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WESTERN WATER BULLETIN 1963

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

COLORADO RIVER

TIJUANA RIVER

SANTA CRUZ RIVER

WHITEWATER DRAW

1963

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FOREWORD

This bulletin is the fourth 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 1963.

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 Gila Gravity Main Canal and All-American 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 1963.

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. 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 but are included in the deliveries of Treaty waters to Mexico.

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 ground water 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 herein 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 1963

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 1963. The average seasonal (October 1962-September 1963) rainfall over the upper basin as gaged at 13 index stations was about 12.35 inches as compared to a seasonal average of about 13.70 inches for the 41 seasons 1923-1963. The inflow to Lake Mead formed by Hoover Dam, during the 1963 calendar year was about 1,629,000 acre-feet measured at Grand Canyon or about 14% of the 41-year (1923-1963) average annual inflow of 12,008,541 acre-feet. There was a flow of 34,180 acre-feet contributed to the lower Colorado River during 1963 from the Bill Williams River and 7,210 acre-feet from the Gila River.

The flow of the Colorado River reaching Imperial Dam totaled 6,522,000 acre-feet, about 72% of the 29-year average (1935-1963) of 9,057,424 acre-feet. At the northerly international boundary the total flow of the river during 1963 was 1,833,823 acre-feet or about 40% of the 1935-1963 average of 4,542,501 acre-feet. At the southerly boundary the flow during 1963 was only 185,184 acre-feet or about 5% of the 1935-1963 average of 3,863,638 acre-feet.

The total scheduled treaty waters of the Colorado River delivered to Mexico during 1963 amounted to 1,500,000 acre-feet pursuant to the annual schedules by months for 1963 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 1963 amounted to 2,003,898 acre-feet, 38% of the 1935-1963 average of 5,290,501 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 1963. A maximum instantaneous flow of 11,900 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 18,094,800 acre-feet, 61% of the usable capacity of 29,636,000 acre-feet. The greater part (16,007,000 acre-feet) of the storage was contained in Lake Mead. There were no reported shortages of Colorado River water for irrigation during 1963 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1963 was 1,076,002 acres; 639,125 acres in the United States and 436,877 acres in Mexico.*

The suspended sediment load passing the northerly boundary station in 1963 was 195.6 acre-feet which was about 40% of the 1956-1963 average of 493.5 acre-feet.

Tijuana River Basin

The year 1963 was one of very low rainfall and the eleventh consecutive year of runoff below the 1936-1937 to 1962-1963 mean. It was the sixteenth dry year in the past seventeen years. Temperatures in the Tijuana River basin averaged somewhat below normal during the year, being 0.8 degree below the long-term mean at Barrett Dam.

Rainfall at Barrett Dam in the upper portion of the basin was 14.37 inches, 82% of normal, and at Chula Vista near the lower end of the basin it was 7.14 inches or only 73% of normal.

Runoff in the basin for 1963 averaged less than 2% of average. Above Morena Reservoir the runoff was 151.2 acre-feet or about 2% of the 27-year mean of 7,276.6 acre-feet. At Rodriguez Reservoir the runoff was 253.1 acre-feet or about 1% of the 26-year mean of 17,648 acre-feet.

Combined storage in the three reservoirs in the basin was 1,939 acre-feet at the beginning of the year and 1,583 acre-feet at the end averaging 1,761 acre-feet, or about 1% of the combined capacity of 206,850 acre-feet.

Stored water in Rodriguez Reservoir in 1963 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 1963.

Whitewater Draw

During 1963 the average annual temperature over the watershed was about normal, while the annual precipitation was about 80% of normal. Runoff for the year at the gaging station near Douglas, Arizona, of 5,510 acre-feet was about 79% of the 1936-1963 average.

Santa Cruz River

During 1963 the average annual temperature over the watershed was somewhat below normal and the annual precipitation was about 99% of the 25-year 1939-1963 mean. Runoff measured at the Nogales gaging station where the stream reenters the United States was 16,640 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 2,620 acre-feet Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 14,020 acre-feet from the loop of the river lying in Mexico, or approximately 84% of the flows reaching the Nogales station.

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

GENERAL HYDROLOGIC CONDITIONS FOR 1963–Continued

Alamo and New Rivers

During 1963 the average annual temperature over the drainage area of Alamo and New Rivers as recorded at El Centro, California, was 1.1 degrees below normal and the annual precipitation was about 86% of the long-term mean. The total flow in the Alamo River at the international boundary for 1963 was 2,158 acre-feet which was about 41% of average for the 21-year period 1943-1963. The total flow in the New River at the international boundary for 1963 was 138,906 acre-feet which was about 220% of the 1943-1963 average.

Salton Sea

During 1963 the average annual temperature around the Salton Sea was about 98% of the long-term average while the annual precipitation recorded at Brawley, California, was approximately 105% of the long-term mean of 2.27 inches. The water surface of the Salton Sea rose approximately 1.4 feet during the year. The maximum stage, 232.1 feet below mean sea level, was recorded on several days during December 1963. The minimum stage, 233.5 feet below mean sea level, was recorded on several days during January 1963.

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 39 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. 1963 records excellent. Records available: Gage heights, January 1878 through December 1963; discharges, January 1902 through December 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,870	2,250	897	1,000	960	981	1,570	946	925	640	1,110	1,730
2	2,140	2,500	883	1,030	890	1,030	1,450	918	946	670	1,190	1,410
3	2,530	2,460	876	995	1,010	1,010	1,500	967	946	604	1,390	1,360
4	2,120	2,160	876	1,000	1,130	911	1,240	1,130	974	710	1,460	1,380
5	1,830	1,990	939	932	943	862	1,160	1,320	960	888	1,520	1,370
6	1,470	1,840	953	960	926	890	1,160	1,320	967	820	1,580	1,360
7	1,360	1,610	827	960	905	918	1,230	1,300	953	760	1,510	1,540
8	1,200	1,570	802	1,100	938	925	1,340	1,280	918	604	1,450	1,760
9	1,140	1,720	834	1,140	1,100	960	1,320	1,290	904	568	1,510	1,900
10	883	1,760	827	1,020	1,160	1,130	1,270	1,270	883	562	1,590	1,430
11	848	1,720	876	974	975	1,200	1,320	1,280	1,230	562	1,950	1,350
12	820	1,610	960	1,030	995	1,190	1,360	1,280	1,110	586	1,900	1,350
13	790	1,780	974	1,010	982	1,200	1,310	1,270	996	643	1,590	1,350
14	790	1,820	981	953	935	1,180	1,280	1,210	992	895	1,600	1,380
15	829	2,010	953	995	1,050	1,180	1,290	1,230	981	981	1,440	1,460
16	1,060	2,070	946	988	1,180	1,230	1,280	1,280	980	820	1,440	1,400
17	904	2,140	1,040	1,300	1,320	1,200	1,270	1,300	1,070	670	1,350	1,700
18	876	1,940	1,030	1,100	1,160	1,010	1,220	1,280	3,010	1,050	1,330	1,420
19	890	1,840	995	1,000	1,010	960	918	1,300	3,210	1,350	1,320	1,380
20	876	1,830	981	995	958	981	918	1,240	3,950	1,090	1,520	1,400
21	904	1,900	981	995	934	1,240	911	1,240	3,290	1,080	1,620	1,380
22	1,660	1,780	946	1,080	931	1,040	925	1,250	2,670	1,060	1,700	1,340
23	2,090	1,710	946	1,300	1,100	995	918	1,260	2,630	1,320	2,210	1,440
24	2,000	1,150	981	1,240	988	981	897	1,330	2,680	1,540	2,250	1,380
25	2,020	1,050	960	1,080	1,000	932	1,020	1,340	1,690	1,350	2,210	1,910
26	2,030	1,010	974	1,400	970	1,070	1,020	1,320	1,200	1,560	2,020	2,540
27	2,160	986	1,120	1,120	970	1,270	995	1,210	1,080	1,440	1,540	1,670
28	2,130	971	1,090	1,040	1,060	1,570	925	1,310	1,070	1,360	1,570	1,320
29	2,130		1,020	1,030	954	1,680	1,120	1,180	1,060	1,440	1,750	1,310
30	2,210		974	1,020	954	1,690	1,090	1,030	921	1,310	1,830	1,290
31	2,180		974		988		946	974		1,180		1,290
Sum	46,740	49,177	29,416	31,787	31,376	33,416	36,173	37,855	45,196	30,113	48,450	46,300

