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WESTERN WATER BULLETIN 1961

Flow of The Colorado River and other Western Boundary Streams and Related Data

COLORADO RIVER

TIJUANA RIVER

SANTA CRUZ RIVER

WHITEWATER DRAW

1961

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FOREWORD

This bulletin is the second annual compilation of stream discharges and other hydrographic data relating to the international aspects of the Colorado River below Imperial Dam, the Tijuana River and other streams crossing the western land boundary. The compilation was prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission, and includes data relating to stream flow and kindred subjects for the Colorado River from Imperial Dam to the Gulf of California, the Tijuana River and its important tributaries in the United States and Mexico, and other streams, including the Alamo and New Rivers which cross the California-Baja California boundary, and the Santa Cruz River and Whitewater Draw which cross the Arizona-Sonora boundary. This volume contains the information for the year 1961.

Stream gaging on the Colorado River below Imperial Dam began in 1902 when the station at Yuma, Arizona was established. Stage records have been obtained at this station since January 1878. Continuous stream gaging on the Tijuana River and its important tributaries in the United States and in Mexico began in 1936. Each government operates the gaging stations located within its own country.

Colorado River below Imperial Dam

Below Imperial Dam, the Colorado River flows southward 10 miles to the mouth of the Gila River, thence westward 11 miles to Pilot Knob Mountain, and south 1 mile to the point where the northerly international land boundary, between California and Baja California, intersects the river. From this point the river continues to flow southward and forms the boundary between the United States and Mexico for a distance of about 22 miles to the point where the southerly international land boundary between Arizona and Sonora intersects the river. From this point the river continues to flow southward about 90 miles to discharge into the Gulf of California.

The ordinary flows of Colorado River below Imperial Dam are largely controlled by releases at Hoover Dam, completed in 1935. The releases are further regulated at Davis Dam, completed in 1950, and by Parker and Imperial Dams, completed in 1938. Small amounts of runoff may occasionally be contributed to the flow in the lower river from the usually dry arroyos draining the 10,900 square miles along the river from Hoover Dam to the mouth of the Gila River, not including 5,500 square miles in the Bill Williams River watershed. In addition, flows ranging from usually minor amounts to infrequent torrential floods may enter the lower Colorado River from the Bill Williams River and from the Gila River draining about 7,300 square miles below Painted Rock Dam and Reservoir, completed in January 1960.

At Imperial Dam diversions are made to All-American Canal and Gila Gravity Main Canal for irrigation projects in Arizona, including the Yuma Valley, Gila and Wellton-Mohawk projects, and in California, including the Imperial Valley, Coachella Valley and Reservation Division of Yuma Project. Also, under the provisions of the 1944 Water Treaty, there may be diverted to the All-American Canal at Imperial Dam for delivery to Mexico in the Alamo Canal, or substitute canal, at the northerly boundary, a portion of Mexico's guaranteed annual allotment of waters of the Colorado River. No such diversions were made in 1961.

Below Laguna Dam, measured and unmeasured flows are returned to the river principally as waste and drainage water from the irrigation projects in the United States. The measured return flows include Yuma Main Canal Wasteway, Reservation Main Canal Drain No. 4, Drain 8-B, and Pilot Knob Power Plant and Wasteway entering the river between Yuma and the northerly international boundary, and Cooper, Eleven-Mile, and Twenty-One Mile Wasteways entering the limitrophe section from the United States bank of the river. Waste and drainage waters from irrigation projects in the United States also cross the boundary into Mexico near San Luis, Arizona without returning to the river in the United States.

In the limitrophe section of the river, 1.1 miles downstream from the northerly boundary, Morelos Dam, the principal diversion structure for Mexico, was completed and placed in operation on November 8, 1950. Since that date all of Mexico's guaranteed treaty allotment of Colorado River water has been delivered in the limitrophe section of the river. The greater portion of such deliveries has been diverted to the Alamo Canal at Morelos Dam.

Tijuana River Basin

The total drainage area of the Tijuana River basin is 1,731 square miles of which 27 percent lies in the United States and 73 percent in Mexico. This river is formed by the principal tributaries, Cottonwood Creek, which rises in the United States and Río de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 21 miles from the Pacific Ocean to join the Río de las Palmas in Mexico. From the confluence of these tributaries, the Tijuana River flows northwesterly 5 miles to cross the land boundary into the United States near San Ysidro, California, and Tijuana, Baja California, and then flows westerly 6 miles to discharge into the Pacific Ocean 2 miles north of the boundary. The flow of Cottonwood Creek is partially controlled by Barrett and Morena Reservoirs in the United States and the flow of the Río de las Palmas is partially controlled by Rodriguez Reservoir in Mexico.

Whitewater Draw near Douglas, Arizona

Whitewater Draw rises in the United States and flows south into Mexico crossing the international boundary near Douglas, Arizona, eventually discharging into the Gulf of California through the Yaqui River in Mexico. The total drainage area above the Douglas Gaging Station is 1,023 square miles. A number of mountain streams in the upper reaches of the basin are diverted for irrigation but they would normally sink or go to groundwater before reaching the main water course.

Santa Cruz River Near Nogales and Lochiel, Arizona

The Santa Cruz River rises in the United States and flows south into Mexico crossing the international boundary near Lochiel, Arizona, and returns to the United States near Nogales, Arizona, eventually discharging into the Gila River southwest of Phoenix, Arizona. The drainage area of the Santa Cruz River above Nogales station is 533 square miles. Of this amount, 349 square miles lie in Mexico. There are a few ground water irrigation diversions above the Lochiel station in Arizona and an unknown amount of water diverted for irrigation in Mexico.

FOREWORD–Continued

Acknowledgments

Other agencies which have contributed to the data published here include the Bureau of Reclamation and the Geological Survey of the U. S. Department of the Interior; the U. S. Weather Bureau, Department of Commerce; the Yuma County Water Users' Association, the Imperial Irrigation District, the city of San Diego, California, the California Water and Telephone Company, and the Ministry of Hydraulic Resources of Mexico. Specific notation is made of each of the above-named agencies, where the data appear. The courtesy and cooperation of those who have made these contributions are acknowledged with our appreciation.

Units of Measure

Records of stream flow collected by the Mexican Section are initially computed in metric units, but are reported in this bulletin in equivalent English units. Conversion of the mean daily discharges, the monthly average discharge and the monthly volumes from metric to English units is direct. For this reason the monthly average discharge in cubic feet per second and monthly volumes in acre-feet shown for gaging stations operated by the Mexican Section cannot necessarily be obtained in the usual manner from the total monthly flow in second-foot days.

GENERAL HYDROLOGIC CONDITIONS FOR 1961

Colorado River

Normally there is no measurable amount of runoff from the portion of the Colorado River basin below Hoover Dam, not including Bill Williams and Gila Rivers. There was no significant amount in 1961. The average seasonal (October 1960-September 1961) rainfall over the upper basin as gaged at 13 index stations was about 14.72 inches as compared to a seasonal average of about 13.76 inches for the 39 seasons 1923-1961. The inflow to Lake Mead formed by Hoover Dam, during the 1961 calendar year was about 7,739,100 acre-feet measured at Grand Canyon or about 63% of the 39-year (1923-1961) average annual inflow of 12,202,106 acre-feet. There was a flow of 6,330 acre-feet contributed to the lower Colorado River during 1961 from the Bill Williams River and 11,790 acre-feet from the Gila River.

The flow of the Colorado River reaching Imperial Dam totaled 6,293,000 acre-feet, about 68% of the 27-year average (1935-1961) of 9,247,603 acre-feet. At the northerly international boundary the total flow of the river during 1961 was 1,671,923 acre-feet or about 35% of the 1935-1961 average of 4,744,002 acre-feet. At the southerly boundary the flow during 1961 was only 176,867 acre-feet or about 4% of the 1935-1961 average of 4,131,564 acre-feet.

The total scheduled treaty waters of the Colorado River delivered to Mexico during 1961 amounted to 1,500,000 acre-feet pursuant to the annual schedules by months for 1961 furnished by Mexico. All deliveries were made in the limitrophe section of the Colorado River in accordance with the request of Mexico.

The total of all flows of the Colorado River entering Mexico in 1961 amounted to 1,838,760 acre-feet, 33% of the 1935-1961 average of 5,534,947 acre-feet, as measured 1) in the Colorado River at the northerly international boundary, 2) in the wasteways that discharge into the limitrophe section of the river from the United States bank, and 3) in the canal which discharges waste and drainage waters from the Yuma Project across the southerly land boundary into Mexico near San Luis, Arizona, less diversions in the United States by pumps in the limitrophe section.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1961. A maximum instantaneous flow of 7,470 second-feet occurred in the Colorado River at the northerly boundary station.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 20,248,600 acre-feet, 68% of the usable capacity of 29,636,000 acre-feet. The greater part (18,025,000 acre-feet) of the storage was contained in Lake Mead. There were no reported shortages of Colorado River water for irrigation during 1961 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1961 was 964,000 acres; 629,000 acres in the United States and 335,000 acres in Mexico.

The suspended sediment load passing the northerly boundary station in 1961 was 145 acre-feet which was about 24% of the 1956-1961 average of 610 acre-feet.

Tijuana River Basin

The year 1961 was one of very low rainfall and the ninth consecutive year of runoff below the 1936-1937 to 1960-1961 mean. It was the fourteenth dry year in the past sixteen years. Temperatures in the Tijuana River basin averaged somewhat below normal during the year, being 1.2 degrees below the long-term mean at Barrett Dam.

Rainfall at Barrett Dam in the upper portion of the basin was 7.90 inches, 45% of normal, and at San Diego near the lower end of the basin it was 4.61 inches or only 42% of normal.

Runoff in the basin for 1961 averaged less than 3% of average. Above Morena Reservoir the runoff was 80 acre-feet or about 1% of the 25-year 1936-1937 to 1960-1961 mean of 6,466 acre-feet. At Rodriguez Reservoir the runoff was 536 acre-feet or about 2% of the 25-year mean of 20,140 acre-feet. There has been no flow in the Tijuana River at Nestor since February 11, 1960.

Combined storage in the three reservoirs in the basin was 2,175 acre-feet at the beginning of the year and 1,554 acre-feet at the end averaging 1,864 acre-feet, or about 1% of the combined capacity of 206,040 acre-feet.

Stored water in Rodriguez Reservoir in 1961 was inadequate for domestic use and no water from the reservoir has been used for irrigation since December 1955. There were no diversions from Morena and Barrett Reservoirs, which are a part of the city of San Diego water supply system, during 1961.

Whitewater Draw

During 1961 the average annual temperature over the watershed was about normal, while the annual precipitation was about 114% of normal. Runoff for the year at the gaging station near Douglas, Arizona, of 1,740 acre-feet was about 24% of average and the fourth lowest annual discharge for the 1936-1961 period.

Santa Cruz River

During 1961 the average annual temperature over the watershed was somewhat below normal and the annual precipitation was about 94% of the 23-year 1939-1961 mean. Runoff measured at the Nogales gaging station where the stream reenters the United States was 12,090 acre-feet. The total runoff for the year measured at the gaging station near Lochiel, Arizona, where the stream enters Mexico from the United States was 909 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 11,181 acre-feet from the loop of the river lying in Mexico, or approximately 92% of the flows reaching the Nogales station.

GENERAL HYDROLOGIC CONDITIONS FOR 1961–Continued

Alamo and New Rivers

During 1961 the average annual temperature over the drainage area of Alamo and New Rivers as recorded at El Centro, California, was 2.1 degrees below normal and the annual precipitation was about 64% of the long-term mean. The total flow in the Alamo River for the year at the international boundary was 1,795 acre-feet which was about 32% of average for the 19-year period 1943-1961. The total flow for 1961 in the New River at the international boundary was 115,031 acre-feet which was about 208% of the 1943-1961 average.

Salton Sea

During 1961 the average annual temperature around the Salton Sea was about 103% of the long-term average while the annual precipitation recorded at Brawley, California, was approximately 60% of the long-term mean of 2.46 inches. The water surface of the Salton Sea rose approximately 0.3 foot during the year. The maximum stage, 233.8 feet below mean sea level, was recorded on several days during April and May 1961. The minimum stage, 234.6 feet below mean sea level, was recorded on several days during January, October, and November 1961.

COLORADO RIVER AT YUMA, ARIZONA - DISCHARGES

DESCRIPTION: Water-stage recorder and cableway 500 feet upstream from lower highway bridge, 7 miles upstream from the northerly international land boundary, 1,800 feet downstream from the upper highway and railroad bridges at Yuma, Arizona, 5 miles downstream from the mouth of the Gila River, 19 miles downstream from Imperial Dam, and one-half mile upstream from the mouth of the Yuma Main Canal Wasteway. Zero of gage is 102.86 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 46 current meter measurements during the year and a continuous record of gage heights. Computations by shifting control methods. Records collected and furnished by U. S. Geological Survey. 1961 records excellent. Records available: Gage heights, January 1878 through December 1961; discharges, January 1902 through December 1961.

REMARKS: Reservoirs on the Colorado River, including Lake Mead where storage began in 1935, reservoirs on the Gila River, irrigation diversions, and return flows modify the river flow at this station.

EXTREMES: Prior to 1935: Maximum discharge 250,000 second-feet January 22, 1916; maximum gage height 34.00 feet, same date; minimum discharge 18 second-feet August 25-27, 1934; minimum gage height 12.70 feet September 17, 1917; average annual flow 15,094,000 acre-feet; maximum annual flow 25,970,000 acre-feet, 1909; minimum annual flow 2,384,000 acre-feet, 1934. Since 1935: Maximum discharge 34,900 second-feet September 7, 1939; maximum gage height 24.57 feet, same date; minimum discharge 41 second-feet March 8, 1956; minimum gage height 8.36 feet July 16, 1947.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	791	2,010	877	1,140	623	1,440	969	917	1,160	777	793	625
2	673	1,880	999	1,210	627	1,480	889	987	841	730	793	643
3	776	869	866	1,220	629	1,540	857	1,150	851	757	811	813
4	783	638	1,000	1,150	628	1,680	787	1,350	869	757	817	641
5	674	614	1,140	1,160	757	1,740	774	1,270	937	770	811	577
6	641	599	827	1,180	999	1,800	1,030	1,210	888	727	799	589
7	615	536	763	1,230	658	1,700	1,090	1,200	847	701	799	595
8	623	518	965	1,080	778	1,340	1,100	1,190	818	800	791	565
9	915	549	1,320	1,080	705	1,330	1,100	1,170	839	806	811	649
10	1,420	555	1,390	1,080	653	1,380	1,180	1,230	818	781	835	751
11	1,310	911	1,380	1,080	676	1,460	1,200	1,210	819	811	835	787
12	1,320	691	1,460	1,080	646	1,560	1,180	1,220	813	787	829	685
13	1,270	513	1,040	1,120	572	1,570	1,100	1,220	840	773	891	733
14	750	448	1,080	1,080	599	1,750	1,110	1,200	868	761	947	732
15	740	532	1,130	1,100	637	1,730	1,050	1,160	953	757	898	1,070
16	652	531	1,110	1,110	809	1,490	913	1,150	888	765	823	1,040
17	584	560	1,090	995	860	1,180	980	1,220	873	811	805	982
18	528	552	1,090	1,620	688	1,120	967	1,190	919	805	739	769
19	581	567	1,130	1,650	638	1,350	1,010	1,210	774	835	793	727
20	563	797	1,110	1,470	854	1,500	1,030	1,050	946	805	787	673
21	593	1,140	1,090	1,130	907	1,040	1,000	893	865	787	757	673
22	565	986	1,040	845	932	808	1,000	850	828	823	763	1,110
23	602	907	1,050	754	996	772	991	867	771	842	799	871
24	634	760	1,070	716	986	1,030	1,220	844	759	835	811	737
25	768	592	1,080	583	992	855	1,260	856	754	829	747	899
26	1,490	602	1,080	641	960	1,050	1,130	842	767	843	736	864
27	1,170	581	1,030	643	898	1,100	1,150	843	990	905	770	670
28	1,980	665	1,080	623	1,020	1,020	1,160	894	852	891	648	655
29	2,050		1,100	612	1,250	1,000	1,110	881	782	912	571	703
30	2,050		1,120	637	1,370	1,020	1,070	888	814	805	713	781
31	2,010		1,110		1,340		1,010	873		793		685
Sum	30,121	21,103	33,617	31,019	25,687	39,835	32,417	33,035	25,743	24,781	23,722	23,294

Current Year 1961 — Period 1935-1961

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	12.81	10.30	†29	2,050	18	528	972	59,740	513,708	1,615,000	40,490
Feb.	12.39	10.40	1	2,010	14	448	754	41,860	451,118	1,321,000	24,330
Mar.	12.00	10.99	12	1,460	7	763	1,084	66,680	450,640	1,097,000	29,760
Apr.	12.16	10.72	19	1,650	25	583	1,034	61,530	334,761	759,900	61,530
May	11.78	10.60	30	1,370	13	572	829	50,950	376,594	1,137,000	36,270
June	12.28	11.10	6	1,800	23	772	1,328	79,010	349,396	1,376,000	46,850
July	11.68	11.00	25	1,260	5	774	1,046	64,300	314,506	818,600	64,300
Aug.	11.80	10.46	4	1,350	26	842	1,066	65,520	317,742	938,800	29,480
Sept.	11.47	10.67	1	1,160	25	754	858	51,060	314,856	1,198,000	40,310
Oct.	11.09	10.61	29	912	7	701	799	49,150	330,938	1,233,000	27,340
Nov.	11.08	10.45	14	947	29	571	791	47,050	392,964	1,418,000	30,990
Dec.	12.24	10.46	22	1,110	8	565	751	46,200	491,611	1,789,000	34,970
Yearly	12.81	10.30		2,050		448	943	683,000	4,638,834	11,730,000	683,000

† And other days Ø Mean daily

COLORADO RIVER AT YUMA, ARIZONA - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.00	12.37	11.22	11.58	10.79	11.79	11.38	11.00	11.38	10.83	10.78	10.74
2	10.86	12.25	11.37	11.70	10.78	11.85	11.33	11.09	10.98	10.75	10.78	10.77
3	11.05	11.08	11.20	11.71	10.79	11.90	11.30	11.29	11.03	10.77	10.81	11.08
4	11.07	10.72	11.39	11.60	10.78	12.05	11.17	11.53	11.06	10.77	10.82	10.74
5	10.89	10.69	11.60	11.60	10.98	12.08	11.13	11.42	11.20	10.81	10.81	10.53
6	10.82	10.66	11.17	11.59	11.28	12.12	11.43	11.33	11.11	10.72	10.79	10.55
7	10.76	10.55	11.03	11.66	10.78	12.01	11.52	11.30	10.98	10.70	10.79	10.56
8	10.78	10.53	11.33	11.51	10.96	11.60	11.55	11.27	10.88	10.86	10.80	10.50
9	11.07	10.59	11.73	11.52	10.83	11.60	11.58	11.25	10.90	10.87	10.83	10.63
10	11.58	10.59	11.81	11.50	10.75	11.68	11.65	11.31	10.87	10.81	10.85	10.79
11	11.45	11.14	11.82	11.50	10.78	11.79	11.66	11.29	10.87	10.85	10.85	10.85
12	11.46	10.80	11.93	11.49	10.75	11.87	11.63	11.31	10.84	10.81	10.84	10.68
13	11.47	10.55	11.41	11.54	10.64	11.88	11.55	11.31	10.88	10.80	10.93	10.76
14	10.82	10.43	11.45	11.51	10.70	12.07	11.57	11.29	10.91	10.80	11.01	10.78
15	10.80	10.58	11.53	11.55	10.77	12.04	11.50	11.24	11.03	10.79	10.95	11.34
16	10.54	10.57	11.52	11.57	11.05	11.78	11.33	11.23	11.05	10.78	10.85	11.22
17	10.42	10.64	11.49	11.41	11.12	11.41	11.40	11.30	11.03	10.82	10.83	11.14
18	10.32	10.62	11.49	11.96	10.87	11.36	11.37	11.26	11.08	10.81	10.72	10.82
19	10.41	10.67	11.57	11.99	10.80	11.65	11.44	11.29	10.83	10.85	10.82	10.75
20	10.39	11.12	11.54	11.76	11.14	11.82	11.45	11.12	11.06	10.80	10.82	10.66
21	10.44	11.60	11.50	11.42	11.18	11.38	11.42	10.90	10.95	10.77	10.78	10.66
22	10.39	11.39	11.44	11.12	11.24	11.18	11.42	10.83	10.89	10.83	10.80	11.36
23	10.46	11.26	11.43	11.05	11.32	11.14	11.44	10.85	10.81	10.86	10.87	11.10
24	10.53	11.05	11.46	10.98	11.29	11.49	11.54	10.81	10.80	10.85	10.90	10.92
25	10.86	10.77	11.48	10.75	11.30	11.27	11.45	10.85	10.79	10.84	10.84	11.18
26	11.83	10.79	11.49	10.84	11.26	11.51	11.30	10.82	10.82	10.88	10.91	11.15
27	11.47	10.75	11.42	10.82	11.20	11.57	11.31	10.80	11.14	10.95	10.96	10.81
28	12.35	10.90	11.48	10.76	11.36	11.43	11.33	10.89	10.94	10.93	10.69	10.75
29	12.43		11.50	10.75	11.60	11.42	11.28	10.87	10.85	10.96	10.54	10.83
30	12.42		11.52	10.83	11.72	11.44	11.24	10.90	10.92	10.80	10.86	10.96
31	12.37		11.52		11.68		11.14	11.06		10.78		10.80
Avg.	11.08	10.92	11.48	11.39	11.05	11.67	11.41	11.13	10.96	10.82	10.83	10.85

RESERVATION CANAL MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

DESCRIPTION: Water-stage recorder, 500 feet north of the U. S. Highway No. 80 culvert, one-half mile upstream from the mouth of the canal, and 1 mile northwest of Yuma, Arizona. Discharge measurements are made from a footbridge immediately below the gage. The drainage canal discharges into the outfall channel of the Yuma Main Canal Wasteway, and thence into the Colorado River on the right bank 6.5 miles upstream from the northerly international land boundary, and one half mile below the Yuma gaging station. Prior to December 31, 1955, published as California Drainage Canal near Yuma, Arizona.

RECORDS: Based on 52 current meter measurements during the year and a continuous record of gage heights. Records are computed and furnished by the U. S. Bureau of Reclamation. Records available: Monthly discharge, January 1913 to April 1920, October 1921 to March 1925, and January 1934 to September 1947; daily and monthly discharge, October 1947 through December 1961.

REMARKS: Reservation Canal Main Drain No. 4 collects drainage and waste water from the Reservation Division of the Yuma Project, located in California. The drain discharges to the river by gravity, except during high stages of the Colorado River, when pumping is necessary. Average annual flow prior to 1937 was 12,800 acre-feet. Monthly and annual averages since 1937 are shown in the table below.

EXTREMES: Prior to 1937: Maximum annual flow 20,190 acre-feet, 1916; minimum annual flow 8,920 acre-feet 1913.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	58	61	58	67	54	70	77	76	74	68	67	55
2	55	59	71	59	55	66	74	76	68	64	65	49
3	62	58	68	58	56	69	70	86	74	68	57	48
4	65	60	61	62	61	68	73	82	68	66	56	48
5	56	57	64	60	61	61	74	81	75	85	54	56
6	52	55	61	62	66	61	73	73	76	70	52	62
7	57	60	61	63	64	72	75	71	70	62	74	57
8	53	67	66	65	58	75	77	83	69	63	70	50
9	52	57	71	59	60	70	77	94	72	60	70	50
10	67	56	74	63	66	62	70	76	69	73	64	49
11	56	57	59	67	64	67	78	74	65	70	57	49
12	54	64	58	62	80	62	83	73	70	75	57	61
13	50	60	55	63	71	71	77	71	69	72	57	57
14	52	52	57	64	66	66	77	70	77	64	69	59
15	56	62	60	64	60	60	80	72	67	57	59	56
16	51	66	72	56	70	64	73	77	64	55	68	52
17	62	60	73	56	73	66	72	80	75	67	60	51
18	59	56	63	63	67	73	76	89	73	74	59	50
19	60	57	59	68	70	69	80	78	71	68	56	49
20	57	57	57	68	68	66	73	76	74	61	54	47
21	53	56	60	69	61	73	69	69	73	56	68	47
22	60	59	65	68	56	71	74	80	68	56	68	46
23	58	63	67	63	61	67	77	87	73	57	57	46
24	61	58	64	61	62	70	69	76	68	74	55	46
25	56	72	62	64	64	68	68	72	73	76	52	45
26	68	59	63	69	61	64	78	74	65	71	51	47
27	71	55	62	71	65	73	70	68	66	60	51	46
28	65	57	61	75	58	66	75	65	69	61	67	44
29	55		62	68	56	71	78	72	71	56	60	44
30	55		69	60	57	76	70	72	77	56	60	44
31	59		68		63		68	69		76		45
Sum	1,795	1,660	1,971	1,917	1,954	2,037	2,305	2,362	2,123	2,041	1,814	1,555

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1937-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			27	71	13	50	57.9	3,560	3,389	4,780	877
Feb.			25	72	14	52	59.3	3,290	3,211	4,320	563
Mar.			10	74	13	55	63.6	3,910	3,881	5,240	1,240
Apr.			28	75	† 16	56	63.9	3,800	3,929	5,250	1,160
May			12	80	1	54	63.0	3,880	4,026	5,590	992
June			30	76	15	60	67.9	4,040	3,861	5,580	885
July			12	83	† 25	68	74.4	4,570	4,216	6,550	816
Aug.			9	94	28	65	76.2	4,680	4,161	6,810	861
Sept.			† 14	77	16	64	70.8	4,210	3,990	6,220	889
Oct.			5	85	16	55	65.8	4,050	3,992	5,740	1,040
Nov.			7	74	† 26	51	60.5	3,600	3,735	5,490	994
Dec.			6	62	† 28	44	50.2	3,080	3,639	4,960	966
Yearly				94		44	64.5	46,670	46,030	63,700	12,840

Current Year 1961

† And other days Ø Mean daily

YUMA MAIN CANAL WASTEWAY TO COLORADO RIVER AT YUMA, ARIZONA

DESCRIPTION: The wasteway receives water from the Yuma Main Canal at the check structure on the canal, 1,645 feet above the intake of the Colorado River siphon and 3.2 miles below the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side one-half mile downstream from the Yuma gaging station, and 6.5 miles upstream from the northerly international land boundary.

RECORDS: Discharge is computed as the difference between the measured discharge of the Yuma Main Canal at the Siphon Drop Power Plant upstream and that of the same canal below the Colorado River siphon, with deductions for small irrigation diversions from the canal between the two gaging stations. 1961 records good, except those below 100 second-feet, which are poor. Records obtained and furnished by U. S. Geological Survey. Records available: April 1913 through December 1961.

REMARKS: The wasteway discharges to the river the flow in excess of irrigation water in the Yuma Main Canal. This excess flow, in addition to the irrigation water, was diverted from the All-American Canal into the Yuma Main Canal and utilized for power purposes at the Siphon Drop Power Plant.

EXTREMES: Prior to 1935 when storage began in Lake Mead: Average annual flow, 297,800 acre-feet; maximum annual flow, 913,700 acre-feet, 1932; minimum annual flow, 114,900 acre-feet, 1917. Since 1935: Maximum mean daily discharge, 2,020 second-feet, December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	446	1,440	1,120	1,430	862	972	1,130	86	345	215	81	544
2	788	1,470	1,110	1,680	760	1,200	1,530	89	496	152	88	541
3	943	858	1,160	1,700	794	1,250	1,650	153	746	70	82	846
4	1,020	289	1,270	1,500	734	1,260	1,410	136	777	79	50	498
5	960	353	1,580	1,310	705	1,130	1,260	61	1,030	111	104	53
6	869	316	1,480	1,020	388	1,040	935	59	945	98	50	50
7	765	288	1,210	1,080	550	1,060	993	30	506	142	40	77
8	803	357	1,350	1,250	440	1,060	1,080	30	106	114	143	42
9	388	416	1,140	1,360	438	1,120	1,370	86	102	113	117	40
10	25	350	1,140	1,230	479	1,290	1,180	174	111	55	49	40
11	25	223	1,280	1,200	491	1,380	1,070	152	163	60	49	40
12	25	244	1,390	1,200	607	1,150	1,030	190	103	50	40	40
13	496	544	1,230	1,180	689	1,110	1,080	216	90	136	40	50
14	859	470	1,200	1,280	775	1,100	1,180	180	88	257	40	132
15	836	528	1,290	1,400	815	1,050	1,210	147	77	302	52	626
16	159	491	1,440	1,440	871	1,030	1,290	172	872	159	53	55
17	121	613	1,430	1,330	848	1,010	1,130	150	884	50	40	57
18	80	574	1,420	1,260	914	1,200	1,050	106	766	55	40	40
19	89	715	1,590	1,170	992	1,360	1,100	143	487	55	40	60
20	151	1,240	1,540	988	1,050	1,290	1,060	312	359	65	40	52
21	151	1,470	1,430	1,090	802	1,210	1,070	326	401	55	40	45
22	128	1,360	1,350	1,140	963	1,050	1,120	269	350	50	40	231
23	178	1,150	1,160	1,120	923	1,130	1,310	241	395	50	65	615
24	274	1,120	1,260	1,030	816	1,140	493	189	399	55	40	625
25	958	1,070	1,350	982	859	1,220	75	354	388	50	221	625
26	1,410	1,090	1,450	949	873	1,150	100	277	380	132	694	620
27	1,470	1,060	1,260	800	1,200	1,110	53	127	303	55	653	326
28	1,510	1,120	1,220	635	1,280	929	50	251	253	50	187	40
29	1,570		1,210	687	966	962	99	242	353	40	40	40
30	1,500		1,230	931	975	954	198	389	415	40	439	40
31	1,400		1,310		982		132	756		47		40
Sum	20,397	21,219	40,600	35,372	24,841	33,917	28,438	6,093	12,690	2,962	3,657	7,130

Current Year 1961 — **Period 1935-1961**

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			29	1,570	† 10	25	658	40,460	81,422	110,700	14,450
Feb.			† 2	1,470	11	223	758	42,090	70,233	89,140	24,900
Mar.			19	1,590	2	1,110	1,310	80,530	76,353	90,190	7,100
Apr.			3	1,700	28	635	1,179	70,160	75,324	86,580	26,040
May			28	1,280	6	388	800	49,270	76,840	88,280	48,440
June			11	1,380	28	929	1,131	67,270	72,804	86,960	53,590
July			3	1,650	28	50	917	56,410	75,885	91,220	56,410
Aug.			31	756	† 7	30	197	12,090	76,122	89,890	12,090
Sept.			5	1,030	15	77	423	25,170	70,654	83,660	25,170
Oct.			15	302	† 29	40	95.5	5,880	71,292	90,050	5,880
Nov.			26	694	† 7	40	122	7,250	71,621	101,500	7,250
Dec.			3	846	† 9	40	230	14,140	79,756	108,800	13,480
Yearly				1,700		25	650	470,720	898,306	1,042,850	470,720

† And other days Ø Mean daily

DRAIN NO. 8-B (ARAZ DRAIN)

DESCRIPTION: This drain discharges into the Colorado River 4.5 miles downstream from the Yuma gaging station and 2.5 miles upstream from the northerly international boundary. Prior to October 1955, published as Araz Drain.

RECORDS: Computed by Bureau of Reclamation from 51 current meter measurements by Imperial Irrigation District at a footbridge one-fourth mile above the mouth. Daily discharge records furnished by the U. S. Geological Survey. Records available: May 1948 through December 1961.

REMARKS: Drain 8-B, which was constructed in February 1948, collects seepage water in the westerly section of the Reservation Division of the Yuma Project which lies in California. Flow in the drain between the mouth and the U. S. Highway No. 80 culvert, about 3,200 feet upstream, is affected by backwater from the river during ordinary high stages.

EXTREMES: Mean daily discharge: Maximum, 24 second-feet on September 1, 1953; minimum, less than 1 second-foot during March and April 1948.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7	7	7	6	7	6	8	7	7	9	7	7
2	7	7	7	6	6	6	8	8	7	9	7	7
3	7	7	7	6	6	6	8	8	7	9	7	7
4	7	7	7	6	6	6	8	8	7	8	7	7
5	7	7	7	6	6	6	8	8	7	8	7	7
6	7	6	6	6	6	6	8	8	7	8	7	7
7	7	6	6	6	6	6	7	8	7	8	6	7
8	7	6	6	6	6	5	7	8	7	7	6	7
9	7	6	6	6	6	5	7	8	7	7	6	7
10	6	6	6	6	6	6	7	8	7	7	6	7
11	6	6	7	6	6	6	8	8	7	7	6	7
12	6	7	7	6	6	6	8	8	7	6	6	7
13	6	7	7	6	6	6	8	8	7	6	6	6
14	6	7	7	6	6	7	8	8	7	6	6	6
15	6	7	8	6	6	7	8	8	7	6	6	6
16	6	7	8	6	6	7	8	8	8	6	7	6
17	6	7	8	7	6	7	8	8	8	7	7	6
18	6	7	8	7	6	7	8	8	8	7	7	6
19	6	6	7	7	6	7	8	8	8	7	7	6
20	6	6	7	7	6	7	8	8	8	7	7	6
21	6	6	7	7	6	7	7	8	9	7	6	6
22	6	6	7	7	6	7	7	8	9	7	6	6
23	6	6	7	7	6	7	7	7	9	7	6	6
24	6	6	7	7	6	7	7	7	9	8	6	6
25	7	6	7	7	6	7	7	7	9	8	6	6
26	7	6	7	7	6	7	7	7	9	8	6	6
27	7	6	7	7	6	7	7	7	9	8	6	6
28	7	7	8	7	6	8	7	7	9	7	7	6
29	7		8	7	6	8	7	7	9	7	7	6
30	7		8	7	6	8	7	7	9	7	7	6
31	7		8		6		7	7		7		6
Sum	202	181	220	194	187	198	233	238	235	226	194	198

Month	Current Year 1961 Extreme Gage Feet High	Extreme Gage Feet Low	Ø Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1948-1961 Acre-Feet Average	Maximum	Minimum
Jan.			† 1	7	† 10	6	6.5	401	565	899	307
Feb.			† 1	7	† 6	6	6.5	359	487	746	278
Mar.			†15	8	† 6	6	7.1	436	580	853	353
Apr.			†17	7	† 1	6	6.5	385	615	1,000	379
May			1	7	† 2	6	6.0	371	607	966	61
June			†28	8	† 8	5	6.6	393	633	1,030	89
July			† 1	8	† 7	7	7.5	462	731	1,260	139
Aug.			† 2	8	† 1	7	7.7	472	807	1,350	228
Sept.			†21	9	† 1	7	7.8	466	767	1,370	258
Oct.			† 1	9	† 12	6	7.3	448	782	1,220	399
Nov.			† 1	7	† 7	6	6.5	385	702	1,240	357
Dec.			† 1	7	† 13	6	6.4	393	650	1,050	341
Yearly				9		5	6.9	4,970	7,926	12,429	1,872

† And other days Ø Mean daily

PILOT KNOB POWER PLANT AND WASTEWAY NEAR PILOT KNOB, CALIFORNIA

DESCRIPTION: The Pilot Knob power plant and wasteway is located on the All-American Canal, 20.8 miles downstream from the intake at Imperial Dam, 6 miles west of Yuma, about one mile north of the northerly international boundary and empties into the Alamo Canal in the United States and thence into Colorado River through Rockwood gates. Water-stage recorder is located on right bank of the All-American Canal, 550 feet upstream from wasteway gates and 1,800 feet from entrance of the power plant. Tailrace gate is on left bank, 680 feet below power plant with automatic recording equipment in control house. All bypass gates are equipped with calibrated openings which are read on all gate changes. Datum of forebay and tailrace gage is at mean sea level; elevation of sill of wasteway gates is 147.88 feet, U. S. C. & G. S. datum. Prior to October 1956, this station published as Pilot Knob Wasteway near Pilot Knob, California.

RECORDS: Daily discharge is computed from flowmeter equipment and head and openings on wasteway gates or from head and gate opening on wicket and wasteway gates. Records furnished by the U. S. Geological Survey. Records available: July 1944 to December 1961. The wasteway was operated for the purpose of diverting Colorado River water to the Alamo Canal for use in Mexico from July 1944 to November 8, 1950, in accordance with arrangements between the United States and Mexico for emergency use of the All-American Canal facilities. Records since 1950 show water released through Pilot Knob power plant and wasteway from the All-American Canal and returned to the Colorado River through Rockwood gates.

REMARKS: Pilot Knob wasteway was completed in 1938 and the first flow occurred on February 5, 1939. Pilot Knob power plant was completed in January 1957 and the first flow occurred on January 14, 1957.

EXTREMES: Maximum mean daily discharge, 8,350 second-feet on January 26, 1958; minimum mean daily discharge, no flow during long periods.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	2,410	0	2,200	0	0	1,130	3,420	0	0	0	0
2	0	1,300	0	2,140	0	0	1,680	3,370	0	0	0	0
3	0	77	0	1,760	0	0	1,880	3,020	0	0	0	0
4	0	0	0	1,300	0	0	1,830	3,800	0	0	0	0
5	0	0	0	1,470	0	0	2,070	3,740	0	0	0	0
6	0	0	0	1,550	0	0	1,800	3,770	0	0	0	0
7	0	0	0	1,600	0	0	1,810	3,140	465	0	0	0
8	0	0	0	1,470	0	0	1,560	3,210	1,140	0	0	0
9	0	0	0	1,470	0	0	1,650	3,120	1,120	0	0	0
10	0	0	0	1,530	0	0	1,600	2,990	1,000	0	0	0
11	0	0	0	1,630	0	0	1,770	2,880	1,470	0	0	0
12	0	0	87	1,640	0	0	1,550	2,320	1,500	0	0	0
13	0	0	1,090	1,580	0	0	1,240	2,320	1,350	0	0	0
14	0	0	1,160	1,430	0	0	1,260	2,170	1,390	0	0	0
15	0	0	1,310	1,320	0	0	1,180	1,850	1,250	0	0	1,570
16	0	0	1,500	1,140	0	0	1,180	2,020	0	0	0	1,590
17	0	0	1,440	1,090	0	0	1,240	1,940	0	0	0	1,170
18	0	0	1,360	0	0	0	1,230	1,720	0	0	0	1,090
19	0	0	1,370	0	0	0	1,200	1,560	0	0	0	1,040
20	0	0	1,420	0	0	434	1,160	1,580	0	0	0	991
21	0	0	1,660	0	0	1,130	1,150	1,770	0	0	0	0
22	0	0	1,640	0	0	1,100	1,170	1,430	0	0	0	0
23	0	0	1,690	0	0	1,130	1,170	1,940	0	0	0	0
24	0	0	1,670	0	0	1,170	1,700	1,950	0	0	0	0
25	0	0	1,430	0	0	1,110	2,040	908	0	0	0	0
26	0	0	1,400	0	0	1,100	2,300	1,030	0	0	0	0
27	0	0	1,650	0	0	1,110	2,540	1,430	0	0	0	0
28	1,960	0	1,660	0	0	1,120	2,800	1,560	0	0	0	0
29	3,090		1,820	0	0	1,110	2,460	1,520	0	0	0	0
30	3,710		1,830	0	0	1,110	2,560	732	0	0	0	0
31	3,540		2,040		0		3,030	0		0		0
Sum	12,300	3,787	29,227	26,320	0	11,624	52,940	68,210	10,685	0	0	7,451

Month	Current Year 1961 — Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1944-1961 — Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			30	3,710	† 1	0	397	24,400	44,252	400,200	0
Feb.			1	2,410	† 4	0	135	7,510	14,047	149,500	0
Mar.			31	2,040	† 1	0	943	57,970	40,224	279,300	0
Apr.			1	2,200	†18	0	877	52,200	81,832	260,900	0
May				0		0	0	0	28,181	165,400	0
June			24	1,170	† 1	0	387	23,060	66,088	204,300	0
July			31	3,030	1	1,130	1,708	105,000	109,276	260,000	0
Aug.			4	3,800	31	0	2,200	135,300	113,284	270,100	0
Sept.			12	1,500	† 1	0	356	21,190	72,307	173,300	0
Oct.				0		0	0	0	15,834	51,460	0
Nov.				0		0	0	0	20,289	182,600	0
Dec.			16	1,590	† 1	0	240	14,780	42,541	319,700	0
Yearly				3,800		0	610	441,400	648,155	1,944,700	0

† And other days Ø Mean daily

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank and cableway at the point where the northerly international land boundary (California-Baja California) intersects the Colorado River about 7 miles downstream from the Yuma gaging station, 5 miles west of Yuma, Arizona, 1.1 miles upstream from Morelos Diversion Structure, and about one mile downstream from Rockwood Gate. Zero of gage is at mean sea level, U. S. C. & G. S. datum. Station is operated by the United States Section of the Commission.

RECORDS: Based on 327 current meter measurements during the year, 211 by the United States Section, 103 by the Mexican Section of the Commission, 13 by the United States Geological Survey, and a continuous record of gage heights. Computation by shifting control methods. Discharges are computed on the basis of a water-stage recorder located 1,680 feet upstream from the northerly international boundary where the remains of an old weir serve as a partial controlling section. A continuous gage height record is available November 15, 1948 to December 31, 1961; daily discharge records available January 1, 1950 through December 1961.

REMARKS: Reservoirs on the Colorado River, including Lake Mead above Hoover Dam, where storage began in 1935, reservoirs on the Gila River, and many irrigation diversions and return flows regulate the river flow at this station except for infrequent flood flows. During 1961, the flow at this point represented the total amount of Colorado River water which crossed the northerly international boundary. The flow at this station plus the flow from the three wasteways from the United States in the limitrophe section of the river, less pump diversions from the United States bank in the limitrophe section, plus the flow delivered across the southerly land boundary near San Luis, make up the total Colorado River water delivered to Mexico under terms of the 1944 Water Treaty.

