.19	4.87	2.70	4.48	2.95	3.44	3.29	5.08	1.85	2.79
Mar.	9.21	8.66	7.73	7.92	6.25	6.08	7.54	9.06	4.66	4.25
Apr.	12.96	10.98	10.88	9.63	9.69	7.46	13.02	11.83	6.54	5.21
May	13.46	12.55	11.88	9.89	10.70	8.20	12.39	11.04	5.54	5.84
June	15.67	13.56	12.89	10.99	13.26	9.68	16.60	13.81	7.25	6.55
July	13.83	13.21	11.10	12.17	10.67	10.72	15.73	15.90	6.96	6.96
Aug.	14.77	11.76	12.56	12.22	11.12	10.65	15.20	13.62	7.19	6.70
Sept.		9.25	8.27	8.74	7.64	7.64	8.66	9.75	4.87	4.78
Oct.		6.65	5.58	6.34	4.90	5.83	6.20	7.84	4.08	4.41
Nov.		4.51	4.60	4.41	4.13	3.64	6.69	5.96	4.51	3.33
Dec.		3.70	3.45	3.24	3.15	2.65	4.65	3.95	3.66	2.42
Total		103.03	95.18	92.85	87.93	78.78	114.40	111.43	59.46	55.54

In Mexico

Month	San Antonio, Durango		La Junta, Chih.		Villalba, Chih.		La Boquilla Dam, Chih.		Delicias, Chih.		Palestina, Coah.	
	1948	Average 1943-48	1948	Normal 1936-48	1948	Average 1940-48	1948	Normal 1938-48	1948	Average 1940-48	1948	Normal 1931-48
Jan.	4.07	4.51	2.54	2.69	4.75	5.15	4.76	4.08	3.00	3.65	8.65	5.60
Feb.	8.12	6.86	4.29	3.83	8.61	7.33	7.40	5.93	5.06	5.31	8.44	4.97
Mar.	11.48	10.43	6.98	6.36	12.63	11.60	10.83	9.60		8.71	9.78	7.27
Apr.	10.70	11.21	9.70	9.03	13.44	13.74	13.07	11.64	9.31	9.96	10.93	8.52
May	11.83	12.07	11.15	10.87	15.42	15.54	14.54	13.84	11.13	11.73	11.36	9.57
June	10.19	10.92	9.94	10.35	13.70	14.40	13.72	13.63	10.50	11.91	10.87	10.80
July	7.31	8.17	8.61	7.33	10.83	11.32	12.28	11.27	10.83	10.52	11.79	11.39
Aug.	9.37	7.94	6.94	6.21	10.68	9.69	11.19	9.56	10.99	8.74	9.51	11.46
Sept.	6.59	6.19	5.29	5.36	7.91	7.64	7.71	7.47	7.46	7.50	9.57	9.34
Oct.	5.51	5.61	4.34	4.77	5.87	6.90	6.18	6.35	5.18	5.96	5.33	8.07
Nov.	5.11	5.05	3.35	3.35	4.39	5.67	5.30	4.77	4.04	4.36	5.44	6.65
Dec.	4.30	3.99	2.30	2.47	4.47	4.52	4.57	3.63	3.31	3.46	4.22	5.70
Total	94.58	92.95	75.43	72.62	112.70	113.50	111.55	101.77		91.81	105.89	99.34

Month	Sabinas, Coah.		Don Martín, Coah.		Lag. De Salinillas, N. L.		Cd. Anahuac, N. L.		Monterrey, N. L.		Montemorelos, N. L.	
	1948	Average 1941-48	1948	Normal 1927-48	1948	Normal 1936-48	1948	Normal 1933-48	1948	Normal 1921-48	1948	Average 1941-48
Jan.	2.02	2.91	2.86	3.50	3.16	3.83	2.77	2.56	4.11	4.02	2.74	2.65
Feb.	2.25	3.58	3.19	4.24	3.37	4.99	2.76	3.49	5.06	4.84	3.21	3.04
Mar.	5.61	6.68	6.16	7.34	6.76	8.27	6.46	6.24	7.26	6.70	5.78	5.65
Apr.	9.63	10.00	8.81	9.05	8.83	10.28	9.09	7.91	10.23	7.67	8.63	5.95
May	10.27	10.80	8.80	10.38	8.50	10.80	9.39	8.90		8.50	6.69	6.50
June	11.77	12.16	9.42	11.91	9.57	11.44		10.25		9.28	9.45	7.64
July	8.40	11.98	9.27	12.38	9.09	12.16	10.93	11.10	13.91	10.23	9.02	8.84
Aug.		12.26	10.26	11.99	9.15	11.31	10.28	10.78	12.02	9.26	9.33	8.52
Sept.		7.78	5.46	8.34	5.34	8.20	6.13	7.15	6.85	5.49	4.56	5.56
Oct.		5.84	3.84	6.26	3.49	6.42	4.57	5.35		4.30	2.80	3.70
Nov.		3.72	3.55	4.24	4.06	4.83		3.43	4.18	3.71	2.97	2.67
Dec.		2.38	2.92	3.26	3.04	3.63	3.09	2.45	4.04	3.48	3.05	2.44
Total		90.09	74.54	92.89	74.36	96.16		79.61		77.48	68.23	63.16