Month	Current Year 1963								Period 1935-1963		
	Ø Extreme Gage Feet		Ø Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	High Day	High	Low Day	Low			Average	Maximum	Minimum
Jan.	12.67	10.81	3	2,530	† 13	790	1,508	92,710	483,369	1,615,000	40,490
Feb.	12.70	11.34	2	2,500	28	971	1,756	97,540	424,915	1,321,000	24,330
Mar.	11.36	10.93	27	1,120	8	802	949	58,350	423,802	1,097,000	29,760
Apr.	11.84	11.06	26	1,400	5	932	1,060	63,050	316,360	759,900	61,530
May	11.63	11.08	17	1,320	2	890	1,012	62,230	355,105	1,137,000	36,270
June	12.01	10.96	30	1,690	5	862	1,114	66,280	329,678	1,376,000	46,850
July	11.89	11.05	1	1,570	24	897	1,167	71,750	297,887	818,600	64,300
Aug.	11.60	11.06	25	1,340	2	918	1,221	75,080	300,927	938,800	29,480
Sept.	13.77	11.01	20	3,950	10	883	1,507	89,640	298,298	1,198,000	40,310
Oct.	11.76	10.41	26	1,560	† 10	562	971	59,730	312,675	1,233,000	27,340
Nov.	12.33	11.19	24	2,250	1	1,110	1,615	96,100	372,331	1,418,000	30,990
Dec.	12.58	11.46	26	2,540	† 30	1,290	1,494	91,830	465,111	1,789,000	34,970
Yearly	13.77	10.41		3,950		562	1,277	924,300	4,380,458	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 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12.09	12.45	11.07	11.16	11.45	11.13	11.89	11.11	11.06	10.54	11.19	11.88
2	12.33	12.69	11.05	11.20	11.40	11.20	11.76	11.06	11.10	10.59	11.30	11.55
3	12.67	12.70	11.04	11.15	11.51	11.17	11.82	11.13	11.10	10.48	11.54	11.49
4	12.30	12.39	11.04	11.16	11.55	11.03	11.52	11.35	11.15	10.69	11.61	11.50
5	12.06	12.22	11.13	11.06	11.48	10.96	11.42	11.58	11.13	10.98	11.68	11.49
6	11.71	12.11	11.15	11.10	11.47	11.00	11.41	11.57	11.15	10.90	11.74	11.48
7	11.58	11.90	10.97	11.10	11.41	11.04	11.51	11.55	11.13	10.81	11.67	11.68
8	11.38	11.88	10.93	11.30	11.46	11.05	11.64	11.53	11.09	10.48	11.60	11.91
9	11.31	12.03	10.98	11.35	11.42	11.10	11.61	11.54	11.07	10.42	11.67	12.02
10	10.95	12.05	10.97	11.18	11.35	11.34	11.55	11.51	11.04	10.41	11.75	11.56
11	10.90	12.02	11.04	11.12	11.12	11.42	11.62	11.53	11.60	10.41	12.08	11.47
12	10.86	11.89	11.16	11.20	11.16	11.41	11.66	11.52	11.55	10.45	12.04	11.47
13	10.81	12.06	11.18	11.17	11.16	11.43	11.60	11.51	11.48	10.56	11.75	11.47
14	10.81	12.10	11.19	11.09	11.09	11.40	11.57	11.44	11.49	10.95	11.76	11.51
15	10.89	12.28	11.15	11.15	11.26	11.40	11.58	11.46	11.47	11.07	11.59	11.60
16	11.23	12.38	11.14	11.14	11.43	11.46	11.56	11.52	11.47	10.80	11.59	11.54
17	10.98	12.43	11.27	11.55	11.63	11.42	11.55	11.55	11.65	10.53	11.49	11.85
18	10.94	12.20	11.26	11.30	11.43	11.17	11.49	11.52	13.62	11.20	11.47	11.57
19	10.96	12.11	11.21	11.16	11.19	11.11	11.08	11.55	13.20	11.51	11.45	11.53
20	10.94	12.11	11.19	11.15	11.12	11.14	11.08	11.48	13.77	11.19	11.68	11.55
21	10.98	12.17	11.19	11.15	11.08	11.50	11.07	11.47	13.31	11.17	11.80	11.53
22	11.90	12.05	11.14	11.32	11.08	11.24	11.09	11.49	12.83	11.13	11.87	11.49
23	12.28	11.99	11.13	11.64	11.30	11.18	11.08	11.50	12.80	11.45	12.30	11.60
24	12.20	11.65	11.18	11.62	11.14	11.16	11.05	11.59	12.84	11.70	12.33	11.55
25	12.22	11.53	11.14	11.59	11.19	11.10	11.23	11.60	12.00	11.51	12.30	12.07
26	12.23	11.51	11.16	11.84	11.34	11.30	11.23	11.58	11.41	11.76	12.14	12.58
27	12.35	11.48	11.36	11.64	11.38	11.55	11.19	11.44	11.21	11.65	11.70	11.85
28	12.32	11.34	11.32	11.10	11.49	11.89	11.09	11.56	11.20	11.53	11.73	11.48
29	12.32		11.20	11.58	11.36	12.00	11.36	11.40	11.18	11.59	11.90	11.47
30	12.40		11.14	11.53	11.36	12.01	11.32	11.20	11.01	11.44	11.97	11.46
31	12.37		11.13		11.14		11.12	11.12		11.28		11.46
Avg.	11.65	12.06	11.14	11.29	11.32	11.31	11.41	11.45	11.74	11.01	11.76	11.63

RESERVATION CANAL MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

DESCRIPTION: Water-stage recorder, 500 feet upstream from 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	49	67	54	56	54	72	62	68	66	68	67	59
2	61	57	58	63	53	73	63	69	63	73	60	57
3	62	48	63	76	60	65	63	62	67	73	59	58
4	48	50	53	73	59	64	67	70	76	73	62	73
5	47	52	60	68	52	74	70	68	69	72	64	68
6	47	56	70	77	61	71	78	75	82	67	72	60
7	43	59	62	63	73	73	86	77	68	63	70	54
8	43	53	58	61	59	78	67	81	58	63	69	53
9	45	55	61	57	58	72	73	68	58	62	60	56
10	47	57	59	70	57	77	76	70	65	60	66	73
11	43	49	66	76	59	72	73	67	64	58	64	69
12	43	61	71	74	58	75	78	66	66	55	71	70
13	43	52	66	74	63	74	72	64	75	50	76	65
14	42	53	63	55	58	78	64	65	72	64	69	59
15	56	60	60	58	56	88	70	68	64	67	80	54
16	55	55	76	70	56	81	72	70	61	73	74	55
17	45	50	77	72	69	70	77	74	86	76	70	68
18	43	57	70	63	68	73	78	78	260	75	63	70
19	43	55	67	72	67	69	77	64	120	70	62	72
20	43	62	90	77	61	74	78	70	80	60	74	66
21	43	58	73	59	63	74	68	87	75	59	76	65
22	43	58	59	56	63	68	62	85	70	63	74	54
23	43	51	62	62	60	77	62	79	65	62	62	60
24	44	49	67	67	65	73	62	73	64	58	63	67
25	46	49	62	57	67	77	64	71	64	59	58	60
26	44	58	74	58	58	81	62	67	63	63	54	60
27	44	63	74	61	58	70	71	64	63	59	61	62
28	50	54	58	58	61	78	74	70	62	56	69	61
29	62		68	75	73	80	62	67	62	59	76	58
30	58		74	55	70	72	59	67	62	63	58	65
31	55		58		78		60	78		64		67
Sum	1,480	1,548	2,033	1,963	1,917	2,221	2,150	2,202	2,270	1,987	2,003	1,938

Current Year 1963 — **Period** 1937-1963

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.			† 3	62	14	42	47.7	2,940	3,361	4,780	877
Feb.			1	67	3	48	55.3	3,070	3,197	4,320	563
Mar.			20	90	4	53	65.6	4,030	3,879	5,240	1,240
Apr.			† 6	77	† 14	55	65.4	3,890	3,936	5,250	1,160
May			31	78	5	52	61.8	3,800	4,031	5,590	992
June			15	88	4	64	74.0	4,410	3,907	5,580	885
July			7	86	30	59	69.4	4,260	4,226	6,550	816
Aug			21	87	3	62	71.0	4,370	4,197	6,810	861
Sept.			18	260	† 8	58	75.7	4,500	4,016	6,220	889
Oct.			17	76	13	50	64.1	3,940	3,983	5,740	1,040
Nov.			15	80	26	54	66.8	3,970	3,738	5,490	994
Dec.			† 4	73	8	53	62.5	3,840	3,637	4,960	966
Yearly				260		42	65.0	47,020	46,108	63,700	12,840