EXTREMES: Prior to 1935: Maximum instantaneous discharge estimated about 250,000 second-feet, January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 13,443,000 acre-feet; maximum annual flow 25,480,000 acre-feet, 1907; minimum annual flow, 1,174,000 acre-feet, 1934. Since January, 1935: Maximum mean daily discharge, about 33,000 second-feet, February 7, 1942; minimum discharge, no flow during April 1935.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,400	6,130	2,060	4,870	1,640	2,470	3,250	4,460	1,760	1,110	943	1,250
2	1,600	4,730	2,260	4,950	1,480	2,730	4,080	4,390	1,570	1,020	955	1,160
3	1,780	2,280	2,140	4,820	1,540	2,860	4,530	4,340	1,690	920	969	1,710
4	1,880	1,170	2,500	4,070	1,490	3,060	4,080	5,370	1,800	926	958	1,410
5	1,690	1,150	2,820	4,140	1,600	2,980	4,170	5,440	2,040	944	913	822
6	1,620	1,160	2,480	3,900	1,630	2,950	3,800	5,180	1,990	902	910	764
7	1,600	1,070	2,020	3,960	1,430	2,950	3,890	4,470	2,070	890	913	735
8	1,600	1,030	2,370	4,030	1,390	2,470	3,830	4,580	2,190	950	983	700
9	1,520	1,110	2,590	4,060	1,280	2,500	4,120	4,560	2,200	980	976	760
10	1,730	1,090	2,730	3,940	1,340	2,700	4,010	4,420	2,130	920	990	830
11	1,520	1,290	2,800	4,090	1,300	2,860	4,140	4,290	2,630	914	966	872
12	1,480	1,240	2,960	4,060	1,420	2,830	3,920	3,730	2,650	902	924	776
13	1,730	1,220	3,480	4,020	1,330	2,600	3,600	3,730	2,400	941	924	800
14	1,730	1,090	3,530	3,940	1,520	2,850	3,650	3,670	2,430	1,080	1,030	902
15	1,720	1,220	3,770	4,140	1,650	2,880	3,640	3,280	2,420	1,130	1,040	2,970
16	968	1,160	4,020	3,900	1,820	2,570	3,490	3,460	1,800	1,000	965	3,010
17	944	1,370	4,060	3,540	1,880	2,270	3,470	3,440	1,890	932	882	2,440
18	776	1,370	3,970	3,130	1,780	2,260	3,220	3,050	1,920	920	832	2,050
19	758	1,430	4,140	3,050	1,760	2,710	3,460	2,990	1,530	956	888	1,920
20	836	1,950	4,180	2,620	1,960	3,010	3,380	3,010	1,440	908	885	1,910
21	1,040	2,580	4,290	2,360	1,900	3,520	3,290	3,040	1,460	872	838	901
22	944	2,580	4,200	2,080	1,940	3,060	3,370	2,640	1,380	920	825	1,270
23	956	2,000	4,020	2,010	2,180	3,100	3,540	3,160	1,310	950	892	1,720
24	1,000	2,050	4,100	1,920	2,010	3,440	3,540	3,060	1,310	1,010	944	1,370
25	1,510	1,870	4,040	1,750	2,010	3,300	3,350	2,130	1,290	957	912	1,640
26	2,760	1,840	4,030	1,790	1,980	3,410	3,520	2,330	1,240	1,040	1,380	1,690
27	2,670	1,690	4,040	1,650	2,230	3,530	3,660	2,460	1,410	1,010	1,540	1,270
28	4,990	1,870	4,020	1,520	2,480	3,140	4,020	2,790	1,190	1,020	1,040	785
29	6,650		4,240	1,530	2,350	3,250	3,770	2,770	1,170	1,010	687	879
30	7,320		4,320	1,720	2,470	3,180	3,900	2,000	1,300	943	947	958
31	7,000		4,460		2,430		4,360	1,770		906		928
Sum	50,740		97,560		87,440		110,010		29,883		41,202	
	65,722		106,640		55,220		116,050		53,610		28,851	

Month	Current Year 1961 Extreme Gage Feet		Extreme Second-Feet High		Extreme Second-Feet Low		Average Second-Feet	Total Acre-Feet	Period 1935-1961 Acre-Feet		
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	108.25	102.71	30	7,470	18	722	2,120	130,358	570,861	1,644,000	31,900
Feb.	108.06	103.18	1	7,040	10	1,000	1,810	100,641	475,356	1,378,000	60,400
Mar.	106.05	104.01	31	4,780	1	1,940	3,440	211,517	437,650	1,120,000	19,400
Apr.	106.57	103.32	2	5,520	28	1,480	3,250	193,507	323,020	823,850	0
May	104.16	103.06	28	2,530	11	1,240	1,780	109,527	371,598	1,151,000	77,400
June	105.34	103.87	20	3,920	17	2,140	2,910	173,435	332,114	1,175,000	8,500
July	105.95	104.76	3	4,770	18	3,020	3,740	230,182	296,105	763,800	24,400
Aug.	106.94	103.52	5	5,950	25	1,400	3,550	218,202	317,099	791,600	43,800
Sept.	104.81	103.09	11	2,910	29	1,130	1,790	106,334	316,121	1,029,000	60,000
Oct.	104.69	102.68	1	1,300	8	830	964	59,272	336,099	1,186,000	59,272
Nov.	105.00	102.37	27	1,640	29	663	962	57,225	423,988	1,422,000	56,200
Dec.	107.62	102.41	15	4,070	8	650	1,330	81,723	543,991	1,832,000	42,000
Yearly	108.25	102.37		7,470		650	2,310	1,671,923	4,744,002	10,596,900	722,100

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.48	107.51	104.12	106.09	103.52	104.15	104.84	105.86	103.76	103.08	103.98	103.71
2	103.67	106.65	104.26	106.13	103.40	104.36	105.48	105.86	103.52	102.94	103.39	103.07
3	103.80	104.67	104.15	106.06	103.44	104.41	105.81	105.91	103.66	102.83	103.49	103.75
4	103.99	103.52	104.34	105.44	103.34	104.61	105.54	106.61	103.85	102.82	103.77	103.43
5	103.81	103.47	104.64	105.43	103.43	104.59	105.64	106.63	104.00	102.84	104.27	102.60
6	103.75	103.48	104.45	105.28	103.43	104.49	105.38	106.55	104.03	102.78	104.24	102.52
7	103.61	103.33	104.07	105.38	103.28	104.48	105.48	106.12	104.03	102.77	104.21	102.53
8	103.67	103.29	104.31	105.32	103.26	104.16	105.40	106.08	104.27	102.85	104.27	102.48
9	103.62	103.34	104.49	105.39	103.13	104.11	105.61	106.05	104.29	102.90	104.40	102.53
10	103.75	103.31	104.63	105.34	103.16	104.30	105.54	106.04	104.19	102.79	104.23	102.66
11	103.58	103.47	104.73	105.39	103.11	104.44	105.58	105.98	104.58	102.82	103.93	102.75
12	103.60	103.47	104.88	105.41	103.25	104.46	105.48	105.62	104.64	102.79	103.81	102.57
13	103.78	103.45	105.31	105.38	103.23	104.30	105.29	105.52	104.40	102.80	103.74	102.66
14	103.75	103.30	105.21	105.28	103.37	104.46	105.33	105.44	104.43	102.98	103.98	102.74
15	103.74	103.42	105.46	105.33	103.42	104.52	105.27	105.12	104.42	103.08	104.04	105.69
16	103.05	103.37	105.65	105.24	103.58	104.27	105.21	105.23	103.85	102.93	103.85	106.79
17	102.94	103.58	105.63	105.04	103.64	103.98	105.22	105.29	103.90	102.82	103.45	106.19
18	102.77	103.50	105.55	104.62	103.56	103.98	105.14	105.02	103.95	102.82	103.31	105.68
19	102.77	103.60	105.68	104.64	103.53	104.32	105.21	104.90	103.53	102.83	103.50	105.46
20	102.85	104.13	105.70	104.32	103.74	104.58	105.18	104.95	103.42	102.78	103.52	105.37
21	102.93	104.64	105.76	104.14	103.69	105.06	105.16	105.02	103.43	102.72	103.40	103.95
22	102.88	104.69	105.66	103.92	103.70	104.70	105.17	104.54	103.34	102.79	103.43	104.30
23	102.96	104.11	105.52	103.85	103.81	104.74	105.27	104.99	103.27	102.84	103.55	105.26
24	103.03	104.20	105.61	103.74	103.70	*105.01	105.27	104.98	103.25	103.50	103.61	104.77
25	103.61	103.84	105.50	103.57	103.74	*104.90	105.13	104.21	103.24	104.17	103.48	105.10
26	104.82	103.89	105.53	103.59	103.72	*104.97	105.24	104.28	103.17	104.39	104.60	105.14
27	104.82	103.83	105.56	103.54	103.87	105.02	105.39	104.41	103.36	104.38	104.87	104.46
28	106.64	103.92	105.49	103.37	104.09	104.74	105.63	104.71	103.14	104.27	103.81	103.57
29	107.75		105.63	103.36	104.01	104.78	105.37	104.76	103.15	104.23	102.44	103.67
30	108.17		105.64	103.54	104.12	104.78	105.43	104.05	103.29	104.01	103.00	103.89
31	107.99		105.82		104.10		105.75	103.80		104.05		103.80
Avg.	104.05	103.96	105.13	104.77	103.56	104.52	105.37	105.31	103.78	103.18	103.79	103.97

* Partly estimated

COLORADO RIVER IMMEDIATELY ABOVE MORELOS DAM - STAGES

DESCRIPTION: Water-stage recorder located on the right bank of the Colorado River in Mexico attached to the upstream abutment of the intake gates for the Alamo Canal at Morelos Dam, 1.1 miles downstream from the northerly international boundary, and about 8 miles downstream from the Yuma gaging station. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage height records November 8, 1950 to June 3, 1951; a continuous record of gage heights June 4, 1951 through December 31, 1961.

REMARKS: Prior to June 4, 1951, when a continuous water-stage recorder was installed, mean daily gage height records were determined from hourly readings of a staff gage.

EXTREMES: Since November 8, 1950: Maximum mean daily gage height, 112.86 feet January 2, 1958; minimum mean daily gage height, 101.67 feet February 17, 1957.

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102.17	106.69	102.69	104.53	102.49	102.99	103.51	104.33	102.82	102.17	103.74	103.05
2	102.30	105.84	102.79	104.56	102.36	103.12	104.07	104.40	102.66	102.13	103.05	102.03
3	102.40	103.48	102.76	104.49	102.40	103.15	104.33	104.95	102.72	102.00	103.22	102.72
4	102.49	102.07	102.89	103.94	102.33	103.31	104.27	105.51	102.99	101.94	103.54	102.53
5	102.46	102.07	103.12	103.87	102.36	103.31	104.30	105.51	103.05	101.94	104.13	101.80
6	102.43	102.03	103.02	103.77	102.40	103.22	104.30	105.51	103.08	101.87	104.13	101.74
7	102.33	101.94	102.72	103.87	102.30	103.22	104.33	105.18	103.05	101.90	104.07	101.74
8	102.36	101.94	102.85	103.81	102.26	103.02	104.30	105.09	103.41	101.94	104.13	101.71
9	102.33	101.97	103.02	103.87	102.17	102.99	104.30	105.12	103.41	101.97	104.23	101.71
10	102.40	101.97	103.15	103.84	102.23	103.12	104.27	105.15	103.28	101.90	104.07	101.80
11	102.30	102.10	103.22	103.87	102.20	103.18	104.33	105.09	103.58	101.90	103.74	101.87
12	102.33	102.10	103.38	103.87	102.26	103.18	104.30	104.82	103.67	101.90	103.61	101.74
13	102.43	102.10	103.71	103.90	102.23	103.08	104.27	104.49	103.38	101.90	103.51	101.80
14	102.43	102.00	103.67	103.87	102.33	103.18	104.30	104.49	103.41	101.97	103.77	101.87
15	102.43	102.10	103.84	103.87	102.40	103.25	104.30	104.20	103.41	102.13	103.84	105.05
16	101.90	102.07	103.97	103.81	102.49	103.08	104.27	104.30	102.82	102.07	103.61	106.59
17	101.84	102.20	103.97	103.64	102.56	102.89	104.30	104.43	102.89	101.97	103.18	105.97
18	101.74	102.17	103.97	103.38	102.49	102.85	104.30	104.13	102.99	101.97	103.02	105.48
19	101.77	102.23	104.00	103.54	102.49	103.08	104.30	103.97	102.56	101.94	103.22	105.28
20	101.77	102.59	104.07	103.18	102.62	103.28	104.33	104.00	102.36	101.90	103.25	105.18
21	101.84	102.85	104.13	103.08	102.59	103.61	104.30	104.10	102.43	101.87	103.08	103.74
22	101.80	103.15	104.10	102.85	102.62	103.35	104.30	103.54	102.36	101.90	103.12	104.07
23	101.84	102.59	103.97	102.69	102.69	103.38	104.33	103.97	102.30	102.00	103.25	105.05
24	101.90	102.62	104.04	102.59	102.62	103.58	104.33	104.04	102.26	103.12	103.35	104.53
25	102.33	102.53	103.97	102.49	102.66	103.51	104.30	103.38	102.26	103.97	103.18	104.86
26	103.44	102.53	103.97	102.53	102.62	103.54	104.30	103.35	102.23	104.20	104.36	104.92
27	103.67	102.49	104.04	102.46	102.72	103.58	104.36	103.41	102.36	104.20	104.66	104.23
28	105.91	102.56	104.00	102.33	102.85	103.41	104.36	103.71	102.23	104.07	103.51	103.31
29	107.02		104.17	102.33	102.85	103.44	104.30	103.81	102.23	104.04	101.67	103.38
30	107.32		104.13	102.49	102.95	103.44	104.33	103.18	102.30	103.84	102.07	103.61
31	107.12		104.33		102.95		104.36	102.89		103.84		103.51
Avg.	102.86	102.61	103.60	103.44	102.50	103.24	104.28	104.32	102.82	102.47	103.51	103.45

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

DESCRIPTION: Water-stage recorder and staff gage on left bank of Alamo Canal, 200 feet downstream from the intake at Morelos Dam, 1,350 feet upstream from the point where it joins the old Alamo Canal, 2.2 miles upstream from Matamoros check, and about one mile south of the northerly international boundary. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: The diversions are computed from the sum of the flows of the Conexión, Alamo, and del Norte Canals below Matamoros check. Discharges for 1961 based on a continuous record of gage heights and generally daily measurements of the canals described above. Records available: November 8, 1950 through December 1961. Records are collected and furnished by the Mexican Section of the Commission.

REMARKS: The canal is operated with a minimum hydraulic slope to permit the maximum retention of silt above Matamoros check and the lower velocities do not permit measuring with a current meter. Records for this station show the amounts of Colorado River water diverted at Morelos Diversion Dam to the intake canal and thence to the Alamo Canal for use in Mexico. Water for use in Mexico may also be diverted to the Alamo Canal in the United States directly from the river at Rockwood Heading or by means of Imperial Dam, the All-American Canal, and certain facilities of the Imperial Irrigation District under conditions set forth in the 1944 Water Treaty. No diversions of the above nature have been made during the years 1951 through 1961 and consequently the records reported below show the total water diverted from the Colorado River to the Alamo Canal during those years. Other diversions from the Colorado River are made by Mexico downstream from Morelos Dam by means of pumps.

EXTREMES: Maximum mean daily discharge, 6,540 second-feet, August 3, 1958; minimum mean daily discharge, zero on various days during 1951, 1952, 1955, and 1961.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,400	1,370	2,140	4,840	1,640	2,390	3,150	4,520	1,730	1,100	413	1,040
2	1,640	1,350	2,340	4,910	1,500	2,640	3,920	4,410	1,490	1,020	576	1,030
3	1,760	1,400	2,190	4,800	1,550	2,760	4,410	4,200	1,600	936	551	1,110
4	1,950	1,220	2,460	4,060	1,410	3,140	3,990	5,260	1,790	911	385	1,180
5	1,760	1,190	2,720	3,990	1,530	2,950	4,130	5,440	1,860	961	206	745
6	1,790	1,130	2,640	3,780	1,540	2,870	3,670	5,160	1,980	915	202	727
7	1,580	1,080	2,150	3,990	1,420	2,810	3,920	4,520	1,900	890	206	735
8	1,610	1,040	2,270	3,880	1,320	2,380	3,780	4,520	2,130	918	191	692
9	1,610	1,110	2,500	3,990	1,240	2,300	4,100	4,480	2,140	1,010	198	731
10	1,720	1,140	2,620	3,920	1,270	2,510	3,960	4,380	2,060	862	219	795
11	1,600	1,240	2,780	3,990	1,240	2,720	3,990	4,270	2,410	897	346	865
12	1,590	1,350	2,980	4,030	1,350	2,740	3,880	3,780	2,620	876	335	756
13	1,670	1,360	3,460	4,030	1,320	2,480	3,570	3,740	2,300	908	321	802
14	1,690	1,170	3,360	3,810	1,470	2,720	3,570	3,600	2,370	1,020	332	858
15	1,640	1,250	3,780	3,880	1,560	2,810	3,500	3,220	2,430	1,090	328	756
16	1,010	1,210	3,990	3,780	1,670	2,460	3,350	3,380	1,850	985	364	0
17	946	1,370	4,030	3,440	1,810	2,180	3,350	3,460	1,880	886	431	0
18	876	1,370	3,920	2,930	1,740	2,150	3,160	3,040	1,880	939	410	36.0
19	855	1,450	4,100	2,810	1,690	2,590	3,410	2,940	1,530	932	406	72.7
20	869	1,920	4,130	2,530	1,940	2,850	3,300	3,000	1,420	911	396	78.4
21	992	2,300	4,240	2,360	1,890	3,530	3,260	3,080	1,430	848	417	65.0
22	911	2,120	4,200	2,080	1,890	2,980	3,290	2,480	1,290	893	399	67.5
23	985	1,940	3,920	2,010	2,000	3,030	3,460	2,990	1,310	862	417	77.3
24	1,030	2,070	4,030	1,940	1,890	3,310	3,400	2,910	1,290	639	424	73.1
25	1,370	1,860	3,880	1,680	1,920	3,280	3,200	2,130	1,250	420	456	74.5
26	1,770	1,970	3,880	1,670	1,930	3,300	3,410	2,140	1,210	399	445	73.1
27	1,690	1,820	3,990	1,590	2,050	3,430	3,640	2,390	1,400	374	466	71.3
28	1,540	2,030	3,960	1,490	2,320	2,990	4,100	2,690	1,170	381	519	63.9
29	1,540		4,170	1,450	2,270	3,060	3,640	2,790	1,190	385	597	63.9
30	1,520		4,170	1,600	2,310	3,060	3,740	1,900	1,280	381	788	64.6
31	1,530		4,480		2,270		4,340	1,720		374		19.4
Sum	44,444	41,830	105,480	95,260	52,950	84,420	113,590	108,540	52,190	24,923	11,744	13,722.7

Month	Current Year 1961 — Extreme Gage Ø Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1951-1961 — Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	101.84	101.15	4	1,950	19	855	1,430	88,110	36,759	99,160	970
Feb.	102.30	101.48	21	2,300	8	1,040	1,490	82,934	38,077	82,934	9,230
Mar.	103.90	102.07	31	4,480	1	2,140	3,400	209,212	160,759	216,990	97,900
Apr.	104.20	101.08	2	4,910	29	1,450	3,170	188,934	207,121	264,130	172,540
May	102.40	101.94	28	2,320	† 9	1,240	1,710	104,977	109,591	159,010	66,210
June	103.18	102.33	21	3,530	18	2,150	2,810	167,429	201,360	269,630	156,660
July	104.27	103.25	3	4,410	1	3,150	3,670	225,301	278,461	304,260	225,301
Aug.	105.35	102.85	5	5,440	31	1,720	3,500	215,340	271,908	341,040	215,340
Sept.	103.64	102.17	12	2,620	28	1,170	1,740	103,485	169,179	198,090	103,485
Oct.	102.13	100.20	1	1,100	†27	374	805	49,438	56,189	90,640	40,520
Nov.	100.62	99.77	30	788	8	191	392	23,288	22,141	93,330	7,520
Dec.	102.95	98.56	4	1,180	†16	0	441	27,207	39,259	114,320	8,830
Yearly	105.35	98.56		5,440		0	2,050	1,485,655	1,590,804	1,961,550	1,381,110

† And other days Ø Mean daily

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	101.57	101.51	102.07	104.13	102.00	102.43	103.25	104.07	102.82	102.10	100.26	102.95
2	101.61	101.54	102.30	104.20	101.97	102.49	103.87	104.17	102.66	102.13	100.56	101.35
3	101.64	101.48	102.30	104.13	102.00	102.56	104.04	104.82	102.72	102.00	100.62	102.26
4	101.84	101.57	102.33	103.64	101.97	102.56	104.04	105.31	102.95	101.87	100.43	101.94
5	101.64	101.57	102.62	103.51	102.03	102.56	104.04	105.35	103.02	101.80	100.30	100.39
6	101.64	101.54	102.53	103.38	102.00	102.46	104.13	105.35	103.08	101.74	100.26	100.36
7	101.57	101.51	102.26	103.44	101.97	102.43	104.17	105.02	103.05	101.77	100.20	100.36
8	101.61	101.51	102.40	103.38	101.97	102.36	104.17	104.95	103.41	101.77	100.23	100.33
9	101.57	101.54	102.40	103.48	101.94	102.33	104.13	104.99	103.41	101.67	100.23	100.36
10	101.61	101.51	102.43	103.41	101.94	102.43	104.07	105.05	103.28	101.67	100.16	100.43
11	101.57	101.67	102.46	103.41	101.94	102.49	104.13	104.95	103.54	101.74	100.33	100.43
12	101.61	101.77	102.66	103.44	102.03	102.46	104.10	104.72	103.64	101.74	100.23	100.36
13	101.67	101.54	103.02	103.44	101.97	102.40	104.10	104.43	103.35	101.61	100.20	100.39
14	101.61	101.51	102.89	103.41	102.00	102.43	104.23	104.43	103.38	101.71	100.20	100.43
15	101.57	101.51	103.05	103.44	102.03	102.46	104.17	104.17	103.38	102.07	100.16	100.03
16	101.28	101.54	103.18	103.35	102.07	102.36	104.13	104.23	102.82	102.03	100.30	98.56
17	101.21	101.54	103.18	103.31	102.10	102.33	104.13	104.36	102.89	101.90	100.33	98.56
18	101.18	101.57	103.22	102.92	102.07	102.36	104.20	104.10	102.95	101.87	100.30	98.56
19	101.15	101.61	103.31	103.12	102.10	102.36	104.23	103.90	102.46	101.67	100.43	98.92
20	101.18	101.87	103.44	103.08	102.13	102.43	104.23	103.94	102.30	101.64	100.20	99.54
21	101.15	102.30	103.58	102.99	102.07	102.66	104.23	104.04	102.36	101.61	100.26	99.93
22	101.18	102.07	103.51	102.66	102.13	102.76	104.23	103.51	102.30	101.64	100.23	100.10
23	101.15	101.94	103.38	102.30	102.13	102.79	104.27	103.87	102.20	101.71	100.26	100.43
24	101.21	102.17	103.48	101.71	102.10	102.82	104.27	104.00	102.20	101.74	100.20	100.66
25	101.51	101.97	103.15	101.35	102.10	102.79	104.23	103.35	102.20	101.67	100.26	100.89
26	101.64	101.97	103.35	101.08	102.07	102.82	104.23	103.31	102.17	101.05	100.36	101.08
27	101.61	101.97	103.48	101.21	102.10	102.85	104.27	103.38	102.33	100.23	100.26	101.31
28	101.74	102.03	103.38	101.41	102.13	102.99	104.20	103.64	102.17	100.26	100.23	101.48
29	101.57		103.67	101.74	102.13	103.18	104.20	103.77	102.20	100.26	99.77	101.57
30	101.44		103.71	102.00	102.20	103.15	104.23	103.15	102.23	100.20	100.39	101.71
31	101.44		103.90		102.40		104.17	102.85		100.20		101.80
Avg.	101.48	101.71	102.99	102.94	102.06	102.58	104.13	104.23	102.78	101.52	100.27	100.56

COLORADO RIVER IMMEDIATELY BELOW MORELOS DAM - STAGES

DESCRIPTION: Gage painted on sloping concrete apron immediately downstream from Morelos Dam, on the right bank of the river, 1.1 miles downstream from the northerly international boundary, and about 8.0 miles downstream from the Yuma gaging station. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Mean daily gage heights obtained from hourly gage readings. Records obtained and furnished by the Mexican Section of the Commission. Records available: Gage heights only, February 20, 1951 through December 1961.

EXTREMES: Maximum mean daily gage height, 112.80 feet, January 2, 1958; minimum mean daily gage height, 99.15 feet, March 26, 1951.

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	101.05	106.63	100.72	100.72	100.49	100.49	100.52	100.72	100.62	100.79	103.84	101.21
2	101.05	105.84	100.72	101.02	100.49	100.49	100.66	100.66	100.62	100.79	103.12	101.15
3	101.05	103.12	100.72	100.75	100.52	100.49	100.59	100.69	100.62	100.82	103.28	102.79
4	101.25	101.02	100.72	100.72	100.49	100.52	100.56	100.66	100.59	100.82	103.61	102.23
5	101.02	100.95	100.72	100.69	100.49	100.52	100.66	100.62	100.72	100.79	104.17	100.52
6	101.02	100.98	100.72	100.66	100.49	100.52	100.72	100.62	100.75	100.79	104.17	100.49
7	100.98	100.89	100.69	100.62	100.49	100.59	100.59	100.62	100.82	100.79	104.17	100.39
8	100.98	100.89	100.72	100.62	100.49	100.56	100.62	100.69	100.79	100.69	104.20	100.46
9	100.98	100.89	100.72	100.62	100.59	100.59	100.59	100.72	100.72	100.72	104.30	100.39
10	100.98	100.85	100.72	100.62	100.59	100.56	100.56	100.69	100.75	100.79	104.13	100.39
11	100.95	100.85	100.72	100.66	100.46	100.59	100.59	100.69	100.72	100.82	103.77	100.43
12	100.92	100.89	100.72	100.69	100.46	100.56	100.56	100.66	100.89	100.79	103.67	100.52
13	100.95	100.85	100.72	100.69	100.46	100.62	100.52	100.69	100.98	100.75	103.58	100.59
14	100.95	100.85	100.72	100.69	100.43	100.59	100.56	100.69	101.02	100.79	103.84	100.43
15	100.92	100.85	100.72	100.66	100.43	100.56	100.56	100.69	100.98	100.75	103.90	104.20
16	100.89	100.85	100.72	100.62	100.49	100.56	100.56	100.69	100.95	100.79	103.67	106.59
17	100.85	100.85	100.72	100.62	100.52	100.52	100.56	100.69	100.92	100.92	103.25	105.97
18	100.82	100.85	100.72	100.69	100.56	100.52	100.62	100.66	100.95	100.95	103.12	105.51
19	100.82	100.85	100.72	100.66	100.52	100.52	100.66	100.62	100.95	100.79	103.31	105.35
20	100.82	101.02	100.72	100.62	100.49	100.59	100.62	100.62	100.89	100.82	103.35	105.25
21	100.82	102.17	100.75	100.59	100.52	100.62	100.62	100.62	100.89	100.82	103.18	103.84
22	100.82	102.49	100.75	100.56	100.49	100.59	100.59	100.69	100.85	100.79	103.22	104.13
23	100.82	101.05	100.72	100.56	100.56	100.52	100.59	100.72	100.82	101.12	103.38	105.09
24	100.82	101.38	100.72	100.52	100.62	100.52	100.66	100.79	100.79	103.22	103.41	104.59
25	101.28	100.72	100.72	100.62	100.56	100.52	100.62	100.66	100.79	104.04	103.28	104.95
26	103.54	100.72	100.72	100.59	100.52	100.56	100.62	100.66	100.89	104.27	104.43	104.99
27	103.71	100.72	100.72	100.56	100.52	100.62	100.59	100.69	100.92	104.27	104.76	104.30
28	105.81	100.75	100.75	100.52	100.56	100.59	100.56	100.66	100.82	104.17	103.54	103.38
29	106.96		100.72	100.49	100.59	100.59	100.56	100.69	100.82	104.10	100.85	103.48
30	107.32		100.72	100.49	100.62	100.52	100.56	100.66	100.82	103.87	100.72	103.71
31	107.09		100.72		100.56		100.59	100.66		103.94		103.61
Avg.	101.88	101.46	100.72	100.64	100.52	100.55	100.59	100.67	100.82	101.63	103.51	102.93

COOPER WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging regulatory waste water from the Cooper Canal to the Colorado River. This wasteway is located 1.5 miles downstream from the northerly international boundary and 0.4 mile downstream from Morelos Diversion Dam. This is one of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, March 1950 through December 1961, obtained by the United States Section; monthly discharge, January 1934 through March 1950, by the Bureau of Reclamation.

EXTREMES: Prior to March 1950, maximum monthly discharge, 914 acre-feet, January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 50.1 second-feet, August 16, 1958, at maximum gage height of 113.32 feet; minimum instantaneous discharge, zero during parts of each month.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.0	11.3	1.4	1.9	0.3	0.2	0.8	5.0	0.4	6.6	1.0	2.7
2	2.7	6.0	2.6	2.6	0	.5	6.8	4.9	3.1	.3	9.5	9.1
3	3.3	1.1	4.6	0	.2	.4	.2	.7	.6	0	6.4	.1
4	1.8	9.2	6.5	0	9.5	.1	0	.2	3.0	0	1.6	0
5	.9	14.7	1.7	0	1.4	.4	0	0	2.5	4.4	12.1	0
6	.1	2.9	.1	6.8	8.2	5.6	1.8	3.1	3.8	.6	2.9	0
7	4.3	0	0	2.6	1.3	2.9	2.1	.3	9.4	.4	3.4	1.7
8	.8	0	0	3.0	3.6	3.9	3.3	.1	4.7	.2	2.0	6.6
9	.1	1.9	2.8	1.0	2.5	4.5	2.0	0	1.4	.1	3.5	.3
10	0	7.2	4.2	.7	4.4	1.1	1.7	0	3.2	1.5	1.8	.6
11	0	3.2	3.3	6.0	.4	7.3	.6	2.3	2.3	.2	0	.7
12	0	2.6	6.1	3.8	2.7	.2	2.7	1.9	1.4	.5	6.7	.5
13	0	2.0	.7	5.0	6.4	1.1	.7	7.1	.9	4.3	.1	3.6
14	4.3	5.4	4.9	2.9	.2	0	6.7	.1	7.3	5.1	0	.1
15	6.4	5.3	8.0	7.0	.2	.6	6.3	0	1.9	2.1	0	6.5
16	0	4.7	3.8	5.3	1.0	.2	.2	.2	3.0	3.2	5.7	.3
17	2.8	3.3	2.2	3.8	2.8	6.5	.6	.4	3.9	6.1	4.4	.1
18	.2	1.9	0	4.1	5.5	1.4	2.8	.4	4.4	6.7	3.0	0
19	4.6	10.7	2.8	5.6	.6	2.9	6.4	.4	.6	1.0	1.5	0
20	1.2	4.9	5.7	6.1	2.2	.2	.9	.4	1.4	5.7	4.0	2.3
21	1.2	5.4	2.0	3.1	4.1	4.6	5.5	.4	2.7	5.4	.2	5.1
22	.3	.8	5.2	2.5	3.9	1.0	1.4	1.7	3.0	.4	3.5	.2
23	1.4	2.4	10.3	2.8	4.9	.2	0	.7	.7	.1	0	3.9
24	1.1	12.7	.1	2.8	5.0	1.1	7.0	7.4	1.1	0	3.5	3.6
25	.1	4.1	.3	3.8	1.7	.2	3.8	1.3	.5	.1	1.9	4.0
26	.1	4.2	3.6	2.1	2.9	3.3	4.9	5.6	4.7	3.8	0	3.7
27	.1	3.1	1.2	2.0	3.1	.2	.8	3.9	4.7	1.9	1.3	.5
28	3.7	.3	.7	3.2	12.5	.6	.4	0	1.1	4.2	.4	0
29	6.1		0	2.0	14.2	1.7	.3	0	4.6	.1	1.3	0
30	.9		0	7.7	2.0	.1	.5	0	2.3	0	.6	0
31	7.8		2.7		.2		4.3	0		0		0
Sum	57.3	131.3	87.5	100.2	107.9	53.0	75.5	48.5	84.6	65.0	82.3	56.2

Month	Current Year 1961								Period 1935-1961		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High			Low					
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	112.42	111.00	29	23.6	† 2	0	1.8	114	221	914	0
Feb.	112.56	111.00	†19	27.1	† 6	0	4.7	260	190	400	6
Mar.	112.46	111.00	23	24.6	† 1	0	2.8	174	202	517	0
Apr.	112.50	111.00	†28	25.6	† 1	0	3.3	199	224	425	40
May	112.62	111.00	6	28.6	† 1	0	3.5	214	205	440	76
June	112.56	111.00	11	27.1	† 8	0	1.8	105	193	595	47
July	112.55	111.00	2	26.8	† 1	0	2.4	150	175	516	0
Aug.	112.51	111.00	26	25.8	† 3	0	1.6	96.2	132	617	0
Sept.	112.52	111.00	7	26.1	† 1	0	2.8	168	136	462	0
Oct.	112.49	111.00	5	25.4	† 2	0	2.1	129	164	490	0
Nov.	112.52	111.00	12	26.1	† 1	0	2.8	163	193	462	9
Dec.	112.51	111.00	2	25.8	† 3	0	1.8	111	241	592	90
Yearly	112.62	111.00		28.6		0	2.6	1,883.2	2,276	4,500	1,178

† And other days

COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, and cableway 1.8 miles downstream from the northerly international boundary, 0.7 mile downstream from Morelos Diversion Dam, and about 9 miles downstream from Yuma, Arizona, along the river levee. The cableway and recorder are 1,260 feet and 1,300 feet, respectively, below the mouth of Cooper Wasteway. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 105 current meter measurements during the year and a continuous record of gage heights. Computations by shifting control methods. Records available: Daily discharges, January 1, 1954 through December 1961; continuous record of gage heights, July 20, 1952 through December 1961.

REMARKS: Reservoirs, diversions in United States and Mexico, drainage returns, and waste flows modify the river flow at this station. The record at this station, less that of Cooper Wasteway, represents the river flow passing Morelos Diversion Dam.

EXTREMES: Maximum gage height 112.05 feet December 24, 1957; minimum gage height 99.47 feet May 28, 1960.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	25.0	4,920	20.0	16.6	15.5	19.6	17.2	21.5	14.4	16.6	607	155
2	26.0	3,440	17.0	64.1	14.4	20.2	21.5	22.8	14.4	13.9	417	64.6
3	26.0	1,090	21.0	37.6	19.0	20.9	19.6	21.5	13.9	13.4	447	339
4	56.0	48.5	21.0	19.5	25.8	22.8	19.0	19.0	13.9	13.9	541	286
5	26.0	42.5	21.0	16.6	19.6	24.3	22.8	17.8	16.6	14.4	789	17.2
6	25.0	41.0	19.0	25.0	22.2	28.9	24.3	20.2	19.6	12.4	794	14.2
7	27.0	23.0	15.0	22.2	19.6	25.8	19.0	18.4	20.2	10.9	784	14.2
8	25.0	23.0	18.0	20.2	16.1	22.8	19.0	21.1	18.4	10.5	805	17.2
9	23.0	27.0	21.0	18.4	25.8	23.5	17.8	22.2	13.4	10.0	858	12.5
10	23.0	30.0	23.0	17.2	28.1	21.5	16.6	21.5	15.5	12.9	784	12.0
11	21.0	27.0	22.0	22.8	18.4	23.5	16.1	20.2	14.4	13.4	651	12.5
12	20.0	28.0	26.0	25.0	20.9	20.2	16.6	19.0	22.1	12.4	615	17.8
13	20.0	24.0	22.0	22.8	22.2	20.2	15.0	20.9	25.8	13.4	587	23.0
14	22.0	26.0	23.0	20.2	16.1	19.6	16.6	17.8	27.3	11.9	675	13.6
15	25.0	28.0	26.0	22.2	16.6	17.8	16.1	19.3	23.5	10.5	704	1,970
16	16.0	26.0	20.0	22.8	26.5	17.2	12.4	20.9	21.5	12.4	623	3,020
17	19.0	24.0	20.0	22.2	28.9	18.4	12.4	19.0	20.9	17.8	485	2,470
18	19.0	21.0	18.0	24.3	29.7	15.5	14.4	17.8	21.5	19.0	447	2,080
19	22.0	24.0	18.0	26.5	23.5	16.1	20.9	16.6	22.2	13.4	498	1,910
20	21.0	53.0	22.0	23.5	24.3	17.2	20.2	16.6	19.0	15.5	508	1,850
21	19.0	368	25.0	19.0	25.0	19.6	21.5	16.6	16.1	16.1	469	980
22	19.0	570	25.0	17.2	24.3	17.2	21.5	18.4	16.6	12.9	472	1,130
23	18.0	57.5	28.0	17.2	28.9	16.6	20.2	22.2	16.6	32.1	498	1,820
24	18.0	178	20.0	17.2	31.4	16.1	22.2	28.9	15.0	350	518	1,440
25	76.0	27.0	18.0	25.8	27.3	16.6	20.2	19.0	13.9	617	462	1,700
26	839	22.0	19.0	20.2	26.5	17.8	17.8	17.8	17.8	744	928	1,740
27	1,010	18.0	17.0	19.0	27.3	21.1	16.1	19.0	21.5	750	1,110	1,320
28	3,000	22.0	21.0	17.2	32.3	20.9	16.1	14.4	16.6	704	627	818
29	5,040		24.0	17.8	34.1	19.6	15.0	15.2	16.1	686	32.5	872
30	6,050		19.0	20.2	29.7	16.6	15.0	16.6	16.1	585	18.4	980
31	5,730		17.0		22.8		16.1	15.0		620		908
Sum	22,306.0	11,228.5	646.0	680.5	742.8	598.1	559.2	597.2	544.8	5,385.7	17,753.9	28,006.8

Month	Current Year 1961 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	High	Extreme Second-Feet Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1954-1961 Acre-Feet Average	Maximum	Minimum
Jan.	106.32	100.16	30	6,240	19	11.0	720	44,243	361,807	969,540	34,710
Feb.	106.25	100.25	1	6,000	28	9.0	401	22,271	178,550	414,310	17,650
Mar.	100.62	100.27	21	54.5	28	14.0	20.8	1,281	118,036	630,230	780
Apr.	101.73	100.22	2	300	2	13.4	22.7	1,350	93,571	532,320	899
May	100.69	100.17	9	62.2	2	11.9	24.0	1,473	105,501	375,970	460
June	100.64	100.35	27	37.0	20	14.4	19.9	1,186	24,380	119,980	834
July	100.54	100.31	5	28.1	18	10.5	18.0	1,109	23,758	89,430	654
Aug.	100.69	100.38	24	37.0	29	10.9	19.3	1,185	41,688	125,590	702
Sept.	100.74	100.41	14	32.3	9	11.4	18.2	1,081	26,274	87,830	113
Oct.	103.73	100.47	26	906	9	10.0	174	10,682	75,010	172,940	10,682
Nov.	103.92	100.60	27	1,190	30	17.8	592	35,214	164,483	356,390	35,214
Dec.	106.52	100.27	15	3,760	11	11.0	903	55,551	247,532	643,850	25,040
Yearly	106.52	100.16		6,240		9.0	244	176,626	1,460,590	3,957,730	176,626

COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	100.47	105.82	100.38	100.30	100.25	100.40	100.36	100.51	100.44	100.58	103.08	101.24
2	100.47	105.08	100.37	100.57	100.24	100.40	100.43	100.50	100.44	100.53	102.48	100.87
3	100.46	102.90	100.40	100.47	100.30	100.40	100.41	100.46	100.44	100.53	102.56	102.05
4	100.69	100.79	100.39	100.35	100.39	100.42	100.40	100.42	100.45	100.55	102.83	101.74
5	100.46	100.75	100.38	100.25	100.30	100.43	100.45	100.41	100.50	100.57	103.38	100.43
6	100.44	100.74	100.35	100.32	100.34	100.48	100.49	100.46	100.55	100.53	103.37	100.38
7	100.45	100.59	100.30	100.29	100.30	100.47	100.42	100.44	100.56	100.50	103.34	100.37
8	100.42	100.57	100.34	100.27	100.24	100.46	100.42	100.49	100.53	100.48	103.38	100.41
9	100.39	100.60	100.38	100.25	100.39	100.47	100.41	100.50	100.45	100.47	103.47	100.32
10	100.38	100.63	100.40	100.24	100.41	100.44	100.40	100.48	100.49	100.53	103.31	100.30
11	100.35	100.60	100.38	100.35	100.25	100.47	100.39	100.47	100.48	100.54	103.00	100.30
12	100.34	100.60	100.41	100.39	100.28	100.42	100.40	100.45	100.60	100.52	102.89	100.38
13	100.34	100.56	100.36	100.38	100.30	100.42	100.37	100.49	100.66	100.54	102.80	100.45
14	100.35	100.58	100.37	100.34	100.21	100.41	100.40	100.44	100.68	100.52	103.00	100.30
15	100.38	100.59	100.41	100.36	100.22	100.39	100.40	100.47	100.63	100.49	103.06	103.69
16	100.28	100.57	100.35	100.37	100.37	100.38	100.34	100.50	100.60	100.54	102.88	105.71
17	100.30	100.55	100.35	100.35	100.40	100.41	100.35	100.47	100.59	100.65	102.48	105.10
18	100.27	100.52	100.33	100.38	100.42	100.36	100.39	100.45	100.60	100.66	102.35	104.64
19	100.27	100.55	100.32	100.41	100.35	100.38	100.47	100.44	100.61	100.55	102.49	104.42
20	100.26	100.70	100.36	100.37	100.36	100.40	100.44	100.44	100.58	100.59	102.51	104.32
21	100.25	101.82	100.39	100.30	100.38	100.43	100.46	100.45	100.55	100.60	102.37	103.06
22	100.25	102.26	100.40	100.27	100.37	100.38	100.46	100.49	100.56	100.54	102.40	103.29
23	100.25	100.66	100.43	100.28	100.44	100.37	100.44	100.51	100.56	100.71	102.49	104.25
24	100.25	101.24	100.35	100.28	100.47	100.36	100.47	100.56	100.54	102.34	102.56	103.73
25	100.52	100.43	100.32	100.41	100.42	100.37	100.44	100.45	100.52	103.16	102.40	104.06
26	102.60	100.38	100.33	100.32	100.42	100.39	100.42	100.45	100.59	103.43	103.47	104.12
27	103.02	100.34	100.30	100.30	100.44	100.44	100.40	100.49	100.64	103.45	103.78	103.48
28	104.64	100.38	100.34	100.27	100.51	100.43	100.40	100.43	100.56	103.36	102.79	102.63
29	105.85		100.38	100.28	100.54	100.40	100.39	100.46	100.56	103.31	100.77	102.72
30	106.25		100.34	100.33	100.51	100.35	100.39	100.48	100.56	103.11	100.61	102.90
31	106.13		100.32		100.44		100.42	100.44		103.15		102.78
Avg.	101.22	101.14	100.36	100.34	100.36	100.41	100.41	100.47	100.55	101.23	102.74	102.40

ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. This wasteway is located in Arizona 4.3 miles downstream from the northerly international boundary and 3.2 miles downstream from Morelos Diversion Dam. It is the largest of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through December 1961, obtained by the United States Section; monthly discharge, January 1924 through December 1950, by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 9,570 acre-feet, January 1949; minimum discharge, zero on various occasions. Since January 1, 1951, maximum instantaneous discharge, 800 second-feet, December 3, 1961, at a maximum gage height of 117.60 feet; minimum instantaneous discharge, zero during parts of each year.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	75.3	32.5	13.7	12.4	28.0	59.1	19.9	10.0	6.6	110	18.1	2.5
2	30.4	18.0	8.8	88.8	1.3	19.3	74.0	9.0	14.7	34.6	5.9	28.1
3	15.7	11.3	14.3	48.0	22.0	20.0	42.2	4.0	30.0	1.0	29.9	115
4	26.9	9.5	9.3	15.1	23.8	15.1	3.8	20.7	24.7	13.2	19.3	9.4
5	14.2	107	134	21.8	5.6	40.6	4.2	13.8	3.1	7.5	59.6	1.3
6	25.7	41.9	26.5	43.4	15.0	8.5	21.3	90.7	1.2	7.8	25.9	.6
7	35.8	3.8	4.4	27.1	24.1	17.9	16.0	25.5	11.0	37.5	24.1	29.1
8	62.5	4.6	3.3	28.6	34.4	9.8	16.3	2.1	28.4	21.1	17.9	31.6
9	98.9	19.5	23.8	40.3	17.7	1.1	30.3	7.5	24.0	38.6	11.7	18.7
10	9.1	21.3	13.4	45.2	12.2	12.9	24.5	10.4	30.5	15.3	25.9	4.9
11	1.8	18.1	21.7	30.2	25.8	22.8	16.9	6.2	8.5	23.8	28.2	22.4
12	.8	43.0	42.8	23.2	24.3	27.9	15.7	21.4	9.3	19.6	5.6	2.5
13	.2	34.9	22.8	25.0	30.0	20.3	17.7	36.3	8.1	26.5	34.0	15.5
14	18.1	7.4	21.2	47.4	60.1	1.5	6.5	20.7	11.2	9.6	29.2	27.0
15	25.0	7.8	22.9	39.8	38.4	13.8	5.6	12.1	17.9	20.9	11.6	76.9
16	15.9	6.2	29.1	26.1	29.2	17.2	27.6	20.3	9.7	21.5	4.7	36.4
17	13.4	7.1	27.6	36.1	34.6	12.7	20.0	12.0	50.0	20.1	28.1	48.9
18	12.9	36.1	9.7	16.9	30.6	10.5	3.3	18.0	42.9	21.3	3.5	19.3
19	45.5	58.0	29.2	17.8	17.3	41.4	8.1	29.4	23.1	20.0	26.4	4.7
20	32.3	37.2	24.8	14.9	39.2	15.6	14.6	14.6	43.8	31.2	29.4	1.2
21	9.7	31.8	19.0	5.4	ᵘ 68.0	10.6	20.1	5.8	18.3	17.6	15.7	7.3
22	29.2	18.3	12.4	10.6	* 33.9	10.7	23.7	10.7	19.7	36.0	5.5	13.1
23	29.9	24.0	16.5	42.6	10.8	21.5	43.1	8.5	26.3	22.9	14.4	23.0
24	14.0	17.4	27.7	28.2	27.3	11.1	6.2	2.7	33.7	20.0	18.6	14.2
25	17.5	13.9	20.9	25.6	22.3	32.0	1.7	21.1	34.9	25.5	30.9	16.4
26	23.5	51.1	7.6	23.7	27.8	21.1	.8	21.9	31.3	23.4	35.3	16.4
27	29.8	34.3	27.6	8.6	25.5	6.4	24.9	9.8	16.8	26.0	17.4	11.2
28	34.9	19.0	31.6	11.7	49.3	5.0	20.2	68.7	9.2	108	29.2	11.2
29	31.2		5.5	7.7	28.1	4.2	34.3	47.1	38.0	37.3	7.6	20.6
30	21.0		13.4	71.8	40.5	4.5	22.8	3.5	36.8	.6	17.7	20.5
31	24.4		13.3		38.8		18.2	1.7		1.7		41.8
Sum	825.5	735.0	698.8	884.0	885.9	515.1	604.5	586.2	663.7	820.1	631.3	691.7

Month	Current Year 1961 Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1935-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	116.77	111.72	8	471	†13	0	26.6	1,637	4,724	9,570	263
Feb.	116.63	111.76	5	432	8	.6	26.2	1,458	3,755	8,430	657
Mar.	116.30	111.78	5	360	† 8	.9	22.5	1,386	3,513	6,230	1,000
Apr.	116.16	111.77	2	334	12	.8	29.5	1,753	3,236	6,300	0
May	115.27	111.76	3	217	3	.6	28.6	1,757	3,992	9,320	101
June	113.60	111.78	1	104	† 8	.9	17.2	1,022	3,790	7,440	910
July	116.33	111.73	2	366	5	.2	19.5	1,199	3,821	8,320	840
Aug.	116.14	111.74	28	331	31	.3	18.9	1,163	3,187	9,740	710
Sept.	113.47	111.76	17	96.8	1	.6	22.1	1,316	2,353	6,140	820
Oct.	116.52	111.72	1	405	† 3	0	26.4	1,627	3,173	5,680	1,400
Nov.	114.70	111.81	1	172	†12	1.3	21.0	1,252	3,798	8,220	1,252
Dec.	117.60	111.73	3	800	6	.2	22.3	1,372	5,124	9,430	1,372
Yearly	117.60	111.72		800		0	23.4	16,942	44,466	82,900	16,942

† And other days ᵘ Estimated * Partly estimated

COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of river, 4.3 miles downstream from northerly international boundary, 3.2 miles downstream from Morelos Diversion Dam, about 50 feet downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 11 miles downstream from Yuma, Arizona along the river levee. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Mean daily gage heights based on continuous water-stage records. Records available: Continuous record of gage heights, November 1947 through December 1961; once weekly readings obtained by the U. S. Bureau of Reclamation January 1940 through October 1947.