Month	El Cuchillo, N. L.		Saltillo, Coah.		Los Herreras, N. L.		Cienaga De Flores, N. L.		Comalos, Tamps.		Control (C-1-K-9), Tamps.	
	1948	Average 1940-48	1948	Normal 1929-48	1948	Average 1941-48	1948	Average 1941-48	1948	Normal 1938-48	1948	Average 1942-48
Jan.	4.75	4.10	3.94	4.90	4.02	3.68	4.47	3.86	3.71	4.08	1.83	2.83
Feb.	5.07	5.19	7.52	5.36	3.96	4.49	4.87	4.57	4.15	5.67	2.81	3.05
Mar.	8.80	8.65	9.47	7.86	7.44	7.83	6.42	7.20	7.60	8.90	4.21	5.06
Apr.	9.10	9.95	10.26	9.35	10.94	8.89	8.26	8.04	13.30	10.99	7.62	6.74
May	10.70	10.90	9.96	9.39	9.49	9.32	8.94	8.97	11.48	12.09	7.41	7.52
June	10.61	12.08	8.59	9.86	8.87	9.79	9.54	9.46	15.55	13.88	7.41	7.63
July	14.45	14.12	6.52	8.78	12.61	11.59	9.17	10.39	13.83	15.31	7.66	8.49
Aug.	13.84	13.20	8.51	8.38	11.95	11.10	9.67	9.92	13.30	13.91	8.15	8.33
Sept.	8.50	9.06	4.51	6.65	7.27	7.36	6.12	6.77	8.46	9.81	5.49	6.38
Oct.	4.94	6.56	3.82	6.02	4.85	5.65	4.44	4.89	5.91	7.81	4.51	5.69
Nov.	5.54	4.95	5.12	5.01	4.62	4.45	4.68	4.42	6.40	5.72	4.05	4.24
Dec.	5.92	4.41	6.70	5.26	4.89	4.16	4.09	3.18	4.46	4.39	3.53	3.48
Total	102.22	103.17	84.92	86.82	90.91	88.31	80.67	81.67	108.15	112.56	64.68	69.44

TEMPERATURE, HUMIDITY, AND WIND AT DRYDEN EVAPORATION STATION

The temperature and humidity at Dryden Evaporation Station are recorded continuously by a hygrothermographic instrument housed in a low-louvered insulated shelter at the level of and about 6 feet from the evaporation pan. The total miles of wind movement are indicated by a standard 3-cup anemometer, installed and operated according to specifications for a Class A Weather Bureau evaporation station. The hygrothermograph and anemometer, furnished by the U.S. Weather Bureau, began operating in June 1947. The mean temperature and humidities below are integrated from the continuous record.

Month	Mean Temperature Degrees Fahrenheit		Mean Relative Humidity Percent		Mean Wind Miles per Hour	
	1948	Average 1947-1948	1948	Average 1947-1948	1948	Average 1947-1948
January	43.3		50.1		5.1	
February	51.2		56.6		5.5	
March	59.1		38.6		6.3	
April	74.0		41.2		6.1	
May	77.5		46.6		6.6	
June	84.5		37.8		6.0	
July	82.1	83.4	45.9	46.2	5.9	5.6
August	84.3	81.8	39.1	48.4	5.0	5.2
September	75.0	76.4	41.5	45.0	4.4	3.8
October	65.0	69.9	49.5	53.6	4.0	4.1
November	* 53.3	54.5	* 34.9	45.1	4.4	4.2
December	51.5	50.6	41.2	51.6	3.5	3.8
Annual	66.8		43.6		5.2	

* Partly estimated

DRAINAGE BASIN AND IRRIGATED AREAS
Along the Rio Grande and Tributaries—1948

The total area within the outer rim of the Rio Grande Basin is about 335,500 square miles; however, in many places, particularly along the southwestern boundary of the basin, large areas contribute no surface run-off to the Rio Grande. Such non-contribution areas constitute about 48.8% of the total area, leaving 171,887 square miles of productive watershed. Only the productive part of the watershed is included in the list below.