† 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 upstream from the intake of the Colorado River siphon and 3.2 miles downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side 0.4 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. 1963 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	152	328	38	53	908	78	88	61	55	58	78	63
2	239	555	61	55	992	85	53	44	64	67	116	59
3	392	765	66	74	901	75	35	64	61	74	74	30
4	58	302	64	80	616	58	37	55	55	210	58	33
5	91	69	31	99	1,010	47	42	56	44	282	64	33
6	117	55	64	71	1,030	57	40	79	74	355	52	38
7	38	122	67	69	977	56	107	71	67	353	37	55
8	38	282	50	83	998	64	52	47	50	64	30	236
9	38	250	72	47	465	81	42	64	35	37	35	8
10	38	211	74	23	59	71	46	38	37	39	44	1
11	23	159	49	27	143	55	46	84	504	52	55	5
12	34	56	34	36	238	50	41	84	790	44	39	34
13	23	124	26	54	193	62	46	58	948	112	47	57
14	23	157	35	64	195	50	69	40	988	175	52	50
15	141	329	62	84	214	70	40	53	990	201	58	67
16	188	633	31	39	236	64	35	59	993	78	74	57
17	27	577	50	61	383	50	53	71	1,130	74	58	30
18	29	158	60	64	348	48	45	74	926	500	44	21
19	32	52	60	57	146	40	47	55	42	186	58	34
20	28	152	54	34	173	59	46	42	52	177	81	11
21	31	107	61	63	136	51	88	41	101	140	167	54
22	23	26	53	43	163	44	72	95	98	64	140	34
23	23	63	55	46	88	36	58	76	95	58	79	34
24	34	878	80	326	77	38	52	61	64	42	81	25
25	38	914	64	872	169	37	78	61	41	235	55	21
26	67	968	38	521	824	38	81	71	42	348	33	21
27	166	975	33	890	907	55	84	42	52	424	39	21
28	154	696	43	917	894	47	64	36	50	211	53	25
29	134		33	981	924	44	55	41	58	50	70	25
30	280		27	908	924	70	46	50	188	39	70	16
31	126		51		76		34	74		47		30
Sum	2,825	9,963	1,586	6,741	15,407	1,680	1,722	1,847	8,694	4,796	1,941	1,228

Month	Current Year 1963								Period 1935-1963		
	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.			3	392	† 11	23	91.1	5,600	76,111	110,700	3,230
Feb.			27	975	22	26	356	19,760	66,261	89,140	5,240
Mar.			24	80	13	26	51.2	3,150	71,294	90,190	2,870
Apr.			29	981	10	23	225	13,370	70,677	86,580	2,500
May			6	1,030	10	59	497	30,560	72,783	88,280	5,480
June			2	85	23	36	56.0	3,330	68,017	86,960	3,330
July			7	107	31	34	55.5	3,420	70,863	91,220	2,710
Aug.			22	95	28	36	59.6	3,660	71,216	89,890	3,660
Sept.			17	1,130	9	35	290	17,240	67,092	83,660	17,240
Oct.			18	500	9	37	155	9,510	66,938	90,050	5,880
Nov.			21	167	8	30	64.7	3,850	67,160	101,500	3,850
Dec.			8	236	10	1	39.6	2,440	74,567	108,800	2,440
Yearly				1,130		1	160	115,900	842,969	1,042,850	75,950

† And other days Ø Mean daily

COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY AT YUMA, ARIZONA - DISCHARGES

DESCRIPTION: Water-stage recorder located in California on the right bank of the river, 1,000 feet downstream from the mouth of the Yuma Main Canal Wasteway, 0.6 mile downstream from the abandoned gaging station on the Colorado River at Yuma, 5.2 miles downstream from the mouth of the Gila River, 19.6 miles downstream from Imperial Dam and 6.4 miles upstream from the northerly international boundary. Zero of gage is 101.99 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements made generally every two weeks and a continuous record of gage heights. Computations by shifting control methods. Records obtained and furnished by U. S. Geological Survey. Records available: October 1963 through December 1963. If records for "Yuma Main Canal Wasteway" and "Reservation Canal Main Drain No. 4" are subtracted from records at this station, records equivalent to those published as "Colorado River at Yuma" can be obtained.

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

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1										764	1,260	1,830
2										821	1,360	1,530
3										782	1,500	1,440
4										1,030	1,580	1,460
5										1,190	1,650	1,460
6										1,110	1,720	1,460
7										1,160	1,640	1,630
8										770	1,590	1,980
9										662	1,640	1,920
10										656	1,770	1,490
11										674	2,100	1,410
12										704	2,040	1,440
13										828	1,780	1,460
14										1,140	1,760	1,460
15										1,240	1,600	1,570
16										961	1,600	1,490
17										800	1,480	1,750
18										1,500	1,430	1,490
19										1,670	1,430	1,470
20										1,360	1,670	1,480
21										1,300	1,870	1,500
22										1,220	1,900	1,440
23										1,460	2,230	1,540
24										1,660	2,300	1,490
25										1,610	2,230	1,950
26										1,960	2,050	2,460
27										1,910	1,630	1,780
28										1,610	1,680	1,400
29										1,530	1,860	1,400
30										1,410	1,920	1,400
31										1,300		1,400
Sum										36,792	52,270	48,980

Month	Current Year 1963								Period 1951-1963		
	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.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug											
Sept.											
Oct.			26	1,960	10	656	1,187	72,980	184,192	802,210	59,080
Nov.			24	2,300	1	1,260	1,742	103,700	220,276	911,370	53,690
Dec.			26	2,460	†28	1,400	1,580	97,150	289,979	1,114,550	53,120
Yearly											

† And other days Ø Mean daily

COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY AT YUMA, ARIZONA - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1										10.44	11.02	11.73
2										10.53	11.14	11.43
3										10.47	11.30	11.33
4										* 10.83	11.38	11.36
5										* 11.04	11.45	11.36
6										* 10.94	11.52	11.35
7										* 11.00	11.44	11.53
8										10.45	11.39	11.88
9										10.27	11.44	11.82
10										10.26	11.57	11.39
11										10.29	11.90	11.30
12										10.31	11.84	11.33
13										10.47	11.60	11.36
14										10.87	11.60	11.36
15										11.00	11.45	11.47
16										10.63	11.47	11.39
17										10.40	11.37	11.65
18										11.30	11.32	11.39
19										11.47	11.32	11.36
20										11.14	11.57	11.36
21										11.07	11.77	11.38
22										10.97	11.80	11.30
23										11.25	12.13	11.40
24										11.46	12.20	11.35
25										11.41	12.13	11.81
26										11.76	11.95	12.32
27										11.71	11.53	11.64
28										11.41	11.58	11.25
29										11.33	11.76	11.25
30										11.20	11.82	11.25
31										11.08		11.25
Avg.										10.93	11.59	11.46

* Partly estimated

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 52 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5	5	6	7	4	6	7	6	7	6	6	6
2	5	5	6	7	4	6	7	6	7	6	6	6
3	5	5	6	6	4	6	6	6	8	6	6	6
4	5	5	6	6	4	6	6	6	8	6	6	5
5	5	5	6	6	4	6	5	7	8	6	6	5
6	5	5	6	6	4	6	5	7	8	6	6	5
7	5	5	6	6	4	6	5	7	8	6	6	5
8	5	5	6	6	4	6	5	8	8	7	6	5
9	5	5	6	7	4	6	5	8	8	7	6	6
10	5	5	6	7	4	7	5	8	8	7	7	6
11	4	5	6	7	4	7	5	8	8	7	7	6
12	4	5	6	7	5	7	5	7	8	7	7	6
13	4	5	6	7	5	7	5	7	8	7	7	6
14	4	5	6	7	5	7	5	7	7	7	7	6
15	4	5	6	6	5	7	5	7	7	7	7	6
16	4	5	6	6	5	7	5	7	7	7	7	5
17	4	5	6	6	5	7	5	7	7	6	7	5
18	4	5	6	6	5	7	5	7	6	6	7	5
19	4	6	6	6	5	6	5	7	6	6	7	5
20	4	6	7	6	5	6	5	7	6	6	7	5
21	4	6	7	6	5	6	5	7	6	6	7	5
22	4	6	7	5	5	6	5	7	6	7	7	5
23	4	6	7	5	5	6	5	7	6	7	7	4
24	4	6	7	5	5	6	5	7	6	7	7	4
25	4	6	7	5	6	7	5	7	7	7	7	4
26	4	6	7	5	6	7	5	7	7	7	6	4
27	4	6	7	5	6	7	5	7	7	7	6	4
28	4	6	8	5	6	7	5	7	7	7	6	4
29	5		8	4	6	7	6	7	7	6	6	4
30	5		8	4	6	7	6	7	7	6	6	4
31	5		8		6		6	7		6		4
Sum	137	150	202	177	151	195	164	217	214	202	196	156