REMARKS: This station is maintained by the United States Section of the Commission as part of the continuing study of channel conditions in the limitrophe section of the river.

EXTREMES: Since November 1947, maximum mean daily gage height, 108.20 feet, January 2, 1958; minimum mean daily gage height, 95.93 feet, March 17, 1951.

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	96.81	102.98	96.58	96.35	96.41	96.69	96.21	96.38	96.34	97.13	99.11	97.31
2	96.59	102.06	96.49	97.13	96.08	96.28	96.70	96.38	96.48	96.66	98.38	97.06
3	96.49	99.72	96.58	96.87	96.26	96.31	96.46	96.30	96.55	96.33	98.50	98.46
4	96.75	97.31	96.47	96.41	96.58	96.29	96.12	96.45	96.50	96.50	98.79	98.15
5	96.49	97.52	97.38	96.37	96.21	96.54	96.13	96.38	96.27	96.49	99.49	96.67
6	96.49	97.23	96.61	96.60	96.35	96.27	96.47	97.00	96.33	96.41	99.50	96.57
7	96.58	96.88	96.38	96.49	96.43	96.34	96.31	96.53	96.47	96.71	99.42	96.71
8	96.66	96.82	96.36	96.46	96.42	96.27	96.33	96.33	96.60	96.57	99.43	96.69
9	96.89	96.92	96.62	96.49	96.37	96.18	96.45	96.37	96.56	96.71	99.56	96.65
10	96.40	96.93	96.54	96.66	96.38	96.25	96.41	96.42	96.66	96.51	99.45	96.53
11	96.29	96.84	96.55	96.58	96.38	96.38	96.31	96.36	96.42	96.61	99.12	96.65
12	96.27	97.00	96.76	96.57	96.46	96.38	96.28	96.53	96.45	96.56	98.96	96.49
13	96.26	96.96	96.56	96.62	96.53	96.33	96.25	96.72	96.52	96.64	98.93	96.65
14	96.43	96.72	96.58	96.72	96.65	96.08	96.15	96.55	96.59	96.45	99.12	96.64
15	96.48	96.68	96.60	96.67	96.50	96.20	96.16	96.44	96.70	96.58	99.18	99.62
16	96.37	96.66	96.58	96.49	96.44	96.26	96.36	96.58	96.61	96.61	98.99	101.92
17	96.29	96.61	96.58	96.62	96.56	96.24	96.33	96.46	96.92	96.54	98.61	101.36
18	96.30	96.86	96.39	96.43	96.55	96.11	96.13	96.48	96.87	96.72	98.43	100.93
19	96.52	96.96	96.58	96.42	96.35	96.48	96.30	96.62	96.68	96.62	98.59	100.71
20	96.44	96.93	96.57	96.41	96.55	96.23	96.38	96.49	96.85	96.73	98.71	100.63
21	96.24	98.01	96.51	96.26	96.83	96.21	96.41	96.38	96.64	96.58	98.50	99.59
22	96.35	98.61	96.48	96.25	96.62	96.15	96.45	96.47	96.62	96.76	98.51	99.59
23	96.41	96.96	96.56	96.64	96.33	96.25	96.61	96.51	96.68	96.66	98.60	100.58
24	96.29	97.64	96.61	96.44	96.54	96.11	96.29	96.48	96.72	98.15	98.71	100.13
25	96.44	96.60	96.52	96.57	96.41	96.36	96.23	96.54	96.72	99.15	98.57	100.41
26	98.71	96.91	96.32	96.44	96.43	96.29	96.19	96.59	96.64	99.42	99.61	100.49
27	99.46	96.73	96.53	96.25	96.45	96.11	96.45	96.50	96.62	99.53	99.98	99.99
28	101.40	96.60	96.60	96.24	96.70	96.13	96.41	96.85	96.45	99.56	99.21	99.32
29	103.19		96.37	96.16	96.57	96.07	96.57	96.76	96.73	99.34	96.95	99.41
30	103.57		96.38	96.78	96.61	95.99	96.44	96.42	96.74	99.02	96.83	99.57
31	103.33		96.37		96.52		96.46	96.31		99.06		99.48
Avg.	97.46	97.52	96.55	96.51	96.47	96.26	96.35	96.50	96.60	97.27	98.86	98.74

TWENTY-ONE MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. This wasteway is located in Arizona 18.5 miles downstream from the northerly international boundary, 17.4 miles downstream from Morelos Diversion Dam, and 2.2 miles upstream from the southerly international boundary. It is the farthest downstream of the three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through December 1961, obtained by the United States Section; monthly discharge, March 1939 through December 1950, by Bureau of Reclamation.

REMARKS: This wasteway was completed and flow began March 14, 1939. Since May 13, 1944, waste water from the West Main Canal which previously discharged across the southerly land boundary has been returned to the Colorado River through this wasteway.

EXTREMES: Prior to January 1951, maximum monthly discharge, 2,860 acre-feet, January 1946; minimum monthly discharge, zero for various months. Since January 1, 1951, maximum instantaneous discharge, 102 second-feet, January 24, 1954 at maximum gage height of 95.46 feet (present datum); minimum instantaneous discharge, zero during a part of most months.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.7	8.8	19.0	19.0	18.0	18.2	4.0	4.9	0.3	* 26.0	0.2	4.5
2	1.1	6.0	4.6	22.7	1.4	2.6	13.6	3.2	2.4	* 18.4	10.7	5.8
3	2.6	18.9	28.0	21.5	.3	15.0	20.8	2.5	8.1	1.5	12.0	20.8
4	28.0	14.9	30.3	1.4	8.6	22.2	.9	.3	27.6	.1	10.2	14.4
5	25.3	16.5	34.1	.6	8.8	14.9	.1	.1	8.6	14.0	18.3	2.1
6	13.9	13.1	20.9	5.6	5.3	11.6	5.4	3.9	24.5	40.4	9.2	.9
7	6.9	1.2	1.9	11.3	7.5	.8	9.4	19.8	18.6	* 29.0	8.3	.7
8	11.6	0	.5	10.8	9.6	8.5	4.4	2.2	22.0	ᵁ 26.0	3.2	4.6
9	15.2	1.2	6.8	23.5	14.8	6.0	4.1	.4	19.0	* 22.0	9.0	6.8
10	2.7	1.4	22.4	20.7	5.6	16.8	6.4	4.1	12.9	8.5	1.1	5.0
11	.5	3.3	12.2	6.5	19.7	30.2	8.1	5.8	5.3	8.4	8.8	3.8
12	.1	.2	15.6	9.9	10.7	23.0	7.5	.2	14.7	27.8	0	5.4
13	0	20.0	31.9	14.1	36.1	14.1	15.2	5.6	17.8	15.2	0	9.8
14	3.4	8.2	20.6	9.0	10.4	20.8	1.4	15.8	10.9	9.5	0	11.7
15	20.2	14.9	15.5	10.0	7.9	12.4	.9	23.1	9.4	2.7	0	32.8
16	15.4	15.5	20.9	13.0	4.9	14.8	4.4	15.1	1.9	7.8	0	16.0
17	10.3	11.5	14.1	5.5	3.7	28.9	17.4	15.0	3.6	7.8	0	4.9
18	5.6	18.7	24.6	1.6	25.2	12.1	17.0	14.8	3.3	12.9	0	6.9
19	25.0	29.5	* 21.0	5.6	21.4	12.3	0	9.3	5.1	1.2	0	1.2
20	24.8	6.2	* 17.2	9.7	17.4	15.1	5.1	5.4	6.6	24.1	0	.8
21	4.5	1.4	5.5	25.4	8.5	9.2	3.5	5.2	20.7	11.7	1.8	.5
22	3.1	8.3	3.3	14.9	5.6	1.8	16.9	3.9	8.3	1.2	3.4	9.1
23	8.3	8.7	8.1	1.7	14.6	6.0	12.9	11.2	13.1	.8	20.4	8.6
24	6.6	15.4	13.5	11.8	10.5	16.6	5.0	6.3	5.6	3.6	15.2	10.4
25	13.4	11.4	19.3	16.0	14.9	24.6	4.7	.7	12.1	2.4	0	4.1
26	6.6	11.6	27.1	14.9	5.0	8.2	5.6	5.3	3.8	6.6	0	8.4
27	14.8	1.6	16.2	7.3	10.8	8.4	15.4	8.0	2.0	3.1	5.0	5.4
28	12.9	11.4	6.3	13.8	.3	6.2	9.9	13.3	11.0	3.6	15.3	8.9
29	16.7		8.8	7.5	4.0	4.4	4.1	18.3	17.7	17.1	6.5	11.1
30	25.3		21.8	11.3	4.7	1.6	.6	1.8	3.7	1.4	6.2	1.6
31	24.1		20.1		5.3		5.2	.8		.4		13.4
Sum	353.6	279.8	512.1	346.6	321.5	387.3	229.9	226.3	320.6	355.2	164.8	240.4

Current Year 1961 — **Period** 1939-1961

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	94.94	92.92	4	57.8	†12	0	11.4	701	1,184	2,860	397
Feb.	94.71	92.92	19	49.2	† 8	0	10.0	555	982	2,510	478
Mar.	94.81	92.92	13	52.9	†21	0	16.5	1,016	872	1,660	293
Apr.	94.80	92.92	21	52.5	† 7	0	11.6	687	967	1,940	326
May	94.79	92.92	13	52.1	†10	0	10.4	638	1,238	2,470	183
June	95.07	92.92	10	62.8	†19	0	12.9	768	1,090	2,350	292
July	94.74	92.92	10	50.3	† 1	0	7.4	456	944	1,950	192
Aug.	94.54	92.92	15	43.2	† 1	0	7.3	449	952	2,530	200
Sept.	94.84	92.92	14	54.0	† 1	0	10.7	636	843	2,180	122
Oct.	95.19	92.92	6	67.6	† 4	0	11.5	705	1,015	2,100	238
Nov.	94.50	92.92	24	41.8	† 7	0	5.5	327	1,202	2,380	327
Dec.	94.57	92.94	14	44.2	9	.1	7.8	477	1,388	2,680	477
Yearly	95.19	92.92		67.6		0	10.2	7,415	12,677	24,370	6,448

† And other days ᵁ Estimated * Partly estimated

DIVERSIONS BY PUMPS IN THE UNITED STATES - LIMITROPHE SECTION

DESCRIPTION: Approximately 11 pumps located along the left bank of the Colorado River in the Limitrophe Section operated by individuals to pump water for irrigating land in the river floodway in the United States.

RECORDS: Monthly quantities of water pumped estimated by the United States Section of the Commission from weekly readings of running time meters attached to the pumps and pump capacities. Records available: January 1956 through December 1961.

REMARKS: These records are used in the computations of water delivered to Mexico under provisions of the 1944 Water Treaty.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1956-1961		
		Average	Maximum	Minimum
January	196	172	280	80
February	272	358	500	210
March	397	421	600	317
April	389	447	510	389
May	506	530	770	400
June	385	608	800	385
July	559	619	820	460
August	300	453	800	290
September	462	448	940	194
October	357	308	390	240
November	292	235	330	90
December	184	166	230	99.2
Yearly	4,299	4,765	6,480	3,941.2

EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir located about 300 feet north of the international boundary and 1.5 miles east of the Colorado River. This is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Wasteway discharges computed by United States Section of the Commission beginning November 1, 1953, from head on control weir as measured by water-stage recorder and weir ratings as determined by current meter measurements. During the year 20 measurements were made by the United States Section. Records available: Monthly discharges January 1924 through June 1928, January 1932 through December 1933, and April 1935 through December 1961; daily discharges October 1946 through December 1961.

REMARKS: Wasteway discharges from the East Main Canal comprise regulatory waste and drainage waters from the eastern half of the Valley Division of the Yuma Project. Beginning in January 1956 flows from this canal discharging into Mexico have been included in deliveries to Mexico in the same manner as waste flows arriving in the bed of the limitrophe section of Colorado River, under terms of an agreement between the two Sections of the Commission.

EXTREMES: Monthly and annual extremes for the current year and for the period 1935-1961 are shown in the summary table below.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	25.1	15.3	29.5	6.4	27.7	0.2	¤ 14.0	23.9	17.8	13.9	24.8	23.3
2	20.8	7.9	8.9	13.9	25.6	3.8	¤ 10.0	21.3	14.9	5.8	18.0	20.5
3	8.8	9.4	16.7	39.0	33.4	11.3	¤ 15.0	2.3	15.2	4.9	13.9	8.2
4	21.6	22.0	13.4	20.7	22.3	3.9	10.0	8.6	21.6	16.8	23.3	5.9
5	23.8	23.4	11.6	31.6	31.2	19.1	8.5	2.0	16.7	27.6	37.0	10.5
6	9.4	13.1	7.5	15.0	20.8	17.3	8.0	2.6	17.6	12.7	21.3	23.8
7	13.4	15.2	11.0	7.6	29.0	31.9	6.9	1.8	22.5	36.2	11.3	22.5
8	15.8	16.2	4.7	29.1	46.3	3.9	4.8	12.9	6.4	24.7	5.9	8.0
9	18.4	13.7	18.9	24.2	16.4	15.7	6.2	9.5	26.3	21.3	26.2	21.8
10	4.0	11.0	8.3	13.6	14.0	3.0	3.3	22.7	4.3	8.9	23.7	14.4
11	1.0	7.6	5.7	24.6	6.6	12.2	8.1	21.1	13.8	1.2	9.7	16.7
12	.5	20.4	10.0	6.2	15.6	16.7	13.5	19.9	13.1	25.1	9.4	23.0
13	0	12.0	13.2	13.0	14.3	11.4	18.1	23.2	13.1	20.9	16.4	11.0
14	.8	20.0	14.7	18.3	38.8	8.5	0	21.4	10.9	8.5	13.6	23.4
15	18.6	18.1	15.1	32.1	30.3	17.5	3.3	37.5	17.8	15.0	17.8	38.5
16	26.4	12.2	17.9	8.3	10.6	19.2	14.6	22.4	6.0	25.6	16.8	20.8
17	18.3	9.4	8.0	23.0	8.9	15.3	18.1	26.7	16.2	5.9	26.2	8.0
18	15.6	6.6	10.4	11.9	17.4	5.5	21.5	37.0	30.0	3.2	25.8	17.4
19	19.0	5.8	8.5	24.2	.2	10.1	21.4	30.7	24.4	13.3	20.6	4.1
20	17.4	25.9	25.3	28.1	17.6	3.2	16.2	31.5	26.6	26.8	34.3	3.4
21	9.9	4.1	10.1	7.0	21.3	1.5	5.1	27.2	15.8	15.6	16.5	10.2
22	11.1	1.4	2.8	27.6	22.3	11.1	0	3.0	23.7	23.6	4.1	33.9
23	14.6	4.6	4.6	30.0	12.0	5.6	0	4.3	26.8	12.4	6.3	28.7
24	1.7	17.6	6.0	31.7	25.3	24.0	10.0	2.7	19.2	27.5	37.4	26.8
25	8.4	15.6	17.5	16.1	14.6	12.5	* 23.0	.6	.2	13.1	22.5	26.8
26	18.9	12.8	22.1	19.2	7.6	17.8	¤ 15.0	3.3	2.5	1.0	24.5	25.4
27	29.7	21.7	25.5	20.5	10.2	15.5	¤ 14.0	10.2	17.0	2.6	11.0	6.7
28	14.3	14.2	18.9	19.3	28.2	22.7	¤ 4.0	8.5	19.0	23.2	15.7	18.3
29	19.1		10.7	28.0	30.8	18.9	¤ 3.1	6.0	12.0	36.3	21.0	20.3
30	8.4		7.4	28.1	.3	13.6	¤ 7.1	6.7	13.8	34.8	9.4	8.5
31	7.3		20.6		13.5		* 12.1	5.2		33.4		11.4
Sum	422.1	377.2	405.5	618.3	613.1	372.9	* 314.9	456.7	485.2	541.8	564.4	542.2

Current Year 1961

Month	Extreme Gage Feet		∅ Extreme Second-Feet				Average Second-Feet	Total Acre-Feet
			High		Low			
	High	Low	Day		Day			
Jan.			27	29.7	13	0	13.6	837
Feb.			20	25.9	22	1.4	13.5	748
Mar.			1	29.5	22	2.8	13.1	804
Apr.			3	39.0	12	6.2	20.6	1,226
May			8	46.3	19	.2	19.8	1,216
June			7	31.9	1	.2	12.4	740
July			25	* 23.0	† 14	0	* 10.2	* 625
Aug.			15	37.5	25	.6	14.7	906
Sept.			18	30.0	25	.2	16.2	962
Oct.			29	36.3	26	1.0	17.5	1,075
Nov.			24	37.4	22	4.1	18.8	1,119
Dec.			15	38.5	20	3.4	17.5	1,075
Yearly				46.3		0	15.7	11,333

Period 1935-1961

Acre-Feet		
Average	Maximum	Minimum
1,507	3,360	¤ 383
1,215	3,170	¤ 383
1,417	2,920	190
1,399	3,170	197
1,540	3,040	385
1,335	3,660	175
1,478	3,590	198
1,464	3,960	169
1,296	3,170	159
1,360	3,280	504
1,511	3,570	430
1,511	3,080	438
17,033	38,310	* 4,800

† And other days ∅ Mean daily * Partly estimated ¤ Estimated

YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorders located in the forebay and afterbay of the Border Pumping Plant on the Main Drain about 200 feet north of the international boundary near San Luis, Arizona, 1.3 miles east of the Colorado River. This is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Main Drain discharges are lifted 10 to 12 feet at the pumping plant and are computed from pump ratings and the differential head measured by the two gages. Pump ratings are checked by monthly current meter measurements. During the year 12 measurements were made by the United States Section of the Commission. Records are computed by the Yuma County Water Users' Association, reviewed and furnished to the Commission by the U. S. Geological Survey. Records available: Monthly discharges June 1919 to December 1961.

REMARKS: Flows in the Main Drain are principally drainage waters from the Valley Division of the Yuma Project. Both the Main Drain and the East Main Canal Wasteway discharge into Mexico at the international land boundary near San Luis, Sonora. The water is used for irrigation in Mexico on the left (Sonora) bank of the Colorado River. Beginning in January 1956 the flows from this drain discharging into Mexico have been included in deliveries to Mexico in the same manner as waste flows arriving in the bed of the limitrophe section of Colorado River under terms of an agreement between the two Sections of the Commission.

EXTREMES: Monthly extremes for the current year and for the period 1935-1961 are shown in the table below.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	170	181	201	201	178	209	180	199	174	209	181	171
2	163	179	201	197	193	215	184	182	173	206	185	177
3	171	190	201	198	187	209	178	178	167	194	185	175
4	195	180	202	193	174	200	170	191	168	195	189	172
5	172	185	204	185	181	198	175	185	163	189	190	173
6	176	181	206	180	194	192	172	187	161	193	180	171
7	176	177	222	195	193	190	167	186	166	199	175	165
8	182	174	199	193	193	182	175	187	164	187	184	175
9	174	172	195	199	192	190	172	185	169	188	192	173
10	164	184	195	204	200	194	175	182	171	194	185	172
11	170	192	213	188	195	186	182	175	167	194	187	169
12	153	179	195	190	195	192	174	176	180	198	193	164
13	154	188	195	191	193	178	167	184	183	195	176	162
14	160	197	193	187	199	177	197	184	165	195	191	165
15	172	192	194	186	193	185	205	197	183	186	186	189
16	166	193	209	198	184	178	184	187	190	196	189	187
17	174	186	194	195	184	173	187	192	199	192	171	168
18	170	184	196	187	193	188	190	193	200	192	185	166
19	172	190	196	182	183	190	183	175	191	181	194	163
20	165	199	210	187	183	170	187	189	189	189	186	164
21	169	192	193	190	198	178	188	189	183	196	178	163
22	175	191	187	203	194	183	188	170	174	198	168	158
23	166	192	180	193	182	172	197	188	189	197	170	148
24	172	191	187	193	199	177	179	170	189	196	176	160
25	169	197	192	193	196	182	177	181	175	192	187	147
26	186	199	192	193	193	166	192	183	199	193	177	152
27	182	200	195	192	199	184	185	183	182	197	189	144
28	184	203	195	179	209	201	182	174	195	198	172	143
29	175		199	192	196	180	187	169	195	196	173	147
30	177		214	189	191	179	199	165	194	189	183	147
31	185		192		188		197	159		183		167
Sum	5,339	5,268	6,147	5,753	5,932	5,598	5,675	5,645	5,398	6,007	5,477	5,097

Month	Current Year 1961								Period 1935-1961		
	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			4	195	12	153	172	10,590	7,060	11,140	1,740
Feb.			28	203	9	172	188	10,449	6,964	10,940	1,640
Mar.			7	222	23	180	198	12,192	7,977	12,192	1,940
Apr.			10	204	28	179	192	11,411	7,729	11,890	1,920
May			28	209	4	174	191	11,766	7,748	13,140	1,950
June			2	215	26	166	187	11,103	7,099	12,040	2,290
July			15	205	† 7	167	183	11,256	6,803	11,830	2,530
Aug.			1	199	31	159	182	11,197	6,719	11,960	2,560
Sept.			18	200	6	161	180	10,707	6,881	11,560	2,280
Oct.			1	209	19	181	194	11,915	7,896	12,071	2,940
Nov.			19	194	22	168	183	10,863	7,863	12,010	2,800
Dec.			15	189	28	143	164	10,110	7,645	11,480	2,450
Yearly				222		143	184	133,559	88,384	139,380	27,040

† And other days Ø Mean daily

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

DESCRIPTION: Water-stage recorder located in Mexico on the right bank of the river about 1,000 feet upstream from the southerly international boundary, 2 miles west of San Luis, Arizona, and 19.4 miles downstream from Morelos Dam. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: During 1961, two diversion dikes across the river channel 0.1 mile and 2.8 miles, respectively, below the southerly international boundary caused backwater at this station, and discharges are based on the summation of flows in the Colorado River at R. S. 18-S, 4.7 miles upstream from the southerly international boundary, and the Twenty-one Mile wasteway, 1.6 miles upstream from the southerly international boundary. Computations by shifting channel methods. Records available: Daily discharges, January 1950 through December 1961; continuous record of gage heights, January 1947 through December 1961. Monthly flows for this station have been derived for the period January 1935 through December 1949 based on the computed records of monthly flows of the Colorado River at the northerly international boundary combined with the measured monthly flows from the wasteways discharging into the boundary section of the river from the Yuma Project in Arizona.

REMARKS: Reservoirs, diversions in the United States and Mexico, drainage returns and waste flows modify the river at this station. The river flow past this station is depleted by numerous pumps and gravity diversions before it reaches the Gulf of California.

EXTREMES: Maximum gage height, 84.84 feet, November 29, 1957; minimum gage height, 74.46 feet, April 4, 1959.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	92.1	4,890	81.2	43.0	64.3	61.0	9.3	13.3	2.3	46.5	590	63.0
2	113	3,660	57.2	61.8	19.6	55.2	17.6	7.4	5.2	77.5	457	174
3	77.8	1,830	75.0	127	16.5	49.2	38.0	5.9	12.5	21.3	378	233
4	113	321	77.0	54.0	37.8	44.6	8.3	3.7	42.0	7.8	461	484
5	119	166	93.5	41.3	47.6	47.6	6.9	3.9	23.1	29.5	650	144
6	90.4	203	106	56.6	31.3	41.6	11.3	11.9	30.5	50.4	768	56.4
7	97.1	110	46.1	53.1	30.1	24.1	25.4	61.4	23.6	38.2	745	42.7
8	80.0	94.4	35.1	50.4	38.2	33.9	12.1	19.2	25.8	49.3	713	64.6
9	119	94.2	52.4	65.1	34.4	25.1	10.9	6.0	24.0	41.1	751	74.3
10	86.3	85.0	59.6	68.8	28.2	35.4	15.6	8.9	22.2	40.3	760	57.5
11	61.8	82.1	55.5	53.5	44.5	55.4	11.7	11.7	16.5	28.9	685	53.3
12	51.9	83.8	56.0	47.5	36.0	52.6	11.9	6.7	20.9	49.9	575	56.4
13	51.0	120	91.5	47.4	70.0	47.4	19.8	16.0	23.6	26.2	555	51.8
14	52.8	95.6	66.6	37.6	52.8	47.1	4.2	39.3	16.6	20.7	605	66.0
15	79.5	88.0	61.6	52.8	62.1	28.0	3.5	42.1	15.9	8.9	671	474
16	76.3	84.0	66.6	50.0	38.9	28.0	7.4	31.5	16.4	21.3	616	2,490
17	61.0	74.2	57.5	51.8	41.3	40.2	21.0	31.5	18.6	21.8	474	2,300
18	62.4	89.0	57.8	43.0	61.4	27.5	21.6	26.6	43.9	37.7	379	2,030
19	86.3	112	54.4	45.0	53.2	31.1	3.2	20.5	35.4	30.1	354	1,790
20	112	109	49.2	41.9	43.0	42.5	7.5	19.9	27.1	50.1	525	1,700
21	67.6	164	33.0	60.8	42.5	20.0	4.1	14.4	31.0	33.2	435	1,270
22	61.7	618	41.5	46.0	66.0	11.0	18.8	8.9	13.3	15.2	431	864
23	73.3	261	51.6	37.5	53.8	13.4	16.6	15.2	24.2	22.7	444	1,690
24	63.4	229	61.8	56.2	48.0	27.4	9.4	13.4	24.7	55.8	502	1,400
25	65.6	111	68.4	58.8	49.6	35.8	8.3	4.5	39.5	328	446	1,450
26	224	94.4	66.4	62.0	35.4	25.2	8.8	8.9	22.2	527	605	1,610
27	1,220	94.6	51.2	47.3	45.6	23.9	17.8	14.8	13.2	691	999	1,380
28	1,610	82.0	44.5	44.4	50.5	14.2	13.9	19.8	18.7	620	930	921
29	4,450		47.6	34.0	84.0	10.9	10.3	64.2	28.0	710	268	861
30	5,340		51.8	32.8	60.6	6.4	9.8	26.5	26.3	586	97.8	897
31	5,380		39.0		55.5		13.2	9.2		525		908
Sum	20,238.3	14,045.3	1,856.6	1,571.4	1,442.7	1,005.7	398.2	587.2	687.2	4,811.4	16,869.8	25,656.0

Month	Current Year 1961							Period 1935-1961		
	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.	80.63	74.98	31	5,610	12	46.3	653	40,142	559,624	1,672,000	32,160
Feb.	80.52	74.62	1	5,250	17	61.0	502	27,858	466,107	1,385,000	26,130
Mar.	75.58	74.42	6	132	31	15.0	59.9	3,683	376,559	1,127,000	3,683
Apr.	76.95	74.32	3	208	30	21.0	52.4	3,117	240,585	700,900	977
May	76.29	74.12	29	105	3	14.0	46.5	2,862	329,330	1,160,000	2,490
June	74.82	73.87	5	79.8	30	5.3	33.5	1,995	254,682	1,180,000	1,995
July	75.45	73.90	3	49.3	21	.6	12.8	790	186,288	772,800	790
Aug.	75.82	74.00	29	81.2	26	2.4	18.9	1,165	207,525	796,000	1,165
Sept.	75.45	" 73.55	21	74.6	1	1.2	22.9	1,363	249,798	1,033,000	1,363
Oct.	* 76.62	74.06	29	827	15	4.5	155	9,543	315,010	1,192,000	9,120
Nov.	77.23	75.34	28	1,050	30	87.0	562	33,461	416,246	1,428,000	33,461
Dec.	79.05	74.76	16	2,610	12	39.4	828	50,888	529,810	1,839,000	30,320
Yearly	80.63	73.55		5,610		0.6	244	176,867	4,131,564	10,688,800	176,867

" Estimated * Partly estimated

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	77.35	80.42	74.73	75.45	75.04	74.46	74.55	75.13	*73.98	75.31	76.22	75.24
2	76.22	79.76	74.59	75.74	74.58	74.62	74.89	75.13	u73.55	75.25	76.06	75.53
3	75.05	78.48	74.67	76.50	74.32	74.57	75.20	74.92	u73.55	74.59	75.83	75.53
4	75.09	76.12	74.75	75.88	74.29	74.54	74.89	75.38	*74.10	74.22	75.99	76.33
5	75.18	*75.42	74.79	74.91	74.56	74.63	75.00	75.37	74.37	74.11	76.26	75.65
6	75.76	*75.53	75.24	74.81	74.41	74.62	74.68	75.19	74.26	74.61	76.66	75.02
7	75.87	75.11	74.61	75.24	74.36	74.37	74.68	75.24	74.17	74.49	76.61	74.88
8	75.68	74.93	74.45	74.98	74.37	74.38	74.70	75.09	74.30	74.52	76.55	74.94
9	75.79	74.88	74.59	75.13	74.40	74.31	74.71	74.98	74.25	74.57	76.55	74.98
10	76.10	74.82	75.00	75.26	74.25	74.42	74.65	74.82	74.23	74.56	76.59	74.92
11	75.83	75.35	75.27	75.08	74.56	74.57	74.78	74.83	74.15	74.68	76.50	74.81
12	75.67	75.52	74.93	75.08	74.40	74.70	74.81	74.32	74.38	74.50	76.34	74.83
13	75.28	75.54	75.20	75.20	74.67	74.61	74.85	74.16	74.20	74.54	76.31	74.82
14	#	75.35	74.88	75.08	74.57	74.66	74.81	74.53	74.17	74.44	76.37	74.88
15	#	75.16	74.92	75.05	74.91	74.50	74.80	74.67	74.32	74.39	76.48	75.35
16	#	75.15	75.00	75.11	74.75	74.37	74.65	74.65	74.12	74.82	76.43	78.80
17	76.00	75.08	74.88	74.97	74.77	74.45	74.73	75.05	74.11	74.50	76.26	78.70
18	76.12	75.05	74.88	74.74	74.75	74.30	74.59	75.08	74.18	74.43	76.08	78.36
19	76.05	75.20	74.92	74.64	74.59	74.25	74.66	75.10	74.68	74.51	76.02	78.07
20	76.81	*75.16	75.25	74.58	74.42	74.44	74.61	74.90	74.36	74.56	76.30	77.97
21	76.57	75.26	74.89	74.60	74.45	74.67	74.35	75.54	74.65	74.51	76.17	77.60
22	75.36	76.48	74.88	74.63	74.71	74.32	74.26	74.81	74.25	74.32	76.16	76.91
23	75.90	76.02	74.91	74.51	74.70	74.17	74.57	74.95	74.48	74.21	76.22	77.86
24	76.17	75.62	75.00	74.56	74.52	74.46	74.80	74.84	74.58	74.32	76.36	77.64
25	75.80	75.17	75.13	74.49	74.62	74.68	74.50	74.72	75.11	75.41	76.37	77.67
26	76.15	74.77	74.95	74.64	74.91	74.58	74.44	74.64	74.54	76.10	76.51	77.87
27	77.40	74.80	74.94	74.46	75.08	74.55	74.52	74.86	74.58	76.46	77.15	77.71
28	77.47	74.68	74.84	74.51	75.49	74.13	74.89	74.90	74.58	76.33	77.12	77.13
29	79.70		74.94	74.42	75.34	74.08	74.58	75.12	74.78	76.45	76.18	76.87
30	80.41		75.05	74.39	74.69	74.32	74.37	74.77	74.96	76.28	75.42	76.94
31	80.56		75.13		74.56		75.19	74.49		76.11		77.01
Avg.		75.74		74.95		74.46		74.91		74.91		76.48
	**76.48		74.91		74.65		74.70		74.33		76.34	

Recorder inoperative u Estimated * Partly estimated ** Based on days of record only

DIVERSIONS FROM COLORADO RIVER IN MEXICO TO SANCHEZ MEJORADA - SAN LUIS CANALS NEAR SAN LUIS, SONORA

DESCRIPTION: Pumping plant operated by the Ministry of Hydraulic Resources, located on the left bank of the Colorado River immediately downstream from the Mexicali-San Luis highway bridge and about 1,300 feet downstream from the southerly international boundary. Pumping equipment consists of 3 pumps in the Sanchez Mejorada system (2 of 30 inches and 1 of 40 inches) and 2 pumps of 30 inches in the Ejido San Luis system.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1961.

REMARKS: Flow in the Colorado River available for diversion at this point consists of water that is permitted to pass Morelos Dam and of return flows from the Yuma Project in the United States at Cooper, Eleven Mile and Twenty-one Mile Wasteways, less depletions by pumps on both banks of the limitrophe section of the river.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	28.3	0	31.8	0	0	28.3	0	24.7	0	0	0	0
2	28.3	0	31.8	28.3	0	28.3	0	28.3	0	0	0	0
3	0	0	0	31.8	0	28.3	141	28.3	0	0	0	0
4	0	0	31.8	31.8	0	28.3	283	28.3	0	0	0	0
5	28.3	0	31.8	31.8	0	28.3	283	24.7	0	0	0	0
6	28.3	0	31.8	31.8	24.7	28.3	283	56.5	0	0	0	0
7	28.3	0	31.8	17.7	17.7	28.3	283	56.5	0	0	0	0
8	28.3	0	31.8	0	0	28.3	283	31.8	0	0	0	0
9	28.3	0	31.8	0	21.2	28.3	283	28.3	0	0	0	0
10	60.0	0	31.8	0	0	28.3	283	28.3	0	0	0	0
11	109	0	31.8	21.2	0	28.3	166	28.3	0	0	0	0
12	91.8	21.2	31.8	31.8	0	28.3	0	28.3	0	0	0	0
13	53.0	28.3	31.8	31.8	0	28.3	283	28.3	0	0	0	0
14	53.0	24.7	31.8	31.8	0	28.3	0	28.3	28.3	0	0	0
15	63.6	28.3	31.8	21.2	0	28.3	258	10.6	28.3	0	0	0
16	70.6	28.3	31.8	31.8	14.1	28.3	283	0	28.3	0	0	0
17	70.6	28.3	31.8	31.8	28.3	28.3	272	28.3	28.3	0	0	0
18	60.0	28.3	31.8	31.8	28.3	28.3	283	28.3	0	0	0	0
19	38.8	28.3	31.8	31.8	28.3	28.3	283	24.7	0	0	0	0
20	70.6	28.3	31.8	17.7	14.1	28.3	283	0	0	0	0	0
21	81.2	28.3	31.8	31.8	0	28.3	283	24.7	0	0	0	0
22	60.0	28.3	31.8	31.8	0	28.3	283	0	0	0	0	0
23	67.1	28.3	31.8	31.8	0	28.3	283	0	28.3	0	0	0
24	70.6	0	31.8	7.1	0	24.7	283	0	28.3	0	0	0
25	67.1	0	0	0	0	28.3	0	0	28.3	0	0	0
26	63.6	28.3	0	0	0	28.3	0	0	0	0	0	0
27	0	28.3	31.8	0	24.7	28.3	0	0	0	0	0	0
28	0	28.3	31.8	0	28.3	28.3	212	0	0	0	0	0
29	0		31.8	0	28.3	0	283	0	0	0	0	0
30	0		31.8	0	28.3	0	283	28.3	0	0	0	0
31	0		31.8		28.3		283	28.3		0		0
Sum	1,348.7	413.8	890.4	558.4	314.6	788.8	6,426	622.1	198.1	0	0	0

Month	Current Year 1961								Period 1958-1961		
	Extreme Gage Feet		∅ Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			11	109	† 27	0	43.4	2,675	892	2,675	0
Feb.			† 13	28.3	† 1	0	14.8	820	448	820	245
Mar.			† 1	31.8	† 25	0	29.7	1,828	1,156	1,828	490
Apr.			† 3	31.8	† 1	0	18.7	1,107	1,043	1,107	1,009
May			† 17	28.3	† 1	0	10.2	623	743	1,016	589
June			† 1	28.3	† 29	0	26.1	1,562	1,319	1,562	883
July			† 4	283	† 1	0	207	12,724	4,832	12,724	0
Aug.			6	56.5	† 16	0	20.1	1,231	3,086	6,612	1,231
Sept.			† 14	28.3	† 1	0	6.7	392	1,065	1,660	392
Oct.				0		0	0	0	78.6	315	0
Nov.				0		0	0	0	0	0	0
Dec.				0		0	0	0	0	0	0
Yearly				283		0	31.4	22,962	14,902	22,962	10,269

† And other days ∅ Mean daily

WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

DESCRIPTION: Water-stage recorder with cableway over the outlet canal from Canal de Conexión on the right bank of the Colorado River located approximately 0.6 mile downstream from the control structure at Kilometer 27 on Canal de Conexión which is 16.8 miles downstream from Morelos Dam and 0.2 mile south of the crossing of the Mexicali-San Luis and Algodones-Pescaderos road. The recorder housing is on the left bank of the outlet canal immediately upstream from where it discharges into the Colorado River.

RECORDS: Data collected by the Colorado River Irrigation District of the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission. 1961 records good. Records available: April 1956 through December 1961.

REMARKS: The Colorado River Irrigation District in Mexico transports water for irrigation of lands on the left bank of the Colorado River by the Canal de Conexión to a point called Kilometer 27, at which point water is discharged into the river for pumping to the canals on the left bank by the Bacanora and Monumentos pumps. A dike is constructed across the river channel at this point and no flow is allowed to pass downstream except for minor seepage.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	106	127	897	406	290	547	901	374	0	53.0	141
2	0	70.6	201	883	283	314	759	908	177	0	45.9	148
3	0	102	272	883	300	325	883	749	177	0	38.8	141
4	0	0	318	696	247	388	724	989	177	0	35.3	141
5	0	0	360	653	325	434	795	1,020	388	0	35.3	141
6	0	0	413	583	332	413	636	989	360	0	35.3	113
7	0	0	332	636	251	396	622	901	374	0	35.3	141
8	0	0	452	636	194	381	622	759	371	0	35.3	124
9	0	0	523	689	138	283	646	759	371	0	35.3	81.2
10	0	0	636	696	117	353	636	653	233	0	35.3	53.0
11	0	0	706	689	63.6	406	636	685	194	141	35.3	53.0
12	0	0	664	731	88.3	459	717	473	424	152	53.0	49.4
13	0	0	699	742	91.8	420	713	456	237	170	35.3	38.8
14	0	0	590	685	98.9	441	689	516	314	230	45.9	42.4
15	0	0	646	692	106	494	689	494	403	240	53.0	42.4
16	0	0	653	706	124	254	636	551	325	247	56.5	0
17	0	0	689	643	187	339	639	784	321	0	60.0	0
18	0	0	664	544	219	283	565	689	470	0	60.0	0
19	0	0	724	551	159	388	607	671	173	0	60.0	0
20	0	0	742	410	124	406	576	653	0	0	53.0	0
21	0	0	713	399	215	614	512	851	0	0	53.0	0
22	0	0	706	388	145	512	530	583	0	0	49.4	0
23	0	0	682	396	173	459	565	646	378	0	49.4	0
24	0	0	671	346	152	565	625	583	378	0	49.4	0
25	0	0	653	335	145	593	533	554	403	0	53.0	0
26	283	0	636	346	162	593	547	576	364	0	49.4	0
27	215	0	664	268	286	593	576	625	371	0	53.0	0
28	0	95.3	622	170	318	441	724	706	148	0	159	0
29	102		706	124	215	417	551	784	0	0	159	0
30	131		706	265	230	484	526	583	0	0	159	0
31	127		724		272		901	523		0		0
Sum	858	373.9	17,894	16,682	6,167.6	12,738	19,927	21,614	7,905	1,180	1,730.4	1,450.2

Current Year 1961 — **Period** 1956-1961

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			26	283	† 1	0	27.5	1,702	16,634	69,527	0
Feb.			1	106	† 4	0	13.4	743	2,340	8,679	0
Mar.			20	742	1	127	576	35,492	17,202	35,492	770
Apr.			1	897	29	124	554	33,083	35,319	68,714	15,049
May			1	406	11	63.6	199	12,230	16,518	22,072	12,230
June			21	614	16	254	424	25,272	23,541	28,915	11,358
July			31	901	21	512	643	39,520	42,989	46,139	39,520
Aug.			5	1,020	13	456	696	42,874	46,200	55,497	24,466
Sept.			18	470	† 20	0	263	15,676	28,873	37,194	15,676
Oct.			16	247	† 1	0	38.1	2,340	6,091	13,532	0
Nov.			† 28	159	† 4	35.3	57.6	3,433	15,213	69,415	0
Dec.			2	148	† 16	0	47.0	2,879	12,718	70,213	0
Yearly				1,020		0	295	215,244	267,264	346,339	194,011

† And other days Ø Mean daily

DIVERSIONS FROM COLORADO RIVER TO BACANORA AND MONUMENTOS CANALS IN MEXICO

DESCRIPTION: Pumping plant operated by the Ministry of Hydraulic Resources and the Association of Users of the Bacanora and Monumentos Canals, located on the left bank of the Colorado River in Ejido Monumentos in San Luis Río Colorado, Sonora, about 5.0 river miles downstream from the southerly international boundary and immediately downstream from Kilometer 27 outlet canal. Pumping equipment consists of 22 pumps with ownership divided between the Ministry of Hydraulic Resources and the Association of Users as follows: In the Bacanora system, Association of Users, 8 pumps (1 of 30 inches, 5 of 36 inches, and 2 of 42 inches); the Ministry, 11 pumps (5 of 30 inches and 6 of 36 inches), and in Monumentos system the Association of Users have 3 pumps of 36 inches.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1961.

REMARKS: A part of the natural flow in the river at the pumping plant and releases from Canal de Conexión to the river at Kilometer 27 are pumped to the left bank canal system for irrigation and domestic use. On the Bacanora Canal, at Kilometer 1+258, a gaging station was constructed in 1959 with a water-stage recorder and cableway which has not been placed in operation.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	70.6	162	731	360	180	470	720	254	0	0	0
2	0	70.6	177	738	283	254	600	745	138	0	0	0
3	0	53.0	275	756	226	272	727	622	138	0	0	0
4	0	81.2	290	738	230	283	611	625	138	0	0	0
5	0	24.7	286	607	261	335	611	780	300	0	0	0
6	0	24.7	448	558	283	360	540	763	293	0	0	0
7	0	14.1	357	583	212	272	509	738	258	0	0	0
8	0	7.1	343	629	162	258	540	625	268	0	0	0
9	0	17.7	452	607	145	166	519	583	272	0	0	0
10	0	0	590	646	117	247	523	558	194	0	0	0
11	0	0	636	593	53.0	293	547	558	159	109	0	0
12	0	0	671	607	42.4	396	586	434	290	127	0	0
13	0	0	671	618	67.1	367	597	332	212	124	0	0
14	0	0	646	611	77.7	293	576	410	222	127	0	0
15	0	0	547	586	77.7	392	586	424	297	127	0	0
16	0	0	622	646	77.7	226	533	466	240	127	0	0
17	0	0	636	590	88.3	258	537	629	219	106	0	0
18	0	0	646	533	244	184	420	516	219	0	0	0
19	0	0	671	371	215	254	470	583	141	0	0	0
20	0	0	671	343	95.3	205	473	576	0	17.7	0	0
21	0	0	653	353	177	441	431	643	0	35.3	0	0
22	0	74.2	636	318	180	427	427	576	0	14.1	0	0
23	0	0	636	311	177	339	448	505	166	0	0	0
24	0	10.6	636	325	162	403	547	484	219	0	0	0
25	0	14.1	569	258	145	509	388	505	272	0	0	0
26	0	45.9	643	300	155	466	410	385	272	0	0	0
27	0	77.7	636	247	113	498	434	523	265	0	0	0
28	0	60.0	590	152	198	374	544	565	88.3	0	0	0
29	0		618	106	127	339	505	629	0	0	0	0
30	0		657	152	155	392	371	498	0	0	0	0
31	0		664		138		742	392		0		0
Sum	0	646.2	16,735	14,613	5,044.2	9,683	16,222	17,392	5,534.3	914.1	0	0

Month	Current Year 1961								Period 1958-1961		
	Extreme Gage Feet		∅ Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.				0		0	0	0	72.2	217	0
Feb.			4	81.2	†10	0	23.0	1,282	497	1,282	0
Mar.			†12	671	1	162	540	33,187	20,724	33,187	12,111
Apr.			3	756	29	106	487	28,985	33,545	38,007	28,985
May			1	360	12	42.4	163	10,003	14,885	24,285	10,003
June			25	509	9	166	323	19,202	22,177	26,862	19,202
July			31	742	30	371	523	32,179	33,404	36,297	31,738
Aug.			5	780	13	332	562	34,492	37,802	48,947	31,023
Sept.			5	300	†20	0	184	10,975	34,698	78,396	10,975
Oct.			†12	127	† 1	0	29.3	1,812	2,358	4,749	510
Nov.				0		0	0	0	0	0	0
Dec.				0		0	0	0	31.6	126	0
Yearly				780		0	236	172,117	182,499	213,722	161,658

† And other days ∅ Mean daily

WASTEWAY TO COLORADO RIVER AT COLONIA ELIAS IN MEXICO

DESCRIPTION: Wasteway structure located at Kilometer 7+570 of the Barrote Canal on the right bank of the Colorado River in Colonia Elias about 20.5 miles downstream from the southerly international boundary and the town of San Luis Río Colorado, Sonora; about 10 miles upstream from the Sonora-Baja California railroad bridge and 4.3 miles upstream from the Miguel C. Rodriguez gaging station. The wasteway gates are located about 2,500 feet from the right bank of the Colorado River.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through December 1961.