The irrigated areas shown below are listed according to the downstream sequence of the points of diversion of their irrigation water and consequently, they may or may not be wholly within the indicated main river or tributary reach. They are all within the Rio Grande Basin except in the Lower Rio Grande Valley below the Rio Grande City gaging station where water is diverted at numerous points to irrigate lands which are adjacent to, but do not contribute surface run-off to the Rio Grande. All of the areas listed are equipped with irrigation facilities. In the United States all areas were irrigated in 1948; in Mexico the areas classed as "Secondary" are those for which water is available only after the water requirements of the "Primary" areas have been satisfied.

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin—Square Miles			Irrigated Areas—Acres			
	In		Total	In			Total
	United States	Mexico		United States	Mexico		
					Primary	Secondary	
Above San Marcial Gaging Station	24,717	0	24,717	726,400	0	0	726,400
San Marcial Station to El Paso Station	4,550	0	4,550	100,483	0	0	100,483
Above El Paso Gaging Station	29,267	0	29,267	826,883	0	0	826,883
El Paso Station to American Dam	4	0	4	0	0	0	0
Above American Dam	29,271	0	29,271	826,883	0	0	826,883
American Dam to Juárez Station	41	47	88				
Above Juárez Gaging Station	29,312	47	29,359				
Juárez Station to Island Station	146	472	618				
Above Island Gaging Station	29,458	519	29,977				
Island Station to County Line Station	485	186	671				
American Dam to County Line - total	672	705	1,377	55,955			
Above County Line Gaging Station	29,943	705	30,648	882,838			