Month	Current Year 1963 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 May 1948-1963 Acre Feet Average	Maximum	Minimum
Jan.			† 1	5	† 11	4	4.4	272	526	899	268
Feb.			† 19	6	† 1	5	5.4	298	459	746	260
Mar.			† 28	8	† 1	6	6.5	401	549	853	298
Apr.			† 1	7	† 29	4	5.9	351	580	1,000	341
May			† 25	6	† 1	4	4.9	300	575	966	61
June			† 10	7	† 1	6	6.5	387	601	1,030	89
July			† 1	7	† 5	5	5.3	325	686	1,260	139
Aug			† 8	8	† 1	6	7.0	430	763	1,350	228
Sept.			† 3	8	† 18	6	7.1	424	724	1,370	258
Oct.			† 8	7	† 1	6	6.5	401	735	1,220	399
Nov.			† 10	7	† 1	6	6.5	389	662	1,240	357
Dec.			† 1	6	† 23	4	5.0	309	609	1,050	309
Yearly				8		4	5.9	4,290	7,469	12,429	4,290

† 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, about one mile upstream from the northerly international boundary. 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 to the power plant. Datum of gage is 150.00 feet above mean sea level. Tailrace gage is on left bank, 680 feet downstream from 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 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 through December 1963. 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	1,020	2,320	0	1,090	2,440	2,710	1,120	0	0	0
2	0	0	1,070	2,540	0	1,020	2,000	2,960	1,160	0	0	0
3	401	0	1,080	2,690	0	996	1,580	2,970	1,120	0	0	0
4	1,260	0	1,090	2,750	0	1,030	1,520	2,960	1,220	0	0	0
5	146	0	1,110	3,000	0	1,100	1,600	3,180	1,530	0	0	0
6	0	0	1,710	3,010	0	1,100	1,600	3,300	1,440	0	0	0
7	0	0	1,350	3,340	0	1,100	1,600	3,680	1,280	0	0	0
8	0	0	1,800	3,140	0	1,100	1,810	3,870	1,240	0	0	0
9	0	0	1,880	2,940	0	1,100	1,770	4,140	1,020	0	0	0
10	0	0	1,910	2,900	0	1,100	1,810	2,840	1,020	0	0	0
11	0	20	1,970	2,550	0	1,740	1,840	2,860	339	0	0	0
12	0	1,000	1,900	3,040	0	2,000	1,770	2,410	0	0	0	0
13	0	537	1,590	3,460	0	2,000	1,780	2,400	0	0	0	0
14	0	0	1,180	3,310	0	1,720	2,000	2,430	0	0	0	0
15	0	0	995	2,860	0	1,700	2,190	2,380	0	0	0	0
16	908	0	1,240	2,580	0	1,430	2,070	2,340	0	0	0	0
17	1,120	0	1,700	1,980	0	1,200	2,070	2,700	654	0	0	0
18	544	0	2,570	1,690	0	1,100	2,090	3,640	6,980	0	0	0
19	0	0	3,270	1,310	0	1,050	2,360	2,790	5,060	1,360	0	0
20	0	0	3,110	1,110	0	1,400	2,420	2,120	2,800	1,900	0	0
21	0	0	1,990	1,090	0	1,380	2,430	1,910	1,060	1,360	0	0
22	0	0	1,970	1,060	0	1,770	2,530	1,780	1,030	967	0	0
23	567	0	2,010	1,200	0	2,200	2,480	1,700	1,020	1,030	0	0
24	1,320	0	2,020	661	0	2,550	2,420	1,420	1,020	951	0	0
25	1,120	0	1,970	0	0	2,950	2,450	1,220	664	61	0	0
26	297	0	1,900	0	0	3,360	2,350	1,280	0	0	0	0
27	0	0	1,720	0	0	3,220	2,240	1,620	0	0	0	0
28	0	334	1,740	0	0	2,880	2,220	1,660	0	0	0	0
29	0		1,950	0	0	2,450	2,180	1,440	0	0	0	0
30	0		1,880	0	0	2,350	2,190	1,350	0	0	0	0
31	0		2,070		1,100		2,420	1,290		0		0
Sum	7,683	1,891	54,765	56,531	1,100	51,186	64,230	75,350	32,777	7,629	0	0

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						
				Current Year 1963					Period 1944-1963		
Jan.			24	1,320	† 1	0	248	15,240	45,541	400,200	0
Feb.			12	1,000	† 1	0	67.5	3,750	13,373	149,500	0
Mar.			19	3,270	15	995	1,767	108,600	48,102	279,300	0
Apr.			13	3,460	† 25	0	1,884	112,100	85,278	260,900	0
May			31	1,100	† 1	0	35.5	2,180	27,711	165,400	0
June			26	3,360	3	996	1,706	101,500	68,911	204,300	0
July			22	2,530	4	1,520	2,072	127,400	110,308	260,000	0
Aug.			9	4,140	25	1,220	2,431	149,500	114,346	270,100	0
Sept.			18	6,980	† 12	0	1,093	65,010	68,958	173,300	0
Oct.			20	1,900	† 1	0	246	15,130	15,008	51,460	0
Nov.				0		0	0	0	21,862	182,600	0
Dec.				0		0	0	0	38,680	319,700	0
Yearly				6,980		0	968	700,400	658,078	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 335 current meter measurements during the year, 216 by the United States Section, 107 by the Mexican Section of the Commission, 12 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 through December 1963; daily discharge records available January 1, 1950 through December 1963.

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 1963, 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,100	2,380	2,040	3,440	1,970	2,260	4,190	3,890	2,230	846	1,350	1,900
2	2,240	2,840	2,180	3,910	2,000	2,280	3,600	4,130	2,300	894	1,430	1,630
3	3,130	3,130	2,150	3,940	2,050	2,280	3,300	4,200	2,250	866	1,560	1,530
4	3,460	2,480	2,120	4,010	2,000	2,140	2,880	4,310	2,400	922	1,660	1,530
5	2,370	2,140	2,170	4,300	2,140	2,200	2,900	4,760	2,690	1,320	1,770	1,540
6	1,820	2,040	2,920	4,210	2,120	2,200	2,790	4,800	2,620	1,220	1,800	1,550
7	1,600	1,820	2,380	4,470	2,000	2,250	2,960	5,250	2,490	1,190	1,740	1,630
8	1,330	1,910	2,790	4,400	2,070	2,270	3,320	5,560	2,350	822	1,660	2,090
9	1,310	2,030	2,900	4,570	1,800	2,320	3,240	5,740	2,060	731	1,670	2,000
10	1,090	2,090	2,930	4,150	1,380	2,500	3,170	4,420	2,040	720	1,750	1,640
11	1,040	1,980	2,980	3,770	1,290	3,130	3,300	4,360	1,970	786	1,980	1,490
12	974	2,800	3,140	4,250	1,380	3,420	3,240	3,940	2,040	834	2,100	1,470
13	932	2,520	2,690	4,770	1,350	3,410	3,230	3,860	1,990	920	1,870	1,530
14	938	2,150	2,450	4,470	1,240	3,070	3,490	3,910	2,060	1,160	1,860	1,490
15	959	2,280	2,190	4,190	1,330	3,110	3,700	3,840	2,040	1,310	1,680	1,620
16	2,050	2,620	2,480	3,860	1,510	2,870	3,420	3,860	2,060	1,050	1,720	1,530
17	2,240	2,680	2,930	3,580	1,730	2,630	3,530	4,190	2,430	939	1,620	1,780
18	1,680	2,290	3,890	3,080	1,650	2,290	3,490	5,130	9,880	1,380	1,560	1,590
19	1,050	2,010	4,590	2,590	1,280	2,120	3,520	4,380	8,670	3,240	1,550	1,550
20	1,040	2,050	4,620	2,320	1,260	2,510	3,550	3,640	6,770	3,290	1,700	1,530
21	1,050	2,140	3,300	2,270	1,220	2,780	3,580	3,370	4,850	2,730	1,940	1,540
22	1,680	1,950	3,250	2,250	1,190	2,990	3,620	3,240	3,970	2,230	1,990	1,500
23	2,470	1,890	3,190	2,780	1,310	3,350	3,590	3,260	4,040	2,460	2,230	1,580
24	3,320	1,950	3,300	2,400	1,170	3,700	3,550	2,980	4,010	2,610	2,490	1,510
25	3,170	1,890	3,220	1,950	1,220	3,960	3,640	2,800	2,990	1,720	2,380	1,930
26	2,470	2,000	3,210	2,080	1,810	4,480	3,670	2,830	1,560	1,940	2,210	2,600
27	2,270	1,990	3,190	2,140	1,950	4,650	3,520	3,090	1,330	1,950	1,740	1,960
28	2,310	2,060	3,020	2,070	2,060	4,600	3,440	3,160	1,310	1,780	1,800	1,560
29	2,230		3,310	2,120	1,990	4,150	3,530	2,870	1,240	1,620	1,890	1,510
30	2,350		3,160	2,060	1,990	4,120	3,520	2,680	1,190	1,570	1,980	1,490
31	2,320		3,290		2,330		3,550	2,520		1,360		1,520
Sum	58,993	62,110	91,980	100,400	51,790	90,040	106,030	120,970	89,830	46,410	54,680	51,320