REMARKS: The wasteway structure has 3 manually operated rectangular gates which discharge directly from the Barrote Canal into a wasteway leading to the Colorado River.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	14.1	0	0	0	0	0	0	0	0	0	0
5	0	53.0	0	0	0	0	0	0	0	0	0	0
6	0	88.3	0	0	0	0	0	0	0	0	0	0
7	0	67.1	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	31.8	0	0	0	0	0	0	0	0	0	0
24	0	31.8	0	0	0	0	0	0	0	0	0	0
25	0	31.8	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0		0	0	0	0	0	0	0	0	0	0
30	0		0	0	0	0	0	0	0	0	0	0
31	0		0		0		0	0		0		0
Sum	0	317.9	0	0	0	0	0	0	0	0	0	0

Month	Current Year 1961 — Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1957-1961 — Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.				0		0	0	0	717	3,201	0
Feb.			6	88.3	† 1	0	11.3	631	221	631	0
Mar.				0		0	0	0	1,493	6,850	0
Apr.				0		0	0	0	1,201	3,707	0
May				0		0	0	0	292	1,163	0
June				0		0	0	0	152	625	0
July				0		0	0	0	859	4,296	0
Aug.				0		0	0	0	825	1,926	0
Sept.				0		0	0	0	975	1,548	0
Oct.				0		0	0	0	205	791	0
Nov.				0		0	0	0	0	0	0
Dec.				0		0	0	0	153	766	0
Yearly				88.3		0	0.7	631	7,093	13,429	631

† And other days Ø Mean daily

COLORADO RIVER AT MIGUEL C. RODRIGUEZ GAGING STATION IN MEXICO

DISCHARGES

DESCRIPTION: Water-stage recorder and cableway located in Mexico on the Colorado River about 24.5 miles downstream from the southerly international boundary, 44.5 miles downstream from Morelos Dam and 4.5 miles upstream from the Sonora-Baja California railroad bridge. Water-stage recorder was moved from the right bank to the left bank of the Colorado River on May 29, 1961. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 81 current meter measurements, 31 double and 19 single, made by the Mexican Section of the Commission and a continuous record of gage heights. From June 1951 to July 1954, discharges were computed from gage height records based on daily gage readings at 8:00 a.m., Pacific Standard Time. A continuous record of gage heights obtained since July 21, 1954. Records available: June 1951 through December 1961.

EXTREMES: Since January 1, 1952: Maximum mean daily gage height, 53.28 feet on January 4, 1958, with discharge of 18,500 second-feet; minimum mean daily gage height, 38.09 feet on July 12, 1958, with zero flow; maximum mean daily discharge, 20,200 second-feet on December 19, 1952, gage height of 15.94 feet; minimum mean daily discharge, no flow on various days of June 1956, March and April 1957, July 1958 and March 1959.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	325	4,910	57.6	23.3	21.2	10.6	12.7	8.8	24.4	32.1	374	295
2	231	3,990	55.8	22.6	17.0	11.3	7.1	8.1	25.1	29.7	396	275
3	204	2,660	79.8	21.5	11.3	12.0	7.1	8.1	22.2	29.0	388	298
4	185	982	67.8	20.8	17.0	12.7	7.1	16.6	22.6	25.4	324	329
5	157	345	65.7	20.1	16.2	13.4	7.1	18.7	26.8	26.5	322	583
6	183	228	63.6	19.1	15.5	14.1	12.7	18.7	24.0	26.5	410	343
7	210	232	61.4	18.4	14.8	14.8	12.7	18.7	21.2	23.3	523	171
8	166	173	59.3	19.1	14.1	4.9	12.7	18.4	23.0	21.2	551	120
9	128	228	37.8	19.4	13.4	8.8	12.7	15.9	18.4	18.0	562	107
10	89.3	183	55.1	20.1	12.7	14.8	13.1	12.0	17.3	12.7	590	100
11	126	191	52.6	20.5	12.0	14.5	13.4	9.9	13.1	9.9	611	93.2
12	83.3	185	38.8	21.2	11.7	14.5	13.8	11.3	12.7	10.6	569	86.5
13	63.6	176	37.4	20.5	11.3	18.0	14.1	10.9	11.7	12.4	498	79.8
14	77.7	189	35.3	19.4	10.6	18.0	7.8	8.8	10.6	13.4	477	80.9
15	90.8	163	33.5	18.7	10.2	18.0	8.1	8.8	10.9	14.1	505	97.5
16	57.6	158	40.3	18.0	9.5	18.0	8.1	8.5	12.0	14.8	540	614
17	57.6	141	29.0	17.3	9.2	14.5	15.2	8.8	19.1	17.3	540	2,130
18	53.7	124	26.5	16.6	9.2	14.5	15.5	9.2	20.5	16.6	448	2,100
19	50.1	119	30.7	15.5	9.2	14.5	15.9	10.9	21.5	12.7	396	1,880
20	101	105	27.9	15.9	9.5	14.5	8.8	11.3	22.6	10.6	367	1,680
21	197	101	24.7	16.2	9.5	8.8	8.8	11.7	22.2	9.2	399	1,600
22	225	136	21.5	16.2	9.5	8.5	8.5	12.0	19.1	8.8	385	1,210
23	200	263	22.2	16.6	9.9	8.5	8.1	12.7	22.2	7.8	388	953
24	174	322	22.6	17.0	9.9	8.1	7.8	15.5	21.5	6.7	406	1,490
25	156	134	23.3	17.3	9.5	8.1	7.4	14.8	20.5	6.4	427	1,390
26	177	136	24.0	17.3	9.2	8.1	7.1	16.2	20.8	9.2	473	1,430
27	364	118	24.7	17.3	8.8	7.8	12.4	13.4	27.9	12.0	569	1,550
28	756	73.1	25.4	17.0	8.5	12.7	11.7	12.7	29.7	59.7	848	1,380
29	2,180		20.1	16.6	8.1	12.7	10.9	13.8	29.7	234	936	
30	4,060		19.4	16.2	7.8	12.7	10.2	14.8	32.5	340	569	819
31	4,940		19.1		9.9		9.5	15.5		371		890
Sum	16,765.1		555.7		372.4		395.5		1,441.6			25,110.9
	16,068.7	1,202.9		356.2		328.1		625.8		14,791		

Month	Current Year 1961 Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1951-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	46.53	39.90	31	5,120	19	50.1	519	31,871	436,083	1,047,732	31,871
Feb.	46.33	40.39	1	4,980	28	57.6	600	33,257	289,877	696,461	31,303
Mar.	40.45	40.39	3	79.8	31	19.1	38.8	2,387	210,398	807,342	2,387
Apr.	40.42	40.39	1	23.3	19	15.5	18.4	1,103	139,496	588,983	1,103
May	40.42	40.35	1	21.2	30	7.8	11.7	707	189,335	732,815	707
June	40.45	40.29	† 13	18.0	9	3.5	12.4	739	80,495	555,460	266
July	40.49	40.32	11	24.7	3	3.9	10.6	651	43,122	264,561	0
Aug.	40.65	40.42	31	19.8	† 2	8.1	12.7	786	64,114	309,320	786
Sept.	40.94	40.52	30	33.9	14	10.6	20.8	1,241	98,006	572,551	1,241
Oct.	43.50	40.62	31	381	25	6.0	46.6	2,859	153,818	769,939	2,859
Nov.	44.46	42.65	29	982	5	310	494	29,335	255,194	909,399	29,335
Dec.	46.69	41.67	17	2,190	13	79.8	809	49,833	362,300	1,060,767	40,003
Yearly	46.69	39.90		5,120		3.5	216	154,769	2,327,204	7,923,600	154,769

† And other days

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April [1]	May [1]	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	40.58	46.29	40.39	40.42	40.42	40.42	40.42	40.42	40.68	40.91	43.27	42.45
2	40.45	45.70	40.39	40.42	40.39	40.42	40.35	40.42	40.68	40.88	43.34	42.42
3	40.42	44.85	40.45	40.42	40.35	40.42	40.35	40.42	40.65	40.85	43.27	42.52
4	40.45	43.21	40.42	40.42	40.39	40.42	40.35	40.52	40.65	40.78	42.95	42.65
5	40.42	41.83	40.42	40.42	40.39	40.42	40.35	40.55	40.68	40.85	42.88	43.24
6	40.52	41.57	40.42	40.42	40.39	40.42	40.42	40.55	40.65	40.91	43.27	42.75
7	40.58	41.60	40.42	40.42	40.39	40.42	40.42	40.55	40.62	40.91	43.67	42.13
8	40.50	41.37	40.42	40.42	40.39	40.32	40.42	40.55	40.65	40.94	43.73	41.86
9	40.32	41.14	40.35	40.42	40.39	40.35	40.42	40.52	40.62	40.94	43.73	41.80
10	40.12	41.01	40.42	40.42	40.39	40.42	40.42	40.49	40.62	40.88	43.80	41.77
11	40.29	40.98	40.42	40.42	40.39	40.42	40.42	40.45	40.55	40.88	43.83	41.73
12	40.09	40.91	40.39	40.42	40.39	40.42	40.42	40.49	40.55	40.88	43.67	41.70
13	40.01	40.85	40.39	40.42	40.39	40.45	40.42	40.49	40.58	40.91	43.41	41.67
14	40.06	40.85	40.39	40.42	40.39	40.45	40.35	40.45	40.58	40.94	43.31	41.67
15	40.12	40.75	40.42	40.42	40.39	40.45	40.35	40.45	40.55	40.94	43.37	41.77
16	39.96	40.75	40.42	40.42	40.39	40.45	40.35	40.45	40.58	40.94	43.47	43.44
17	39.96	40.72	40.39	40.42	40.39	40.42	40.42	40.45	40.68	41.04	43.44	46.56
18	39.93	40.70	40.39	40.42	40.39	40.42	40.42	40.45	40.68	40.94	43.14	46.46
19	39.90	40.68	40.42	40.42	40.39	40.42	40.42	40.49	40.68	40.78	42.95	45.93
20	40.16	40.65	40.42	40.42	40.39	40.42	40.35	40.49	40.68	40.75	42.85	45.51
21	40.55	40.65	40.42	40.42	40.39	40.35	40.35	40.49	40.68	40.72	43.01	45.31
22	40.62	40.78	40.42	40.42	40.39	40.35	40.35	40.49	40.65	40.72	42.98	44.52
23	40.57	41.60	40.42	40.42	40.39	40.35	40.35	40.49	40.72	40.68	43.01	44.00
24	40.52	41.34	40.42	40.42	40.39	40.35	40.35	40.52	40.72	40.62	43.04	45.01
25	40.39	40.78	40.42	40.42	40.39	40.35	40.35	40.52	40.68	40.68	43.08	44.78
26	40.42	40.81	40.42	40.42	40.39	40.35	40.35	40.55	40.72	40.91	43.21	44.85
27	41.34	40.58	40.42	40.42	40.39	40.35	40.42	40.52	40.85	40.94	43.47	45.05
28	42.75	40.45	40.42	40.42	40.39	40.42	40.42	40.52	40.88	41.77	44.19	44.69
29	44.23		40.39	40.42	40.39	40.42	40.42	40.55	40.88	43.08	44.36	43.83
30	45.60		40.39	40.42	40.39	40.42	40.42	40.58	40.91	43.47	43.34	43.60
31	46.23		40.39		40.42		40.42	40.58		43.41		43.70
Avg.	40.91	41.54	40.42	40.42	40.39	40.40	40.39	40.49	40.68	41.11	43.37	43.54

[1] Stages estimated in April and May

DIVERSIONS FROM COLORADO RIVER TO ZACATECAS CANAL IN MEXICO

DESCRIPTION: Pumping plant operated by the Ministry of Hydraulic Resources, located on the left bank of the Colorado River in the Colonia Sanchez Corral about 1.2 miles upstream from the Sonora-Baja California railroad bridge and about 29 miles downstream from the southerly international boundary. Plant discharge is into Zacatecas Canal. Pumping equipment consists of 6 pumps, 4 of 36-inch diameter, 1 of 42 inches, and 1 of 48 inches.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1961.

REMARKS: The flows of the Colorado River passing this pumping plant consist of the flows which pass Miguel C. Rodriguez, 4.5 miles upstream from the pumping plant.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	166	74.2	102	35.3	45.9	35.3	35.3	35.3	70.6	53.0	0	0
2	84.8	60.0	91.8	35.3	56.5	35.3	35.3	35.3	56.5	35.3	0	0
3	141	70.6	91.8	35.3	45.9	53.0	35.3	35.3	53.0	35.3	0	0
4	166	60.0	91.8	35.3	49.4	53.0	35.3	35.3	56.5	35.3	0	0
5	148	49.4	91.8	45.9	56.5	35.3	35.3	67.1	56.5	35.3	0	0
6	205	117	91.8	35.3	56.5	35.3	35.3	74.2	35.3	35.3	0	0
7	198	152	84.8	35.3	49.4	35.3	35.3	67.1	70.6	35.3	0	0
8	162	177	84.8	35.3	10.6	35.3	35.3	77.7	38.8	35.3	0	0
9	162	198	84.8	35.3	21.2	35.3	56.5	74.2	35.3	35.3	0	0
10	145	191	63.6	35.3	60.0	35.3	35.3	60.0	35.3	35.3	0	0
11	162	198	67.1	45.9	56.5	35.3	49.4	35.3	56.5	35.3	0	0
12	109	191	67.1	49.4	49.4	35.3	35.3	35.3	35.3	35.3	0	0
13	84.8	162	60.0	63.6	67.1	53.0	35.3	35.3	35.3	35.3	0	0
14	84.8	162	67.1	63.6	45.9	49.4	45.9	35.3	35.3	35.3	0	0
15	148	162	63.6	53.0	35.3	45.9	35.3	35.3	35.3	35.3	0	0
16	84.8	162	53.0	60.0	35.3	35.3	35.3	35.3	35.3	3.5	0	0
17	84.8	170	42.4	53.0	35.3	35.3	35.3	35.3	35.3	0	0	0
18	84.8	162	42.4	35.3	35.3	35.3	35.3	35.3	35.3	0	0	0
19	84.8	134	42.4	53.0	35.3	35.3	35.3	60.0	70.6	0	0	0
20	106	180	42.4	35.3	35.3	35.3	35.3	84.8	56.5	0	0	0
21	198	60.0	42.4	35.3	35.3	35.3	35.3	67.1	56.5	0	0	0
22	198	70.6	42.4	35.3	35.3	35.3	35.3	74.2	42.4	0	0	0
23	198	184	42.4	49.4	35.3	35.3	35.3	56.5	45.9	0	0	0
24	198	198	42.4	45.9	35.3	35.3	35.3	53.0	49.4	0	0	0
25	187	198	42.4	35.3	35.3	35.3	35.3	67.1	53.0	0	0	0
26	198	198	42.4	35.3	35.3	35.3	35.3	67.1	42.4	0	0	0
27	367	187	42.4	35.3	28.3	35.3	35.3	74.2	56.5	0	0	0
28	314	138	53.0	35.3	35.3	35.3	35.3	63.6	35.3	0	0	0
29	275		60.0	35.3	14.1	35.3	35.3	56.5	53.0	0	0	0
30	191		42.4	35.3	31.8	35.3	35.3	84.8	28.3	0	0	0
31	127		42.4		35.3		35.3	67.1		0		0
Sum	5,062.6	4,065.8 / 1,921.1		1,253.4	1,239.2	1,136.8	1,140.2	1,719.9	1,401.8	550.7	0	0

Month	Current Year 1961								Period 1958-1961		
	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
				High		Low					
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			27	367	† 2	84.8	164	10,045	7,464	10,045	5,309
Feb.			† 9	198	5	49.4	145	8,063	5,634	8,063	4,287
Mar.			1	102	† 17	42.4	61.8	3,810	5,662	6,641	3,810
Apr.			† 13	63.6	† 1	35.3	41.7	2,486	3,948	5,884	2,486
May			13	67.1	8	10.6	39.9	2,459	992	2,459	0
June			† 3	53.0	† 1	35.3	38.1	2,259	1,395	2,259	729
July			9	56.5	† 1	35.3	36.7	2,263	2,342	2,606	2,157
Aug.			† 20	84.8	† 1	35.3	55.4	3,411	4,452	6,144	2,438
Sept.			† 1	70.6	30	28.3	47.0	2,796	3,418	5,104	1,177
Oct.			1	53.0	† 17	0	17.7	1,092	2,685	6,461	960
Nov.				0		0	0	0	300	1,054	0
Dec.				0		0	0	0	4,730	9,512	0
Yearly				367		0	54.0	38,684	40,932	43,674	38,684

† And other days Ø Mean daily

WASTEWAY TO COLORADO RIVER AT UNION IN MEXICO

DESCRIPTION: Wasteway structure located at Kilometer 21+736 of the Barrote Canal in the Colonia Hidalgo about 1,500 feet from right bank of the Colorado River. The wasteway discharges into the Colorado River at a point about 0.6 mile upstream from the Sonora-Baja California railroad bridge and 30 miles downstream from the southerly international boundary.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through December 1961.

REMARKS: The wasteway structure has 3 manually operated rectangular gates which discharge from the Barrote Canal into a wasteway leading to the Colorado River.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	155	0	0	0	0	0	0	0	0	0	0	0
27	155	0	0	0	0	0	0	0	0	0	0	0
28	152	0	0	0	0	0	0	0	0	0	0	0
29	155		0	0	0	0	0	0	0	0	0	0
30	152		0	0	0	0	0	0	0	0	0	0
31	155		0		0		0	0		0		0
Sum	924	0	0	0	0	0	0	0	0	0	0	0

Month	Current Year 1961 Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1957-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			† 26	155	† 1	0	30.0	1,835	1,685	3,166	0
Feb.				0		0	0	0	915	2,788	0
Mar.				0		0	0	0	3,226	7,074	0
Apr.				0		0	0	0	2,349	4,462	0
May				0		0	0	0	2,315	4,413	0
June				0		0	0	0	604	1,505	0
July				0		0	0	0	1,314	4,296	0
Aug.				0		0	0	0	701	1,857	0
Sept.				0		0	0	0	951	1,800	0
Oct.				0		0	0	0	1,732	6,997	0
Nov.				0		0	0	0	0	0	0
Dec.				0		0	0	0	508	932	0
Yearly				155		0	2.5	1,835	16,300	24,526	1,835

Ø Mean daily † And other days

DIVERSIONS BY INDIVIDUAL PUMPS IN MEXICO

DESCRIPTION: Pumps operated by private individuals under the control and supervision of the Ministry of Hydraulic Resources, located along the Colorado River, 8 pumps being on the right bank in the limitrophe section and the others along both banks of the river downstream from the southerly international boundary.

RECORDS: Data collected by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1961.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	7.1	3.5	7.1	7.1	0	0	0	0
2	0	0	0	0	10.6	0	10.6	10.6	0	0	0	0
3	0	0	0	0	10.6	3.5	14.1	7.1	3.5	3.5	0	0
4	0	0	0	24.7	14.1	3.5	10.6	3.5	7.1	3.5	0	0
5	0	0	0	10.6	0	3.5	14.1	0	10.6	10.6	0	0
6	0	0	0	17.7	0	3.5	7.1	0	7.1	10.6	0	0
7	0	0	0	17.7	0	7.1	7.1	0	10.6	7.1	0	0
8	0	7.1	0	17.7	0	14.1	0	10.6	7.1	10.6	0	0
9	0	10.6	0	17.7	0	7.1	0	10.6	7.1	3.5	0	0
10	0	10.6	0	17.7	0	0	0	14.1	7.1	0	0	0
11	0	10.6	0	17.7	0	0	0	10.6	10.6	0	0	0
12	0	10.6	0	0	0	0	3.5	10.6	7.1	0	0	0
13	0	10.6	0	0	0	0	3.5	7.1	3.5	0	0	0
14	0	3.5	0	0	0	0	3.5	10.6	10.6	0	0	0
15	0	3.5	0	0	21.2	7.1	3.5	7.1	7.1	0	0	0
16	0	3.5	0	0	7.1	3.5	3.5	10.6	14.1	0	0	0
17	0	0	0	0	10.6	7.1	10.6	7.1	10.6	0	0	0
18	0	0	0	0	7.1	7.1	7.1	10.6	7.1	0	0	0
19	0	0	0	0	10.6	10.6	10.6	3.5	0	0	0	0
20	0	0	0	0	0	7.1	10.6	0	0	0	0	0
21	0	0	7.1	0	0	10.6	14.1	0	0	0	0	0
22	0	0	10.6	0	0	7.1	10.6	7.1	0	0	0	0
23	0	0	7.1	0	0	10.6	7.1	7.1	0	3.5	0	0
24	0	0	10.6	0	14.1	7.1	0	0	0	3.5	0	0
25	0	0	10.6	0	0	10.6	0	0	0	3.5	0	0
26	0	7.1	10.6	0	0	7.1	7.1	0	0	10.6	0	0
27	0	10.6	14.1	0	14.1	10.6	7.1	7.1	0	7.1	0	0
28	0	3.5	10.6	0	0	7.1	10.6	7.1	0	0	0	0
29	0		0	0	17.7	10.6	7.1	3.5	0	0	0	0
30	0		0	0	0	10.6	3.5	0	0	0	0	0
31	0		0		17.7		7.1	0		0		0
Sum	0	91.8	81.3	141.5	162.6	180.3	201.4	173.3	130.9	77.6	0	0

Current Year 1961 — **Period** 1958-1961

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.				0		0	0	0	220	358	0
Feb.			† 9	10.6	† 1	0	3.2	182	324	791	0
Mar.			27	14.1	† 1	0	2.5	161	152	210	84.3
Apr.			4	24.7	† 1	0	4.6	281	271	379	154
May			15	21.2	† 5	0	5.3	322	238	322	112
June			8	14.1	† 2	0	6.0	364	287	364	175
July			† 3	14.1	† 8	0	6.7	405	390	405	371
Aug.			10	14.1	† 5	0	5.7	355	672	1,648	322
Sept.			16	14.1	† 1	0	4.6	266	506	1,240	210
Oct.			† 5	10.6	† 1	0	2.5	148	77.0	161	0
Nov.				0		0	0	0	38.1	112	0
Dec.				0		0	0	0	98.9	255	0
Yearly				24.7		0	3.5	2,484	2,654	3,132	2,346.2

† And other days Ø Mean daily

COLORADO RIVER AT EL MARITIMO IN MEXICO - DISCHARGES

DESCRIPTION: Water-stage recorder and cableway in Mexico 47.6 miles downstream from the southerly international boundary, 18.6 miles downstream from the Sonora-Baja California Railroad bridge, and 3.7 miles east of Kilometer 70 of the Mexicali-San Felipe highway. The recorder is located on the right bank of the Colorado River. Zero of gage is 9.84 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 26 current meter measurements made during the year and a continuous record of gage heights. Data obtained and furnished by the Mexican Section of the Commission. Records available: Mean daily stages and discharges from January 1, 1960. Incomplete record of gage heights, March 1, 1946 through November 1947; twice daily readings of gage heights, January 1, 1948 through December 1949; continuous record of gage heights since installation of water-stage recorder February 8, 1956. When affected by tides in the Gulf of California, the discharge is deduced from stage-discharge curves based on measurements at low tide and the discharge at Miguel C. Rodriguez, taking into consideration the pumps and wasteways between the two stations.

REMARKS: The flow past this station is affected by the tides in the Gulf of California. Measurements for basic computations are taken near the date of the first or third quarter moon (neap tide).

EXTREMES: Maximum discharge, 4,410 second-feet, January 21, 1960; minimum discharge, no flow during parts of each year.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.0	632	0	12.7	21.5	0	0	0	0	0	275	427
2	3.9	844	0	14.1	18.4	0	0	0	0	0	360	360
3	2.5	953	0	15.5	13.1	0	0	0	0	0	484	337
4	1.1	922	0	22.6	8.1	0	0	0	0	0	540	324
5	0	607	0	24.7	3.5	0	0	0	0	0	540	320
6	0	431	0	26.5	0	0	0	0	0	0	491	335
7	0	367	0	28.3	0	0	0	0	0	0	530	322
8	0	338	0	33.9	0	0	0	0	0	0	622	297
9	0	255	0	36.0	0	0	0	0	0	0	629	263
10	0	188	0	38.1	0	0	0	0	0	0	678	224
11	0	139	0	38.1	0	0	0	0	0	0	696	193
12	0	99.6	0	42.4	0	0	0	0	0	0	685	153
13	0	70.6	0	47.3	0	0	0	0	0	0	636	126
14	0	55.8	0	57.2	0	0	0	0	0	0	572	112
15	0	47.0	0	67.8	0	0	0	0	0	0	537	108
16	0	42.0	0	71.0	0	0	0	0	0	0	540	105
17	0	33.5	0	77.0	0	0	0	0	0	0	544	181
18	0	23.3	0	77.0	0	0	0	0	0	0	562	660
19	0	13.8	0	76.6	0	0	0	0	0	0	533	985
20	0	7.4	0	76.3	0	0	0	0	0	0	505	1,067
21	0	2.8	0	75.6	0	0	0	0	0	0	480	1,105
22	0	0	0	74.5	0	0	0	0	0	0	452	1,098
23	0	0	0	65.7	0	0	0	0	0	37.8	438	950
24	0	0	1.8	60.7	0	0	0	0	0	51.9	441	918
25	0	0	2.8	53.0	0	0	0	0	0	78.0	427	1,070
26	0	0	4.2	48.0	0	0	0	0	0	75.9	417	1,105
27	0	0	5.3	41.0	0	0	0	0	0	71.7	417	1,172
28	2.5	0	6.7	36.4	0	0	0	0	0	71.7	424	1,240
29	18.4		8.1	30.0	0	0	0	0	0	77.7	459	1,151
30	144		9.5	25.8	0	0	0	0	0	129	491	932
31	381		11.3		0		0	0		187		784
Sum	559.4	6,071.8	49.7	1,393.8	64.6	0	0	0	0	780.7	15,405	18,424

Month	Current Year 1961 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 1960-1961 Acre-Feet Average	Maximum	Minimum
Jan.	17.88	13.29	31	463	† 5	0	18.0	1,111	113,168	225,224	1,111
Feb.	18.31	13.55	4	1,052	† 22	0	217	12,045	33,267	54,491	12,045
Mar.	13.75	13.29	31	11.3	† 1	0	1.8	98.9	7,561	15,024	98.9
Apr.	13.78	13.35	† 15	77.0	1	12.4	46.6	2,765	6,371	9,978	2,765
May	13.55	13.09	1	21.5	† 6	0	21.1	128	10,222	20,317	128
June	13.42	12.99		0		0	0	0	0	0	0
July	13.78	13.06		0		0	0	0	0	0	0
Aug.	14.01	13.12		0		0	0	0	0	0	0
Sept.	13.78	13.16		0		0	0	0	3,550	7,101	0
Oct.	13.68	13.02	31	187	† 1	0	25.1	1,549	5,924	10,298	1,549
Nov.	15.52	13.88	11	735	1	275	512	30,553	47,112	63,672	30,553
Dec.	16.31	13.91	28	1,240	17	100	593	36,550	66,852	97,155	36,550
Yearly	18.31	12.99		1,240		0	118	84,799.9	294,027	503,260	84,799.9

† And other days

COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.42	18.08	13.55	13.39	13.48	13.25	13.42	13.52	13.65	13.42	13.88	15.35
2	13.39	18.27	13.52	13.39	13.52	13.25	13.42	13.45	13.58	13.35	14.07	15.19
3	13.35	18.21	13.48	13.39	13.48	13.22	13.39	13.42	13.48	13.29	14.30	15.09
4	13.32	17.88	13.45	13.45	13.45	13.22	13.29	13.39	13.42	13.25	14.44	15.03
5	13.32	16.93	13.42	13.45	13.42	13.19	13.22	13.32	13.39	13.25	14.47	14.99
6	13.32	16.21	13.35	13.45	13.39	13.22	13.16	13.25	13.35	13.22	14.44	15.03
7	13.29	15.85	13.35	13.45	13.39	13.29	13.09	13.22	13.35	13.19	14.53	14.96
8	13.32	15.62	13.35	13.52	13.35	13.32	13.09	13.22	13.32	13.12	14.73	14.86
9	13.32	15.35	13.35	13.52	13.42	13.32	13.09	13.25	13.25	13.16	14.83	14.73
10	13.32	15.09	13.35	13.52	13.42	13.32	13.09	13.22	13.25	13.16	14.93	14.57
11	13.32	14.86	13.29	13.48	13.42	13.32	13.12	13.22	13.25	13.12	15.03	14.44
12	13.32	14.63	13.29	13.52	13.35	13.32	13.12	13.19	13.29	13.12	15.09	14.24
13	13.32	14.44	13.29	13.55	13.35	13.29	13.12	13.22	13.29	13.09	15.09	14.11
14	13.35	14.34	13.29	13.65	13.35	13.22	13.09	13.25	13.29	13.09	15.06	14.01
15	13.35	14.30	13.42	13.75	13.39	13.22	13.12	13.25	13.25	13.06	15.09	13.98
16	13.39	14.34	13.52	13.75	13.39	13.22	13.09	13.22	13.25	13.02	15.12	13.94
17	13.45	14.30	13.62	13.78	13.32	13.22	13.12	13.22	13.25	13.02	15.16	14.30
18	13.52	14.21	13.75	13.75	13.32	13.16	13.09	13.22	13.22	13.02	15.22	15.62
19	13.55	14.04	13.75	13.71	13.29	13.16	13.09	13.19	13.19	13.06	15.19	16.14
20	13.52	13.91	13.68	13.68	13.25	13.16	13.09	13.19	13.19	13.02	15.16	16.24
21	13.45	13.78	13.62	13.65	13.22	13.19	13.09	13.16	13.19	13.06	15.12	16.27
22	13.45	13.71	13.58	13.62	13.19	13.12	13.09	13.16	13.22	13.16	15.09	16.24
23	13.42	13.62	13.45	13.58	13.12	13.09	13.06	13.16	13.35	13.29	15.09	16.01
24	13.39	13.81	13.42	13.58	13.12	13.06	13.06	13.22	13.58	13.39	15.12	15.94
25	13.39	13.88	13.39	13.55	13.12	13.06	13.06	13.39	13.71	13.45	15.12	16.14
26	13.35	13.81	13.35	13.55	13.12	13.02	13.09	13.58	13.78	13.42	15.12	16.17
27	13.32	13.75	13.35	13.52	13.09	13.06	13.22	13.78	13.68	13.39	15.16	16.24
28	13.55	13.65	13.35	13.52	13.09	13.19	13.42	13.88	13.58	13.32	15.22	16.31
29	14.44		13.35	13.48	13.12	13.29	13.65	13.91	13.52	13.29	15.35	16.17
30	16.37		13.35	13.48	13.16	13.35	13.71	13.78	13.45	13.48	15.49	15.98
31	17.52		13.39		13.22		13.65	13.68		13.68		15.85
Avg.	13.65	15.03	13.45	13.55	13.30	13.22	13.19	13.35	13.39	13.22	14.93	15.29

COLORADO RIVER AT TIDE GAGE IN MEXICO - STAGES

DESCRIPTION: Automatic stage recorder located at the mouth of the Colorado River where it enters the Gulf of California, 19.9 miles downstream from El Maritimo Gaging Station and 7.5 miles east of Kilometer 85 on the Mexicali San Felipe highway.

RECORDS: Continuous record of water surface elevations except for periods when station is silted due to the action of the tides and the flow of the river. Data is obtained and furnished by the Mexican Section of the Commission. Records available: November 29, 1952 through December 1961, incomplete because of silting of station.

Elevation in Feet above Mean Sea Level — 1961

DAY	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
1	●				12.20 10.50	9.55			12.99 14.99	10.83 10.53	11.81 14.73	11.22 10.63
2	8.92 8.79	8.46			●13.85 11.48	9.28 9.32			12.47 14.44	10.99 10.56	11.12 13.02	10.96 10.60
3	10.93 8.30	8.14 8.27			13.71	9.78 12.43			11.58 12.60	10.89 10.43	11.61	10.50
4	10.10	8.10			12.43	12.34			11.48	10.33	10.50	10.50 10.43
5	9.58	8.07 8.07			12.34	12.27			10.73	10.14 10.24	◗10.43	10.43
6					12.27	12.14			10.24	10.17	10.43	10.43
7					12.14	12.01			◗10.27	10.24	10.43	10.40
8			◗10.63	10.50	12.01	11.88	◗		10.20	10.20	11.22	10.43
9	◗		10.37	10.24	◗11.88	11.75	10.04 10.04	9.91	10.20 11.09	10.17	11.12 12.47	10.43
10			10.24	9.94	11.75	11.61	10.07	10.01	11.61 12.01	10.20 10.24	10.99 13.52	10.50 10.40
11			10.17 9.84	9.78 9.65	11.61	11.48	11.52 11.15	10.04 10.04	13.81 12.57	10.30 10.63	11.42 14.11	10.70 10.50
12			12.47 10.86	9.71 9.45	11.48	11.35	13.45 14.04	10.40 10.63	14.14 12.53	10.43 10.79	○11.29 13.71	10.73 10.50
13			14.70 12.93	10.04 9.74	11.35	11.29	14.50 14.86	10.83	14.70 12.60	10.53 10.96	10.89 13.06	10.70 10.56
14			15.94 14.70	10.66	14.90	14.11	○15.26 15.58	10.93 11.06	○14.60 11.71	10.53 10.99	12.57	10.60
15			○16.24 15.68	10.40 11.15	15.58 15.09	10.83 10.83	14.73 15.22	11.22 11.02	14.07 11.22	10.47 10.83	11.91	10.56
16			16.31 15.42	10.99 11.35	○15.91 15.75	11.22 11.81	13.58 14.44	11.12 10.76	12.73	10.47	11.12	10.50
17			15.88 14.63	11.09 11.15	15.88 15.62	11.48	12.14 12.99	10.89 10.40	11.61	10.40		10.50
18			14.24 12.17	10.96 10.79	14.83 14.44	11.48 11.22	11.09	10.17	10.63	10.30 10.37	10.50	10.50
19			10.56	10.37 10.04	12.60 11.94	11.09 10.83 11.38	10.24	10.24 10.20	10.37	10.30	10.50	10.50
20			10.04 10.01	9.97 9.88			10.24	10.17	10.33	10.30	10.50	10.37
21			9.88	9.71			10.20	10.17	10.30	10.20	☾10.43	10.37
22			☾9.71	9.51			☾10.24	10.17	☾10.24	10.20	10.43	10.37
23	☾		9.51	9.45	☾		10.24	10.17	10.20	10.17	10.43	10.37
24			9.45	9.35			10.20	10.17	10.17	10.10	10.43 10.63	10.40 10.43
25			9.42	9.35			10.17	10.17	10.10	10.04	12.50	10.43
26			10.17	9.45			10.17	10.14	10.24 10.70	10.24 10.24	11.09 14.50	10.53 10.50
27			10.33	9.42			10.63 10.76	10.14 10.14	10.89 12.80	10.24	12.66 15.81	10.83 10.60
28			11.48 9.61	9.51 9.32			11.55 12.30	10.17	11.81 14.53	10.43 10.37	●13.32 16.04	11.29 10.83
29							12.14 13.32	10.30 10.30	●12.70 15.26	10.79 10.56	13.12 15.91	11.48 10.89
30							●12.80 14.40	10.50 10.43	12.73 15.42	11.09 10.66	13.06 15.81	11.48 10.96
31	●				●				12.96 15.58	11.22 10.79		

Bold numerals correspond to morning tides. ○ New Moon ● Full Moon ☾ First Quarter ◗ Last Quarter

COLORADO RIVER AT TIDE GAGE IN MEXICO - STAGES
Continued

Elevation in Feet above Mean Sea Level — 1961

DAY	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
1	12.96 15.19	11.42 10.89	11.45 11.42	11.09 10.86	11.19	11.12	11.52	11.48			12.30	12.30
2	11.81 14.07	11.09 10.56	10.86	10.70 10.63	11.12	11.09	11.48	11.48			12.37	12.30
3	11.09	10.56	10.63	10.63	11.09	11.09	11.48	11.48			12.34	12.24
4		10.53	10.63	10.63	11.15	11.15	11.48	11.48			12.30	12.20
5	10.50	10.50	10.63	10.56			11.48	11.45			12.27 12.20	12.17 12.14
6	10.50	10.47	10.56	10.56			11.45 12.01	11.45 11.48			13.29 12.24	12.14 12.14
7	10.47	10.47	10.56 11.98	10.56			11.48 12.73	11.48 11.55			14.11 12.47	12.27
8	10.47 11.71	10.43	12.66	10.56			12.73 11.61	11.52 11.55			14.70 12.66	12.11 12.24 12.07
9	12.34	10.37 10.47	11.88 13.52	10.56 10.63			12.76 12.96	11.15			14.83 12.60	12.27
10	13.32		10.96 13.09	10.79 10.66			13.02 12.47	11.19 11.65			14.24	12.04
11	14.37	10.40	11.06 13.52	10.76 10.70			12.60 12.27	11.02 10.96			12.99	12.01 12.04
12	11.22 13.78	10.83 10.50	11.48 13.52	10.89 10.73			12.60	10.76 11.68				
13	11.38 13.45	10.76 10.56	11.71 13.52	10.83 10.76			11.81	11.68				
14	10.76 12.86	10.70 10.56	11.81 12.93	10.83 10.73								
15	10.83 12.73	10.60 10.50	11.29	10.83 10.83					12.01	11.84		
16	11.55	10.53	10.83	10.83			11.55	11.55	12.11	12.11		
17		10.50	10.83	10.76			11.52	11.48	12.11	12.11		
18	10.50	10.50	10.76	10.73			11.45	11.42	12.11 12.27	12.11 12.14		
19	10.53	10.50	10.73	10.66			11.42	11.38	12.86 12 83	12.14 12.14	12.86 12.01	12.01 11.88
20	10.50	10.50	10.66	10.63			11.65 12.86	11.55 11.22	14.44 13.29	12.20 11.81	13.45 12.20	12.17 12.20
21	10.50	10.50	10.89	10.63 10.76			13.02 13.42	11.45	14.70 12.40	12.34	13.45 12.40	12.37 12.37
22	10.50	10.50					13.88 14.07	11.78 11.94	14.70 12.37	12.14 12.27	13.48 12.53	12.50 12.47
23	10.70	10.50						11.94	13.71	12.14 12.11	13.22 12.60	12.57 12.50
24	12.60								12.80	12.07	12.63 12.57	12.63 12.47
25	14.11	10.76							12.60	12.27	12.53	12.50
26	12.37 14.14	10.86 10.66							12.37	12.37		
27	14.11 14.63	11.35 11.02							12.37	12.37		
28	15.09 15.32	11.75 11.25							12.34	12.34		
29	15.09 15.22	12.07 11.65			11.55	11.55			12.34	12.34		
30	14.86 15.16	11.91 11.58			11.55	11.52			12.34	12.34		
31	13.12 13.91	12.14 11.09										

Bold numerals correspond to morning tides. ○ New Moon ● Full Moon ☾ First Quarter ☽ Last Quarter

SANTA CLARA ESTUARY AT RAILROAD CROSSING IN MEXICO

DESCRIPTION: A measuring section at the entrance to a road culvert 100 feet downstream from the Sonora-Baja California railroad bridge at Kilometer 65, four hundred feet west of Monument C. I. L. A. F. C. 49 and 1.2 miles to the southwest along the road from the village of Riito. No gage has been installed.

RECORDS: Based on 38 double measurements with current meter during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1958 through December 1961.

REMARKS: The flow at this station consists of return flows from the wasteways on the left bank of the Colorado River and from the Bolsa Drain through an old channel of the Colorado River into the Gulf of California.

EXTREMES: Maximum mean daily discharge, 91.8 second-feet, November 10, 1958; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	0	5.5	3.7	25.8	17.7	5.9	0	3.1	19.5	15.2	5.6
2	4.0	0	5.8	4.9	23.1	17.4	6.7	0	3.5	19.6	15.3	4.9
3	4.1	0	6.0	6.1	20.5	17.1	7.6	.5	3.8	19.8	15.4	4.2
4	4.1	0	6.3	7.4	20.0	16.7	8.3	1.0	4.2	20.0	15.5	3.5
5	4.2	0	6.6	8.6	19.6	16.4	9.1	1.5	4.6	21.7	15.5	2.8
6	4.2	0	6.9	9.9	19.1	16.1	10.0	2.0	5.0	23.4	15.6	2.1
7	4.2	0	7.1	11.1	18.7	15.8	10.8	2.5	5.4	25.1	15.8	2.7
8	4.3	0	7.4	11.2	18.3	15.9	11.6	3.0	4.9	26.7	15.8	3.4
9	4.3	0	7.7	11.2	17.8	16.1	10.7	3.5	4.4	28.4	15.9	4.0
10	4.4	0	7.9	11.3	17.4	16.2	9.8	3.4	3.9	30.1	16.0	4.6
11	4.4	.4	8.2	11.3	17.0	16.4	8.9	3.2	3.4	31.8	16.1	5.2
12	4.5	.7	8.5	11.4	19.3	16.5	8.0	3.1	2.9	30.4	14.2	5.9
13	4.5	1.1	8.7	14.0	21.6	16.7	7.1	2.9	2.4	28.9	12.3	6.5
14	4.6	1.4	9.0	16.6	23.9	16.8	6.3	2.8	1.9	27.5	10.4	6.4
15	4.6	1.8	10.6	19.3	26.2	16.7	5.3	2.6	1.7	26.1	8.5	6.2
16	4.7	2.0	12.1	21.9	28.5	16.5	4.4	2.5	1.6	24.7	8.9	6.1
17	4.7	2.3	13.7	24.6	30.8	16.4	3.6	2.3	1.4	23.2	9.2	5.9
18	4.8	2.6	15.2	27.2	30.1	16.2	2.7	2.2	1.3	21.8	9.6	5.8
19	4.1	2.8	16.8	29.8	29.5	16.1	1.8	5.0	1.1	20.4	9.9	5.7
20	3.4	3.1	18.4	31.2	28.7	16.0	.9	7.8	1.0	18.9	10.3	5.5
21	2.7	3.4	19.9	32.5	28.0	15.8	0	10.6	3.5	17.3	10.6	5.0
22	2.0	3.6	21.5	33.8	27.3	14.4	0	13.4	6.0	15.8	10.9	4.5
23	1.4	3.9	18.4	35.1	26.7	12.9	0	16.2	8.6	14.2	11.3	4.0
24	.7	4.2	15.3	36.5	26.0	11.5	0	14.3	11.1	12.6	10.6	3.4
25	0	4.4	12.3	37.8	24.8	10.1	0	12.3	13.6	11.1	9.9	2.9
26	0	4.7	9.2	39.1	23.7	8.6	0	10.3	16.2	9.5	9.2	2.4
27	0	5.0	6.1	36.5	22.6	7.2	0	8.3	18.7	10.5	8.5	1.9
28	0	5.3	3.1	33.8	21.4	5.8	0	6.3	18.9	11.4	7.8	1.6
29	0		0	31.1	20.3	4.3	0	4.3	19.1	12.4	7.1	1.3
30	0		1.2	28.5	19.1	5.1	0	2.3	19.3	13.3	6.3	1.1
31	0		2.5		18.0		0	2.7		14.2		.8
Sum	92.9	52.7	297.9	637.4	713.8	425.4	139.5	152.8	196.5	630.3	357.6	125.9

Current Year 1961 — **Period 1958-1961**

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			18	4.8	†25	0	3.0	184	1,247	1,980	184
Feb.			28	5.3	† 1	0	1.9	105	957	1,891	105
Mar.			22	21.5	29	0	9.6	591	1,044	2,029	591
Apr.			26	39.1	1	3.7	21.3	1,265	1,967	2,709	1,265
May			17	30.8	11	17.0	23.0	1,415	2,163	2,615	1,415
June			1	17.7	29	4.3	14.2	843	1,401	1,676	843
July			8	11.6	†21	0	4.5	276	242	682	3.2
Aug.			23	16.2	† 1	0	4.9	302	494	1,001	52.7
Sept.			30	19.3	20	1.0	6.5	389	1,239	2,059	389
Oct.			11	31.8	26	9.5	20.3	1,250	2,343	4,610	1,041
Nov.			11	16.1	30	6.3	11.9	709	1,633	4,084	674
Dec.			13	6.5	31	.8	4.1	249	509	1,089	233
Yearly				39.1		0	10.4	7,579	15,238	24,596	7,579

† And other days Ø Mean daily

STORED WATER IN LARGE RESERVOIRS OF THE COLORADO RIVER

Data are presented below for all large storage reservoirs in the Colorado River basin below Lee's Ferry, all of which are located in the United States. The monthly figures represent usable contents on the last day of the month, in thousands of acre-feet. The capacities indicated are usable capacities at the top of the spillway gates in closed position, for those dams having controlled spillways; for all others, capacities indicated are at spillway level. Records furnished by the United States Geological Survey.