DRAINAGE BASIN AND IRRIGATED AREAS

Along the Rio Grande and Tributaries—1948

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin-Square Miles			Irrigated Areas—Acres			
	In		Total	In			Total
	United States	Mexico		United States	Mexico		
					Primary	Secondary	
County Line Station to Fort Quitman	663	679	1,342	17,695			
Above Fort Quitman Gaging Station	30,606	1,384	31,990	900,533	51,644		952,177
Fort Quitman Station to La Nutria	1,041	886	1,927	1,989	6,425		8,414
Above La Nutria Gaging Station (Inactive)	31,647	2,270	33,917	902,522	58,069		960,591
La Nutria to Upper Presidio Station	580	503	1,083	1,629	9,143		10,772
Above Upper Presidio Gaging Station	32,227	2,773	35,000	904,151	67,212		971,363
Rio Conchos above Boquilla Dam	0	7,322	7,322	0	2,965	0	2,965
Rio Conchos below Boquilla Dam	0	17,419	17,419	0	171,984	12,108	184,092
Rio Conchos - total	0	24,741	24,741	0	174,949	12,108	187,057
Upper to Lower Presidio Station - excluding Rio Conchos	21	5	26	*822	0	0	822
Upper to Lower Presidio Station - total	21	24,746	24,767	822	174,949	12,108	187,879
Above Lower Presidio Gaging Station	32,248	27,519	59,767	904,973	242,161	12,108	1,159,242
Alamito Creek above Gaging Station	1,504	0	1,504	340	0	0	340
Terlingua Creek above Gaging Station	1,070	0	1,070	188	0	0	188
Lower Presidio to Johnson Ranch Station - excluding Alamito and Terlingua Creeks	1,439	2,671	4,110	3,457	3,460	1,977	8,894
Lower Presidio Station to Johnson Ranch Station - total	4,013	2,671	6,684	3,985	3,460	1,977	9,422
Above Johnson Ranch Gaging Station	36,261	30,190	66,451	908,958	245,621	14,085	1,168,664
Johnson Ranch Station to Boquillas	471	3,735	4,206	0	0	0	0
Above Boquillas Gaging Station (Inactive)#	36,732	33,925	70,657	908,958	245,621	14,085	1,168,664
Boquillas to Langtry Station	6,123	2,595	8,718	23	0	0	23
Above Langtry Gaging Station	42,855	36,520	79,375	908,981	245,621	14,085	1,168,687
Pecos River above Girvin	29,562	0	29,562	● 230,300	0	0	230,300
Pecos River, Girvin to IBWC Gaging Station	5,731	0	5,731	## 2,719	0	0	2,719
Pecos River above IBWC Gaging Station	35,293	0	35,293	233,019	0	0	233,019
Goodenough Spring above Gaging Station	1	0	1	0	0	0	0
Devils River above IBWC Gaging Station	4,185	0	4,185	0	0	0	0
Las Vacas Arroyo above Gaging Station	0	160	160	0	742	494	1,236
Langtry to Del Rio - excluding above tributaries	416	2,495	2,911	122	0	0	122
Langtry to Del Rio - total	39,895	2,655	42,550	233,141	742	494	234,377
Above Del Rio Gaging Station	82,750	39,175	121,925	1,142,122	246,363	14,579	1,403,064
San Felipe Creek above Gaging Station	46	0	46	808	0	0	808
Pinto Creek above Gaging Station	236	0	236	50	0	0	50
Rio San Diego above Gaging Station	0	916	916	0	16,555	0	16,555
Rio San Diego - total	0	926	926	0	17,791	988	18,779
Rio San Rodrigo above Gaging Station	0	591	591	0	3,707	3,213	6,920
Rio San Rodrigo - total	0	842	842	0	6,178	3,954	10,132
Del Rio to Eagle Pass - excluding above tributaries	1,213	314	1,527	22,051	2,471	3,212	27,734
Del Rio to Eagle Pass - total	1,495	2,082	3,577	22,909	26,440	8,154	57,503
Above Eagle Pass Gaging Station	84,245	41,257	125,502	1,165,031	272,803	22,733	1,460,567
Rio Escondido above Gaging Station	0	1,279	1,279	0	6,178	8,649	14,827
Rio Escondido - total	0	1,320	1,320	0	6,178	8,649	14,827
Eagle Pass to El Jardín - excluding Rio Escondido total	736	1,485	2,221	1,611	247	0	1,858
Eagle Pass to El Jardín - total	736	2,805	3,541	1,611	6,425	8,649	16,685
Above El Jardín Dam Site	84,981	44,062	129,043	1,166,642	279,228	31,382	1,477,252
El Jardín to Laredo - total	737	1,079	1,816	7,165	1,235	0	8,400
Above Laredo Gaging Station	85,718	45,141	130,859	1,173,807	280,463	31,382	1,485,652
Rio Salado above Venustiano Carranza Dam	0	13,819	13,819	0	54,363	8,896	63,259
Rio Salado above Gaging Station	0	21,528	21,528	0	112,927	19,027	131,954
Laredo to Zapata - excluding Rio Salado	1,097	942	2,039	12,040	988	0	13,028
Laredo to Zapata - total	1,097	22,470	23,567	12,040	113,915	19,027	144,982
Above Zapata Gaging Station	86,815	67,611	154,426	1,185,847	394,378	50,409	1,630,634
Rio Alamo above Gaging Station	0	1,675	1,675	0	4,942	5,437	10,379
Zapata to Roma - excluding Rio Alamo	1,032	315	1,347	4,791	0	0	4,791
Zapata to Roma - total	1,032	1,990	3,022	4,791	4,942	5,437	15,170
Above Roma Gaging Station	87,847	69,601	157,448	1,190,638	399,320	55,846	1,645,804
Rio San Juan above Marte Gómez Dam	0	12,473	12,473	0	102,549	67,212	169,761
Rio San Juan - total	0	12,679	12,679	0	153,946	67,212	221,158
Roma to Rio Grande City - excluding Rio San Juan	678	181	859	1,974	0	0	1,974
Roma to Rio Grande City - total	678	12,860	113,538	1,974	153,946	67,212	223,132
Above Rio Grande City Gaging Station	88,525	82,461	170,986	1,192,612	553,266	123,058	1,868,936
Rio Grande City to Hidalgo	415	430	845		0	0	
Above Hidalgo Gaging Station	88,940	82,891	171,831		553,266	123,058	
Hidalgo to Matamoros	26	26	52		63,753	0	
Above Matamoros Gaging Station	88,966	82,917	171,883		617,019	123,058	
Matamoros to Lower Brownsville Station	2	2	4		0	0	
Rio Grande City to Lower Brownsville Station	443	458	901	586,020	63,753	0	649,773
Above Lower Brownsville Gaging Station	88,968	82,919	171,887	1,778,632	617,019	123,058	2,518,709
Lower Brownsville Station to the Gulf of Mexico				3,500			
Above Gulf of Mexico				1,782,132			

* Includes 50 acres supplied from well # Operated as a "Special Station in Big Bend Area" during April and May 1948
Includes 2,242 acres supplied from wells ● Includes 111,500 acres supplied chiefly from wells