Month	Current Year 1963								Period 1935-1963		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	105.54	103.07	3	3,700	13	902	1,900	117,011	541,072	1,644,000	31,900
Feb.	105.09	104.06	3	3,300	7	1,660	2,220	123,193	449,150	1,378,000	60,400
Mar.	106.55	104.05	20	5,090	1	1,980	2,970	182,440	420,829	1,120,000	19,400
Apr.	106.24	103.61	9	5,180	24	1,690	3,350	199,140	314,559	823,850	0
May	104.37	103.02	31	2,730	24	1,110	1,670	102,724	353,834	1,151,000	77,400
June	106.06	103.88	27	4,740	4	2,100	3,000	178,592	320,679	1,175,000	8,500
July	106.00	104.51	1	4,700	6	2,750	3,420	210,307	289,754	763,800	24,400
Aug.	106.69	103.77	9	6,010	31	2,230	3,900	239,940	309,968	791,600	43,800
Sept.	112.14	102.94	18	11,900	30	1,090	2,990	178,175	303,948	1,029,000	60,000
Oct.	105.42	102.34	19	3,770	10	695	1,500	92,053	319,202	1,186,000	59,272
Nov.	104.30	103.30	24	2,540	1	1,330	1,820	108,456	404,655	1,422,000	56,200
Dec.	104.24	103.16	26	2,810	11	1,420	1,660	101,792	514,851	1,832,000	42,000
Yearly	112.14	102.34		11,900		695	2,530	1,833,823	4,542,501	10,596,900	722,100

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	104.35	104.49	104.09	105.20	103.81	104.03	105.62	105.29	103.80	102.54	103.32	103.85
2	104.47	104.71	104.17	105.48	103.82	104.03	105.12	105.45	103.88	102.54	103.44	103.63
3	104.98	104.97	104.16	105.49	103.89	104.01	104.85	105.51	103.84	102.48	103.53	103.45
4	105.16	104.56	104.17	105.53	103.79	103.93	104.60	105.60	103.93	102.57	103.55	103.44
5	104.41	104.35	104.18	105.72	103.90	103.97	104.56	105.94	104.17	103.02	103.56	103.45
6	104.18	104.32	104.77	105.68	103.92	103.97	104.55	106.01	104.12	102.84	103.60	103.44
7	104.15	104.26	104.53	105.85	103.85	104.02	104.65	106.29	104.00	103.11	103.56	103.52
8	104.07	104.52	104.79	105.75	103.91	104.02	104.88	106.43	103.90	103.25	103.57	103.84
9	103.93	104.36	104.93	105.78	103.70	104.06	104.81	106.54	103.68	102.94	103.61	103.76
10	103.54	104.41	105.01	105.45	103.35	104.21	104.79	105.73	103.65	102.40	103.66	103.37
11	103.30	104.33	105.06	105.27	103.16	104.73	104.88	105.62	103.63	102.39	103.86	103.24
12	103.22	104.76	105.07	105.27	103.27	105.01	104.82	105.24	103.68	102.38	103.90	103.23
13	103.13	104.67	104.89	105.93	103.23	105.04	104.81	105.21	103.64	102.47	103.69	103.28
14	103.11	104.41	104.72	105.74	103.12	104.81	104.99	105.20	103.68	102.81	103.68	103.25
15	103.23	104.47	104.54	105.55	103.20	104.83	105.13	105.15	103.69	103.00	103.55	103.39
16	104.36	104.69	104.73	105.26	103.33	104.64	105.01	105.13	103.70	102.74	103.57	103.31
17	104.25	104.76	105.00	105.00	103.60	104.47	105.01	105.43	104.03	102.53	103.51	103.50
18	103.75	104.50	105.65	104.68	103.54	104.18	105.00	106.11	110.77	103.05	103.48	103.31
19	103.31	104.34	106.17	104.30	103.15	103.94	105.01	105.54	109.84	104.87	103.48	103.29
20	103.28	104.36	106.23	104.10	103.11	104.29	105.05	104.86	107.63	104.79	103.63	103.28
21	103.30	104.40	105.23	104.13	103.09	104.56	105.08	104.70	105.97	104.28	103.81	103.29
22	103.88	104.30	105.09	104.15	103.09	104.73	105.12	104.64	105.30	103.86	103.82	103.23
23	104.59	104.30	105.04	104.45	103.23	104.99	105.08	104.59	105.28	104.10	104.05	103.31
24	105.26	104.33	105.14	104.21	103.14	105.29	105.01	104.37	105.29	104.57	104.25	103.26
25	105.12	104.31	105.05	103.83	103.16	105.53	105.11	104.24	104.46	103.97	104.24	103.59
26	104.55	104.32	104.97	103.95	103.57	105.93	105.06	104.30	103.25	104.03	104.07	104.09
27	104.47	104.26	104.96	103.95	103.74	105.99	104.97	104.49	103.05	103.90	103.73	103.66
28	104.49	104.18	104.93	103.89	103.83	105.91	104.88	104.53	103.04	103.67	103.74	103.29
29	104.48		105.08	103.93	103.77	105.68	104.95	104.32	103.03	103.50	103.84	103.29
30	104.52		104.93	103.86	103.77	105.62	104.98	104.11	103.03	103.46	103.90	103.28
31	104.46		105.07		104.13		105.03	104.02		103.35		103.29
Avg.	104.11	104.45	104.91	104.92	103.52	104.68	104.95	105.18	104.50	103.27	103.71	103.43

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 gates of the Intake 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 1963.

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 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.54	103.48	102.62	103.84	102.92	102.95	104.27	104.07	102.99	101.90	102.76	103.05
2	103.61	103.58	102.72	104.00	102.92	102.95	103.87	104.20	103.02	101.87	102.79	102.95
3	103.90	103.74	102.66	104.04	102.99	102.95	103.64	104.20	102.99	101.80	102.85	102.72
4	103.94	103.54	102.72	104.07	102.89	102.92	103.48	104.27	103.02	101.87	102.82	102.66
5	103.44	103.51	102.82	104.20	102.99	102.95	103.48	104.49	103.15	102.20	102.76	102.66
6	103.51	103.51	103.25	104.27	102.99	102.99	103.44	104.49	103.12	102.10	102.79	102.66
7	103.54	103.61	103.54	104.33	102.95	102.99	103.54	104.72	103.05	102.46	102.76	102.72
8	103.61	103.97	103.61	104.27	102.99	102.99	103.67	104.82	102.99	103.05	102.82	102.89
9	103.44	103.51	103.77	104.23	102.82	103.02	103.61	104.92	102.89	102.62	102.89	102.85
10	102.99	103.64	103.94	104.07	102.62	103.12	103.61	104.46	102.85	101.80	102.89	102.46
11	102.69	103.54	104.00	104.00	102.36	103.48	103.67	104.30	102.85	101.77	103.05	102.33
12	102.59	103.58	103.90	104.23	102.46	103.67	103.61	103.97	102.89	101.77	103.08	102.33
13	102.46	103.58	103.84	104.56	102.46	103.81	103.64	103.94	102.85	101.84	102.92	102.36
14	102.49	103.51	103.84	104.43	102.40	103.74	103.81	103.90	102.85	102.07	102.92	102.33
15	102.62	103.51	103.71	104.30	102.40	103.77	103.94	103.84	102.85	102.23	102.85	102.43
16	103.31	103.48	103.87	104.07	102.43	103.67	103.87	103.77	102.85	102.10	102.85	102.36
17	103.15	103.58	104.04	103.74	102.69	103.54	103.84	104.00	103.18	101.87	102.82	102.49
18	102.69	103.54	104.43	103.51	102.59	103.31	103.84	104.40	110.14	102.30	102.79	102.36
19	102.72	103.51	105.15	103.28	102.36	102.92	103.87	104.17	109.19	104.10	102.79	102.36
20	102.66	103.51	105.02	103.15	102.40	103.18	103.87	103.64	106.66	103.74	102.89	102.36
21	102.72	103.51	103.77	103.15	102.43	103.41	103.90	103.54	104.59	103.15	102.99	102.36
22	103.08	103.51	103.58	103.18	102.43	103.58	103.94	103.51	103.97	102.92	102.99	102.30
23	103.64	103.54	103.58	103.38	102.49	103.77	103.90	103.48	103.77	103.25	103.18	102.36
24	104.43	103.51	103.67	103.22	102.49	104.04	103.87	103.31	103.77	103.94	103.38	102.33
25	104.10	103.48	103.58	102.95	102.46	104.23	103.94	103.25	103.35	103.48	103.44	102.59
26	103.54	103.44	103.54	103.02	102.69	104.49	103.90	103.28	102.43	103.41	103.25	103.02
27	103.61	103.31	103.61	102.99	102.79	104.46	103.84	103.41	102.30	103.15	102.99	102.66
28	103.64	102.95	103.64	102.95	102.82	104.43	103.77	103.44	102.30	102.95	102.99	102.36
29	103.64		103.77	102.99	102.79	104.27	103.84	103.28	102.26	102.79	103.05	102.33
30	103.58		103.61	102.95	102.79	104.27	103.84	103.15	102.26	102.79	103.08	102.30
31	103.51		103.67		102.99		103.87	103.12		102.76		102.33
Avg.	103.30	103.52	103.66	103.71	102.67	103.53	103.78	103.91	103.58	102.58	102.95	102.52