In Thousands of Acre-Feet

Month	LAKE MEAD (Capacity 27,207.0)		LAKE MOHAVE (Capacity 1,810.0)		HAVASU LAKE (Capacity 619.4)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 29,636.4)	
	1961	Average 1935-1961	1961	Average 1951-1961	1961	Average 1939-1961	1961	Estimated Average
Jan.	18,986.0	16,558.1	1,696.0	1,627.6	546.3	560.2	21,228.3	18,745.9
Feb.	18,753.0	16,144.6	1,702.0	1,671.8	536.2	569.7	20,991.2	18,386.1
Mar.	18,208.0	15,827.8	1,684.0	1,674.8	570.7	583.4	20,462.7	18,086.0
April	17,898.0	16,044.3	1,734.0	1,691.1	583.8	608.5	20,215.8	18,343.9
May	18,002.0	17,442.3	1,762.0	1,723.1	595.8	600.3	20,359.8	19,765.7
June	18,806.0	19,449.0	1,619.0	1,594.0	594.8	607.2	21,019.8	21,650.2
July	18,378.0	19,779.5	1,460.0	1,453.8	573.2	598.4	20,411.2	21,831.7
Aug.	17,955.0	19,468.1	1,393.0	1,391.6	576.2	579.6	19,924.2	21,439.3
Sept.	17,919.0	19,025.0	1,350.0	1,409.7	570.5	576.6	19,839.5	21,011.3
Oct.	18,085.0	18,622.0	1,379.0	1,432.7	554.3	583.8	20,018.3	20,638.5
Nov.	18,093.0	18,227.9	1,489.0	1,518.7	555.8	569.7	20,137.8	20,316.3
Dec.	18,025.0	17,754.9	1,682.0	1,610.7	541.6	565.3	20,248.6	19,930.9
Avg.	18,259.0	17,862.0	1,579.2	1,566.7	566.6	583.6	20,404.8	20,012.3
Max.	18,986.0	27,780.0	1,762.0	1,808.0	595.8	688.7	21,228.3	28,235.0
Min.	17,898.0	* 10,727.0	1,350.0	1,186.0	536.2	76.9	19,839.5	* 13,062.6

* Minimum since 1940

SUSPENDED SILT

The following tables are based on determinations of gravimetric percentages of dry silt in water samples taken at each station by one of the following methods:

A. By lowering a D-43 depth integrating sampler at verticals located at centers of sections of equal discharge in the river cross section, being careful to approach but not strike the bottom. The samples obtained in the section are combined to comprise a composite sample for that date.

B. By lowering a D-43 depth integrating sampler at verticals located at centers of each span of the service bridge across the Alamo Canal, being careful to approach but not strike the bottom. The samples obtained in the section are combined to comprise a composite sample for that date.

C. By sampling at the stream surface with a separate bottle at each of three points, spaced 1/6, 1/2, and 5/6 of the stream width. The gravimetric percentage in each sample is determined, a coefficient of 1.10 is applied to the average of the three, and the product applied to the volume of the stream flow represented by that set of samples.

For ease of comparison, the assumption is made that 1,847 tons of silt deposited would occupy a volume of one acre-foot, or one cubic foot of deposited silt would weigh 85 pounds.

Month	1961							Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot			
	Water	Silt		Average	Maximum Sample	Minimum Sample		Average	Maximum	Minimum

Colorado River at Northerly International Boundary

Period 1956-1961

Jan.	177,159,000	23,700	12	0.0134	0.0258	0.0038	12.8	88.6	341	1.6
Feb.	136,770,000	13,800	11	.0101	.0214	.0029	7.5	34.9	116	1.6
Mar.	287,456,000	50,800	14	.0176	.0352	.0065	27.5	105.8	499	8.8
Apr.	262,980,000	35,300	12	.0134	.0198	.0037	19.1	105.3	434	19.1
May	148,851,000	11,900	14	.0080	.0117	.0054	6.4	40.5	201	4.3
June	235,691,000	36,100	13	.0153	.0242	.0085	19.5	34.4	92.6	18.8
July	312,815,000	48,900	13	.0156	.0324	.0097	26.5	44.7	89.3	21.9
Aug.	296,534,000	29,300	13	.0099	.0214	.0037	15.9	41.7	103	15.1
Sept.	144,502,000	10,100	13	.0070	.0101	.0043	5.5	16.0	43.6	5.5
Oct.	80,548,000	2,900	13	.0036	.0075	.0012	1.6	8.7	20.0	1.6
Nov.	77,776,000	2,300	11	.0030	.0048	.0010	1.2	28.8	89.9	1.0
Dec.	111,057,000	3,500	12	.0031	.0294	.0004	1.9	60.4	174	.6
Yearly	2,272,139,000	268,600	151	0.0118	0.0352	0.0004	145.4	609.8	2,202	145.4

Samples by U. S. Section, and Analyses by Mexican Section, Method A

Colorado River at Southerly International Boundary

Jan.										
Feb.										
Mar.										
Apr.										
May										
June				No samples obtained in 1961.						
July										
Aug.										
Sept.										
Oct.										
Nov.										
Dec.										
Yearly										

SUSPENDED SILT

Month	1961						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

Intake Canal at Morelos Diversion Structure

Period 1952-1961

Jan.	119,801,000	19,464	5	0.0150	0.0292	0.0041	10.5	6.3	22.3	0.2
Feb.	112,763,000	35,868	4	.0319	.0484	.0132	19.4	8.0	19.4	2.1
Mar.	284,460,000	121,493	3	.0432	.0537	.0266	65.6	73.0	154	11.1
Apr.	256,888,000	69,919	4	.0242	.0442	.0124	37.8	67.5	121	30.5
May	142,735,000	13,010	5	.0092	.0139	.0078	7.1	20.0	51.2	6.5
June	227,649,000	67,977	7	.0297	.0535	.0113	36.7	59.2	109	19.9
July	306,336,000	50,456	4	.0161	.0245	.0097	27.2	78.2	156	25.9
Aug.	292,793,000	28,517	4	.0093	.0163	.0064	15.4	70.1	135	15.4
Sept.	140,705,000	11,581	4	.0079	.0100	.0051	6.2	30.6	64.7	6.2
Oct.	67,219,000	6,704	5	.0105	.0244	.0024	3.6	6.6	12.0	1.0
Nov.	31,665,000	764	4	.0024	.0031	.0019	.4	1.9	9.3	.2
Dec.	36,992,000	2,005	2	.0061	.0067	.0034	1.1	5.1	14.8	1.1
Yearly	2,020,006,000	427,758	51	0.0212	0.0537	0.0019	231.0	426.8	696	199

Samples and Analyses by Mexican Section, Method B

Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1961

Jan.	43,335,000	11,874	1	0.0274	0.0325	0.0117	6.4	129	251	6.4
Feb.	45,219,000	13,427	2	.0297	.0398	.0095	7.2	10.5	13.9	7.2
Mar.	3,245,000	1,038	2	.0320	.0421	.0171	.6	2.4	4.1	.6
Apr.	1,499,000							1.1	1.1	1.1
May	961,000							1.5	1.5	1.5
June	1,005,000							.1	.1	.1
July	885,000							.1	.1	.1
Aug.	1,068,000							.2	.2	.2
Sept.	1,688,000	26	4	.0016	.0030	.0010	0	.2	.5	0
Oct.	3,888,000	72	4	.0018	.0035	.0014	.1	2.0	4.0	.1
Nov.	39,886,000	1,307	4	.0033	.0082	.0014	.7	2.4	4.0	.7
Dec.	67,756,000	20,129	4	.0297	.0688	.0043	10.9	9.8	10.9	8.8
Yearly	210,435,000		21					[u] 158.8		

Samples and Analyses by Mexican Section, Method C

[u] Estimated

1961 records incomplete. Period records reported April through September correspond to 1960 figures.

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES
1961

The following tables show electrical conductivity, expressed in mhos per centimeter cube x 10^6 at 25° C of individual water samples taken at Colorado River stations. The determinations for the Northerly and Southerly International Boundary stations, with the exception of those designated by an asterisk, were made by the United States Section of this Commission. The determinations for the Intake Canal at Morelos Dam station were made by the Mexican Section of this Commission.

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

Colorado River at Northerly International Boundary

September		October		November		November		November		December		December		December	
22	2,840	28	*3,200	9	4,090	20	*4,200	30	*1,900	8	*1,800	16	*1,500	24	*2,600
28	3,520	30	*4,000	10	*4,400	21	*4,200	December		9	*1,950	17	*1,400	25	*2,250
October		30	4,100	11	*4,000	23	*4,000	1	*1,450	10	*3,900	18	*1,500	26	*2,250
13	4,170	31	*4,000	13	4,210	24	*4,000	2	*1,700	11	*4,300	19	*1,600	26	2,770
20	4,190	November		14	*3,800	25	*4,000	4	*1,500	11	4,440	19	2,980	27	*2,600
25	*4,000	1	*4,000	16	*3,800	27	*1,700	4	1,580	12	*4,250	20	*1,700	28	*3,400
26	*3,900	2	*4,150	17	*4,400	27	1,950	5	*1,750	13	*4,500	21	*3,300	29	*3,400
27	*3,700	3	*4,300	18	*4,500	28	*1,700	6	*1,750	14	*4,150	22	*3,400	30	*3,200
27	4,070	4	*4,200	20	4,450	29	*2,000	7	*1,800	15	*1,500	23	*2,050	31	*3,600

Colorado River at Southerly International Boundary

October															
20	1,770														

Intake Canal at Morelos Diversion Structure

October		November		November		November		November		December		December		December	
25	4,000	3	4,300	13	4,100	21	4,400	30	1,700	8	1,800	16	1,700	24	2,800
26	3,700	4	4,400	14	3,800	22	4,500	December		9	2,000	17	1,700	25	2,500
27	3,700	6	4,000	15	3,800	23	4,150	1	1,500	10	3,900	18	1,900	26	2,400
28	3,400	7	4,100	16	3,800	24	4,000	2	1,700	11	4,300	19	1,900	27	2,700
30	4,000	8	4,250	17	4,350	25	4,050	4	1,500	12	3,950	20	2,000	28	3,600
31	4,000	9	3,900	18	4,300	27	1,700	5	1,750	13	4,500	21	3,500	29	3,600
November		10	4,300	19	4,200	28	1,700	6	1,750	14	4,400	22	3,600	30	3,300
1	4,000	11	4,000	20	4,200	29	2,000	7	1,800	15	1,700	23	2,550	31	3,600
2	4,150														

* Determinations made by the Mexican Section of this Commission

RAINFALL ON THE COLORADO RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall at stations located in California and Arizona in the United States and in Baja California and Sonora in Mexico, with averages for their periods of record. The stations in the United States are operated by the United States Bureau of Reclamation, California State Division of Forestry, and by the University of Arizona Experimental Farm. Those in Mexico are all operated by the Ministry of Hydraulic Resources with the exception of Ampac, which is operated by the Jabonera del Pacifico. Records of daily rainfall amounts, where available, are on file in the offices of the United States or Mexican Sections of this Commission. For location, elevation, period of record, and the observer, see alphabetical listings of these stations on page 52 in this bulletin.

In the United States

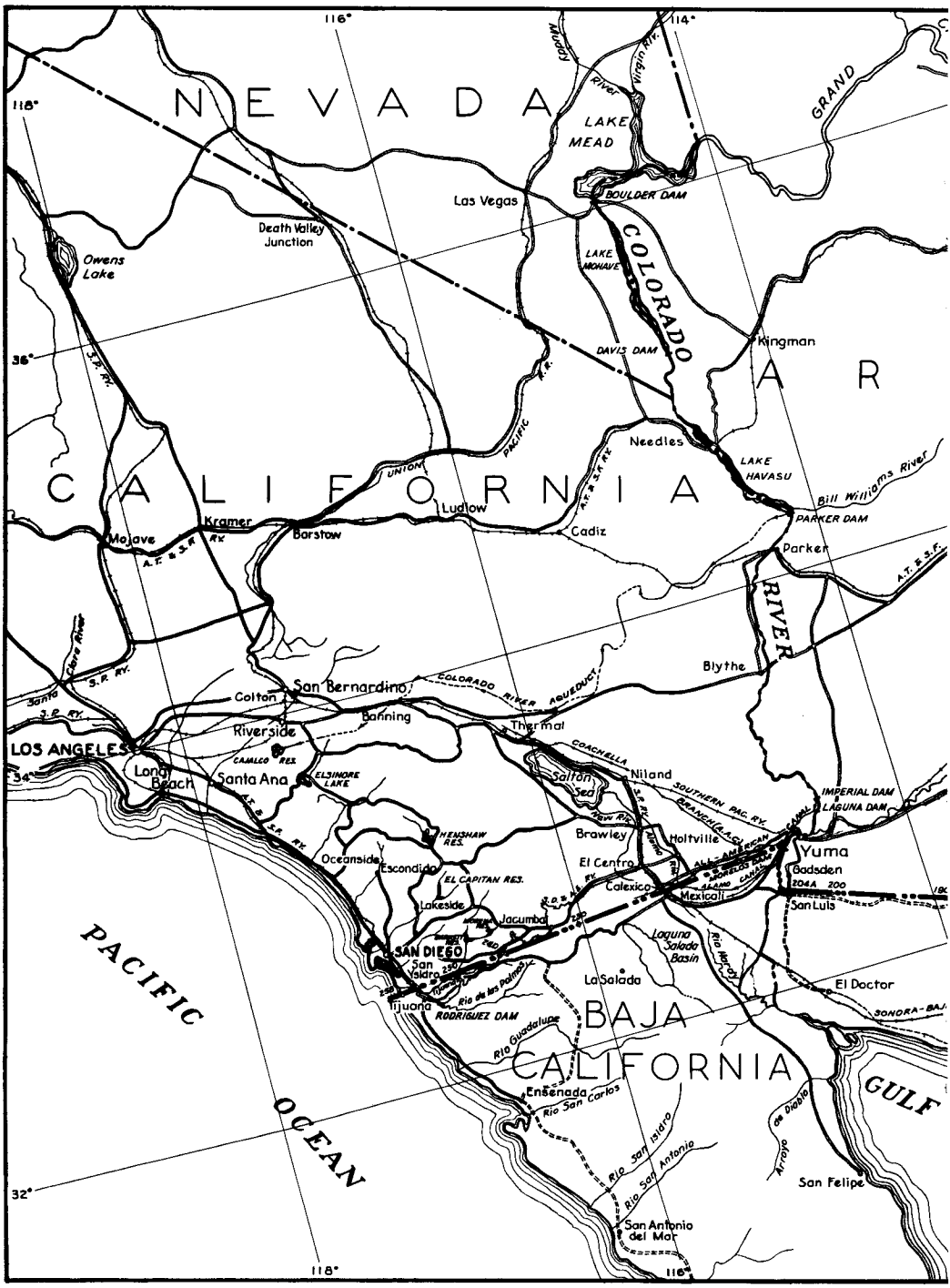
Month	Blythe, California		Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1961	*Average	1961	Average	1961	*Average
Jan.	0.26	0.52	0.56		0.21	0.41
Feb.	0	.45	0		0	.40
Mar.	.01	.43	.02		.02	.22
Apr.	T	.13	.22		0	.13
May	T	.02	0		0	.01
June	0	.03	0		0	.01
July	.12	.23	T		.10	.21
Aug.	.57	.79	1.28		1.20	.51
Sept.	0	.34	.04		0	.35
Oct.	0	.24	.24		0	.36
Nov.	.03	.25	.09		.06	.14
Dec.	.85	.60	.27		1.56	.39
Yearly	1.84	4.03	2.72		3.15	3.14

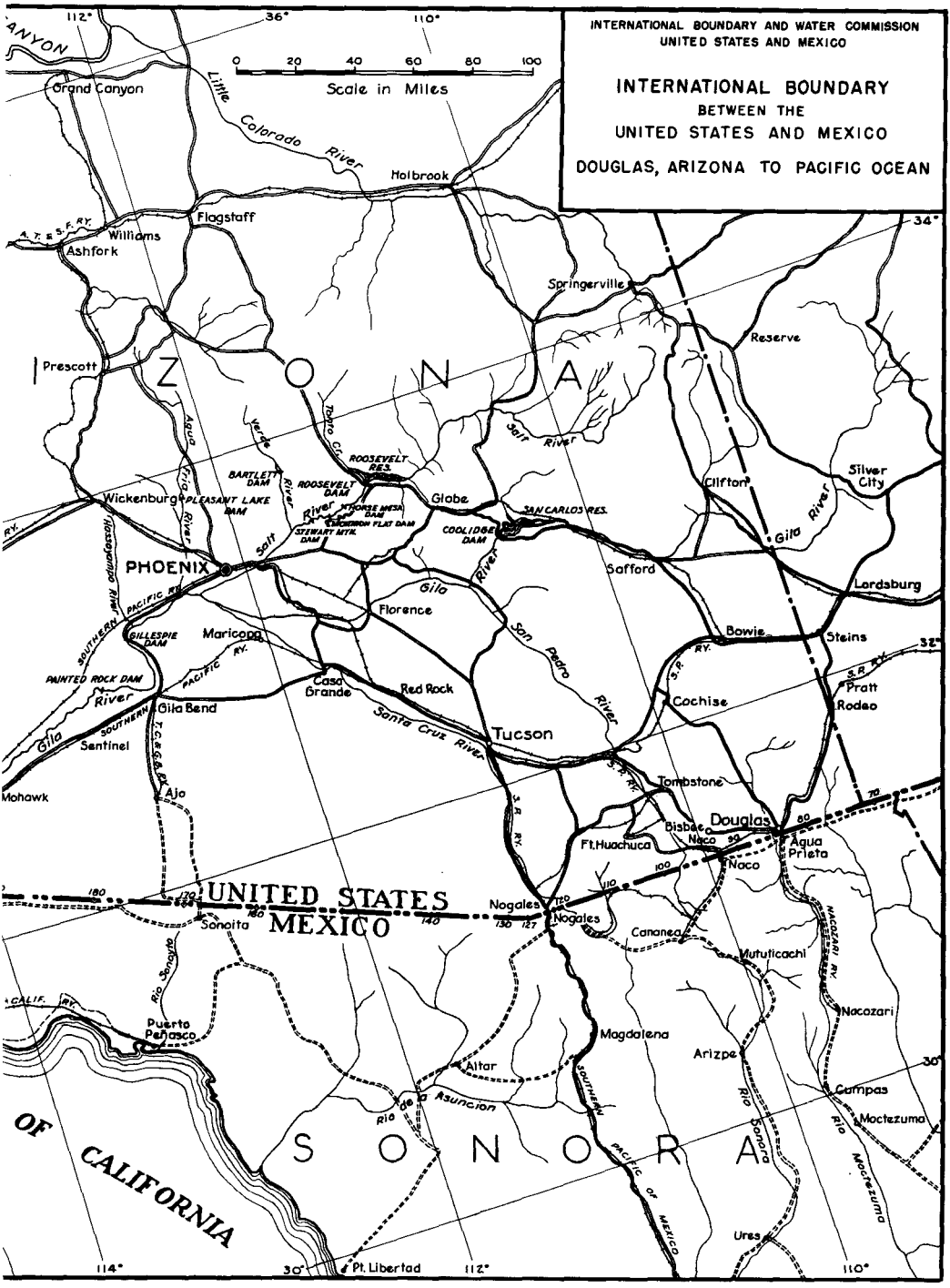
In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Ampac, Baja California		Bataques, Baja California		San Luis, R. C., Sonora	
	1961	Average	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	0.16	0.47	0.16	0.39	0.04	0.28	0	0.55	0.16	0.28
Feb.	T	.16	0	.35	0	.16	0	.04	0	.12
Mar.	.04	.12	0	.20	0	.12	0	.04	0	.08
Apr.	0	.04	0	.12	0	.08	0	.04	0	.04
May	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0
July	0	.08	.04	.08	0	.04	0	.04	0	.16
Aug.	T	.20	1.54	.35	2.36	.47	0	.08	2.36	.47
Sept.	0	.04	0	.35	0	.08	0	0	0	.04
Oct.	0	.31	0	.24	0	.08	0	.28	0	.12
Nov.	.04	.04	.04	.12	T	.04	0	.04	0	0
Dec.	.39	.24	.75	.87	.08	.12	.24	.16	.98	.24
Yearly	0.63	1.65	2.53	3.11	2.48	1.46	0.24	1.18	3.50	1.54

Month	Delta, Baja California		Kilometer 50, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1961	Average	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	0.59	0.39	0	0.35	0.59	0.31	0.04	0.24	0.04	0.28
Feb.	0	.04	0	.16	0	0	0	.08	0	.08
Mar.	.08	.12	0	.16	0	0	0	.12	0	.20
Apr.	0	.08	0	.04	0	0	0	.04	0	.12
May	0	0	0	.04	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	.12
July	0	.04	0	.12	0	0	.08	.08	0	.16
Aug.	.24	.12	0	.39	0	.04	.12	.47	2.01	.35
Sept.	0	.08	0	.08	0	.28	0	.31	0	.20
Oct.	0	.16	0	.12	0	.08	0	.16	0	.39
Nov.	.08	.04	0	.28	T	0	.04	.04	.04	0
Dec.	.75	.28	.75	.20	.79	1.06	.31	.24	.75	.31
Yearly	1.74	1.22	0.75	1.65	1.38	1.10	0.59	1.81	2.84	2.32

* Based on 1931-1955 Period


NEVADA
CALIFORNIA
ARIZONA
BAJA CALIFORNIA
PACIFIC OCEAN
GULF
LAKE MEAD
BOULDER DAM
Las Vegas
Death Valley Junction
Owens Lake
LAKE MOHAVE
COLORADO RIVER
DAVIS DAM
Kingman
Needles
LAKE HAVASU
Bill Williams River
PARKER DAM
Parker
RIVER
Blythe
Ludlow
Cadiz
Barstow
Mojave
Kramer
San Bernardino
Colton
Riverside
Banning
Thermal
COLORADO RIVER AQUEDUCT
LOS ANGELES
Long Beach
Santa Ana
CAMILLO RES.
ELSINORE LAKE
Salton Sea
Niland
COACHELLA
SOUTHERN PACIFIC BRANCH
IMPERIAL DAM
LAGUNA DAM
Brawley
Holtville
Yuma
El Centro
Calexico
Mexicali
Oceanside
Escondido
HENSHAW RES.
EL CAPITAN RES.
Lakeside
Jacumba
SAN DIEGO
San Ysidro
Tijuana
Rio de las Palmas
RODRIGUEZ DAM
Rio Guadalupe
Laguna Salada Basin
La Salada
Rio Hardy
El Doctor
SONORA-BAJA
Ensenada
Rio San Carlos
Rio San Isidro
Rio San Antonio
San Antonio del Mar
San Felipe
Arroyo de Diablo
Santa Ana River
116°
114°
118°
38°
34°
32°


INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
INTERNATIONAL BOUNDARY
BETWEEN THE
UNITED STATES AND MEXICO
DOUGLAS, ARIZONA TO PACIFIC OCEAN
Scale in Miles
0 20 40 60 80 100
Grand Canyon
Little Colorado River
Holbrook
Flagstaff
Williams
Ashfork
Springerville
Reserve
Prescott
ARIZONA
Verde
Tonto Cr.
Salt River
ROOSEVELT RES.
BARTLETT DAM
ROOSEVELT DAM
Wickenburg
PLEASANT LAKE DAM
Globe
SAN CARLOS RES.
COOLIDGE DAM
STEWART MTN. DAM
Clifton
Silver City
Gila River
PHOENIX
Safford
Lordsburg
Florence
Maricopa
Bowie
Steins
GILLESPIE DAM
PAINTED ROCK DAM
Casa Grande
Red Rock
San Pedro River
Cochise
Pratt
Rodeo
Gila Bend
Santa Cruz River
Tucson
Sentinel
Mohawk
Ajo
Tombstone
Douglas
Bisbee
Naco
Agua Prieta
Ft. Huachuca
UNITED STATES
MEXICO
Nogales
Sonoita
Cananea
Mututicachi
Nacozari
Rio Sonoyta
Puerto Peñasco
Magdalena
Altar
Arizpe
Campas
Moctezuma
Asuncion
SONORA
OF CALIFORNIA
Ures
Pt. Libertad
Gulf of California
Pacific of Mexico
Southern Pacific R.R.
A. T. & S. F. Ry.
S. P. Ry.
S. R. Ry.
Nacozari R.R.
Rio Sonora
Rio Moctezuma

LOCATION OF RAINFALL STATIONS ON THE COLORADO RIVER WATERSHED

The precipitation records of the stations listed alphabetically below begin on the date shown and extend through 1961. The state in which each station is located follows the name of the station.

In the United States

NAME OF STATION	LATI-TUDE	LONGI-TUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Blythe, California *	33° 37'	114° 36'	268	1909	State Division of Forestry
Davis Dam No. 2, Arizona *	35° 12'	114° 34'	657	1955	U. S. Bureau of Reclamation
Yuma Citrus Station, Arizona	32° 37'	114° 39'	191	1923	University of Arizona Experimental Farm

In Mexico

NAME OF STATION	LATI-TUDE	LONGI-TUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Ampac, Baja California	32° 34'	115° 26'	16	1949	Jabonera del Pacífico
Bataques, Baja California	32° 33'	115° 04'	16	1948	Hydraulic Resources
Delta, Baja California	32° 21'	115° 11'	16	1948	Hydraulic Resources
El Mayor, Baja California	32° 08'	115° 15'	10	1949	Hydraulic Resources
Kilometer 50, Baja California	32° 15'	115° 03'	49	1952	Hydraulic Resources
Los Algodones, Baja California	32° 42'	114° 44'	115	1948	Hydraulic Resources
Mexicali, Baja California	32° 40'	115° 28'	13	1926	Hydraulic Resources
Riito, Sonora	32° 10'	114° 57'	13	1959	Hydraulic Resources
San Felipe, Baja California *	31° 02'	114° 53'	33	1948	Hydraulic Resources
San Luis, R. C., Sonora	32° 28'	114° 47'	131	1949	Hydraulic Resources

* Not shown on map

EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at two stations in Arizona and at seven stations in Baja California and Sonora, Mexico. The stations in the United States are operated by the U. S. Bureau of Reclamation and by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Hydraulic Resources with the exception of Ampac, which is operated by the Jabonera del Pacifico. The type of pan used at all these stations was the U. S. Weather Bureau standard pan, four feet in diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," page 52 in this bulletin.

In the United States

Month	Davis Dam No. 2		Yuma Citrus Station	
	1961	Average	1961	Long Term * Average
Jan.	10.87		3.65	3.99
Feb.	8.59		5.09	4.98
Mar.	9.95		6.75	8.02
Apr.	13.99		9.53	10.45
May	17.26		11.76	13.67
June	20.90		13.23	14.86
July	21.70		13.52	16.22
Aug.	18.15		10.85	14.30
Sept.	15.31		8.78	11.46
Oct.	13.79		6.64	8.26
Nov.	8.32		3.97	5.36
Dec.	7.61		2.51	3.84
Total	166.44		96.28	115.41

In Mexico

Month	Los Algodones		Mexicali		Ampac		San Luis, R. C.	
	1961	Average 1949-55&61	1961	Average 1926-1961	1961	Average 1953-1961	1961	Average 1953-1961
Jan.	5.83	3.94	3.31	2.64	3.62	2.76	4.61	3.43
Feb.	7.44	5.20	4.09	3.46	4.37	3.82	5.04	4.29
Mar.	8.31	6.93	6.57	5.83	6.85	6.18	6.89	6.81
Apr.	11.85	8.90	9.06	7.91	10.20	8.82	7.44	8.90
May	14.53	11.50	11.38	10.51	13.27	11.57	10.59	11.30
June	14.65	11.89	11.73	11.42	12.44	11.30	13.27	13.07
July	14.45	11.77	12.09	11.65	11.22	11.42	14.13	14.57
Aug.	11.97	11.46	10.28	9.96	9.57	9.57	12.91	13.07
Sept.	11.50	9.49	8.23	8.15	6.26	7.28	10.28	9.88
Oct.	9.92	7.91	5.47	5.59	5.75	4.76	6.73	6.77
Nov.	5.55	4.72	3.19	3.39	3.50	3.27	4.72	4.37
Dec.	3.94	3.86	1.97	2.48	4.33	3.07	3.23	3.50
Total	119.94	99.88	87.37	83.03	91.38	82.40	99.84	101.54

Month	Delta		El Mayor		San Felipe	
	1961	Average 1959-1961	1961	Average 1953-1961	1961	Average 1952-1961
Jan.	4.88	3.82	4.57	3.19	7.56	5.20
Feb.	5.43	5.08	5.98	4.25	8.23	5.98
Mar.	6.46	6.93	7.01	6.30	8.15	7.05
Apr.	8.74	8.27	9.37	8.43	10.87	8.46
May	10.91	10.43	10.94	9.92	11.46	10.75
June	10.59	11.30	12.68	11.57	10.83	11.22
July	11.85	11.61	13.62	12.72	11.77	11.93
Aug.	9.33	9.80	12.83	11.81	10.55	10.79
Sept.	8.70	8.03	11.73	10.63	10.51	10.43
Oct.	6.30	6.14	11.14	8.15	9.76	8.86
Nov.	4.25	4.17	4.69	4.88	6.50	6.46
Dec.	3.07	3.43	3.31	3.27	5.71	5.28
Total	90.51	90.16	107.87	93.50	111.90	102.05

* Based on 1935-1955 Period

TEMPERATURE IN THE COLORADO RIVER BASIN

The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with averages for their periods of record. The maximum, minimum, and monthly mean temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations," page 52 in this bulletin.

Degrees Fahrenheit

In the United States

Month	Blythe, California				Davis Dam No. 2, Arizona				Yuma Citrus Station, Arizona			
	1961			* Average	1961			Average	1961			* Average
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	54	78	28	52	55	71	32		55	79	33	53
Feb.	59	81	32	57	57	79	36		58	84	33	57
Mar.	63	88	37	63	62	89	41		61	90	37	62
Apr.	71	104	42	71	71	104	50		69	103	41	70
May	76	101	50	78	78	100	56		73	100	46	77
June	88	116	53	84	92	121	60		86	114	55	84
July	92	115	65	92	98	119	74		90	113	58	92
Aug.	91	113	65	91	94	116	72		90	110	67	91
Sept.	81	105	55	85	82	105	60		80	103	54	86
Oct.	70	100	40	73	73	97	49		71	100	40	74
Nov.	57	82	30	60	59	80	37		57	83	31	62
Dec.	51	75	28	54	51	69	36		52	76	31	55
Yearly	71	116	28	72	73	121	32		70	114	31	72

In Mexico

Month	Los Algodones, Baja California				Mexicali, Baja California				Ampac, Baja California			
	1961		1948-1961		1961		1926-1961		1961		1949-1961	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	79	37	86	23	82	30	93	19	81	28	88	21
Feb.	86	41	95	28	88	37	93	23	88	36	91	23
Mar.	90	43	100	32	91	43	100	32	88	43	95	28
Apr.	104	50	106	37	104	48	106	34	102	27	106	27
May	104	54	117	43	104	50	117	45	104	48	115	41
June	117	59	126	52	118	57	120	52	118	55	120	52
July	113	64	118	61	115	64	118	55	118	59	120	54
Aug.	113	61	120	61	113	68	118	54	115	63	118	55
Sept.	106	59	122	54	106	55	122	48	108	54	118	48
Oct.	102	46	111	32	104	43	109	39	104	39	108	32
Nov.	86	27	100	27	84	36	99	28	86	32	93	27
Dec.	77	32	88	28	81	32	90	25	82	30	88	21
Yearly	117	27	126	23	118	30	122	19	118	27	120	21

Month	Bataques, Baja California				San Luis, R. C., Baja California				Delta, Baja California			
	1961		1948-1961		1961		1949-1961		1961		1948-1961	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	90	41	113	30	81	37	100	19	88	34	97	30
Feb.	93	39	97	19	86	37	109	27	88	39	99	28
Mar.	104	37	109	25	90	43	102	32	93	45	108	28
Apr.	117	46	117	16	100	46	106	39	104	45	115	32
May	118	50	124	34	102	46	115	45	106	50	124	32
June	135	57	135	43	118	54	126	55	118	57	133	36
July	131	63	131	45	113	59	124	59	115	66	135	45
Aug.	129	70	129	46	111	70	122	59	111	72	140	52
Sept.	135	52	135	39	108	59	118	52	106	57	124	39
Oct.	118	41	118	41	102	45	118	45	106	41	113	36
Nov.	95	32	115	32	88	36	100	30	90	36	120	32
Dec.	84	32	95	28	79	36	102	23	82	34	104	28
Yearly	135	32	135	16	118	36	126	19	118	34	140	28

* Based on Period 1931-1955

TEMPERATURE IN THE COLORADO RIVER BASIN

Degrees Fahrenheit
In Mexico

Month	Kilometer 50, Baja California				Riito, Sonora				El Mayor, Baja California			
	1961		1950-1959 & 1961		1961		1949-1961		1961		1949-1961	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.			90	21	81	28	91	19	81	32	86	25
Feb.	73	30	97	21	84	32	95	21	81	36	93	27
Mar.	81	30	99	28	91	37	100	25	86	39	97	36
Apr.	88	34	106	32	102	41	106	37	100	45	108	36
May	97	39	117	39	104	46	115	43	104	46	113	37
June	102	48	117	39	118	52	124	45	104	48	122	37
July	109	50	120	45	113	59	140	55	104	52	122	39
Aug.	109	61	117	52	109	70	122	46	113	52	122	41
Sept.	97	39	115	39	106	52	118	39	104	50	120	37
Oct.	97	39	108	36	102	41	115	34	104	50	106	37
Nov.	84	30	104	25	90	28	102	27	88	37	106	34
Dec.	75	30	95	21	77	27	86	21	84	34	100	19
Yearly			120	21	118	27	140	19	113	32	122	19

Month	San Felipe, Baja California											
	1961		1948-1961									
	Max.	Min.	Max.	Min.								
Jan.	90	43	99	32								
Feb.	91	39	102	32								
Mar.	93	43	104	32								
Apr.	108	46	113	37								
May	106	52	115	41								
June	118	59	124	50								
July	115	68	124	50								
Aug.	117	70	135	41								
Sept.	115	63	126	37								
Oct.	109	41	117	41								
Nov.	93	39	118	34								
Dec.	88	37	97	32								
Yearly	118	37	135	32								

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM
1961

The total drainage area within the Colorado River basin is about 246,000 square miles, of which 184,600 square miles lie above Imperial Dam and about 61,400 square miles are below the dam. Of the area below Imperial Dam, 59,400 square miles are in the United States and about 2,000 square miles are in Mexico. The area below Imperial Dam includes the Gila River watershed with a total area of about 58,200 square miles, of which about 1,100 square miles are in Mexico.

The irrigated areas tabulated below comprise the areas in the United States and Mexico which are served by diversions from the Colorado River at or below Imperial Dam. The diversions are supplemented by some pumping from wells in both countries. The areas in the United States include: 1) those within the U. S. Bureau of Reclamation Projects and in the North and South Gila Valleys located near Yuma, Arizona, the data for which are furnished by the U. S. Bureau of Reclamation; 2) those within the Coachella Valley, California, the data for which are furnished by the Coachella Valley County Water District and State of California Department of Water Resources; and 3) those within the Imperial Valley, California, the data for which are furnished by the Imperial Irrigation District. The areas in Mexico include those in the Mexicali Valley located in the states of Baja California and Sonora, the data for which are furnished by the Ministry of Hydraulic Resources of Mexico. The areas tabulated below refer to the total areas farmed, and *insofar as possible*, duplication of irrigated areas because of double cropping has been eliminated.

Point of Diversion From Colorado River and Designation of Areas	Total Irrigated Areas Acres
IN UNITED STATES:	
Imperial Dam	
Yuma Valley Division	50,949
Reservation Division	10,960
Yuma Mesa	16,049
Yuma Aux. Project Unit "B" (Yuma Mesa)	3,077
South Gila Valley	11,038
North Gila Valley	5,940
Wellton-Mohawk	52,995
Coachella Valley	60,139
Imperial Valley	435,664
Total in United States	646,811
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 459,828
Total in United States and Mexico	1,106,639

* An estimated one-third of total acreage is served by pumping from ground water in Mexicali Valley.

MESA DRAIN NEAR CUDAHY IN MEXICO

DESCRIPTION: Staff gage located at Kilometer 18.0, about 0.9 mile upstream from the pumping plant on the Alamo Canal above the Cudahy check. Measurements are made at various locations on the drain.

RECORDS: Based on 86 current meter measurements, 38 double and 10 single, made during the year from the bridge or by wading. Data obtained and furnished by the Mexican Section of the Commission. Records available: July 25, 1956 through December 1961.

REMARKS: Mesa Drain is located immediately south of the sand hills. Flow in the drain, consisting of ground water and agricultural returns, is modified by pumping for agricultural and domestic use in Mexico above the station.

EXTREMES: Maximum mean daily discharge, 78.0 second-feet, February 22, 1960; minimum mean daily discharge, 19.4 second-feet, July 31, 1961.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	43.1	42.7	36.4	42.7	33.9	26.8	33.9	21.2	32.1	46.6	28.6	30.0
2	43.8	41.7	36.0	43.1	33.2	26.8	34.3	22.6	32.8	49.1	28.6	31.4
3	43.1	41.0	35.7	43.8	32.5	26.8	34.3	24.0	33.2	47.0	28.3	32.8
4	42.4	40.3	35.3	43.1	32.1	26.8	34.3	25.8	33.5	44.5	28.3	34.6
5	42.0	39.6	35.3	42.0	31.4	26.5	34.3	27.5	35.3	42.4	27.9	35.0
6	41.3	38.8	35.0	41.3	30.7	28.3	34.6	29.0	36.7	39.9	27.9	35.7
7	40.6	39.6	34.6	40.6	30.0	30.0	34.6	30.4	38.5	37.8	28.3	36.0
8	39.9	40.3	34.3	39.6	29.3	31.8	34.6	29.7	39.9	35.7	28.3	36.7
9	39.6	41.0	34.3	38.8	31.8	33.5	34.6	29.0	41.7	33.2	28.6	37.4
10	39.9	41.7	33.9	38.1	33.9	35.3	34.6	28.3	43.1	31.1	29.0	37.8
11	40.3	42.4	36.7	38.8	36.4	36.7	33.9	27.5	44.8	31.1	29.0	38.5
12	40.6	43.1	39.9	39.6	38.5	38.5	33.2	26.8	42.4	31.1	29.3	38.5
13	41.3	43.8	43.1	40.3	40.6	38.1	32.5	26.1	39.9	31.1	29.3	38.1
14	41.7	43.8	42.4	40.6	43.1	37.8	31.8	25.4	37.4	31.4	29.7	38.1
15	42.0	43.8	42.0	41.7	45.2	37.1	31.1	26.5	35.0	31.4	30.0	38.1
16	42.7	43.8	41.7	42.4	44.1	36.7	30.4	27.5	32.5	31.1	30.4	38.1
17	41.7	43.8	41.3	43.1	43.1	36.0	29.7	28.6	30.0	31.1	31.1	37.8
18	40.6	43.8	41.0	42.4	42.0	35.7	29.0	29.7	27.5	30.7	31.4	37.8
19	39.9	43.8	40.6	42.0	41.0	35.3	28.3	31.1	28.3	30.4	31.8	37.8
20	38.8	43.8	40.3	41.7	39.6	35.0	27.5	32.1	29.3	30.4	32.1	37.8
21	38.1	42.7	40.3	41.7	38.5	34.6	26.8	33.2	30.0	30.0	30.7	37.4
22	37.1	42.0	40.3	41.0	37.4	34.6	26.1	32.8	30.7	29.7	29.7	37.4
23	36.0	41.0	40.3	40.6	36.0	34.3	25.4	32.5	31.8	29.7	28.6	37.4
24	37.1	39.9	40.3	40.3	34.6	34.3	24.7	31.8	32.5	29.3	27.5	37.4
25	38.5	38.8	39.9	39.6	32.8	33.9	23.7	31.4	33.2	29.3	26.5	37.1
26	39.6	37.8	39.9	38.5	31.4	33.5	23.0	31.1	34.3	29.3	25.4	37.1
27	40.6	36.7	39.9	37.8	30.0	33.9	22.2	30.7	36.7	29.3	24.0	37.1
28	41.7	36.4	40.6	36.7	28.6	33.9	21.5	30.4	39.2	29.0	25.4	36.7
29	43.1		41.0	35.7	26.8	33.9	20.8	30.7	41.7	29.0	27.2	37.4
30	44.1		41.7	35.0	26.8	33.9	20.1	31.4	44.1	29.0	28.6	37.8
31	43.4		42.0		26.8		19.4	31.8		29.0		38.5
Sum	1,264.6	1,157.9	1,206.0	1,212.6	1,082.1	1,000.3	905.2	896.6	1,068.1	1,039.7	861.5	1,139.3

Month	Current Year 1961 Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1956-1961 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			30	44.1	23	36.0	41.0	2,508	2,864	3,072	2,508
Feb.			† 13	43.8	28	36.4	41.3	2,296	2,839	3,439	2,296
Mar.			13	43.1	10	33.9	35.3	2,392	2,791	3,225	2,392
Apr.			3	43.8	30	35.0	40.3	2,405	2,765	3,381	2,405
May			15	45.2	†29	26.8	35.0	2,147	2,818	3,365	2,147
June			12	38.5	5	26.5	33.2	1,985	2,524	3,324	1,985
July			† 6	34.6	31	19.4	29.3	1,795	2,178	2,688	1,795
Aug.			21	33.2	1	21.2	29.0	1,779	2,482	3,468	1,779
Sept.			11	44.8	18	27.5	35.7	2,119	2,389	2,720	2,119
Oct.			2	49.1	†28	29.0	33.5	2,062	2,643	3,414	2,062
Nov.			20	32.1	27	24.0	28.6	1,708	2,622	3,416	1,708
Dec.			† 11	38.5	1	30.0	36.7	2,260	2,735	3,155	2,260
Yearly				49.1		19.4	35.0	25,456	30,648	34,661	25,456

† And other days Ø Mean daily

ALAMO RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Staff gage in the United States about 7 miles east of Calexico, California, on the right bank of the Alamo River immediately downstream from the international land boundary between the United States and Mexico, a few feet upstream from a 4-foot Cipolletti weir set in the throat of a twin-tube concrete culvert which carries the river flow under the All-American Canal.

RECORDS: Computed on the basis of head on the Cipolletti weir from daily staff gage readings, and weir ratings as determined by monthly current meter measurements. Records obtained and furnished by Imperial Irrigation District. 1961 records excellent. Records available: June 1942 through December 1961.

REMARKS: The flow at this station normally comprises seepage from the All-American Canal and drainage water from the Mexicali Valley which enters the United States.