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

DESCRIPTION: Water-stage recorder and staff gage on left bank of Intake 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 1963 based on a continuous record of gage heights and generally daily measurements of the canals described above. Records available: November 8, 1950 through December 1963. 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 1963 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, 1961, 1962, and 1963.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,080	1,590	1,840	2,900	1,890	2,170	4,240	3,710	2,140	840	1,330	1,920
2	2,180	1,700	1,870	3,110	1,870	2,190	3,500	3,990	2,220	858	1,480	1,710
3	2,650	1,650	1,680	3,200	1,960	2,210	3,160	4,130	2,160	795	1,500	1,500
4	2,300	1,600	1,640	3,410	1,840	2,050	2,830	4,130	2,270	833	1,760	1,430
5	2,140	1,590	1,720	3,640	1,990	2,070	2,840	4,560	2,600	1,320	1,780	1,450
6	1,760	1,630	2,080	4,030	2,070	2,070	2,760	4,770	2,480	1,080	1,810	1,510
7	968	1,080	1,840	4,410	1,880	2,080	2,890	5,160	2,380	1,180	1,720	1,530
8	0	533	1,850	4,240	1,920	2,130	3,170	5,330	2,300	727	1,320	2,080
9	0	1,570	2,210	4,270	1,490	2,200	3,100	5,650	1,990	752	1,250	2,290
10	0	1,670	2,420	3,780	975	2,340	3,130	4,480	1,900	766	1,460	1,910
11	0	1,630	2,390	3,710	911	2,940	3,220	4,240	1,820	752	1,820	1,550
12	0	1,790	2,400	4,030	950	3,370	3,130	3,850	1,930	745	2,170	1,500
13	0	1,800	2,390	4,700	950	3,280	3,100	3,780	1,890	812	1,900	1,430
14	0	1,720	2,020	4,340	862	2,990	3,280	3,880	1,960	1,080	1,850	1,400
15	0	1,740	1,880	3,990	946	3,040	3,450	3,670	1,920	1,070	1,670	1,500
16	501	1,750	1,880	3,710	1,060	2,720	3,270	3,670	2,000	989	1,700	1,450
17	1,160	1,760	2,330	3,300	1,270	2,520	3,310	3,960	2,260	819	1,600	1,690
18	788	1,710	2,910	2,960	1,290	2,210	3,380	4,380	4,030	1,190	1,470	1,410
19	0	1,570	3,180	2,440	840	1,970	3,330	4,170	3,640	1,580	1,450	1,440
20	0	1,590	3,480	2,100	840	2,490	3,370	3,450	3,960	1,900	1,670	1,420
21	0	1,570	2,690	2,130	809	2,660	3,430	3,200	3,260	2,060	1,960	1,480
22	452	1,550	2,600	2,160	819	2,790	3,520	3,140	3,410	2,220	2,050	1,370
23	1,600	1,540	2,720	2,620	918	3,150	3,500	3,020	3,010	2,260	2,100	1,410
24	1,550	1,500	2,870	2,330	770	3,570	3,370	2,830	2,900	2,200	2,190	1,340
25	1,730	1,510	2,810	1,840	812	3,850	3,510	2,620	2,680	1,640	2,140	1,710
26	1,970	1,560	2,800	2,030	1,470	4,450	3,480	2,660	1,580	1,940	2,210	2,330
27	2,000	1,490	2,830	2,030	1,850	4,560	3,380	2,850	1,290	2,120	1,670	1,760
28	2,150	1,800	2,840	1,920	1,970	4,480	3,250	3,030	1,250	1,830	1,730	1,360
29	2,120		3,080	1,980	1,900	4,200	3,270	2,740	1,280	1,660	1,800	1,360
30	1,980		2,760	1,900	1,960	4,170	3,370	2,440	1,250	1,590	1,870	1,350
31	1,670		2,450		2,270		3,410	2,390		1,380		1,330
Sum	33,749	44,193	74,460	93,210	43,352	86,920	101,950	115,880	69,760	40,988	52,430	48,920

Current Year 1963 — **Period Nov. 1950-1963**

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.	103.94		3	2,650	† 8	0	1,090	66,901	45,059	114,523	966
Feb.	103.94	102.92	†13	1,800	8	533	1,580	87,626	40,610	87,626	9,232
Mar.	105.05	102.56	20	3,480	4	1,640	2,400	147,698	162,808	216,994	97,902
Apr.	104.23	102.85	13	4,700	25	1,840	3,110	184,856	205,187	264,127	172,535
May	102.92	102.36	31	2,270	24	770	1,400	86,009	106,437	159,010	66,207
June	104.20	102.79	27	4,560	19	1,970	2,900	172,417	195,370	269,632	152,439
July	103.97	103.28	1	4,240	6	2,760	3,290	202,207	266,280	304,263	196,351
Aug.	104.53	102.92	9	5,650	31	2,390	3,740	229,833	262,005	341,044	185,235
Sept.	104.23	102.00	18	4,030	†28	1,250	2,320	138,305	161,279	198,095	97,356
Oct.	104.04	101.12	23	2,260	8	727	1,320	81,322	54,887	90,639	14,129
Nov.	103.41	102.72	26	2,210	9	1,250	1,750	103,954	31,515	103,954	7,516
Dec.	103.05	101.77	26	2,330	31	1,330	1,580	97,041	49,016	131,440	8,825
Yearly	105.05			5,650		0	2,210	1,598,169	1,583,514	1,961,556	1,381,113

† And other days Ø Mean daily

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.54	103.44	102.56	103.58	102.82	102.79	103.97	103.90	102.79	101.35	102.72	103.05
2	103.64	103.54	102.66	103.74	102.85	102.82	103.61	104.04	102.85	101.12	102.82	102.92
3	103.87	103.71	102.62	103.74	102.92	102.79	103.41	104.04	102.85	101.15	102.85	102.72
4	103.77	103.51	102.69	103.84	102.82	102.79	103.28	104.10	102.89	101.21	102.79	102.69
5	103.41	103.48	102.82	103.87	102.89	102.79	103.28	104.33	102.99	101.74	102.72	102.66
6	103.54	103.48	103.18	103.90	102.89	102.79	103.28	104.30	102.95	101.77	102.76	102.66
7	103.84	103.61	103.54	103.94	102.85	102.79	103.38	104.43	102.92	102.20	102.72	102.72
8	103.18	103.94	103.58	103.90	102.89	102.79	103.48	104.43	102.89	103.08	102.85	102.82
9	102.17	103.48	103.74	103.84	102.79	102.85	103.41	104.53	102.79	102.66	102.92	102.79
10	101.25	103.61	103.90	103.81	102.62	102.92	103.41	104.17	102.76	101.71	102.92	102.13
11	100.33	103.51	103.94	103.74	102.36	103.22	103.48	104.04	102.76	101.57	103.05	101.84
12	99.44	103.58	103.87	103.94	102.49	103.41	103.48	103.67	102.79	101.61	103.05	101.87
13		103.54	103.84	104.23	102.46	103.58	103.44	103.67	102.76	101.64	102.89	101.90
14		103.48	103.87	104.13	102.43	103.58	103.58	103.64	102.76	101.77	102.85	101.87
15		103.48	103.67	104.04	102.43	103.61	103.71	103.54	102.76	101.94	102.79	101.94
16		103.44	103.90	103.84	102.46	103.54	103.61	103.44	102.79	101.97	102.82	101.90
17	103.08	103.54	104.00	103.51	102.69	103.48	103.58	103.67	103.02	101.61	102.79	102.00
18	102.59	103.51	104.40	103.35	102.59	103.28	103.58	103.97	104.23	102.03	102.79	101.84
19	102.03	103.48	105.05	103.15	102.40	102.85	103.58	103.77	104.04	104.04	102.79	101.84
20	101.51	103.48	104.92	103.08	102.43	103.05	103.61	103.31	104.17	103.35	102.89	101.84
21	101.05	103.48	103.61	103.12	102.46	103.28	103.64	103.25	103.48	102.66	102.95	101.84
22	101.77	103.48	103.38	103.15	102.49	103.44	103.71	103.25	103.67	102.62	102.92	101.80
23	103.48	103.51	103.35	103.28	102.56	103.61	103.71	103.22	103.58	103.05	103.12	101.87
24	103.94	103.44	103.44	103.12	102.53	103.81	103.67	103.08	103.64	103.87	103.35	101.80
25	103.64	103.44	103.38	102.92	102.53	103.97	103.74	103.02	103.18	103.51	103.41	102.07
26	103.54	103.44	103.35	102.92	102.62	104.20	103.71	103.08	102.13	103.41	103.18	102.43
27	103.67	103.31	103.44	102.89	102.72	104.17	103.64	103.15	102.03	103.15	102.99	102.03
28	103.64	102.92	103.44	102.85	102.76	104.13	103.61	103.18	102.00	102.92	102.99	101.80
29	103.67		103.51	102.92	102.69	103.97	103.64	103.05	102.03	102.72	103.05	101.80
30	103.64		103.41	102.89	102.72	103.94	103.67	102.95	102.00	102.79	103.05	101.77
31	103.64		103.48		102.82		103.71	102.92		102.76		101.77
Avg.		103.50	103.57	103.51	102.64	103.34	103.57	103.65	102.95	102.35	102.93	102.16