EXTREMES: Maximum mean daily discharge, 258 second-feet (estimated), April 13, 1946; minimum discharge, no flow July 22-23, 29-30, 1949. Prior to the period of record, and since 1900, considerably higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a part of its flow passed through the Alamo River channel.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.44	3.15	2.55	3.41	2.21	2.21	2.44	3.28	1.68	2.32	1.49	1.89
2	2.44	2.91	2.79	3.41	2.21	2.21	2.67	3.15	1.89	2.21	2.00	1.79
3	2.44	2.91	2.79	3.67	2.21	2.21	2.55	3.15	1.89	2.21	2.00	1.79
4	2.44	2.91	2.67	3.67	2.32	2.21	2.55	3.15	1.89	2.21	1.89	1.68
5	2.44	2.79	2.55	3.54	2.32	2.10	2.67	3.03	1.89	2.21	1.68	1.89
6	2.44	2.79	2.79	3.41	2.44	2.10	2.55	3.03	2.00	2.44	1.79	2.00
7	2.55	2.00	2.55	3.41	2.21	2.67	2.44	3.03	2.00	2.32	2.44	2.00
8	2.44	2.00	2.67	3.41	2.21	2.79	2.55	3.41	2.00	2.10	2.55	2.10
9	2.44	2.32	2.21	4.07	2.00	2.21	2.44	3.41	2.00	2.10	2.21	2.00
10	2.44	2.44	2.21	3.54	2.21	2.32	2.44	3.41	2.00	2.21	2.10	1.89
11	2.67	3.28	2.32	3.15	2.21	2.67	2.55	3.54	2.67	2.32	2.10	2.00
12	2.44	2.55	3.41	3.03	2.21	3.15	2.67	3.28	2.62	2.21	2.10	2.10
13	2.55	2.10	2.67	3.03	2.21	2.67	2.55	3.28	2.44	3.54	2.10	2.00
14	2.67	2.00	3.03	2.91	2.00	2.44	2.55	3.41	2.44	2.67	2.00	1.89
15	2.79	2.21	2.67	2.44	2.00	2.44	2.55	3.28	2.44	2.67	1.68	2.00
16	2.67	2.21	3.03	2.67	2.00	2.44	2.55	3.41	2.44	2.44	1.79	1.89
17	2.91	2.10	2.91	2.44	2.00	2.44	2.55	3.03	2.00	2.55	2.00	1.89
18	2.67	2.00	2.91	2.44	2.00	2.55	2.79	2.55	2.32	2.67	2.21	1.89
19	2.55	2.55	3.93	2.00	2.32	2.55	2.55	2.44	2.21	2.55	2.00	1.89
20	2.55	2.32	2.55	2.10	2.32	2.44	2.79	2.44	2.21	2.55	1.58	2.00
21	2.44	2.10	3.41	2.10	2.21	2.44	2.55	2.32	2.21	2.55	1.68	2.00
22	2.44	2.21	3.67	2.21	2.44	2.44	2.79	2.32	2.00	2.44	2.00	2.00
23	2.44	2.44	3.54	2.21	2.00	2.21	2.91	2.79	2.21	2.44	2.00	2.10
24	2.67	2.44	3.67	2.10	2.21	2.21	3.54	2.44	2.32	2.67	2.00	2.10
25	2.55	2.55	3.54	2.00	2.21	2.21	3.28	2.55	2.21	2.67	1.89	2.10
26	2.79	2.79	3.67	2.21	2.21	2.44	3.15	2.10	2.21	2.67	1.79	2.10
27	2.79	2.91	3.67	2.21	2.21	2.21	3.28	2.21	2.21	2.32	1.89	2.00
28	3.15	2.79	4.07	2.32	2.21	2.44	3.41	2.21	2.21	2.44	2.21	2.00
29	3.15		4.20	2.32	2.32	2.21	3.03	2.32	2.21	2.44	2.00	2.00
30	3.03		3.67	2.21	2.21	2.21	3.28	2.00	2.21	2.10	1.79	2.00
31	3.54		3.67		2.21		3.67	1.68		1.79		1.89
Sum	81.97	69.77	95.99	83.64	68.05	71.84	86.29	87.65	65.03	75.03	58.96	60.87

Month	Extreme Gage Ø Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1943-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	0.41	0.32	31	3.54	† 1	2.44	2.64	163	517	2,790	99
Feb.	.39	.28	11	3.28	† 7	2.00	2.49	138	468	2,820	100
Mar.	.46	.30	29	4.20	† 9	2.21	3.10	190	519	3,150	111
Apr.	.45	.28	9	4.07	† 19	2.00	2.79	166	570	2,220	97
May	.32	.28	† 6	2.44	† 9	2.00	2.20	135	426	1,800	73
June	.38	.29	12	3.15	† 5	2.10	2.39	142	424	1,690	61
July	.42	.32	31	3.67	† 1	2.44	2.78	171	384	1,710	59
Aug.	.41	.25	11	3.54	31	1.68	2.83	174	477	1,670	83
Sept.	.34	.25	11	2.67	1	1.68	2.17	129	437	1,410	91
Oct.	.41	.26	13	3.54	31	1.79	2.42	149	477	1,840	102
Nov.	.33	.23	8	2.55	1	1.49	1.97	117	492	2,080	86
Dec.	.29	.25	† 8	2.10	4	1.68	1.96	121	446	1,690	80
Yearly	0.46	0.23		4.20		1.49	2.48	1,795	5,637	22,150	1,250

† And other days Ø Mean daily

NEW RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder located on the right (east) bank of the river in the limits of the city of Calexico, California, 1,400 feet downstream (north) of the international land boundary between the United States and Mexico. Measurements are made from a foot bridge at the gage.

RECORDS: Based on a continuous record of gage heights and weekly current meter measurements, supplemented by additional measurements during periods of high flow by the Imperial Irrigation District. Measurements are also made generally once each month by the United States Section of the Commission. Records computed and furnished by the District. 1961 records good. Records available: June 1942 through December 1961.

REMARKS: The New River flows northward from Mexico into the United States and thence into the Salton Sea. The flow at this station normally comprises 1) a portion of the waste and drainage water from the irrigation system in the Mexicali Valley, and 2) sewage and other wastes from Mexicali, Baja California. Flood waters enter the river from local drainage in Mexico and such waters can reach damaging rates during violent desert storms. Waste flows are limited to an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

EXTREMES: Maximum mean daily discharge, 554 second-feet on April 25, 1960; minimum mean daily discharge, 2 second-feet on May 14, 1945. Prior to the period of record, and since 1900, much higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a considerable part of its flow passed through the New River channel.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	162	220	202	194	191	177	122	128	152	128	144	133
2	159	210	218	195	186	180	119	127	152	127	145	171
3	162	182	224	195	185	175	119	122	149	127	122	158
4	157	189	218	198	184	187	126	122	141	127	196	202
5	156	208	237	203	182	170	122	128	139	126	218	212
6	160	173	171	202	179	169	119	139	140	133	184	167
7	159	161	178	201	170	169	121	142	139	117	144	153
8	164	158	182	199	174	168	122	140	140	117	145	153
9	162	156	186	191	169	164	121	140	143	118	138	154
10	160	157	186	190	170	162	125	143	147	131	135	153
11	162	161	192	189	156	156	124	142	148	133	138	152
12	163	167	200	190	178	156	119	141	147	134	135	152
13	162	165	218	189	166	155	116	139	148	135	131	152
14	162	164	186	192	175	156	116	136	133	140	129	165
15	163	122	177	191	146	153	116	206	30	142	132	201
16	175	25	171	200	151	154	119	311	30	142	123	369
17	174	25	173	199	157	154	121	227	25	141	121	244
18	169	20	181	198	164	148	122	196	28	174	121	163
19	169	47	188	195	164	146	129	185	117	140	121	157
20	165	167	192	191	124	144	135	181	163	147	133	157
21	159	535	196	193	90	143	136	176	165	145	141	155
22	160	272	206	190	92	139	137	179	161	148	154	152
23	158	194	210	187	91	136	133	184	157	156	151	143
24	155	134	208	181	105	136	127	209	143	248	151	137
25	155	169	194	180	125	133	122	190	139	238	160	134
26	162	165	175	184	175	133	124	186	136	172	157	130
27	163	165	190	190	264	135	121	174	135	153	160	115
28	167	161	186	192	257	132	118	169	134	142	140	113
29	173		190	189	225	129	115	163	137	141	135	108
30	194		194	188	216	128	119	157	137	141	134	100
31	219		200		198		124	152		139		99
Sum	5,130	4,672	6,029	5,776	5,209	4,587	3,809	5,134	3,855	4,502	4,338	4,954

	Current Year 1961								Period 1943-1961		
Month	Extreme Gage Ø Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	38.21	38.93	31	219	† 24	155	165	10,175	5,099	11,078	1,750
Feb.	35.06		21	535	18	20	167	9,267	4,127	10,836	1,260
Mar.	38.70	39.03	5	237	† 6	171	194	11,958	4,387	11,958	1,010
Apr.	38.82	39.05	5	203	25	180	193	11,457	4,854	14,489	1,390
May	38.39	40.08	27	264	21	90	168	10,332	4,222	10,332	629
June	38.98	39.84	4	187	30	128	153	9,098	3,694	9,098	1,090
July	39.70	40.01	22	137	29	115	123	7,555	3,529	8,815	817
Aug.	37.46	40.02	16	311	† 3	122	166	10,183	4,607	10,921	1,140
Sept.	39.45		21	165	17	25	128	7,646	4,896	11,615	1,800
Oct.	38.27	40.01	24	248	† 7	117	145	8,930	5,594	11,560	2,080
Nov.	38.65	40.01	5	218	† 17	121	145	8,604	5,112	10,143	2,480
Dec.	36.87	40.35	16	369	31	99	160	9,826	5,314	12,845	1,760
Yearly	35.06			535		20	159	115,031	55,435	121,824	24,570

† And other days Ø Mean daily

VOLCANO DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Volcano Drain is measured at a point about 1,000 feet downstream from the bridge on the connecting road between the Tijuana-Mexicali and Mexicali-San Felipe highways, 5.8 miles upstream from the international boundary and 3.7 miles south of Mexicali, Baja California. Measurements obtained at a point near the crossing of the siphon of the West Main Canal and Volcano Drain.

RECORDS: Based on 69 current meter measurements, 20 double and 29 single, made by wading during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1961.

REMARKS: Volcano Drain carries agricultural return flow from a large part of the Mexicali Valley. Cofferdams and other structures in the Laguna Mexico and other points upstream which are not subject to control affect the return flows, which results in an irregular discharge.

EXTREMES: Maximum instantaneous discharge, 220 second-feet on January 30, 1961; minimum instantaneous discharge, 42.0 second-feet on September 18, 1961.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	130	204	127	152	137	108	113	89.0	129	114	107	105
2	131	196	126	154	137	108	114	91.8	125	114	108	103
3	130	188	125	156	138	108	115	94.6	123	111	108	102
4	127	180	124	154	139	108	113	97.1	119	107	109	100
5	126	172	123	152	139	108	111	99.9	120	104	109	105
6	124	164	122	150	140	108	108	103	121	100	110	109
7	122	160	121	148	141	108	106	106	123	96.8	109	114
8	120	156	120	146	141	108	104	106	124	93.6	108	118
9	118	152	119	144	141	108	102	107	125	90.1	107	123
10	116	148	118	142	141	109	99.6	108	126	92.9	106	127
11	118	144	127	143	140	109	98.9	108	127	95.7	105	132
12	121	139	135	144	140	109	98.2	109	115	98.5	105	131
13	118	136	143	145	140	111	97.8	110	102	101	103	130
14	118	135	141	147	139	113	97.1	111	90.4	104	103	129
15	120	135	138	148	139	115	96.4	114	78.4	107	101	128
16	u 162	134	135	149	137	117	95.7	118	66.4	107	99.2	127
17	u 161	134	132	150	135	119	95.0	121	54.0	107	97.5	126
18	u 141	133	130	149	132	121	94.6	124	42.0	107	96.1	125
19	u 141	133	127	147	130	123	93.9	128	52.6	108	94.3	121
20	u 134	132	124	145	128	121	93.2	131	63.2	108	92.5	117
21	u 141	132	126	144	126	119	92.5	135	73.8	108	95.0	113
22	u 145	131	129	142	123	117	91.8	136	84.8	108	97.8	109
23	u 163	131	131	141	121	115	91.1	137	95.3	108	100	105
24	171	131	134	139	119	113	90.8	137	106	108	103	101
25	179	130	137	139	117	111	90.1	138	117	108	105	97.5
26	187	130	139	138	114	109	89.3	139	116	107	108	93.6
27	196	129	142	138	112	110	88.6	140	116	107	111	89.7
28	204	128	144	138	110	111	87.9	141	115	107	109	85.8
29	212		146	137	108	112	87.6	138	115	106	108	84.0
30	220		148	137	108	112	86.9	135	115	106	106	82.6
31	212		150		108		86.2	132		107		80.9
Sum	4,608	4,117	4,083	4,358	4,020	3,368	3,029.2	3,684.4	3,079.9	3,246.6	3,120.4	3,414.1

Month	Current Year 1961 — Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1957-1961 — Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			30	220	10	116	149	9,142	6,360	9,142	4,076
Feb.			1	204	28	128	147	8,165	5,963	8,165	3,536
Mar.			31	150	10	118	132	8,102	6,512	8,102	4,491
Apr.			3	156	30	137	145	8,654	7,178	9,767	4,373
May			† 7	141	†29	108	130	7,973	6,686	8,542	4,675
June			19	123	† 1	108	112	6,675	5,848	7,454	3,547
July			3	115	31	86.2	97.8	6,010	5,831	7,902	2,809
Aug.			28	141	1	89.0	119	7,306	6,966	8,367	4,148
Sept.			1	129	18	42.0	103	6,107	7,368	9,027	4,912
Oct.			1	114	9	90.1	105	6,442	6,901	8,118	4,570
Nov.			27	111	20	92.5	104	6,188	6,174	7,132	4,207
Dec.			11	132	31	80.9	110	6,767	6,329	7,528	4,511
Yearly				220		42.0	121	87,531	78,116	95,813	50,244

† And other days Ø Mean daily u Estimated

SIFON WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Water-stage recorder and control weir located in the wasteway from the West Main Canal to New River about 650 feet downstream from the wasteway structure, 1,300 feet upstream from the confluence with Volcano Drain, 0.5 mile downstream from the crossing of the West Main Canal and the Mexicali-San Felipe highway, 450 feet north of the crossing of the Tijuana-San Felipe Trunk road and New River, 5.7 miles upstream from the international land boundary, and 3.7 miles south of Mexicali, Baja California. The Cipolletti-type wooden control weir has a 13.45-foot crest and is set in the left bank of the wasteway and near the right bank of Volcano Drain. The sea level elevation of the gage has not been determined.

RECORDS: Based on 33 current meter check measurements during the year, a rating curve for the weir, and a continuous record of gage heights. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1952 through December 1961. Records reported below are part of the waste flows from the Mexican system of canals discharging into the territory of the United States, which wastes are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197.

REMARKS: Part of the wasteway flow is sometimes used for irrigation before discharging into the Volcano Drain and thence into New River.

EXTREMES: Maximum instantaneous discharge, 102 second-feet on March 30, 1953 and March 5, 1956; minimum discharge, no flow on numerous occasions during most years.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0.4	0	0.4	0.4	0	0	0
2	0	0	0	0	0	.4	0	0	.4	0	0	0
3	0	0	0	0	0	.4	0	0	.4	0	0	0
4	0	0	.4	0	0	.4	0	0	.4	0	0	0
5	0	1.4	.4	0	0	.4	0	0	.4	0	0	0
6	0	4.6	.4	0	0	0	0	.4	.4	0	0	0
7	0	.4	.4	0	0	0	0	.7	.4	0	0	0
8	0	.4	0	0	0	0	0	.4	0	0	0	0
9	0	.4	0	0	0	0	0	0	0	0	0	0
10	0	.4	0	0	0	0	0	0	0	0	0	0
11	0	.4	0	0	0	0	0	0	0	0	0	0
12	.4	.4	.4	0	0	0	0	0	0	0	0	0
13	1.1	.4	3.2	0	0	0	0	0	0	.4	0	0
14	.7	.4	0	0	0	0	0	0	0	.4	0	0
15	.7	.4	0	0	0	0	0	.7	0	0	0	0
16	.7	0	0	0	0	0	0	.4	.7	0	0	0
17	.4	0	1.1	0	0	0	0	1.4	0	0	0	0
18	.4	0	0	0	0	0	.7	.4	0	0	0	0
19	0	0	0	0	0	0	.7	.4	0	0	0	0
20	0	0	0	0	0	0	.7	0	0	0	0	0
21	0	.4	0	0	0	0	.7	0	0	0	0	0
22	0	.4	0	0	.4	0	.7	.4	0	0	0	0
23	0	.4	0	0	.7	0	.7	.4	0	0	0	0
24	0	0	0	0	.4	0	.4	.4	0	0	0	0
25	0	0	0	0	.7	0	0	.4	0	0	.4	0
26	0	0	0	0	.4	0	.4	.4	.4	0	.7	0
27	0	.4	0	0	0	0	1.1	.4	0	0	.7	.4
28	0	0	0	0	0	0	1.1	.4	0	0	.4	.4
29	0		0	0	0	0	1.1	.4	.4	0	0	.4
30	0		0	0	0	0	.7	.4	.4	0	0	.4
31	0		0		0		.4	.4		.4		.4
Sum	4.4	11.2	6.3	0	2.6	2.0	9.4	9.2	4.7	1.2	2.2	2.0

Current Year 1961 — **Period** 1952-1961

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			13	1.1	†1	0	0.1	8.1	63.2	293	1.6
Feb.			6	4.6	†1	0	.4	21.1	54.3	96.5	1.6
Mar.			13	5.3	†1	0	.2	12.2	209	597	6.5
Apr.				0		0	0	0	91.6	660	0
May			23	1.1	†1	0	.1	4.9	65.7	141	.8
June			† 1	.4	†6	0	.1	3.2	44.6	186	3.2
July			†27	1.1	†1	0	.3	17.8	63.2	164	8.9
Aug.			17	4.9	†2	0	.3	17.0	146	561	7.3
Sept.			16	1.1	†8	0	.1	8.1	83.5	225	4.9
Oct.			†13	.4	†1	0	0	2.4	143	524	2.4
Nov.			†26	.7	†1	0	.1	4.1	216	1,367	4.1
Dec.			†27	.4	†1	0	.1	3.2	95.7	233	0
Yearly				5.3		0	0.1	102.1	1,276	3,249	102.1

† And other days

WISTERIA CANAL WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Water-stage recorder, staff gage, and control weir located approximately 160 feet downstream from the wasteway gates of the Cerro Prieto and West Main Canals, about 1,000 feet downstream from their confluence in the Colonia Wisteria, 4.3 miles south of the international land boundary, and 3.1 miles south of Mexicali, Baja California.

RECORDS: Based on 37 current meter measurements made during the year, a rating curve for the weir, and a continuous record of gage heights. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1951 through December 1961.

REMARKS: Measurements were taken at various locations downstream from the weir due to poor condition of the channel. Operation of the canal system by the Colorado River Irrigation District in Mexico modifies the flows at this station. Records reported below normally comprise the largest single portion of the waste flows from the Mexican system of canals discharging into the territory of the United States. Such wastes are limited to an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

EXTREMES: Maximum instantaneous discharge, 480 second-feet, August 23, 1955; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	54.0	3.5	3.2	2.8	2.5	2.1	2.5	2.8	3.9	4.2	3.9
2	3.5	31.1	3.5	3.2	2.8	6.7	2.1	2.8	2.8	3.9	4.2	48.0
3	6.4	4.6	3.5	2.8	2.8	5.3	2.1	2.8	2.8	3.9	4.2	30.0
4	4.6	25.1	3.5	3.2	2.8	10.6	2.1	2.8	2.8	3.5	84.0	77.7
5	3.5	43.4	4.9	3.2	2.8	4.2	2.1	2.8	2.5	3.5	97.5	86.2
6	3.5	5.3	4.6	2.8	2.8	2.1	2.1	2.8	2.1	2.8	51.2	26.8
7	3.5	4.6	4.2	3.2	2.8	2.1	2.1	2.8	1.8	2.8	7.1	4.6
8	4.2	4.2	4.2	2.8	2.8	2.1	2.1	2.8	1.4	2.8	5.7	4.2
9	3.9	4.2	4.2	2.8	2.8	2.1	2.1	2.8	1.1	2.1	4.9	4.2
10	3.9	3.9	3.9	2.8	2.8	2.1	4.2	2.8	1.1	2.1	4.6	3.9
11	3.9	3.9	3.9	2.8	2.8	2.1	3.2	2.8	1.1	2.1	4.6	3.9
12	3.9	3.9	3.9	2.8	2.8	2.1	2.1	2.8	.7	2.1	4.2	3.9
13	3.9	3.5	3.9	2.8	2.8	2.1	2.1	2.8	1.8	2.1	3.5	3.9
14	3.9	3.9	3.9	5.3	2.8	2.1	2.1	2.8	2.5	2.1	4.2	3.5
15	3.9	3.9	3.5	10.6	2.8	2.1	2.1	2.8	3.5	2.1	4.2	56.9
16	11.7	3.5	3.5	9.5	2.5	2.1	2.1	2.8	3.5	2.1	3.9	211
17	7.8	3.5	3.2	8.1	2.5	2.1	3.5	3.2	3.5	2.1	3.5	92.5
18	4.2	3.5	3.2	11.3	2.5	2.1	2.8	3.2	3.5	30.4	3.5	12.4
19	3.5	3.5	4.2	6.0	2.5	2.1	2.8	3.2	3.5	3.9	3.5	10.2
20	3.5	3.5	3.5	3.9	2.1	2.1	2.8	3.5	3.9	9.2	12.7	9.2
21	3.5	3.5	3.2	3.5	2.1	2.1	2.5	3.5	3.5	6.7	12.4	9.5
22	3.5	3.5	2.8	3.5	2.1	2.1	2.5	3.5	3.5	7.1	13.8	9.2
23	3.5	3.5	2.8	3.5	2.1	2.1	2.5	3.2	3.5	15.5	6.7	9.2
24	3.5	3.5	2.8	2.8	2.1	2.1	2.1	3.2	2.8	109	7.1	8.8
25	3.5	3.5	2.8	2.8	2.1	2.1	2.1	2.8	2.8	100	13.8	8.8
26	3.5	3.5	2.8	2.8	2.1	2.1	2.1	2.8	2.8	30.4	11.3	8.8
27	6.0	3.5	2.8	2.8	2.1	2.1	2.1	2.5	2.8	12.7	14.5	8.5
28	7.4	3.5	2.8	2.8	2.1	2.1	2.1	2.5	2.8	4.2	5.3	8.5
29	4.9		2.8	2.8	2.1	2.1	2.1	2.5	6.7	4.2	4.9	7.8
30	21.2		2.8	2.8	2.1	2.1	2.1	2.5	3.9	4.2	4.6	7.8
31	44.1		2.8		2.1		2.1	2.5		4.2		7.8
Sum	195.7	245.0	107.9	123.2	77.2	81.8	73.0	89.1	83.8	387.7	409.8	791.6

Current Year 1961 — **Period** 1951-1961

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			31	51.9	† 2	3.5	6.4	388	1,819	5,065	388
Feb.			1	86.9	† 12	3.5	8.8	486	1,158	1,915	486
Mar.			19	14.1	† 22	2.8	3.5	215	1,007	2,201	172
Apr.			18	38.5	† 3	2.8	4.2	245	1,366	4,433	150
May			† 1	2.8	† 24	2.1	2.5	154	871	1,891	105
June			2	59.3	† 21	2.1	2.8	163	540	1,448	81.9
July			10	22.2	† 1	2.1	2.5	146	421	2,039	59.2
Aug.			15	4.6	† 1	2.5	2.8	178	838	1,925	129
Sept.			29	32.5	12	.7	2.8	167	1,006	2,915	101
Oct.			24	182	16	2.1	12.4	770	1,531	2,993	662
Nov.			4	129	13	3.5	13.8	813	1,390	2,351	646
Dec.			16	324	† 14	3.5	25.4	1,570	1,465	2,501	544
Yearly				324		0.7	7.4	5,295	13,397	20,624	5,295

† And other days

WISTERIA DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Wisteria Drain discharges into the stilling basin above the weir of Wisteria Wasteway immediately downstream from the spillway structure of Cerro Prieto and West Main Canals through a 20-inch pipe and thence into New River. The pipe outlet is located in the right bank of the basin in Colonia Wisteria 4.3 miles upstream from the international boundary and about 1.9 miles east of the Tijuana highway from the Tijuana-San Felipe Junction.

RECORDS: Based on weekly readings of water surface elevation, discharges are computed from horizontal pipe formula. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1961.

EXTREMES: Maximum mean daily discharge, 2.1 second-feet, February 6, 1961; minimum, no flow on various occasions during 1960 and 1961. Maximum monthly volume, 55.9 acre-feet, August 1959; minimum monthly volume, 6.5 acre-feet, September 1960.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	1.4	0	0.4	0	0.4	0.7	0.4	0	0.7	0.4	0.7
2	.4	1.4	0	.4	0	.4	.7	.4	0	1.1	.4	.7
3	.4	1.4	0	.7	.4	.4	.7	.4	0	.7	.4	.7
4	.4	1.8	0	.7	.4	.4	.7	.4	0	.7	.4	.4
5	.4	1.8	0	.4	.4	.4	.7	.4	0	.7	.4	.4
6	.7	2.1	0	.4	.4	.4	.7	.4	0	.7	.4	.4
7	.7	1.8	0	.4	.4	.4	.7	.4	0	.4	.4	.4
8	.7	1.4	0	.4	.4	0	.4	.4	0	.4	.4	.4
9	.7	1.1	.4	.4	.4	0	.4	.4	0	.4	.4	.4
10	.7	.7	.4	.4	.4	0	.4	.4	0	.4	.4	.4
11	.4	.7	.4	.4	.4	0	.4	.4	0	.4	.4	.4
12	.4	.4	.4	.4	.4	0	.4	.4	.4	.4	.4	.4
13	.4	0	.4	.4	.4	0	.4	.4	.4	.4	.4	.4
14	.4	0	.4	.7	.4	0	.4	.4	.4	.4	.4	.4
15	.4	0	.4	.7	.4	.4	.4	.4	.4	.4	.4	.4
16	.4	0	.4	.7	.4	.4	.4	.4	.4	.4	.4	.4
17	.4	0	0	.7	.4	.4	.4	.4	.4	.4	.4	.7
18	.4	0	0	.7	.4	.4	.4	.4	.7	.4	.4	.4
19	.4	0	0	.4	.4	.4	.4	.4	.7	.4	.4	.4
20	0	.4	0	.4	.4	.4	.4	.4	.7	.4	.4	.4
21	0	0	0	.4	.4	.4	.4	.4	.7	.4	.4	.4
22	0	0	0	.4	.4	.4	.4	.4	.4	.4	.7	.4
23	0	0	0	.4	0	.4	.4	.4	.4	.4	.7	.4
24	0	0	0	.4	.4	.4	.4	.4	.4	.4	.7	.4
25	.4	0	0	.4	.4	0	.4	.4	.4	.4	1.1	.4
26	.4	0	0	.4	.4	0	.4	.4	.4	.4	1.4	.4
27	.7	0	0	.4	.4	.4	.4	.4	.7	.4	1.4	.4
28	.7	0	.4	.4	.4	.4	.4	.4	.7	.4	1.4	.4
29	.7		.4	0	.4	.4	.4	0	.7	.4	1.1	.4
30	1.1		.4	0	.4	.4	.4	0	.7	.4	1.1	.4
31	1.1		.4		.4		.4	0		.4		.4
Sum	14.2	16.4	4.8	13.3	11.2	8.4	14.5	11.2	10.0	14.6	18.0	13.6

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1957-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
			Current Year 1961								
Jan.			† 30	1.1	† 20	0	0.4	26.8	21.9	43.8	13.0
Feb.			6	2.1	† 13	0	.7	32.4	19.5	32.4	12.2
Mar.			† 9	.4	† 1	0	.2	8.1	15.4	28.4	8.1
Apr.			† 3	.7	† 29	0	.4	24.3	25.9	45.4	13.0
May			† 3	.4	† 1	0	.4	19.5	15.4	19.5	13.0
June			† 1	.4	† 8	0	.4	14.6	20.3	27.6	13.0
July			† 1	.7	† 8	.4	.4	26.8	23.5	35.7	13.0
Aug.			† 1	.4	† 29	0	.4	19.5	25.9	55.9	13.0
Sept.			† 18	.7	† 1	0	.4	18.6	16.2	30.8	6.5
Oct.			2	1.1	† 7	.4	.4	26.8	18.6	26.8	13.0
Nov.			† 26	1.4	† 1	.4	.7	33.2	19.5	33.2	13.0
Dec.			† 1	.7	† 4	.4	.4	24.3	17.0	24.3	13.0
Yearly				2.1		0	0.4	274.9	240	307	155

† And other days Ø Mean daily

RIVERA DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Rectangular control section in the channel of the drain between "K" and "L" streets, 2.4 miles from its confluence with New River and 3.3 miles from the international boundary.

RECORDS: Based on 48 double current meter measurements made from bridge during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1961.

REMARKS: Rivera Drain begins near the right bank of the West Main Canal, 0.9 mile south of the Sharpe Heading, and runs westward across Mexicali, Baja California, and discharges into New River 0.9 mile upstream from the international boundary. Flow at the station consists mainly of agricultural drainage with a small amount of sewage from Mexicali, Baja California.

EXTREMES: Maximum monthly volume, 898 acre-feet, August 1960; minimum volume, 87.6 acre-feet, August 1959. Maximum mean daily discharge, 21.2 second-feet, September 11, 1961; minimum mean daily discharge, 0.7 second-foot, August 17, 1959.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.3	6.4	7.1	6.7	7.1	9.5	6.0	13.8	7.4	17.7	9.2	6.4
2	11.3	6.7	7.1	6.7	7.4	9.2	6.4	13.8	7.1	19.4	9.5	6.4
3	11.3	6.7	7.1	6.7	8.1	8.8	6.4	13.8	7.1	18.0	9.9	6.7
4	11.3	7.1	7.1	7.8	8.8	8.5	6.4	13.8	6.7	16.6	10.2	7.1
5	11.7	7.4	6.7	8.5	9.2	8.1	6.0	13.8	8.8	15.2	10.6	7.1
6	11.7	7.4	6.7	9.5	9.9	7.4	6.0	13.8	10.9	13.8	10.9	6.7
7	11.7	7.8	6.7	10.6	10.6	6.7	5.7	13.8	13.1	12.4	10.9	6.7
8	11.7	7.8	6.7	11.7	10.9	6.4	5.7	13.8	14.8	10.9	10.9	6.4
9	12.0	8.1	6.4	12.4	10.6	5.7	5.3	14.1	17.0	9.2	10.9	6.4
10	11.3	8.1	6.4	13.4	9.9	4.9	5.3	14.5	19.1	9.2	10.9	6.0
11	10.9	8.5	6.4	13.4	9.5	4.2	5.7	14.8	21.2	8.8	10.9	5.7
12	10.2	8.5	6.0	13.8	8.8	3.5	6.0	14.8	20.1	8.8	10.9	6.0
13	9.9	8.8	6.0	13.8	8.5	3.5	6.4	15.2	19.1	8.5	10.9	6.4
14	9.2	8.5	6.4	13.8	7.8	3.9	6.7	15.5	18.0	8.1	10.9	6.7
15	8.8	8.1	6.4	14.1	7.4	3.9	7.4	15.9	17.0	8.1	10.9	7.1
16	8.5	7.8	6.4	14.1	7.4	3.9	7.8	16.6	15.9	7.8	10.9	7.4
17	8.5	7.8	6.4	14.1	7.1	3.9	8.1	17.3	14.8	7.8	10.9	7.4
18	8.5	7.4	6.4	14.1	7.1	3.9	8.5	17.7	13.8	7.4	10.9	7.8
19	8.5	7.1	6.7	14.1	7.1	3.9	8.8	18.4	12.7	7.1	10.9	8.1
20	8.5	6.7	6.7	14.1	7.1	3.9	9.2	19.1	12.0	7.1	10.6	8.5
21	8.5	7.1	6.7	14.1	7.1	3.9	9.5	19.4	10.9	6.7	9.9	8.8
22	8.5	7.1	7.1	14.1	7.1	3.9	10.2	18.0	10.2	6.7	9.2	9.2
23	8.5	7.1	7.1	14.1	7.8	3.9	10.6	16.2	9.2	6.4	8.1	9.5
24	8.1	7.1	7.1	14.1	8.1	3.9	10.9	14.5	8.5	6.7	7.4	9.9
25	7.8	7.1	7.1	13.1	8.8	4.2	11.3	12.7	7.8	7.1	6.7	9.9
26	7.4	7.4	7.4	12.0	9.2	4.2	11.7	11.3	9.2	7.4	5.7	10.2
27	7.1	7.4	7.4	10.9	9.9	4.6	12.0	9.5	10.9	7.8	4.9	10.6
28	6.7	7.4	7.1	9.9	10.2	4.9	12.4	7.8	12.7	7.8	5.3	10.9
29	6.4		7.1	8.8	10.6	5.3	13.1	7.8	14.5	8.1	5.7	10.6
30	6.0		7.1	8.1	10.2	5.7	13.4	7.4	16.2	8.5	6.0	10.2
31	6.4		7.1		9.9		13.8	7.4		8.8		9.9
Sum	288.2	210.4	210.1	352.6	269.2	158.2	262.7	436.3	386.7	303.9	281.5	246.7

Current Year 1961 | **Period 1957-1961**

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			9	12.0	30	6.0	9.2	571	312	571	118
Feb.			13	8.8	1	6.4	7.4	417	327	444	173
Mar.			†26	7.4	12	6.0	6.7	415	337	440	185
Apr.			†15	14.1	† 1	6.7	11.7	700	464	833	132
May			8	10.9	† 1	7.1	8.8	533	384	691	165
June			1	9.5	†12	3.5	5.3	314	348	814	131
July			31	13.8	† 9	5.3	8.5	520	379	854	120
Aug.			21	19.4	†30	7.4	14.1	865	471	899	87.6
Sept.			11	21.2	4	6.7	12.7	767	382	767	120
Oct.			2	19.4	23	6.4	9.9	602	478	833	232
Nov.			† 6	10.9	27	4.9	9.5	559	418	571	244
Dec.			28	10.9	11	5.7	8.1	489	421	646	224
Yearly				21.2		3.5	9.2	6,752	4,721	7,669	2,225

† And other days Ø Mean daily

PUEBLO NUEVO WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Staff gage and control weir located in Mexicali, Baja California on the south side of International Avenue between Morelia and Chilpancingo streets in Colonia Pueblo Nuevo about 1,000 feet west of New River and 80 feet south of the international land boundary.

RECORDS: Discharges are computed from head on the control weir based on staff gage readings. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1956 through December 1961.

REMARKS: The discharges of this wasteway are usually small and consist of overflow from the canal leading to the city pumping plant.

EXTREMES: Maximum monthly volume, 136 acre-feet, January 1956; minimum monthly volume, zero June 1959, December 1960, January, February and March 1961. Estimated maximum discharge, 3.5 second-feet, June 9, 1958; minimum discharge, no flow on numerous occasions.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0.4	0.4	0	0	0.4	1.4	1.1
2	0	0	0	0	0	.4	.7	0	0	.4	1.4	1.1
3	0	0	0	0	0	.4	.7	0	0	.4	1.4	1.1
4	0	0	0	0	0	.7	.7	0	0	.4	1.4	1.1
5	0	0	0	0	.4	.7	.4	0	0	.4	1.8	1.1
6	0	0	0	0	.4	.7	.4	0	0	.4	1.8	.7
7	0	0	0	.4	.4	.4	.4	0	0	.4	1.4	.7
8	0	0	0	.4	.4	.4	.4	0	0	.4	1.4	.4
9	0	0	0	.4	.4	.4	0	0	0	.4	1.1	.4
10	0	0	0	.4	.4	.4	0	0	0	.4	.7	0
11	0	0	0	.4	.4	0	0	0	0	.4	.7	0
12	0	0	0	.4	0	0	0	0	0	.4	.4	0
13	0	0	0	.4	0	0	0	0	0	.7	.4	0
14	0	0	0	0	0	0	0	0	0	.7	.4	0
15	0	0	0	0	0	0	0	0	0	.7	.7	0
16	0	0	0	0	0	0	0	0	0	.7	.7	0
17	0	0	0	0	0	0	0	0	0	.7	.7	0
18	0	0	0	0	0	0	0	0	0	.7	1.1	0
19	0	0	0	0	0	0	0	0	0	.7	1.1	0
20	0	0	0	0	0	0	0	0	0	.7	1.1	0
21	0	0	0	0	0	0	0	0	0	.7	1.1	0
22	0	0	0	0	0	0	0	0	0	.7	1.1	0
23	0	0	0	0	0	0	0	0	0	.7	1.1	0
24	0	0	0	0	0	0	0	0	0	.7	.7	0
25	0	0	0	0	0	0	0	0	0	.7	.7	0
26	0	0	0	0	0	0	0	0	0	.7	.7	0
27	0	0	0	0	0	0	0	0	0	1.1	.7	0
28	0	0	0	0	0	.4	0	0	0	1.1	.7	0
29	0		0	0	0	.4	0	0	.4	1.1	.7	0
30	0		0	0	0	.4	0	0	.4	1.1	.7	0
31	0		0		.4		0	0		1.1		0
Sum	0	0	0	2.8	3.2	6.1	4.1	0	0.8	20.1	29.3	7.7

Current Year 1961 — **Period** 1956-1961

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.				0		0	0	0	46.2	136	0
Feb.				0		0	0	0	34.0	92.4	0
Mar.				0		0	0	0	26.8	62.4	0
Apr.			† 7	.4	† 1	0	.1	4.9	26.8	60.0	4.1
May			† 5	.4	† 1	0	.1	5.7	31.6	69.7	5.7
June			† 4	.7	† 11	0	.4	11.3	25.9	63.2	0
July			† 2	.7	† 9	0	.1	8.1	22.7	43.8	6.5
Aug.				0		0	0	0	17.0	48.6	0
Sept.			† 29	.4	† 1	0	0	1.6	14.6	32.4	1.6
Oct.			† 27	1.1	† 1	.4	.7	38.9	26.8	38.9	4.9
Nov.			† 5	1.8	† 12	.4	1.1	57.6	40.5	61.6	14.6
Dec.			† 1	1.1	† 10	0	.4	14.6	24.3	44.6	0
Yearly				1.8		0	0.4	142.7	337	645	142.7

† And other days Ø Mean daily

SALTON SEA - ELEVATIONS OF WATER SURFACE

DESCRIPTION: Water-stage recorder and staff gage located on the western shore of the Salton Sea, 15.5 miles northwest of Westmoreland, California. The Salton Sea is situated in Imperial and Riverside counties of California in the United States, 125 miles northwest of the Gulf of California, 18 miles northwest of Brawley, California, and 42 miles north of the international boundary between the United States and Mexico. The sea lies in the bottom of a closed basin known as the Salton Sink, which has a drainage area of 8,360 square miles. Zero of the gage is 250.00 feet below mean sea level, U. S. C. & G. S. datum.

RECORDS: Records of water surface elevations available from November 1904 through December 1961. From January 1925 to October 22, 1951, records were collected by Imperial Irrigation District and based generally upon one water surface reading each month, determined from a bench mark at Figtree John's Spring about 22 miles northwest along the western shore from the present gage. Since October 24, 1951, a continuous record of gage heights has been obtained by the U. S. Geological Survey at new gaging station published as Salton Sea near Westmoreland, California. The elevation of the old station is at a datum of one foot higher than that of the present station, therefore to make the records comparable it is necessary to subtract one foot from the elevations of the records obtained at the old station. All records reported below and the area and capacity table are adjusted to the datum of the present station.

REMARKS: Runoff from the basin, irrigation drainage and waste water from Imperial and Coachella Valleys in the United States, and drainage and waste water from part of the Mexicali Valley in Mexico discharge into the Salton Sea. Water from Mexico enters the United States in the Alamo River and New River channels. The bottom of the sea, as determined in 1904, is 274.5 feet below mean sea level, U. S. C. & G. S. datum of 1929, adjustment of 1934 (present datum).

EXTREMES: Maximum elevation during year 233.8 feet below mean sea level. Minimum elevation during year 234.6 feet below mean sea level. Prior to 1935 and since the sea was filled by flood waters of the Colorado River 1905-1906, maximum elevation 195.9 feet below mean sea level (present datum), February 10 to March 29, 1907; minimum elevation 251.6 feet below mean sea level in November 1924.

Mean Daily Water Surface in Feet Below Mean Sea Level 1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	234.6	234.3	u 234.2	u 233.9	233.8	234.0	234.0	234.0	234.3	234.5	234.6	234.5
2	234.6	234.3	u 234.1	u 233.9	233.8	234.0	234.0	234.0	234.4	234.5	234.6	234.5
3	234.6	u 234.3	234.1	233.9	233.9	234.0	234.0	234.0	234.3	234.5	234.6	234.5
4	234.6	u 234.3	234.2	233.9	233.9	234.0	234.0	u 234.1	234.4	234.4	234.5	234.5
5	234.6	u 234.3	234.2	233.8	233.9	234.0	234.0	u 234.1	234.4	234.4	234.5	234.5
6	234.6	u 234.3	234.1	233.8	233.9	234.0	234.0	u 234.1	234.4	234.5	234.5	234.5
7	234.6	234.3	234.1	233.8	233.9	234.0	234.0	u 234.1	234.4	234.6	234.6	234.4
8	234.6	234.3	234.1	233.8	233.9	234.0	234.0	u 234.2	234.4	234.5	234.6	234.5
9	234.6	234.3	234.1	233.8	233.8	234.0	234.0	u 234.2	234.4	234.5	234.6	234.5
10	234.6	u 234.3	234.1	233.8	233.9	234.0	234.0	234.2	234.4	234.5	234.5	234.5
11	234.6	u 234.2	234.1	233.8	233.9	234.0	234.0	234.2	234.4	234.5	234.5	234.5
12	234.6	u 234.2	234.0	233.8	233.9	234.0	234.0	234.2	234.4	234.5	u 234.5	234.5
13	234.6	234.2	234.0	233.8	233.9	234.0	234.0	234.2	234.4	234.5	u 234.5	234.5
14	234.5	234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.4	234.5	u 234.6	234.4
15	234.5	234.2	234.1	233.8	233.9	233.9	234.0	234.2	234.4	234.5	234.6	234.4
16	234.5	234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.4	234.5	234.6	234.4
17	234.5	234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.4	234.5	234.6	234.4
18	234.5	234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.4	234.5	234.6	234.4
19	234.5	u 234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.5	234.5	234.6	234.4
20	234.5	234.2	234.0	233.8	233.9	233.9	234.0	234.2	234.5	234.4	234.6	234.3
21	234.5	234.2	234.0	233.8	233.9	233.9	234.1	234.2	234.5	234.5	234.6	234.3
22	234.4	u 234.2	234.0	233.8	233.9	233.9	234.1	234.2	234.4	234.5	234.5	234.3
23	234.4	u 234.2	234.0	233.8	233.9	233.9	234.1	234.2	234.5	234.5	234.6	234.3
24	234.4	u 234.2	234.1	233.9	233.9	233.9	234.1	234.2	234.5	234.5	234.6	234.3
25	234.4	u 234.2	234.0	233.9	233.9	233.9	234.1	234.2	234.5	234.5	234.6	234.3
26	234.4	u 234.2	234.0	233.8	233.9	234.0	234.0	234.2	234.5	234.5	234.5	234.3
27	234.4	u 234.2	234.0	233.8	233.9	234.0	234.0	234.3	234.5	234.5	234.5	234.3
28	234.4	u 234.2	233.9	233.8	233.9	234.0	234.0	234.3	234.5	234.4	234.5	234.3
29	234.4		233.9	233.8	234.0	234.0	234.0	234.3	234.5	234.5	234.5	234.3
30	234.4		u 233.9	233.8	234.0	234.0	234.0	234.3	234.5	234.5	234.5	234.3
31	234.4		u 233.9		234.0		234.0	234.3		234.6		234.3
Avg.	234.51	* 234.24	234.04	233.82	233.90	233.96	234.02	234.18	234.43	234.49	234.56	234.40

Current Year 1961			Period 1935-1961		
Month	∅ Extreme Elev. Feet		Elevation Feet		
	High	Low	# Average	# Maximum	‡ Minimum
Jan.	234.4	234.6	240.82	234.51	249.3
Feb.	234.2	234.3	240.48	234.24	248.8
Mar.	233.9	234.2	240.21	234.04	248.6
Apr.	233.8	233.9	240.01	233.82	248.7
May	233.8	234.0	239.99	233.90	248.5
June	233.9	234.0	240.17	233.96	248.8
July	234.0	234.1	240.34	234.02	249.1
Aug.	234.0	234.3	240.55	234.18	249.4
Sept.	234.3	234.5	240.73	234.43	249.4
Oct.	234.4	234.6	240.81	234.49	249.8
Nov.	234.5	234.6	240.81	234.56	250.0
Dec.	234.3	234.5	240.62	234.41	249.6
Yearly	233.8	234.6	240.46	234.21	250.0

Area and Capacity Table		
Elevation Feet below M. S. L.	Area Acres	Capacity Acre-Feet
274.5	0	0
273.0	30,000	24,000
271.0	58,000	113,000
269.0	80,000	251,500
266.0	106,000	532,500
261.0	135,000	1,142,000
257.0	148,000	1,709,000
251.0	168,000	2,655,000
247.0	183,000	3,356,000
245.0	191,000	3,730,000
241.0	206,000	4,525,000
236.0	222,000	5,596,000
231.0	235,000	6,739,000

Mean monthly ‡ Reading near first day of month u Estimated
∅ Mean daily * Partly estimated

CHEMICAL ANALYSES AND ELECTRICAL CONDUCTIVITY
1961

The tables below are based on bi-monthly samples from the Alamo and New Rivers taken and analyzed by the State of California Department of Water Resources.