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 1963.

EXTREMES: Maximum mean daily gage height, 112.80 feet, January 2, 1958; minimum mean daily gage height, 98.65 feet several days in December 1963.

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	99.08	102.10	98.92	100.85	99.48	98.79	99.44	99.41	99.38	98.92	98.92	98.85
2	99.08	102.49	99.54	101.25	99.48	98.79	99.44	99.41	99.38	98.88	98.92	98.79
3	100.85	103.67	100.20	101.05	99.48	98.79	99.44	99.41	99.41	98.88	98.92	98.72
4	103.48	102.40	100.16	100.66	99.48	98.79	99.44	99.41	99.54	99.51	98.92	98.72
5	100.03	100.89	100.00	100.75	99.51	98.79	99.44	99.48	99.44	99.57	98.92	98.72
6	99.08	100.26	100.85	99.28	99.54	98.79	99.44	99.44	99.44	99.54	98.92	98.72
7	100.85	100.56	100.39	98.95	99.48	98.79	99.44	99.44	99.44	99.54	98.95	98.72
8	103.61	103.02	101.67	98.95	99.48	98.79	99.44	99.44	99.44	99.54	100.66	98.72
9	103.51	100.13	100.98	98.95	100.59	98.79	99.44	99.44	99.44	99.57	100.82	98.72
10	103.05	100.46	100.56	98.95	100.95	98.79	99.44	99.44	99.44	99.67	100.82	98.72
11	102.72	99.87	100.92	98.95	100.56	98.79	99.48	99.44	99.44	99.57	99.80	98.72
12	102.59	102.20	100.98	98.95	100.72	98.79	99.48	99.44	99.44	99.54	98.88	98.72
13	102.53	101.77	100.52	98.95	100.69	98.79	99.48	99.41	99.44	99.48	98.88	98.72
14	102.49	100.23	100.20	98.95	100.56	98.79	99.48	99.31	99.34	99.51	98.88	98.75
15	102.66	100.46	99.67	98.95	100.59	98.79	99.48	99.31	99.38	99.48	98.88	98.72
16	103.18	102.13	100.39	98.95	100.72	98.79	99.48	99.38	99.38	99.51	98.88	98.69
17	102.59	102.26	100.43	98.95	100.98	98.79	99.48	99.34	99.51	99.51	98.88	98.65
18	102.20	100.95	101.71	98.95	100.95	98.79	99.48	101.54	110.14	99.54	98.88	98.69
19	102.76	100.49	102.46	98.95	100.85	98.79	99.48	99.84	109.45	103.67	98.88	98.69
20	102.72	100.56	102.49	98.95	100.62	98.79	99.48	98.85	106.76	103.94	98.85	98.69
21	102.76	100.92	101.05	98.95	100.39	98.79	99.48	98.82	104.43	101.77	98.85	98.65
22	102.56	100.16	100.79	98.95	100.46	98.79	99.48	98.82	100.89	99.15	98.85	98.65
23	101.80	99.77	100.56	98.95	100.66	98.79	99.41	98.82	102.36	99.44	99.02	98.65
24	104.20	100.49	100.43	99.31	100.79	98.79	99.34	98.82	102.95	100.75	100.36	98.65
25	103.77	100.26	100.43	99.48	100.92	98.79	99.38	98.82	102.00	99.25	99.41	98.65
26	100.85	100.49	100.30	99.54	99.84	99.25	99.34	98.82	99.05	98.98	98.88	98.65
27	99.74	100.39	99.74	99.51	98.88	99.48	99.48	98.85	99.02	98.95	98.88	98.65
28	99.57	98.95	98.95	99.48	98.79	99.48	99.38	98.88	98.95	98.95	98.85	98.65
29	99.44		98.95	99.54	98.79	99.51	99.34	98.92	98.95	98.95	98.85	98.65
30	100.30		99.64	99.48	98.79	99.48	99.34	98.92	98.95	98.92	98.85	98.65
31	101.67		100.30		98.79		99.41	99.31		98.92		98.65
Avg.	101.80	101.01	100.46	99.41	100.06	98.90	99.44	99.29	100.81	99.72	99.18	98.70

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 1963, 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.1	0	2.3	0	0.4	2.9	1.4	0.1	0	1.1	0.1	1.9
2	0	0	1.4	0	1.7	2.1	.2	0	0	.8	2.5	.3
3	.4	0	2.4	0	.1	4.2	0	.3	.7	1.8	.7	1.0
4	0	4.1	0	¤ 2.6	.1	3.5	.1	5.0	2.3	1.2	.1	1.4
5	1.8	5.7	0	¤ 2.3	4.9	7.0	1.4	.3	.2	.1	1.8	3.8
6	0	1.3	0	¤ 4.0	.3	3.2	.7	0	0	.5	1.8	5.7
7	.1	4.7	.1	¤ 4.1	0	1.0	4.6	2.0	.1	.3	3.8	1.7
8	0	1.5	3.6	* 4.2	0	2.2	5.9	.3	.2	.3	2.4	3.2
9	0	.7	2.3	.4	.2	0	9.5	4.1	1.3	2.1	4.2	1.1
10	0	3.3	2.4	.2	3.0	0	2.0	3.8	.6	8.7	2.7	0
11	0	2.5	1.2	.2	10.9	4.2	2.3	8.4	.8	1.3	4.4	0
12	.9	3.4	.6	.4	3.7	2.0	2.6	10.4	.7	2.4	4.7	0
13	7.4	1.8	.8	.8	1.9	4.5	3.2	3.6	.6	3.3	2.3	4.3
14	4.1	4.1	1.6	3.4	4.1	5.1	2.6	1.2	.6	1.0	2.7	5.0
15	11.2	.2	.7	.8	2.3	9.3	5.0	.5	.6	2.3	5.1	5.6
16	5.9	2.4	1.0	.4	.4	8.7	3.7	.4	.4	.2	7.6	.5
17	3.9	1.7	3.6	.3	5.5	5.9	7.7	.4	2.5	4.9	5.1	.4
18	3.5	.2	.9	.1	4.1	1.1	6.4	7.7	3.4	4.1	3.0	5.7
19	1.9	.1	.3	.7	2.5	2.6	1.2	.4	.5	3.4	.7	.4
20	1.9	0	1.5	5.7	1.4	4.0	1.1	6.0	4.4	3.1	4.5	1.4
21	2.3	0	.2	4.2	.6	2.3	8.9	3.8	4.3	2.9	5.7	1.8
22	1.1	¤ .6	4.4	2.7	4.0	7.6	.5	4.8	5.8	1.9	.2	.8
23	2.4	¤ 3.3	7.6	5.9	6.3	1.6	3.0	1.3	5.8	1.2	5.2	3.7
24	1.5	¤ 1.7	4.9	1.1	7.9	1.0	1.0	0	3.7	4.7	4.6	0
25	8.6	* 1.7	1.4	1.5	2.3	4.6	1.6	1.1	.1	5.0	1.6	0
26	5.4	.5	2.0	0	2.1	2.2	.2	5.2	.8	4.0	1.1	4.4
27	3.0	.4	1.6	0	1.4	2.4	7.5	1.8	1.3	3.2	1.6	1.0
28	5.1	1.9	6.0	.5	.4	2.6	5.9	.5	5.7	1.9	6.0	.1
29	1.2		1.3	3.9	4.9	2.8	.3	0	5.2	2.1	10.8	1.5
30	1.6		2.9	.4	6.0	1.4	1.7	0	1.6	0	2.2	.4
31	.9		3.9		1.1		3.6	0		0		.3
Sum	76.2	47.8	62.9	50.8	84.5	102.0	95.8	73.4	54.2	69.8	99.2	57.4