Samples from the Alamo River are taken near the international boundary upstream from seepage pipes from the All-American Canal. Samples from New River are taken from the right bank at road bridge 150 yards north of international boundary. Records of sampling extend from April 1951 through December 1961.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20; Mg, 12.16; Na, 23; (CO_3 plus HCO_3) expressed as CO_3, 30; SO_4, 48; Cl, 35.5; 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 tables as $EC \times 10^6$ at 25°C, is a relative measure of the total salt concentration.

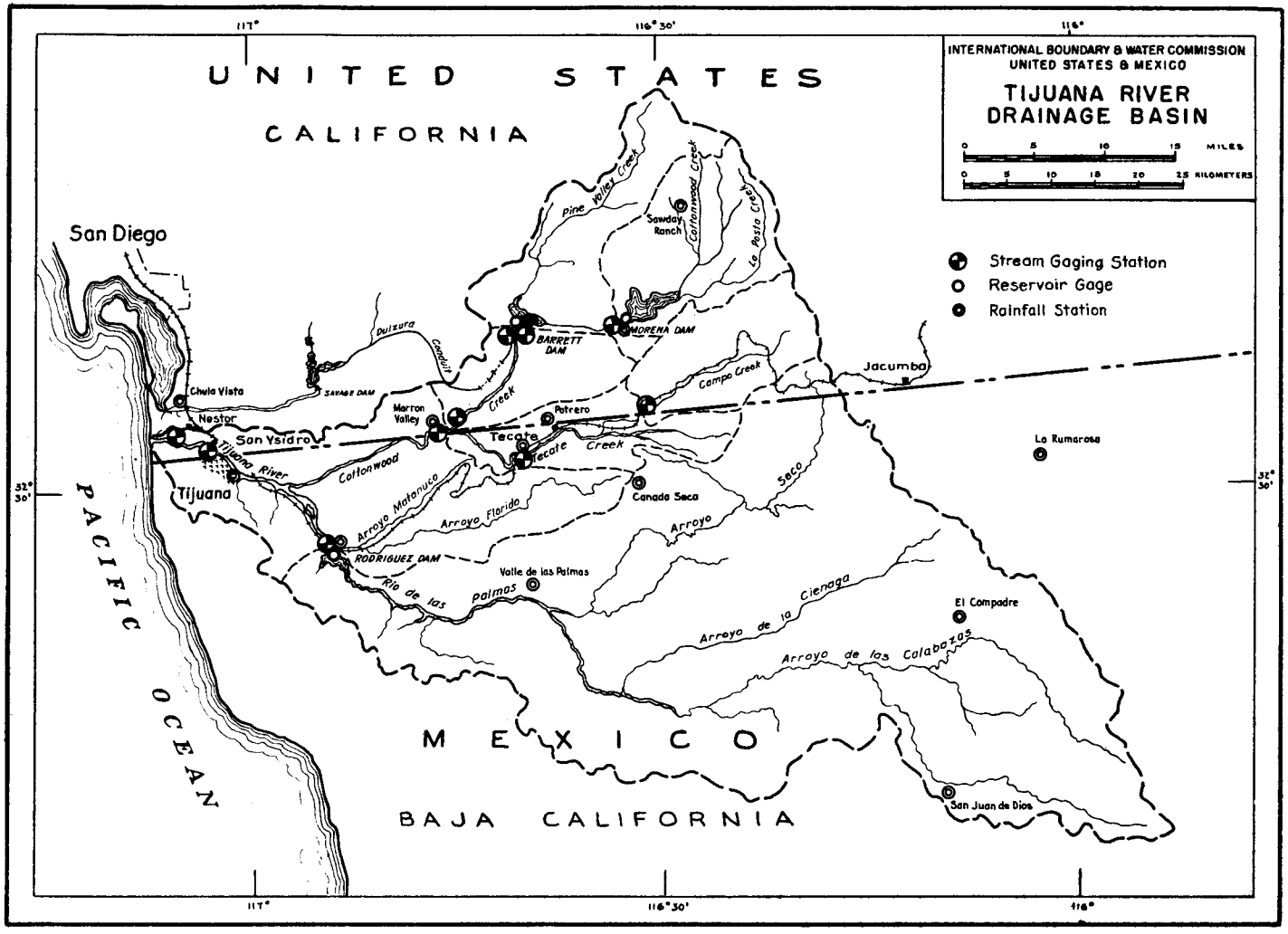
Alamo River

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	$EC \times 10^6$ @25°C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Jan.	1			5,195	1.42	8.0	62				34.54	6.30		29.61	
Feb.															
Mar.	1			4,852	1.40	8.0	63				34.58	5.48		26.37	
Apr.															
May	1	5.04		5,155	1.44	8.0	61	49	11.88	10.60	35.24	6.20	23.30	28.91	0.04
June															
July	1			4,526	1.12	7.8	58				29.23	5.12		23.69	
Aug.															
Sept.	1	4.05		4,357	1.24	7.8	59	49	9.68	9.62	27.84	5.24	18.85	23.55	.06
Oct.															
Nov.	1			5,913	1.64	7.8	61				38.85	7.20		34.07	
Dec.															
Total	6														

New River

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	$EC \times 10^6$ @25°C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Jan.	1			5,750	1.02	8.2	69				38.98	4.74		40.60	
Feb.															
Mar.	1			5,170	1.18	8.0	64				33.97	4.78		37.00	
Apr.															
May	1	4.79		5,263	0.96	7.9	64	67	10.78	8.71	36.11	4.48	14.65	37.65	0.06
June															
July	1			6,002	1.10	7.8	67				41.72	4.02		44.42	
Aug.															
Sept.	1	5.14		5,834	1.16	7.8	65	70	10.08	10.19	35.59	4.12	14.05	42.86	.14
Oct.															
Nov.	1			5,882	1.02	8.0	66				38.98	4.50		41.45	
Dec.															
Total	6														

** Percent of total cations *** Percent of total anions


INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
TIJUANA RIVER
DRAINAGE BASIN
0 5 10 15 MILES
0 5 10 15 20 25 KILOMETERS
Stream Gaging Station
Reservoir Gage
Rainfall Station
UNITED STATES
CALIFORNIA
MEXICO
BAJA CALIFORNIA
PACIFIC OCEAN
San Diego
Chula Vista
Nestor
San Ysidro
Tijuana
Tijuana River
Cottonwood
Pine Valley Creek
Cottonwood Creek
La Posta Creek
Sawday Ranch
Pulzura Conduit
Pulzura Creek
BARRETT DAM
MORENA DAM
SAVAGE DAM
Marron Valley
Potrero
Tecate
Tecate Creek
Campo Creek
Jacumba
La Rumarosa
Arroyo Matanuco
Arroyo Florido
Canada Seca
Arroyo Seco
RODRIGUEZ DAM
Valle de las Palmas
Rio de las Palmas
Arroyo de la Cienaga
El Compadre
Arroyo de las Calabazas
San Juan de Dios
117°
116°30'
116°
32°30'

COTTONWOOD CREEK ABOVE MORENA DAM, CALIFORNIA

DESCRIPTION: Staff gage located on east side of outlet tower immediately upstream from face of Morena Dam. The dam is located on Cottonwood Creek 1.8 miles upstream from the mouth of Hauser Creek, 8.5 miles upstream from Barrett Dam, and about 20 miles upstream from the international boundary. Zero of gage is 2,882.4 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Reservoir inflows shown below were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall, by the International Boundary and Water Commission, United States Section. They represent all water reaching Morena Reservoir, including rainfall on reservoir water surface. Basic data were furnished by the city of San Diego Water Department. Records available: April 1911 through December 1961.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1961 computed on basis of area-capacity curves determined from 1948 resurvey. Various changes have been made to the spillway section since construction of the dam. Elevation of present crest of ungated spillway is 157.00 feet, gage datum. Reservoir capacity at spillway crest, 1948 survey, is 50,210 acre-feet. The entire capacity of Morena Reservoir is used to furnish a part of the water supply of the city of San Diego, California. Water is released from Morena Reservoir down Cottonwood Creek to Barrett Reservoir as required.

EXTREMES: Prior to 1937, maximum monthly inflow, 37,200 acre-feet, January 1916; minimum, no flow during parts of many years. Reference table below for extremes since 1937.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	24.9	600	3,520	7
February	18.0	1,451	16,700	8
March	25.3	2,246	13,220	25.3
April	3.3	1,444	11,490	3.3
May	7.8	509	3,550	7.8
June	0	264	1,660	0
July	0	187	1,010	0
August	4.1	133	1,260	0
September	.2	91.9	1,070	0
October	3.3	108	1,270	0
November	5.2	190	1,380	1
December	28.6	617	3,590	6
Yearly	120.7	7,840.9	39,439	120.7

Note: For months when inflow to the reservoir was small and other quantities were large, discordant figures of inflow may appear. This arises primarily from the difficulty of computing inflow as the residual of several larger quantities, which are not susceptible to measurement with a precision necessary to produce a final answer within desirable limits of accuracy.

COTTONWOOD CREEK BELOW MORENA DAM, CALIFORNIA

DESCRIPTION: Two water-stage recorders, one on the upstream side of the southeast abutment of Morena Dam for measuring head on the spillway crest and one immediately below the dam with a rectangular control weir for measuring ordinary reservoir releases, and cableway located about 0.8 mile downstream from the dam. Discharge measurements made at the cableway include leakage, controlled releases, and spillway discharges.

RECORDS: Monthly records shown below represent the water available immediately below Morena Dam, consisting of spillway waste, draft, and leakage from the dam. They are computed by the International Boundary and Water Commission, United States Section, from basic data furnished by the city of San Diego Water Department. Records available: January 1911 through December 1961.

REMARKS: Flows at this station are regulated by Morena Dam; storage began March 1910. Water is released from Morena Reservoir as required and flows down the natural channel of Cottonwood Creek to Barrett Reservoir. There are no major diversions above Morena Dam.

EXTREMES: Prior to 1937, maximum monthly discharge, 21,400 acre-feet, February 1916; minimum, zero during December 1936. Extremes since 1937 shown in table below.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	3.2	173	1,700	1
February	2.9	472	4,260	2
March	2.4	326	1,490	2.4
April	1.7	1,207	12,950	1
May	1.7	329	3,040	1
June	1.7	452	7,360	0
July	.8	257	2,340	.8
August	.6	214	1,550	.6
September	.6	419	5,880	0
October	.6	125	529	0
November	1.7	168	1,260	0
December	3.8	467	5,350	1
Yearly	21.7	4,609	24,825	21.7

COTTONWOOD CREEK ABOVE BARRETT DAM, CALIFORNIA

DESCRIPTION: Staff gage located immediately upstream from face of dam on west side of outlet tower. Barrett Dam is located on Cottonwood Creek 8.5 miles downstream from Morena Dam, 1 mile downstream from the mouth of Pine Valley Creek and about 12 miles upstream from the international boundary. Zero of gage is 1,446.12 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Records reported below represent all water reaching Barrett Dam from the sub-basin below Morena Dam including rainfall on the reservoir water surface. Leakage, releases and spills from Morena Reservoir are not included. The inflows were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation and rainfall furnished by the city of San Diego, California. Records available: January 1921 through December 1961. Records of stream flow for a station at the dam site are also available for the periods 1906-1915 and 1917-1920.

REMARKS: Storage began at Barrett Reservoir in January 1921. The area-capacity-elevation curves used in the inflow calculations are dated 1948, 1951 and 1955 and were furnished by the city of San Diego Water Department. Capacity of reservoir at top of flash gates on spillway (gage height, 168.88 feet) is 44,755 acre-feet. Capacity at spillway crest (gage height, 160.88 feet) is 37,950 acre-feet. Dead storage, 719 acre-feet below lowest outlet (gage height, 58.8 feet) is included in these capacities. The entire capacity of Barrett Reservoir is used to furnish a part of the water supply of the city of San Diego, California.

EXTREMES: Prior to 1937, maximum monthly discharge, 54,800 acre-feet, February 1927; minimum, no flow during several months of various years. Reference table below for extremes since 1937.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	23.0	721	3,430	23.0
February	17.0	2,006	26,790	10
March	23.7	3,484	18,860	20
April	10.2	2,383	21,630	10.2
May	7.4	729	5,130	0
June	5.6	297	1,730	0
July	5.0	194	1,010	5.0
August	.7	118	579	0
September	7.2	135	759	0
October	5.1	84.3	645	5
November	8.0	143	1,200	0
December	16.3	527	3,380	11.6
Yearly	129.2	10,822.3	59,387	129.2

Note: For months when inflow to the reservoir was small and other quantities were large, discordant figures of inflow may appear. This arises primarily from the difficulty of computing inflow as the residual of several larger quantities, which are not susceptible to measurement with a precision necessary to produce a final answer within desirable limits of accuracy.

DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder 0.5 mile downstream from Barrett Dam on right bank of Dulzura Conduit 50 feet upstream from road crossing to Barrett Dam. Elevation of gage has not been determined.

RECORDS: Computed on basis of head on control section of flume, as measured by water-stage recorder, and rating curve determined from current meter measurements. Records obtained and furnished by the U. S. Geological Survey. Records at present location are good. Records available: January 1909 through December 1961. Records January 1909 to April 1940 from city of San Diego Water Department.

REMARKS: Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 1.5 miles upstream. The conduit carries diversions from Barrett Reservoir on Cottonwood Creek westerly across the divide into Otay Reservoir for municipal use by the city of San Diego. Prior to September 30, 1958, station was located 8 miles along the conduit from Barrett, being reported as "Dulzura Conduit Near Dulzura" and the draft from Barrett Reservoir was computed from the discharges obtained at the conduit gaging station, multiplied by the factor 1.05 to allow for channel losses in the reach from the reservoir to the gaging station.

EXTREMES: Since 1937: Maximum mean daily discharge, 55 second-feet on March 15, 1954; minimum discharge, no flow for long periods on many occasions.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	0	518	2,350	0
February	0	522	2,130	0
March	0	696	2,330	0
April	0	1,096	2,860	0
May	0	1,219	3,040	0
June	0	1,175	2,920	0
July	0	1,033	2,920	0
August	0	954	2,820	0
September	0	662	2,320	0
October	0	506	2,450	0
November	0	698	2,760	0
December	0	610	2,305	0
Yearly	0	9,689	27,170	0

COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located about 2.5 miles downstream from Barrett Dam and 0.5 mile upstream from Rattlesnake Canyon for measuring Barrett Dam spills, and staff gage and control weir located immediately below the dam for measuring leakage. The elevation of the gage is about 1,000 feet (from topographic map).

RECORDS: Furnished by the city of San Diego, California, Water Department and the U. S. Geological Survey. Prior to January 1953 the records were furnished by the San Diego Water Department and reviewed and revised by the United States Section of this Commission. The recorder is to be operated only when Barrett Reservoir is near or above spillway level. There have been no spillway discharges since May 1943. Spillway discharges included in the period record below were computed by the city of San Diego from the head on the spillway crest, read on the reservoir gage, and applied to a broad-crested weir formula. Records available: January 1921 through December 1961. Storage began in Barrett Reservoir in January 1921.

REMARKS: Records reported below represent the water available in the natural channel of Cottonwood Creek immediately below Barrett Dam. Records of draft from Barrett Reservoir are not included inasmuch as all releases are made to Dulzura Conduit which transports water outside the basin. Leakage is mainly through the spillway gates.

EXTREMES: Prior to 1937: Maximum monthly discharge 38,400 acre-feet February 1927; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	0	24.1	590	0
February	0	41.1	990	0
March	0	1,107	13,390	0
April	0	1,625	33,400	0
May	0	368	7,520	0
June	0	51.9	890	0
July	0	2.9	21	0
August	0	2.6	21	0
September	0	2.1	21	0
October	0	1.8	21	0
November	0	1.4	15	0
December	0	2.1	21	0
Yearly	0	3,230	50,364	0

COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located 1.6 miles upstream from the international land boundary between the United States and Mexico, 0.8 mile upstream from the mouth of Tecate Creek, and 5.1 miles south of Dulzura, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the cableway which is located 700 feet downstream from the gage. Zero of gage is 569.40 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on a continuous record of gage heights and current meter measurements or observation of no flow generally made twice each month. Records obtained and furnished by the U.S. Geological Survey. 1961 records good. Records available: October 1936 through December 1961.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 and 18 miles, respectively, upstream from this station. During 1961 there were no releases or spills to the natural channel of Cottonwood Creek at Barrett Dam, the lowermost dam in Cottonwood Creek Basin.

EXTREMES: Maximum discharge 4,340 second-feet February 7, 1937 (gage height 9.65 feet), from rating curve extended above 1,500 second-feet by logarithmic plotting. Minimum discharge, no flow during part of each year.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

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

Month	Current Year 1961								Period 1937-1961		
	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.				0		0	0	0	254	1,190	0
Feb.				0		0	0	0	791	9,940	0
Mar.				0		0	0	0	2,305	20,880	0
Apr.				0		0	0	0	2,240	40,240	0
May				0		0	0	0	522	10,040	0
June				0		0	0	0	100	1,590	0
July				0		0	0	0	11.2	206	0
Aug.				0		0	0	0	.6	7.7	0
Sept.				0		0	0	0	3.0	72	0
Oct.				0		0	0	0	5.7	101	0
Nov.				0		0	0	0	14.0	203	0
Dec.				0		0	0	0	128	1,110	0
Yearly				0		0	0	0	6,374.5	66,700	0

CAMPO CREEK NEAR CAMPO, CALIFORNIA

DESCRIPTION: Water-stage recorder and broad-crested weir 0.5 mile upstream from the international land boundary between the United States and Mexico, on left bank just upstream from California State Highway 94 bridge, 3.5 miles southwest of Campo, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the bridge. Zero of gage is 2,179.08 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on current meter measurements and observation of no flow. Records obtained and furnished by the U.S. Geological Survey. 1961 records good. Records available: October 1936 through December 1961.

REMARKS: Campo Creek originates in the United States and flows southwestward into Mexico where it joins Tecate Creek. The flow at this station is partially regulated by a small conservation reservoir a quarter of a mile upstream, completed in August 1956. There has been no flow since May 9, 1960.

EXTREMES: Maximum discharge 880 second-feet, February 6, 1937 (gage height 4.80 feet, present datum), from rating curve extended above 110 second-feet on basis of velocity-depth relation and cross-section area at the control. Minimum discharge, no flow during most of the summer months of each year.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1937-1961		
		Average	Maximum	Minimum
January	0	187	906	0
February	0	330	1,730	0
March	0	471	2,360	0
April	0	331	3,250	0
May	0	151	1,540	0
June	0	58.8	719	0
July	0	23.6	361	0
August	0	17.1	321	0
September	0	16.2	264	0
October	0	29.0	543	0
November	0	53.7	542	0
December	0	149	808	0
Yearly	0	1,817.4	11,141	0

COTTONWOOD CREEK NEAR INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and cableway, 0.6 mile upstream from the international land boundary between the United States and Mexico, 0.5 mile downstream from the confluence of Cottonwood Creek and Tecate Creek, and 5.5 miles south of Dulzura, California. Low water discharge measurements are made by wading at the gage. Zero of gage is 542.42 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on a continuous record of gage heights and current meter measurements or observation of no flow generally made twice each month. Records obtained and furnished by the U. S. Geological Survey. 1961 records good. Records available: October 1936 through December 1961.

REMARKS: Flow is partially controlled by Barrett and Morena Reservoirs, 11 and 19 miles respectively, upstream from this station. The flow at this station represents the amount of water passing the Marron Dam site.

EXTREMES: Maximum discharge, 4,700 second-feet, February 7, 1937 (gage height 8.50 feet) from rating curve extended above 300 second-feet on basis of velocity-mean depth and area computations. Minimum discharge, no flow at times during most years.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	.1	0	0	0	0	0	0	0	0	0
29	0		.1	0	0	0	0	0	0	0	0	0
30	0		0	0	0	0	0	0	0	0	0	0
31	0		0		0		0	0		0		0
Sum	0	0	0.2	0	0	0	0	0	0	0	0	0

Month	Current Year 1961 — Extreme Gage Feet High	Extreme Gage Feet Low	Ø Extreme Second-Feet High Day	Ø Extreme Second-Feet High	Ø Extreme Second-Feet Low Day	Ø Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1937-1961 Acre-Feet Average	Maximum	Minimum
Jan.								0	548	2,750	0
Feb.								0	1,434	13,680	0
Mar.			† 28	0.1	† 1	0	0.006	.4	3,655	27,140	.4
Apr.								0	3,059	51,060	0
May								0	774	14,110	0
June								0	157	2,630	0
July								0	24.6	312	0
Aug.								0	8.5	171	0
Sept.								0	12.2	152	0
Oct.								0	31.7	705	0
Nov.								0	62.4	839	0
Dec.								0	361	3,330	0
Yearly				0.1		0	0.0005	0.4	10,127.4	97,900	0.4

† And other days Ø Mean daily

RIO DE LAS PALMAS ABOVE RODRIGUEZ DAM, BAJA CALIFORNIA

DESCRIPTION: Rodriguez Dam is located in Mexico on Río de las Palmas, the principal tributary to the Tijuana River, about 5.5 miles upstream from its confluence with Cottonwood Creek, 11 miles upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 10 miles southeast of Tijuana, Baja California.

RECORDS: Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation and rainfall. Records obtained by the Ministry of Hydraulic Resources through May 1961 and from June 1961 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California, which agency took over operation of Rodriguez Dam. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through December 1961. Storage began in Rodriguez Reservoir on September 22, 1936.

REMARKS: Records of runoff represent all water reaching Rodriguez Reservoir including rainfall on the reservoir water surface. Area-capacity-elevation rating for reservoir used in the computations is dated 1927 when the reservoir area was initially surveyed. Elevation of crest of spillway 380.08 feet above mean sea level; at top of spillway gates 410.10 feet above mean sea level. Reservoir capacity at spillway crest 76,210 acre-feet; at top of spillway gates 111,070 acre-feet.

EXTREMES: Maximum monthly inflow, 77,320 acre-feet, April 1941; minimum, no flow during part of most years.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1938-1961		
		Average	Maximum	Minimum
January	20.2	1,227	6,596	0
February	10.2	3,087	41,295	6
March	4.8	8,325	68,321	4
April	0	4,332	77,765	0
May	7.5	532	9,962	0
June	21.3	93.1	890	0
July	24.6	99.2	327	0
August	30.6	60.6	771	0
September	70.5	59.3	465	0
October	109	78.4	344	0
November	141	124	1,012	0
December	103	1,068	15,685	20
Yearly	542.7	19,085.6	177,642	542.7

DIVERSIONS FROM RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

DESCRIPTION: Sparling flow meter located immediately below the dam in the pipe line which carries water released from Rodriguez Reservoir to the North and South Canals.

RECORDS: Direct recording by Sparling flow meter. Records obtained by the Ministry of Hydraulic Resources through May 1961 and from June 1961, by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California. Records furnished through the Mexican Section of the Commission. Records available: May 1937 through December 1961.

REMARKS: Since the dam was completed in 1937, water has been diverted directly into the aqueduct for domestic use for Tijuana, Baja California and into the North and South Canals for irrigation in Mexico. The North Canal delivers water to lands in the Tijuana Valley north of the Río de las Palmas and the South Canal delivers water to lands in the valley south of the Río de las Palmas and the Tijuana River. During 1961 no water was released for irrigation of farm lands.

EXTREMES: Maximum monthly diversion, 1,963 acre-feet, July 1944; minimum, no flow March and April 1941 and August 1960.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1938-1961		
		Average	Maximum	Minimum
January	27.2	306	781	25
February	25.0	342	1,131	23
March	27.6	417	1,222	0
April	19.6	609	1,602	0
May	15.4	850	1,675	15.4
June	23.8	993	1,856	23.8
July	20.3	1,040	1,963	20.3
August	18.8	893	1,859	0
September	48.2	718	1,421	48.2
October	115	619	1,187	54.7
November	126	469	1,037	33.2
December	122	404	981	27.6
Yearly	588.9	7,660	15,315	588.9

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

RECORDS: Records obtained and furnished by the California Water and Telephone Company. Records available: May 1947 through December 1961. Inspection at regular intervals and the record of other stations indicate that there was no flow across the boundary during 1961. The gaging station established May 28, 1947 was discontinued in March 1960. There was no gage operated at the site during 1961.

EXTREMES: Since May 1947, maximum discharge was 2,570 second-feet, March 15, 1953. Minimum discharge, no flow during part or all of each year since 1951.

Monthly Discharge in Acre-Feet

Month	Current Year 1961	Period 1947-1961		
		Average	Maximum	Minimum
January	0	614	4,603	0
February	0	214	1,496	0
March	0	1,264	13,309	0
April	0	386	1,499	0
May	0	67.7	312	0
June	0	44.5	309	0
July	0	35.1	239	0
August	0	30.5	193	0
September	0	36.7	216	0
October	0	58.6	305	0
November	0	83.3	480	0
December	0	178	1,447	0
Yearly	0	3,012.4	19,822	0

TIJUANA RIVER NEAR NESTOR, CALIFORNIA

DESCRIPTION: Water-stage recorder on county road bridge 4.1 miles downstream from the international land boundary between the United States and Mexico, 2.9 miles upstream from mouth of the river, and 1.7 miles south of Nestor, California. Zero of gage is 15.14 feet above mean sea level, U. S. C. & G. S. datum. From April 10, 1953 to August 5, 1958, station was located 2 miles upstream at different datum. There are no significant inflows to the river between the old and new locations of the gage.

RECORDS: Based on current meter measurements or observation of no flow generally made twice a month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1914 to September 1915, and October 1922 to December 1961. (October 1922 to September 1936 are from city of San Diego Water Department.)

REMARKS: The flow at this station is partially controlled by Morena and Barrett Reservoirs on Cottonwood Creek in the United States and by Rodriguez Reservoir on Rio de las Palmas in Mexico. Some diversions for irrigation are normally made in Mexico whenever surface runoff occurs in the river or in its two principal tributaries. There has been no flow at this station since February 11, 1960.

EXTREMES: Since October 1, 1936: Maximum discharge, 17,700 second-feet, February 7, 1937 (gage height 8.20 feet), obtained from rating curve extended above 2,000 second-feet on basis of velocity-depth relationship, and cross section after peak of the flood. Minimum discharge, no flow during parts of most years.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

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

Current Year 1961								Period 1937-1961		
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.				0		0	0	0	1,025	4,070	0
Feb.				0		0	0	0	5,573	66,920	0
Mar.				0		0	0	0	9,870	107,000	0
Apr.				0		0	0	0	8,482	181,900	0
May				0		0	0	0	947	18,340	0
June				0		0	0	0	160	3,060	0
July				0		0	0	0	31.8	523	0
Aug.				0		0	0	0	22.5	242	0
Sept.				0		0	0	0	33.1	234	0
Oct.				0		0	0	0	113	1,340	0
Nov.				0		0	0	0	180	1,490	0
Dec.				0		0	0	0	931	7,930	0
Yearly				0		0	0	0	27,368	332,749	0

TIJUANA INTERNATIONAL TRUNK LINE SEWER AT MANHOLE NO. 38

DESCRIPTION: Water-stage recorder and Palmer-Bowlus flume located in the Tijuana trunk line sewer at manhole No. 38, 600 feet downstream from the junction of the San Ysidro and Tijuana branches of the sewer, 0.6 mile north of the international boundary, and 0.8 mile southwest of San Ysidro, California; and water-stage recorder and weir in San Ysidro branch at the pumping plant 4,700 feet upstream from the junction. Zero of gage at manhole No. 38 is the invert of the pipe and zero flow occurs at gage height 0.25 feet, which is the crest of the flume.

RECORDS: Computed on basis of depth as recorded immediately upstream from Palmer-Bowlus flume. 1961 records good. Records available: January 29, 1948 through December 1961.

REMARKS: This international sewer was constructed by the Governments of the United States and Mexico in 1938 to correct a serious international sanitation problem. The flow through the sewer includes the sewage flows from San Ysidro, California and Tijuana, Baja California and discharges into the Pacific Ocean 3.7 miles below this station and 0.7 mile north of the international boundary. During 1961, pumping tests were made on the recently constructed domestic sewage disposal system in Tijuana, Baja California, consisting of two pumping plants, dual pressure lines and an open canal which transports sewage about 5 miles south of the international boundary where it discharges into the Pacific Ocean. Of the flow indicated below for 1961, approximately 93 percent is contributed from Tijuana, Baja California.

Month	Total Monthly Flows Millions of Gallons			Mean Daily Flows-Millions of Gallons Per Day					
				Current Year 1961			Period 1948-1961		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	5.267	130.330	135.597	4.589	4.072	4.374	5.112	2.062	3.565
Feb.	4.492	112.232	116.724	4.524	3.749	4.169	5.112	2.462	3.586
Mar.	4.880	117.273	122.153	4.330	3.425	3.940	4.880	2.191	3.551
Apr.	4.899	95.538	100.437	3.943	2.456	3.348	4.731	2.055	3.501
May	5.177	85.113	90.290	3.361	2.197	2.913	4.802	1.745	3.491
June	5.248	53.437	58.685	3.296	.259	1.956	4.660	.259	3.422
July	6.457	29.607	36.064	2.197	.194	1.163	4.880	.194	3.334
Aug.	7.090	71.825	78.915	3.232	2.004	2.546	4.589	2.004	3.370
Sept.	6.179	81.073	87.252	3.361	2.585	2.908	4.660	1.648	3.488
Oct.	6.515	79.057	85.572	3.038	2.521	2.760	5.112	2.236	3.495
Nov.	6.205	67.475	73.680	3.102	1.616	2.456	4.912	1.616	3.528
Dec.	6.903	67.035	73.938	3.232	.259	2.385	4.731	.259	3.543
Yearly	69.312	989.995	1,059.307	4.589	0.194	2.902	5.112	0.194	3.490

STORED WATER IN RESERVOIRS, TIJUANA RIVER BASIN

Data are presented below for all storage reservoirs in the Tijuana River Basin. The data represent contents on the last day of the month in acre-feet. The reservoir capacities indicated are total capacities, at the top of the spillway gates in closed position on the controlled spillways of Barrett and Rodriguez Dam, and at spillway level for Morena Dam, which has had an uncontrolled spillway since the spillway gates were removed in 1942. The records of storage reported below for Morena, Barrett, and Rodriguez Reservoirs are based on the capacities as determined by the following surveys: Morena 1948; Barrett 1948, 1951, and 1955; and Rodriguez 1927, when the reservoir area was initially surveyed.

Records for Morena and Barrett Reservoirs are obtained and furnished by the city of San Diego Water Department, the U. S. Geological Survey, and the U. S. Weather Bureau; for Rodriguez Reservoir by the Ministry of Hydraulic Resources, Government of Mexico.

In Acre-Feet

Month	Morena Reservoir (Capacity: 50,210)		Barrett Reservoir (Capacity: 44,760)		Rodriguez Reservoir (Capacity: 111,880)		Total in Tijuana River Basin Reservoirs (Capacity: 206,850)	
	1961	Average 1937-61	1961	Average 1937-61	1961	Average 1937-61	1961	Average 1937-61
Jan.	788	22,042	1,207	15,145	178	44,566	2,173	81,753
Feb.	788	22,896	1,207	16,939	155	45,657	2,150	85,493
Mar.	796	24,624	1,215	18,828	124	50,520	2,135	93,972
Apr.	772	24,590	1,191	19,577	89.2	50,519	2,052.2	94,685
May	727	24,379	1,161	18,731	71.2	49,615	1,959.2	92,725
June	676	23,716	1,116	17,879	59.6	48,149	1,851.6	89,744
July	626	23,098	1,072	16,898	54.5	46,617	1,752.5	86,613
Aug.	585	22,526	1,036	15,915	58.0	45,225	1,679.0	83,666
Sept.	539	21,807	1,001	15,526	72.7	44,034	1,612.7	81,367
Oct.	514	21,498	980	15,039	59.3	43,041	1,553.3	79,578
Nov.	501	21,340	973	14,501	68.7	42,279	1,542.7	78,121
Dec.	520	21,367	987	14,797	47.1	42,566	1,554.1	78,730
Avg.	653	22,824	1,095	16,648	86.4	46,066	1,834.4	85,538
Max.	796	# 61,670	1,215	θ 45,920	178	109,610	2,173	213,600
Min.	501	10	973	106	47.1	47.1	1,542.7	1,542.7

March 31, 1941 - Prior to removal of spillway gates
θ April 30, 1937 - Sandbags were placed on crest of spillway

RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall with averages for their periods of record at stations located in California and Baja California. Daily records, where available, are on file in the offices of the United States and Mexican Sections of this Commission. For location, elevation, period of record, and the observer, see alphabetical listing of these stations on the following page.

In the United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California	
	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	1.22	4.03	1.61	3.52	1.08	3.15	1.15	3.58
Feb.	.08	4.07	.14	3.56	.20	1.94	.15	3.96
Mar.	1.85	3.54	2.46	3.02	3.51	2.49	2.77	3.07
Apr.	0	1.85	0	1.58	0	1.42	0	1.84
May	.02	.67	T	.60	0	.53	.05	.70
June	0	.14	0	.06	0	.05	0	.07
July	0	.42	0	.10	0	.02	0	.21
Aug.	.21	.52	.09	.21	.68	.21	.15	.20
Sept.	0	.33	0	.24	0	.10	0	.23
Oct.	.30	.94	.48	.75	.64	.41	.31	.77
Nov.	.95	1.41	1.02	1.14	.70	1.00	1.27	1.25
Dec.	2.28	3.36	2.10	2.88	2.37	1.71	2.36	3.29
Yearly	6.91	21.28	7.90	17.66	9.18	13.03	8.21	19.17

Month	Sawday Ranch, California		Chula Vista, California	
	1961	Average	1961	Average
Jan.	1.37	3.53	0.81	1.96
Feb.	.07	2.16	.02	1.93
Mar.	1.24	3.03	1.28	1.56
Apr.	0	1.76	0	.84
May	0	.54	T	.27
June	0	.05	T	.04
July	.06	.66	0	.01
Aug.	.30	.64	.07	.09
Sept.	0	.40	0	.13
Oct.	.73	.44	.16	.47
Nov.	1.11	1.23	.56	.81
Dec.	2.44	1.90	1.84	1.81
Yearly	7.32	16.34	4.74	9.92

In Mexico

Month	La Rumurosa, Baja California		Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California	
	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	0.47	0.91	1.10	2.68	0.87	2.13	0.59	1.50
Feb.	0	.47	0	1.02	.12	1.18	T	1.34
Mar.	.28	.63	.59	1.69	.51	1.06	.43	1.46
Apr.	0	.24	0	.91	0	.67	T	.75
May	0	.08	0	.31	0	.24	T	.08
June	0	.04	0	.04	0	.04	T	0
July	.12	.24	0	.08	0	0	T	0
Aug.	.08	.83	1.06	.20		.08	.71	.08
Sept.	0	.20	0	.04	0	.04	T	.24
Oct.	.63	.35	0	.35	.08	.35	T	.35
Nov.	0	.28	.63	.71	.83	.91	.71	.59
Dec.	.12	.67	.87	1.65	1.54	.91	1.38	1.69
Yearly	1.70	4.72	4.25	10.35		7.95	3.82	7.99

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

In Mexico

Month	Cañada Seca, Baja California		Valle de las Palmas, Baja California		El Compadre, Baja California		San Juan de Dios, Baja California	
	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	0.79	1.22	0.71	1.93	1.18	2.36	1.18	2.87
Feb.	0	1.46	T	.91	.12	1.34	.75	2.68
Mar.	2.60	1.85	.55	1.18	1.54	1.93	1.22	2.05
Apr.	0	.87	0	.59	0	.98	0	1.14
May	0	.35	0	.16	0	.47	0	.35
June	0	.04	0	0	0	.04	0	.43
July	0	.75	0	.08	.87	.98	3.31	1.38
Aug.	3.23	.91		.04	1.61	.71	.79	.83
Sept.	0	.16	0	.12	.59	.79	1.10	.39
Oct.	.87	.59	T	.20	.24	.47	.31	.79
Nov.	.83	.51	.20	.59	.35	.79	.83	.87
Dec.	1.81	.83	.91	.94	1.85	1.54		.94
Yearly	10.13	9.84		7.09	8.35	12.60		16.42

T Trace

LOCATION OF RAINFALL STATIONS

In the United States

NAME OF STATION	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Chula Vista, California	32° 36'	117° 06'	9	1930	Western Salt Company
Barrett Dam, California	32° 41'	116° 40'	1,750	1907	City of San Diego
Marron Valley, California	32° 34'	116° 46'	550	1951	I. B. & W. C.
Morena Dam, California	32° 41'	116° 32'	3,010	1906	City of San Diego
Potrero, California	32° 37'	116° 37'	2,390	1914	Thor Nelson
Sawday Ranch, California	32° 45'	116° 29'	3,200	1950	William Tulloch

In Mexico

NAME OF STATION	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Cañada Seca, Baja California	32° 32'	116° 21'	49	1952	Hydraulic Resources
El Compadre, Baja California	32° 20'	116° 14'	3,812	1948	Hydraulic Resources
La Rumurosa, Baja California	32° 33'	116° 03'	3,937	1946	Hydraulic Resources
Rodriguez Dam, Baja California	32° 26'	116° 55'	459	1938	Hydraulic Resources
San Juan de Dios, Baja California	32° 08'	116° 10'	3,280	1956	Hydraulic Resources
Tecate, Baja California	32° 32'	116° 39'	1,690	1946	Hydraulic Resources
Tijuana, Baja California	32° 31'	117° 02'	180	1948	Hydraulic Resources
Valle de las Palmas, Baja California	32° 23'	116° 40'	148	1948	Hydraulic Resources

EVAPORATION IN THE TIJUANA RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at four stations in California and at five stations in Baja California, with averages for their periods of record. The stations in California are observed by Western Salt Company, City of San Diego, California, and the United States Section of this Commission; those in Baja California are observed by the Ministry of Hydraulic Resources. For specific location of these stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 83 in this bulletin.

Types of pans used:

1. Barrett Reservoir: January 1921 through September 1926, square 3-foot by 3-foot by 18-inch deep floating pan. October 1926 through December 1961, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

2. Chula Vista: September 1918 through December 1961, U. S. Weather Bureau 4-foot diameter pan, 10 inches deep, set on 2-inch by 4-inch timber grill.

3. Marron Valley: February 1951 to April 30, 1956, 2-foot diameter screened pan, 36 inches deep with automatic level attachment. From April 30, 1956 to date, same type of pan 22.5 inches in diameter.

4. Morena Reservoir: October 1915 through December 1921, square 3-foot by 3-foot by 18-inch deep floating pan. January 1922 through August 1926 records are the average of evaporation in a square 3-foot by 3-foot by 18-inch deep floating pan and a land pan of the same dimensions. September 1926 through December 1961, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

In the United States

Month	Morena Dam		Barrett Dam		Marron Valley		Chula Vista	
	1961	Average 1916-1961	1961	Average 1921-1961	1961	Average 1951-1961	1961	Average 1919-1961
Jan.	2.65	2.35	2.91	1.89	4.58	2.61	3.36	2.77
Feb.	2.90	2.39	3.29	2.23	4.29	3.18	3.96	3.29
Mar.	2.88	3.76	3.51	3.68	4.50	4.12	5.22	4.94
Apr.	6.28	5.03	6.64	4.96	7.06	5.54	6.69	5.82
May	6.99	7.06	7.35	7.19	7.41	7.04	7.40	6.87
June	10.38	9.09	10.12	8.82	8.70	8.71	6.49	7.06
July	9.98	10.55	10.04	10.43	9.80	10.08	7.75	7.62
Aug.	8.24	9.76	8.88	9.75	8.82	9.44	7.51	7.27
Sept.	6.46	7.99	7.52	8.05	8.18	8.42	6.43	6.04
Oct.	4.99	5.65	5.65	5.66	7.56	6.56	5.48	4.82
Nov.	2.75	3.86	3.29	3.67	5.01	4.84	3.97	3.66
Dec.	1.36	2.76	1.34	2.24	[1] 2.49	3.43	2.19	2.74
Total	65.86	70.25	70.54	68.57	78.40	73.97	66.45	62.90

In Mexico

Month	Tecate		Tijuana		Rodriguez Dam		Valle de las Palmas	
	1961	Average	1961	Average 1952-59&61	1961	Avg.1939-42 and 1946-61	1961	Average 1952-1961
Jan.	4.84		4.72	2.44	6.42	3.70	5.91	3.39
Feb.	4.57		4.09	3.23	5.59	3.86	5.28	3.35
Mar.	4.80		4.29	4.06	5.87	5.16	6.38	5.20
Apr.	6.18		5.67	4.72	8.31	5.75	8.62	6.81
May	6.38		6.65	5.71	9.06	7.44	9.25	7.91
June	8.35		6.65	5.43	9.02	8.23	10.94	9.72
July	9.02		5.12	6.06	9.72	9.09	10.59	10.71
Aug.	8.23			6.22	8.50	8.27		9.80
Sept.	7.24		6.77	5.91	7.91	7.20	8.58	8.66
Oct.	9.88		5.20	4.29	6.57	5.98	8.11	6.30
Nov.	4.33		3.39	3.66	5.47	5.63	5.00	4.80
Dec.	2.64		2.09	2.87	2.76	4.57	4.33	4.21
Total	76.46			54.33	85.20	75.47		79.92

Month	San Juan de Dios	
	1961	Average 1956-1960
Jan.		1.93
Feb.		2.44
Mar.		3.98
Apr.		3.86
May		5.24
June		5.00
July		7.56
Aug.		6.61
Sept.		6.06
Oct.		3.98
Nov.		3.70
Dec.		3.50
Total		56.30

[1] Estimated

TEMPERATURE IN THE TIJUANA RIVER BASIN

The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with averages for their periods of record. The maximum, minimum, and monthly average temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations," page 83 in this bulletin.

Degrees Fahrenheit

In the United States

Month	Barrett Dam, California				Chula Vista, California			
	1961			* Long-Term Average	1961			* Long-Term Average
	Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	50.6	83	22	48.7	Ø 56.3	82	36	51.8
Feb.	51.1	79	30	50.6	Ø 55.5	76	37	53.3
Mar.	51.9	81	31	53.8	Ø 56.3	75	44	55.0
Apr.	58.6	94	32	58.5	Ø 58.3	80	45	57.9
May	Ø 59.9	91	39	63.5	Ø 59.6	73	50	60.7
June	70.7	106	41	68.1	Ø 62.3	73	52	62.7
July	75.5	105	49	76.5				
Aug.	76.4	99	49	76.4	Ø 69.1	83	63	67.7
Sept.	Ø 68.1	99	40	73.0				
Oct.	63.3	98	32	64.6	Ø 62.2	104	47	62.2
Nov.	52.3	83	28	56.7	Ø 58.1	83	40	57.5
Dec.	49.0	78	29	51.3	Ø 53.6	69	39	54.0
Yearly	60.6	106	22	61.8				

In Mexico

Month	La Rumurosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1961		Avg. 1946-1961		1961		Avg. 1946-59&61		1961		Avg. 1948-59&61	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	75	18	81	5	84	32	86	23	88	37	88	30
Feb.	73	27	82	10	79	27	90	21	79	39	91	32
Mar.	75	32	79	16	81	43	88	27	81	45	88	34
Apr.	91	32	91	23	95	37	99	32	88	45	88	37
May	88	37	97	28	88	37	100	36	79	50	97	43
June	100	39	104	34	100	41	104	39	82	50	99	41
July	104	52	104	50	100	46	115	36	84	61	97	46
Aug.	102	57	102	46	97	48	113	34			99	52
Sept.	91	41	104	34	97	39	115	37	99	52	104	46
Oct.			91	25	99	32	106	34	106	45	106	43
Nov.	88	28	88	14	82	28	97	27	86	41	95	34
Dec.	73	21	81	10	77	28	90	25	77	39	91	25
Yearly			104	5	100	27	115	21			106	25

Month	Rodriguez Dam, Baja California				Cañada Seca, Baja California				Valle de las Palmas, Baja California			
	1961		Avg. 1946-1961		1961		Avg. 1951-1961		1961		Avg. 1948-1961	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	88	34	88	34	81	32	84	19	88	27	88	12
Feb.	81	36	90	34	86	27	100	19	84	32	99	23
Mar.	84	41	88	37	88	34	102	19	82	37	93	28
Apr.	91	39	91	36	82	36	113	21	99	39	104	32
May	82	46	99	41	86	36	104	25	91	41	100	39
June	91	46	108	46	90	37	113	30	104	48	108	43
July	90	54	104	52	95	45	111	32	106	54	120	48
Aug.	88	59	104	54	102	52	113	36			108	48
Sept.	99	48	108	48	100	50	109	30	100	46	117	43
Oct.	100	45	108	43	99	36	109	28	100	39	108	37
Nov.	82	37	99	37	91	48	108	19	86	19	95	19
Dec.	77	37	93	27	95	30	113	21	79	32	91	25
Yearly	100	34	108	27	102	27	113	19			120	12

* Based on Period 1931-1955 Ø One or more days missing

TEMPERATURE IN THE TIJUANA RIVER BASIN

Degrees Fahrenheit
In Mexico

Month	El Compadre, Baja California				San Juan de Dios, Baja California							
	1961		Avg. 1948-1961		1961		Avg. 1956-1961					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.	90	37	100	10	68	16	82	7				
Feb.	79	36	97	14	82	19	84	16				
Mar.	93	36	93	28	82	19	84	19				
Apr.	90	45	104	28	84	19	102	19				
May	88	45	109	30	84	21	91	21				
June	100	50	115	32	102	34	106	30				
July	102	50	120	37	106	43	120	36				
Aug.	108	54	120	39	95	43	102	32				
Sept.	109	41	115	32	90	36	97	25				
Oct.	97	37	118	32	97	19	99	19				
Nov.	93	32	106	27	79	19	91	12				
Dec.	86	32	113	19			84	16				
Yearly	109	32	120	10			120	7				

DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS ALONG TIJUANA RIVER AND TRIBUTARIES

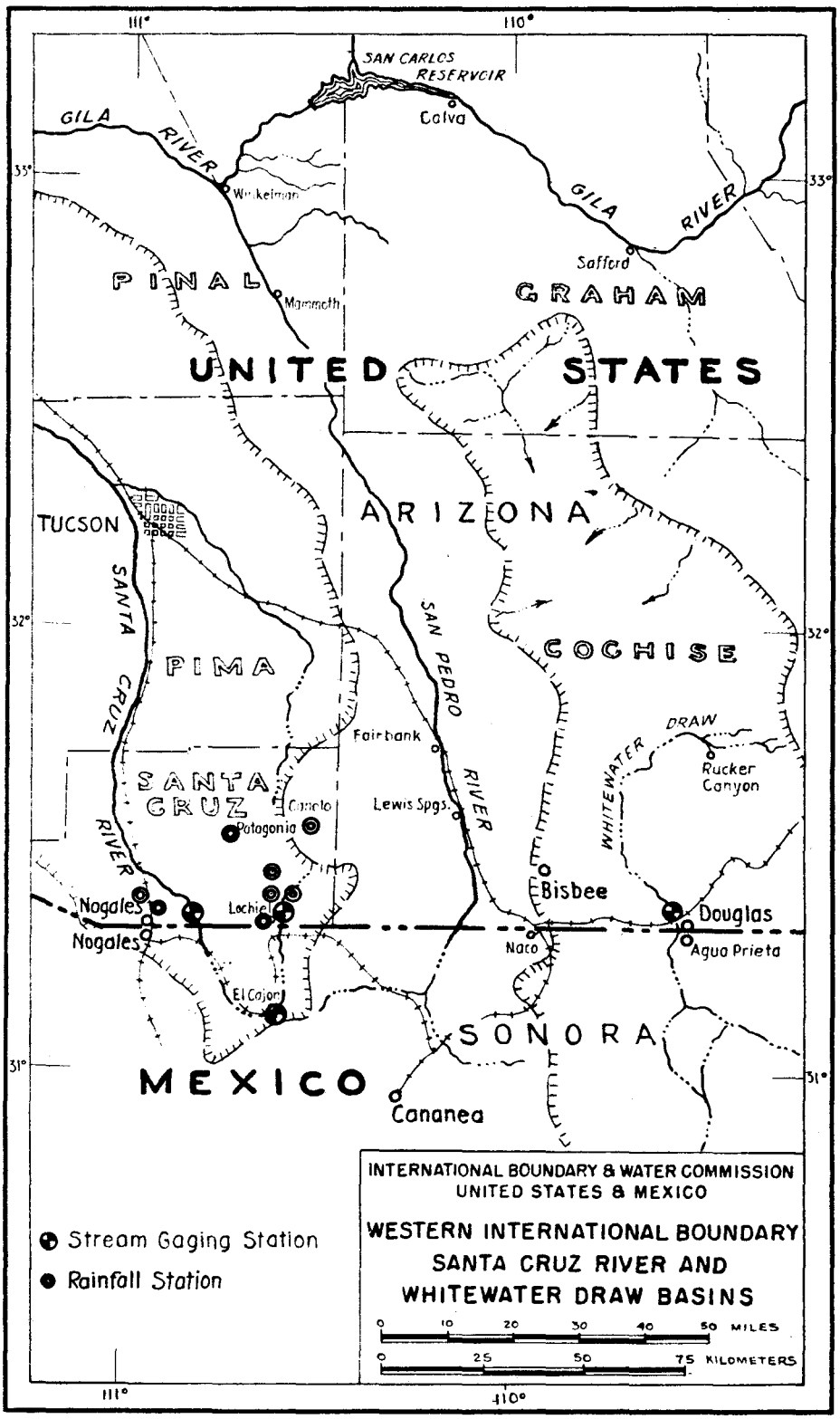
1961

The total area within Tijuana River basin is 1,731 square miles, as determined from the best available maps from both the United States and Mexico. The drainage areas shown below are tabulated according to their downstream sequence.

The irrigated areas, tabulated in downstream sequence, are from the most reliable sources available. Those in the United States were furnished by the United States Department of Agriculture and the State Engineer, State of California, or estimated from aerial photographs. Those in Mexico were furnished by the Ministry of Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana Basin in 1961 was by pumping from ground water.

Designation of Areas	Drainage Basin-Square Miles			Irrigated Areas-Acres		
	United States	Mexico	Total	United States	Mexico	Total
Cottonwood Creek						
above Morena Dam	114	0	114	a) 75	0	a) 75
Morena Dam to Barrett Dam	133	0	133	0	0	0
above Barrett Dam	247	0	247	a) 75	0	a) 75
below Barrett Dam and above Tecate Creek	65	0	65	a) 145	0	a) 145
above Tecate Creek	312	0	312	a) 220	0	a) 220
Campo Creek						
above International Boundary	82	4	86	a) 320	0	a) 320
Tecate Creek						
above International Boundary (does not include Campo Creek)	19	64	83	0	0	0
Cottonwood Creek						
above International Boundary Station	413	68	481	a) 540	0	a) 540
Río de las Palmas						
above Rodriguez Dam	7	981	988	0	b) 0	0
Tijuana River						
above Nestor Gaging Station	458	1,266	1,724			
above the Mouth	462	1,269	1,731	3,000	c) 494	3,494

a) Estimated as of 1948. During extremely dry years these areas may be materially reduced.
b) Areas in upper valleys may be irrigated by pumping from ground water.
c) There was no irrigation in 1961 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir, but an estimated area of about 494 acres was irrigated by pumping from ground water. Depending upon the availability of water this acreage varies considerably from year to year.


111°
110°
SAN CARLOS RESERVOIR
GILA RIVER
Calva
Winkelman
33°
GILA RIVER
Safford
PINAL
Mammoth
GRAHAM
UNITED STATES
ARIZONA
TUCSON
SANTA CRUZ RIVER
SAN PEDRO RIVER
32°
PIMA
COCHISE
Fairbank
WHITEWATER DRAW
Rucker Canyon
SANTA CRUZ
Cumpas
Lewis Spgs.
Patagonia
Bisbee
Douglas
Nogales
Lochiel
Nogales
Naco
Agua Prieta
El Cajon
SONORA
31°
MEXICO
Cananea
Stream Gaging Station
Rainfall Station
INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
WESTERN INTERNATIONAL BOUNDARY
SANTA CRUZ RIVER AND
WHITEWATER DRAW BASINS
0 10 20 30 40 50 MILES
0 25 50 75 KILOMETERS
111°
110°

WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

DESCRIPTION: Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 150 yards upstream from the Southern Pacific Railroad Bridge, 1.5 miles upstream from the international boundary, and 2 miles west of Douglas, Arizona. Zero of gage is 3,906.94 feet above mean sea level, U. S. C. & G. S. datum of 1929.

RECORDS: Based on 17 current meter measurements during the year. Computations by shifting control methods. Records obtained and furnished by the U. S. Geological Survey. Records fair except for periods of fragmentary or no gage height record, which are poor. Records available: August to October 1911 (gage heights and discharge measurements only), July to October 1912, January to June 1913, October 1913, December 1913 to June 1914, February to June 1915, October 1915 to September 1919, October 1919 to April 1922 (gage heights and discharge measurements only), June 1930 to December 1933, May 1935 to July 1947, October 1947 through December 1961 (July 1954 to March 1955 monthly discharge only).

REMARKS: Diversions above this station are mainly by pumping from ground water for irrigation. Records show flow at the international boundary into Mexico except for some smelter waste water entering the stream a short distance below this station.

EXTREMES: Prior to 1936: Maximum recorded discharge, 3,450 second-feet August 10, 1931 (gage height 12.15 feet); maximum estimated discharge, 4,050 second-feet July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 5,060 second-feet August 7, 1955; maximum gage height 14.93 feet July 27, 1959; minimum daily discharge, no flow at times during most years.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.2	0.2	0.08	0.1	0.05	0.01	0.01	1.6	0.3	0.05	0.8	ᵘ 0.2
2	.2	.2	.08	.08	.05	.01	.01	3.9	.1	.04	.3	.1
3	.2	.2	.07	.08	.05	.01	.01	.1	.1	.02	.2	.1
4	.2	.2	.07	.08	.05	.01	.01	.07	.07	.02	.2	.2
5	.2	.1	.08	.08	.05	.01	.01	.07	.05	.02	.2	.1
6	.2	.1	.08	.08	.04	.01	.01	.05	.04	.03	.2	.1
7	.2	.2	.07	.08	.04	.01	.01	.02	.05	.03	.2	.2
8	.2	.2	.07	.08	.04	.01	.01	.02	.05	.03	.3	.6
9	.2	.2	.07	.08	.04	.01	.01	.02	.05	.05	.3	1.6
10	.2	.1	.07	.08	.04	.01	.01	.03	30	.05	.2	.3
11	.2	.1	.07	.08	.04	.01	.01	.06	43	.05	.2	.1
12	.1	.1	.07	.08	.04	.01	.01	.07	19	.05	.2	.2
13	.1	.1	.07	.08	.04	.01	8.3	1.9	1.9	.04	.2	.1
14	.2	.1	.07	.08	.03	.01	.1	.2	11	.03	1.0	.1
15	.2	.1	.07	.08	.03	.03	.02	.04	45	.02	.1	.1
16	.2	.08	.07	.08	.03	.2	0	28	15	.02	.08	.2
17	.2	.1	.07	.08	.03	.05	0	48	5.8	.02	.07	.2
18	.2	.1	.07	.08	.02	.01	0	102	2.2	.03	.08	.1
19	.2	.1	.07	.07	.02	.01	ᵘ .6	47	.8	.03	.1	.1
20	.2	.1	.07	.07	.01	.01	.2	1.3	.2	.04	.1	.1
21	.2	.1	.07	.07	.01	.01	.1	.08	.1	.04	.1	.1
22	.2	.1	.07	.07	.01	.01	.1	4.1	.1	.04	.1	ᵘ .1
23	.2	.08	.08	.05	.01	.01	.02	27	.1	.04	.1	.1
24	.3	.07	.08	.05	.01	.01	ᵘ .02	2.1	.1	.04	.1	.1
25	.3	.07	.08	.05	.01	.01	.3	.4	.1	.04	.1	.1
26	.2	.07	.1	.05	.01	.01	.1	.08	.1	.03	.2	.1
27	.2	.07	.1	.05	.01	.01	.05	.01	.1	.03	.2	.1
28	.2	.08	.1	.05	.01	.01	.01	.01	.1	.03	.2	.1
29	.2		.1	.05	.01	.01	188	24	.08	.04	.2	.1
30	.2		.1	.05	.01	ᵘ .01	138	30	.07	.3	.2	.1
31	.2		.1		.01		.4	2.4		9.1		.1
Sum	6.2	3.32	2.42	2.14	0.85	0.55	336.44	324.63	175.66	10.40	6.53	5.9

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1936-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
			Current Year 1961								
Jan.			†24	0.3	†12	0.1	0.20	12	54.5	451	3.7
Feb.			† 1	.2	†24	.07	.119	6.6	31.7	132	3.8
Mar.			†26	.1	† 3	.07	.078	4.8	34.5	130	4.3
Apr.			1	.1	†23	.05	.071	4.2	31.9	173	1.2
May			† 1	.05	†20	.01	.027	1.7	23.7	138	0
June			16	.2	† 1	.01	.018	1.1	204	1,590	0
July			29	188	†16	0	10.9	667	2,220	8,110	39
Aug.			18	102	†27	.01	10.5	644	3,554	14,480	58
Sept.			15	45	6	.04	5.86	348	726	3,170	.8
Oct.			31	9.1	† 3	.02	.335	21	190	2,210	.5
Nov.			14	1.0	17	.07	.218	13	51.4	352	2.5
Dec.			9	1.6	† 2	.1	.19	12	95.8	1,050	2.6
Yearly				188		0	2.40	1,740	7,217.5	22,321	900

† And other days Ø Mean daily ᵘ Estimated

SEWAGE EFFLUENT, DOUGLAS, ARIZONA, AND AGUA PRIETA, SONORA, INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Flume in influent line at treatment plant, equipped with stilling well and staff gage, for measuring combined flows of Douglas, Arizona and Agua Prieta, Sonora, and Parshall flume with recording flow meter for measuring flows from the city of Douglas. Flows from Mexico are deduced from total flows and city of Douglas flows.

RECORDS: Combined discharges are computed from daily 11:00 a.m. readings of the staff gages by applying an 11:00 a.m. index determined from 7 days of hourly measurements during which the relationship between mean daily readings and 11:00 a.m. readings was developed. Records available: Continuous monthly records since March 1948; daily records March 18, 1948 through December 1950 and January 1952 through December 1961.

REMARKS: Douglas-Agua Prieta international treatment plant was constructed by the Governments of the United States and Mexico in 1947 to correct a serious international sanitation problem and is located in the United States adjacent to the international boundary about one mile west of the Douglas-Agua Prieta Port of Entry. The effluent from the plant is treated in oxidation ponds in Mexico.

Month	Total Monthly Flows Millions of Gallons			Mean Daily Flows-Millions of Gallons Per Day					
				Current Year 1961			Period 1952-1961		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	27.621	7.035	34.656	1.368	0.892	1.118	1.368	0.619	0.901
Feb.	25.749	7.343	33.092	1.784	1.015	1.182	1.784	.584	.909
Mar.	21.873	10.771	32.644	1.161	.949	1.053	1.161	.590	.901
Apr.	22.917	11.292	34.209	1.243	.967	1.140	1.354	.619	.918
May	24.292	12.194	36.486	1.315	1.040	1.177	1.428	.619	.920
June	¤ 27.864	¤ 13.112	¤ 40.976			¤ 1.366	1.692	.626	.994
July	30.890	14.537	45.427			1.465	1.692	.619	1.020
Aug.	31.065	13.186	44.251	1.568	1.266	1.427	1.829	.619	1.054
Sept.	27.325	12.411	39.736	1.632	1.127	1.325	1.884	.626	1.040
Oct.	25.979	12.949	38.928	1.325	.947	1.256	1.667	.626	.990
Nov.	24.428	12.359	36.787	1.339	1.098	1.226	1.354	.619	.956
Dec.	25.986	12.011	37.997	1.320	1.066	1.226	1.582	.619	.964
Yearly	315.989	139.200	455.189			1.247	1.884	0.584	0.964

¤ Estimated

SANTA CRUZ RIVER NEAR LOCHIEL, ARIZONA

DESCRIPTION: Water-stage recorder located in the United States near left bank on the downstream side of concrete bridge pier of county highway bridge, 2.5 miles northeast of Lochiel, Arizona and 1.5 miles upstream from the international boundary. The elevation of the zero of the gage has not been determined but topographic maps indicate the elevation of the stream bed at the gage is about 4,620 feet.

RECORDS: Based on 19 current meter measurements or observations of no flow during the year. Computations by shifting control methods. Records obtained and furnished by the U. S. Geological Survey. Records good except above 3 second-feet and for periods of fragmentary or no gage height record, which are poor. Records available: January 1949 through December 1961.

REMARKS: There are small diversions by ground water pumping for irrigating about 200 acres above station.

EXTREMES: Maximum discharge, 4,520 second-feet July 30, 1950 (gage height 6.75 feet); minimum discharge, no flow for several days of each year.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.2	0.3	0.2	0.1	0.03	0	0	3.5	0.2	0.9	0.7	0.7
2	.2	.3	.3	.1	.01	0	0	3.1	.2	1.0	.7	.5
3	.1	.3	.3	.1	.01	0	0	2.3	.1	1.0	.7	.4
4	.2	.3	.2	.08	.01	0	0	1.7	.2	1.1	.7	.4
5	.2	.2	.2	.08	.05	0	0	.7	.2	1.0	.7	.4
6	.2	.2	.2	.1	.03	0	0	1.4	.2	.9	.6	.5
7	.1	.2	.2	.1	.01	0	0	.5	.8	.8	.6	.6
8	.1	.3	.2	.08	.05	0	0	94	.3	1.0	.7	.7
9	.1	.3	.2	.1	.04	0	0	19	.2	1.3	.6	.6
10	.2	.2	.2	.08	.02	0	0	2.1	1.1	.7	.6	.6
11	.2	.3	.2	.08	.02	0	0	4.9	1.7	.6	.6	.7
12	.2	.3	.2	.08	.01	0	0	.5	19	.6	.5	.6
13	.2	.3	.2	.08	.01	0	0	.4	7.1	.5	.4	.6
14	.2	.3	.2	.08	.01	0	0	13	3.0	.3	.4	.6
15	.2	.3	.2	.08	.05	0	0	1.0	3.0	.3	.4	.8
16	.2	.3	.2	.08	.04	0	25	.3	3.0	.4	.5	.8
17	.2	.3	.2	.08	.03	0	.6	.08	3.0	.3	.5	.7
18	.2	.3	.2	.08	0	0	0	.07	3.0	.3	.5	.7
19	.3	.3	.2	.08	0	0	0	.07	3.0	.3	.6	.7
20	.4	.3	.2	.08	0	0	0	.09	2.8	.2	.7	.7
21	.3	.3	.2	.08	0	0	.1	.07	2.8	.3	.7	.7
22	.3	.3	.1	.05	0	0	.2	2.6	2.5	.4	.7	.7
23	.4	.3	.1	.05	0	0	.02	.9	2.5	.5	.7	.7
24	.4	.2	.1	.05	0	0	1.9	16	2.3	.4	.7	.7
25	.4	.2	.1	.04	0	0	1.2	.9	2.3	.3	.7	.7
26	.3	.2	.1	.04	0	0	.5	.1	2.0	.2	.7	.7
27	.4	.2	.2	.04	0	0	.01	.07	1.8	.2	.7	.7
28	.4	.2	.2	.04	0	0	.04	43	1.6	.3	.7	.7
29	.4		.2	.05	0	0	22	30	1.3	.5	.7	.7
30	.3		.2	.02	0	0	5.8	.7	1.2	1.7	.7	.7
31	.3		.1		0		2.4	.3		1.2		.7
Sum		7.5		2.18		0		243.35		19.5		20.0
	7.8		5.8		0.43		59.77		72.4		18.7	

Current Year 1961 — **Period 1949-1961**

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			†20	0.4	† 3	0.1	0.25	15	27.6	70	3.6
Feb.			† 1	.3	† 5	.2	.27	15	22.0	62	5.0
Mar.			† 2	.3	†22	.1	.19	12	17.9	57	5.0
Apr.			† 1	.1	30	.02	.073	4.3	10.0	29	.4
May			† 5	.05	†18	0	.014	.9	3.1	10	0
June				0		0	0	0	.3	4.4	0
July			16	25	† 1	0	1.93	119	735	4,270	9.5
Aug.			8	94	†18	.07	7.85	483	1,278	10,120	24
Sept.			12	19	3	.1	2.41	144	210	1,110	0
Oct.			30	1.7	†20	.2	.63	39	65.4	337	0
Nov.			† 1	.7	†13	.4	.62	37	29.9	90	0
Dec.			†15	.8	† 3	.4	.65	40	29.1	74	0
Yearly				94		0	1.25	909	2,428	12,633	423

† And other days Ø Mean daily

SANTA CRUZ RIVER AT EL CAJON, SONORA

DESCRIPTION: Water-stage recorder, cableway, and Cipolletti weir with crest length of 26.25 feet and depth of 0.82 foot, 4.3 miles southwest of Santa Cruz, Sonora and approximately 30 miles southeast of Nogales, Sonora. Zero of gage is 4,270.24 feet above mean sea level, U. S. C. & G. S. datum, which is the same elevation as the crest of the weir.

RECORDS: Data is based on river stages and 9 current meter measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 14, 1954 through August 1959; October 1, 1959 to June 14, 1960; July 1960; and January 6 through December 1961.

REMARKS: Irrigation diversions above the station affect the regimen of the river. A flood in August 1955 destroyed the weir which was repaired in February 1957.

EXTREMES: Maximum instantaneous discharge, 4,590 second-feet on August 6, 1955 with stage of 6.00 feet. Minimum discharge, 0.2 second-foot several days during April 1961 with stage of 0.03 foot.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		11.0	5.4	2.3	1.8	1.8	1.0	12.5	64.5	9.5	11.7	12.2
2		11.8	4.3	1.8	2.1	1.5	.6	16.2	57.4	8.8	11.1	12.2
3		9.7	3.8	2.3	2.8	1.3	.6	12.5	55.1	7.7	10.5	12.2
4		10.6	5.4	2.3	3.1	1.5	.6	11.5	54.0	8.7	10.0	11.1
5		9.1	5.7	2.3	3.1	1.8	.6	10.0	52.4	8.5	10.0	10.0
6	0.5	8.8	5.3	2.1	3.5	1.7	1.0	11.2	61.1	8.3	12.0	10.0
7	1.0	8.1	3.4	2.6	3.9	1.3	1.5	10.8	54.5	8.8	13.5	10.8
8	1.0	6.6	2.3	3.7	3.9	1.3	1.9	77.5	51.8	8.9	13.7	10.6
9	1.0	5.0	2.3	3.3	3.9	1.3	2.4	48.5	99.7	9.6	13.4	10.0
10	.7	4.4	2.3	2.3	3.9	1.3	2.5	33.2	74.9	9.7	12.1	9.7
11	.7	3.7	2.3	2.3	3.9	1.3	2.5	34.6	87.5	9.3	11.1	9.7
12	1.0	3.7	2.3	2.3	3.5	1.3	3.0	26.0	107	8.7	11.7	9.9
13	1.5	3.0	2.3	1.8	1.9	1.3	3.4	25.6	90.1	9.1	12.2	9.7
14	2.0	3.0	2.3	1.3	.7	1.3	3.4	29.1	69.9	9.1	13.1	10.0
15	2.0	3.0	2.3	1.0	.7	1.5	3.4	28.6	67.5	8.7	13.4	20.2
16	2.3	4.8	2.3	.9	.7	1.8	4.6	20.5	65.3	9.0	12.8	42.4
17	2.3	5.0	2.3	.5	.7	1.8	17.4	26.9	65.3	8.4	12.2	25.7
18	2.3	5.0	2.3	.4	.7	1.8	11.7	24.2	63.4	9.6	11.9	15.3
19	2.8	6.2	2.3	.4	.7	1.8	22.2	40.4	54.1	9.5	11.1	14.1
20	7.8	8.1	2.3	.4	.7	1.8	15.9	38.8	50.6	8.5	11.7	12.2
21	8.8	8.1	2.3	.3	1.0	1.8	25.4	38.4	46.3	8.1	13.1	12.2
22	9.2	8.1	2.3	.2	1.3	1.8	10.0	52.4	17.4	7.8	13.5	12.2
23	10.3	7.7	2.3	.2	1.3	1.8	16.8	61.6	14.5	8.1	11.4	12.2
24	11.0	6.1	2.3	.2	1.3	2.8	19.0	52.6	14.7	7.8	10.0	12.2
25	9.9	6.6	2.3	.3	1.3	4.2	11.4	66.3	14.7	8.1	10.0	12.2
26	8.5	7.3	2.4	.4	1.3	3.9	10.2	53.4	13.8	7.7	10.0	12.2
27	10.7	6.6	3.0	.4	1.3	3.9	10.2	48.0	11.1	6.7	10.0	12.2
28	11.0	6.1	2.3	.5	1.3	2.9	10.7	50.6	12.4	6.4	11.2	12.2
29	11.0		2.3	.7	1.3	1.3	46.8	97.7	11.8	8.1	12.2	12.2
30	11.0		4.1	.9	1.5	1.0	22.3	67.8	10.0	11.3	12.2	11.6
31	11.0		3.2		1.8		14.6	67.2		12.4		10.0
Sum		187.2	92.0	40.4	60.9	55.9	297.6	1,194.6	1,512.8	270.9	352.8	409.4

Current Year 1961 — # **Period 1954-1961**

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	0.20	0.07	†28	11.0	6	0.5			522	1,487	209
Feb.	.26	.10	2	15.5	†13	2.3	6.6	366	362	1,086	99.7
Mar.	.13	.07	5	6.6	† 8	1.7	3.0	182	268	498	177
Apr.	.13	.03	8	3.7	†22	.2	1.3	78.6	175	306	78.6
May	.13	.03	† 7	3.9	†14	.7	2.0	121	125	233	95.7
June	.13	.07	25	4.6	30	1.0	1.8	109	79.4	109	55.1
July	1.35	.03	29	169	† 2	.6	9.0	553	694	1,225	82.7
Aug.	1.97	.23	29	293	5	8.5	38.5	2,369	6,540	32,608	500
Sept.	1.12	.23	12	124	30	10.0	50.4	3,000	1,213	3,000	103
Oct.	.30	.16	31	13.4	28	6.2	8.7	538	371	883	80.3
Nov.	.33	.23	8	16.0	† 4	10.0	11.8	700	415	700	229
Dec.	.89	.23	16	89.2	†10	9.0	13.2	812	390	812	184
Yearly	1.97	0.03		293		0.2			⊕ 11,649	⊕ 38,880	⊕ 2,311

† And other days ⊕ Annual averages and extremes for 1955 to 1958 # Some months missing

SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 5.5 miles east of Nogales, Arizona, 0.75 mile downstream from the international boundary and 6 miles upstream from the Santa Cruz River bridge on State Highway No. 82. Zero of gage is 3,702.54 feet above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

RECORDS: Based on 19 current meter measurements or observation of no flow during the year. Computations by shifting control methods. Records obtained and furnished by the U. S. Geological Survey. Records fair except for periods of fragmentary or no gage height record, which are poor. Records available: March to November 1907 and April 1909 to December 1912 (discharge measurements and fragmentary gage height record), January 1913 to June 1922 (October 1915 to September 1916, monthly discharges only), May 1930 to December 1933, July 1935 through December 1961.

REMARKS: Diversions in both countries affect the flow at this station. The major diversions occur in Mexico for domestic and irrigation uses. There are no storage dams above the station as of December 1961.

EXTREMES: Prior to 1936: Maximum discharge, 12,000 second-feet August 31, 1935 (gage height 12.3 feet); minimum discharge, no flow for several days each year. Since 1936: Maximum discharge, 10,600 second-feet July 10, 1954 (gage height 13.27 feet); minimum discharge, no flow for several days of many years.

Mean Daily Discharge in Second-Feet 1961 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.4	5.2	4.7	5.2	2.0	0.5	0.3	11	2.0	0.9	21	6.8
2	6.8	5.2	5.2	4.7	1.7	.5	.4	17	1.4	.9	9.2	6.8
3	6.2	5.2	4.7	4.7	1.6	.5	.3	3.1	.7	.7	7.4	6.8
4	6.2	5.2	5.2	4.7	1.4	.5	.4	2.7	.3	.7	6.8	6.8
5	6.2	5.2	5.2	4.3	1.4	.5	.3	2.3	3.8	.5	6.2	6.8
6	5.7	5.2	5.2	3.9	1.4	.4	.3	2.3	.5	.5	6.8	6.8
7	5.2	5.7	4.7	3.4	1.4	.4	.2	2.3	39	.5	7.9	7.4
8	5.2	5.7	4.7	3.1	1.4	.4	.2	2.0	1.4	.9	9.8	13
9	5.2	5.7	4.7	3.1	1.2	.4	.1	187	1.2	1.2	9.2	15
10	5.2	5.7	4.7	3.1	.7	.4	.1	72	11	.9	8.5	13
11	5.2	5.2	4.7	3.1	.5	.4	.1	30	32	.9	7.9	14
12	5.2	5.2	4.7	3.4	.5	.4	0	3.4	160	.9	7.4	33
13	4.7	5.2	5.2	3.1	.9	.3	0	74	122	.9	6.8	45
14	4.7	5.2	5.2	3.1	.9	.3	2.0	53	31	.7	6.2	51
15	4.7	5.2	5.2	3.1	.7	.3	.1	204	8.5	.7	5.7	425
16	4.7	5.2	4.7	3.1	.7	.3	.1	41	6.2	.7	5.2	1,060
17	4.7	5.2	4.7	3.1	.5	.3	0	7.9	3.9	.9	5.2	430
18	5.2	5.2	4.7	3.1	.4	.3	0	34	3.1	.8	5.2	198
19	5.7	5.2	4.7	3.1	.5	.3	133	3.1	2.0	.9	5.2	134
20	7.9	5.2	4.7	3.1	.5	.3	30	1.2	1.2	.9	5.2	98
21	7.9	4.7	4.7	3.1	.5	.3	3	.7	1.2	.7	5.2	80
22	6.8	4.7	4.7	3.1	.4	.3	48	2.2	1.2	.9	5.7	60
23	5.7	4.7	4.7	3.1	.4	.3	41	10	1.2	.9	6.8	49
24	7.4	4.7	4.7	3.1	.4	.3	39	1.7	.9	.9	6.8	41
25	6.8	4.7	5.2	3.1	.7	.3	10	1.4	.9	.9	6.8	36
26	6.2	4.7	5.7	3.1	.7	.3	17	1.4	.9	.9	6.8	29
27	7.9	4.7	5.7	3.1	.7	.3	15	1.2	.9	.9	6.2	25
28	6.8	4.7	5.2	2.7	.7	.3	55	.9	.7	.9	6.8	24
29	5.7		5.7	2.3	.7	.3	82	41	.7	5.7	6.8	22
30	5.2		5.7	2.0	.9	.3	191	47	.7	54	6.8	22
31	5.2		5.7		.7		71	5.1		143		21
Sum	183.6	143.6	155.2	100.2	27.1	10.7	739.9	865.9	440.5	225.7	217.5	2,986.2

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1936-1961 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			†20	7.9	†13	4.7	5.92	364	1,068	16,710	64
Feb.			† 7	5.7	†21	4.7	5.13	283	569	2,710	59
Mar.			†26	5.7	† 1	4.7	5.01	308	430	1,580	98
Apr.			1	5.2	30	2.0	3.34	199	165	444	19
May			1	2.0	†18	.4	.87	54	62.6	180	2
June			† 1	.5	†13	.3	.36	21	85.5	1,020	0
July			30	191	†12	0	23.9	1,470	2,679	15,610	124
Aug.			15	204	21	.7	27.9	1,720	6,088	45,790	91
Sept.			12	160	4	.3	14.7	874	1,151	5,540	17
Oct.			31	143	† 5	.5	7.28	448	297	1,550	11
Nov.			1	21	†16	5.2	7.25	431	246	1,140	24
Dec.			16	1,060	† 1	6.8	96.3	5,920	550	5,920	39
Yearly				1,060		0	16.7	12,090	13,391.1	57,671	3,499

† And other days Ø Mean daily

SEWAGE EFFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Two 12-inch Parshall flumes, each with a recording flow meter and continuous totalizer, one located at the international boundary for measuring effluent coming from Nogales, Sonora and the second located at the treatment plant in the influent line of secondary settling tank; and two calibrated sludge pumps of which pumping times are recorded. One pumps from primary settling tank into digester and the other recirculates sludge from secondary tank to primary tank. Bypass of raw sewage may be made to Nogales Wash, the quantity being estimated on basis of head in a control box in influent line ahead of primary tank. Nogales international sewage treatment plant is located near the north edge of Nogales, Arizona on right bank of Nogales Wash, approximately 2 miles downstream from the international boundary.

RECORDS: Total effluent is computed by adding to the flow measured in the flume from primary to secondary tank, the sludge pumped from primary tank into digester, which does not pass through this flume; subtracting the sludge recirculated from secondary to primary tank, which passes through this flume twice; and adding those flows of bypassed raw sewage into Nogales Wash. Flows from the United States are deduced from total measured flows less measured flows from Mexico. Records available: Continuous monthly record since the plant was placed in operation in August 1951, daily record January 1952 through December 1961.

REMARKS: Nogales international treatment plant treats combined sewage from Nogales, Arizona and Nogales, Sonora by means of primary and secondary sedimentation, sludge digestion, and trickling filters. Chlorination of plant effluent, which may be used for irrigation of lands lying north of the plant, is carried out by the United States at its expense.

Month	Total Monthly Flows Millions of Gallons			Mean Daily Flows-Millions of Gallons Per Day					
				Current Year 1961			Period 1952-1961		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	38.993	27.600	66.593	2.496	1.596	2.148	4.162	0.650	1.610
Feb.	41.970	23.550	65.520	2.802	1.546	2.340	3.762	.650	1.712
Mar.	47.206	28.700	75.906	2.602	2.102	2.449	3.662	.750	1.655
Apr.	44.154	28.600	72.754	2.752	2.002	2.425	3.962	.700	1.644
May	39.556	26.700	66.256	2.552	1.452	2.137	3.634	.550	1.553
June	24.554	27.150	51.704	1.902	1.402	1.723	3.317	.700	1.410
July	25.113	31.350	56.463	2.052	1.502	1.821	3.502	.700	1.452
Aug.	22.073	32.400	54.473	2.002	1.423	1.757	3.587	.750	1.863
Sept.	25.254	31.750	57.004	2.002	1.602	1.900	4.112	.800	2.183
Oct.	26.281	31.800	58.081	2.404	1.452	1.874	3.761	.700	2.006
Nov.	24.854	24.350	49.204	1.802	1.452	1.640	3.510	.800	1.769
Dec.	24.606	34.200	58.806	2.952	1.502	1.897	3.360	.350	1.755
Yearly	384.614	348.150	732.764	2.952	1.402	2.008	4.162	0.350	1.718

RAINFALL ON THE SANTA CRUZ RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall with averages for their periods of record at stations located in Arizona. Four stations are operated and maintained by the United States Section of this Commission and four by the U. S. Weather Bureau. For location, elevation, period of record, type of gage in use, and the observer, see listing at bottom of page following the monthly record.

Month	Meigs Ranch		Jones Ranch		Greene Cattle Company		Nogales Sanitation Plant 2N	
	1961	Average	1961	#Average	1961	#Average	1961	Average
Jan.	1.75	1.08	1.61	1.16	1.20	1.02	1.68	1.26
Feb.	0	.42	.30	.47	.10	.53	.13	.47
Mar.	0	1.02	0	.93	0	.89	.09	.99
Apr.	0	.29	0	.34	0	.10	0	.09
May	0	.06	0	.04	0	.07	0	.08
June	1.18	.67	1.35	.60	1.20	.57	.20	.38
July	3.36	4.47	4.50	5.18	2.32	4.70	2.23	4.41
Aug.	7.10	4.69	6.92	4.46	3.35	3.21	4.11	4.05
Sept.	1.15	.86	1.60	.48	1.60	.94	.97	.78
Oct.	2.25	.98	2.70	.87	2.00	.97	3.45	1.28
Nov.	.35	.40	T	.38	.30	.30	.53	.47
Dec.	1.94	.62	2.50	.68	1.55	.48	2.45	.67
Yearly	19.08	15.56	21.48	15.59	13.62	13.78	15.84	14.93

Month	Nogales		San Rafael Ranch		Canelo		Patagonia	
	1961	Average	1961	Average	1961	Average	1961	Average
Jan.	1.49	1.12	1.43	1.05	1.00	1.23	1.18	1.31
Feb.	.10	.85	.11	.99	.30	1.15	.11	1.04
Mar.	.17	.79	T	.93	.10	.78	.25	.85
Apr.	0	.31	0	.42	0	.39	0	.35
May	0	.15	0	.11	0	.13	0	.18
June	.32	.46	1.08	.82	2.24	1.03	1.10	.52
July	2.78	4.01	3.18	4.54	3.15	4.17	3.30	4.52
Aug.	3.82	3.97	5.16	4.14	4.50	4.70	6.12	4.33
Sept.	1.38	1.53	3.48	1.73	2.07	1.54	2.43	1.53
Oct.	3.64	.77	2.56	.88	2.89	.91	3.37	.85
Nov.	.51	.69	.52	.62	.51	.75	.23	.75
Dec.	2.26	1.15	2.16	1.11	2.55	1.24	3.02	1.16
Yearly	16.47	15.80	19.68	17.34	19.31	18.02	21.11	17.39

LOCATION OF RAINFALL STATIONS

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Meigs Ranch	S	31° 26'	110° 36'	4,836	Mar. 1952	I. B. & W. C.
Jones Ranch	S	31° 22'	110° 36'	4,960	Mar. 1952	I. B. & W. C.
Greene Cattle Company (San Rafael)	R	31° 22'	110° 35'	4,644	June 1952	I. B. & W. C.
Nogales Sanitation Plant 2N	S	31° 21'	110° 56'	3,757	June 1952	I. B. & W. C.
Nogales	R	31° 21'	110° 55'	3,800	1914	Milford L. Noon
San Rafael Ranch	S	31° 21'	110° 37'	4,741	1924	San Rafael Ranch
Canelo	S	31° 33'	110° 32'	4,985	1930	R. E. Ewing
Patagonia	S	31° 33'	110° 45'	4,044	1930	O. J. Rothrock

Some months missing ᵘ Estimated by U. S. Weather Bureau
R Recording rain gage S Standard 8" rain gage

EVAPORATION IN THE SANTA CRUZ RIVER BASIN IN INCHES

Tabulated below are the monthly records of evaporation observed at the station two miles north of the Nogales Sanitation Plant in Arizona, operated and maintained by the United States Section of this Commission. Evaporation is measured in a U. S. Weather Bureau standard pan, four feet in diameter.

For specific location of this station, refer to data opposite same station name shown in "Location of Rainfall Stations," page 96 in this bulletin.

Month	Nogales Sanitation Plant - 2N	
	1961	Average #1953-1961
Jan.	2.80	3.48
Feb.	5.02	4.50
Mar.	7.36	7.37
Apr.	9.93	9.79
May	13.00	12.56
June	13.65	13.58
July	9.96	9.82
Aug.	6.90	7.09
Sept.	6.11	7.67
Oct.	6.28	6.61
Nov.	u 2.66	4.32
Dec.	* 2.27	3.22
Total	85.94	90.01

u Estimated
* Adjusted to full month
# Some months missing

TEMPERATURE, HUMIDITY, AND WIND IN THE SANTA CRUZ RIVER BASIN

Tabulated below are the monthly records of temperature, humidity, and wind at the station two miles north of the Nogales Sanitation Plant in Arizona. Current temperature readings at this station are incomplete. The station is operated and maintained by the United States Section of this Commission. The equipment consists of: standard 8-inch rain gage, 48-inch diameter evaporation pan with stillwell and hook gage, maximum and minimum thermometer, anemometer (registers miles), hygrothermograph, and psychrometer, hand turbine type.

Temperature — Degrees Fahrenheit

Month	Nogales Sanitation Plant - 2N		
	1961		
	Mean	Max.	Min.
Jan.	Ø 47.3	75	22
Feb.	Ø 47.3	79	22
Mar.	Ø 51.2	83	23
Apr.	Ø 59.6	90	31
May	Ø 64.5	94	34
June	Ø 77.0	105	41
July	77.4	99	53
Aug.	Ø 75.4	95	51
Sept.	70.1	93	45
Oct.	Ø 60.5	88	32
Nov.	49.2	79	22
Dec.	46.5	72	23
Yearly	60.5	105	22

Mean Relative Humidity-Percent

Month	Nogales Sanitation Plant - 2N	
	1961	
	Max.	Min.
Jan.	92	40
Feb.	90	14
Mar.	88	20
Apr.	90	20
May	80	10
June	83	20
July	90	40
Aug.	95	20
Sept.	90	20
Oct.	98	60
Nov.	94	12
Dec.	90	18
Yearly		

Ø One or more days missing

Mean Wind Speed – Miles Per Hour

Month	Nogales Sanitation Plant - 2N	
	1961	Average 1953-1961
Jan.	1.6	2.1
Feb.	2.2	2.5
Mar.	3.3	2.7
Apr.	3.0	2.5
May	2.8	2.6
June	2.6	2.4
July	2.0	1.6
Aug.	1.0	.8
Sept.	1.0	1.1
Oct.	1.3	1.5
Nov.	1.1	1.4
Dec.	1.2	1.7
Yearly	1.9	1.9

DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS ALONG SANTA CRUZ RIVER AND WHITEWATER DRAW

1961

The drainage basin areas tabulated below are derived from the best available maps from both the United States and Mexico.

Data on irrigated areas in the Whitewater Draw Basin were furnished by the Smoke Control Section, Phelps-Dodge Smelter at Douglas, Arizona.

Designation of Areas	Drainage Basin-Square Miles			Irrigated Areas-Acres		
	United States	Mexico	Total	United States	Mexico	Total
Santa Cruz River:						
Above Lochiel, Arizona Gaging Station	82	0	82	200	0	200
Lochiel Station to Nogales Station	103	348	451	0	2, 390	2, 390
Above Nogales, Arizona Gaging Station	185	348	533	200	2, 390	2, 590
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1, 023	0	1, 023	22, 900	0	22, 900

CORRECTIONS TO PREVIOUS WATER BULLETINS

ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

In the 1960 Water Bulletin the maximum instantaneous flow since January 1, 1951 should be 348 second-feet on December 24, 1953 at a gage height of 116.48 feet instead of 344 second-feet on August 28, 1958 at a gage height of 116.44 feet as shown.

STORED WATER IN LARGE RESERVOIRS OF THE COLORADO RIVER

In the 1960 Water Bulletin the capacities for Lake Mohave and Havasu Lake should be 1,810.0 and 619.4 acre-feet, respectively, instead of 1,809.8 and 688.0 as shown. The total capacity in the United States Reservoirs should be 29,636.4 acre-feet instead of 29,704.8 as shown.

COTTONWOOD CREEK ABOVE MORENA DAM, CALIFORNIA

In the 1960 Water Bulletin the yearly average for the period 1937-1960 should be 8,161.8 acre-feet instead of 8,163 as shown.

COTTONWOOD CREEK ABOVE BARRETT DAM, CALIFORNIA

In the 1960 Water Bulletin the mean monthly discharge for January should be 43.5 acre-feet instead of 43.4 as shown. The yearly total and yearly minimum should be 422.8 acre-feet instead of 422.7 as shown. The yearly average for the period 1937-1960 should be 11,264.6 acre-feet instead of 11,265 as shown.

STORED WATER IN RESERVOIRS, TIJUANA RIVER BASIN

In the 1960 Water Bulletin the capacities for Morena, Barrett and Rodriguez Reservoirs should be 50,210, 44,760 and 111,880 acre-feet, respectively, instead of 50,130, 44,755, and 111,635 as shown. The total capacity in the Tijuana River Basin Reservoirs should be 206,850 acre-feet instead of 206,520 as shown.

MESA DRAIN NEAR CUDAHY IN MEXICO

In the 1960 Water Bulletin the yearly minimum for the period 1956-1960 should be 31,828 acre-feet instead of 13,579 as shown.

WISTERIA DRAIN TO NEW RIVER IN MEXICO

In the 1960 Water Bulletin the maximum for the month of June during the period 1957-1960 should be 27.6 acre-feet instead of 24.3 as shown.

DIVERSIONS BY INDIVIDUAL PUMPS IN MEXICO

The maximum annual discharge, 3,254 acre-feet, shown on page 40 in the 1960 Water Bulletin was the flow for a partial year's record. The amount shown on page 39 of this bulletin is the maximum annual discharge for years of complete record.