Month	Current Year 1963 Extreme Gage Feet High	Low	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1935-1963 Acre-Feet Average	Maximum	Minimum
Jan.	112.48	111.00	23	25.1	† 1	0	2.5	151	214	914	0
Feb.	112.40	111.00	5	23.1	† 1	0	1.7	94.8	183	400	6
Mar.	112.48	111.00	17	25.1	† 3	0	2.0	125	197	517	0
Apr.	112.50	111.00	20	25.6	† 1	0	1.7	101	215	425	40
May	112.55	111.00	29	26.8	† 4	0	2.7	168	201	440	76
June	112.56	111.00	21	27.1	† 4	0	3.4	202	190	595	47
July	112.63	111.00	†21	28.8	† 2	0	3.1	190	174	516	0
Aug.	112.57	111.00	12	27.4	† 1	0	2.4	146	131	617	0
Sept.	112.36	111.00	17	22.1	† 1	0	1.8	108	135	462	0
Oct.	112.43	111.00	15	23.8	† 2	0	2.3	138	164	490	0
Nov.	112.49	111.00	24	25.4	† 1	0	3.3	197	193	462	9
Dec.	112.56	111.00	18	27.1	† 5	0	1.9	114	232	592	90
Yearly	112.63	111.00		28.8		0	2.4	1,734.8	2,229	4,500	1,178

† And other days ¤ Estimated * Partly estimated

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 110 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 1963; continuous record of gage heights, July 20, 1952 through December 1963.

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 112.18 feet January 28, 1957; minimum gage height 97.81 feet June 10, 1963.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	17.1	730	26.6	421	14.7	20.0	20.2	20.2	13.8	19.0	18.0	21.0
2	17.1	872	147	560	15.2	15.0	19.6	19.6	15.2	18.0	19.0	21.0
3	444	1,370	280	512	17.1	20.0	19.6	21.8	18.0	19.4	19.0	22.0
4	1,200	852	267	631	17.6	20.0	17.6	24.6	22.9	19.4	19.0	21.0
5	181	423	247	449	19.6	25.0	14.3	23.4	20.2	19.6	21.0	23.0
6	21.6	263	522	94.5	18.0	19.0	13.8	22.4	19.6	18.5	20.0	25.0
7	496	330	311	35.0	15.7	15.0	17.6	22.4	19.0	17.6	25.0	21.0
8	1,320	1,190	517	30.2	15.7	16.0	21.2	23.4	18.0	18.5	375	20.0
9	1,260	282	482	23.0	347	12.0	21.2	22.9	18.0	20.7	444	20.0
10	1,150	370	333	23.0	440	10.0	18.5	26.0	18.5	27.2	432	20.0
11	1,040	212	432	27.8	332	18.0	21.2	26.6	19.0	19.6	196	18.0
12	995	832	468	24.9	392	21.0	19.6	30.5	19.6	18.0	25.0	18.0
13	940	684	341	14.0	378	29.0	15.7	21.8	18.5	17.1	23.0	21.0
14	935	288	277	18.2	352	34.6	17.6	16.2	12.2	18.0	25.0	22.0
15	1,000	360	161	18.2	338	32.0	20.2	18.0	15.2	18.0	25.0	21.0
16	1,320	780	316	17.0	370	32.0	20.7	21.2	20.4	18.0	26.0	18.0
17	947	844	326	17.0	459	29.0	22.4	16.6	49.9	16.6	23.0	16.0
18	784	447	752	19.4	450	21.0	24.0	693	6,020	21.8	25.0	23.0
19	1,040	335	1,070	16.0	408	19.0	21.2	223	5,120	ð1,660	22.0	20.0
20	1,010	368	1,050	17.0	362	25.0	15.2	19.4	2,890	ð1,390	25.0	21.0
21	1,050	462	471	17.0	275	20.0	18.5	24.2	1,750	ð 670	27.5	17.0
22	948	263	405	15.7	315	27.5	14.3	29.0	495	30.5	22.0	14.0
23	698	196	355	17.6	382	19.0	16.6	23.0	869	ð 200	45.8	17.0
24	1,600	348	328	12.2	411	18.0	17.6	20.6	1,080	ð 410	312	15.0
25	1,400	280	320	13.8	459	17.7	20.2	18.2	545	ð 80.0	115	16.0
26	444	345	318	16.2	234	17.1	19.6	26.6	29.0	23.0	24.0	20.0
27	156	325	185	15.2	24.0	19.6	22.4	20.6	22.0	21.0	24.0	17.0
28	117	32.0	29.0	14.7	18.0	20.7	18.0	19.4	21.0	21.0	27.5	15.0
29	108		25.4	19.0	21.0	21.2	17.1	20.6	21.0	24.0	29.0	14.0
30	250		153	15.7	23.0	18.0	18.0	17.8	19.0	21.0	21.0	17.0
31	513		275		19.0		21.8	15.7		20.0		17.0
Sum	23,401.8	14,083.0	11,190.0	3,125.3	6,942.6	631.4	585.5	1,548.7	19,219.0	4,915.5	2,454.8	591.0

Month	Current Year 1963 Extreme Gage Feet High	Low	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1954-1963 Acre-Feet Average	Maximum	Minimum
Jan.	104.27	98.47	16	2,570	3	16.4	755	46,417	298,428	969,540	34,710
Feb.	103.73	98.14	8	1,800	9	20.0	503	27,933	150,150	414,310	17,650
Mar.	103.11	98.04	19	1,620	30	21.8	361	22,195	97,056	630,230	780
Apr.	101.36	97.83	5	857	20	9.0	104	6,199	75,609	532,320	899
May	102.17	97.90	9	1,120	9	12.2	224	13,770	88,997	375,970	460
June	99.68	97.81	14	105	10	8.0	21.0	1,252	19,776	119,980	834
July	99.78	99.28	19	40.6	5	11.8	18.9	1,161	19,217	89,430	654
Aug.	101.67	97.89	18	909	14	13.8	50.0	3,072	33,753	125,590	702
Sept.	110.61	98.31	18	8,320	14	11.0	641	38,120	24,923	87,830	113
Oct.	104.05	98.19	19	Ø 1,660	17	14.7	159	9,750	68,559	172,940	9,750
Nov.	100.45	98.09	10	525	1	17.0	81.8	4,869	141,626	356,390	4,869
Dec.	98.39	97.97	18	68.9	23	11.0	19.1	1,172	199,246	643,850	1,172
Yearly	110.61	97.81		8,320		8.0	243	175,910	1,217,340	3,957,730	175,910

Ø Mean daily ð Deduced

COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	98.49	101.44	98.15	100.19	99.48	97.92	99.48	99.41	99.27	98.30	98.20	98.11
2	98.49	101.78	98.82	100.64	99.49	97.87	99.46	99.40	99.30	98.28	98.20	98.11
3	100.10	102.94	99.69	100.43	99.53	97.91	99.47	99.44	99.36	98.42	98.19	98.11
4	102.76	101.69	99.62	100.72	99.54	97.91	99.44	99.49	99.44	99.42	98.19	98.10
5	99.40	100.40	99.50	100.10	99.58	97.97	99.38	99.48	99.39	99.49	98.20	98.12
6	98.54	99.75	100.48	98.48	99.55	97.92	99.37	99.46	99.38	99.47	98.19	98.14
7	100.22	99.98	99.80	98.07	99.50	97.88	99.45	99.47	99.36	99.45	98.23	98.10
8	102.95	102.42	100.61	98.06	99.50	97.89	99.51	99.50	99.34	99.47	99.93	98.09
9	102.83	99.77	100.44	98.02	100.28	97.85	99.51	99.49	99.33	99.50	100.13	98.09
10	102.41	100.10	99.94	98.00	100.26	97.83	99.47	99.53	99.34	99.59	100.14	98.09
11	102.09	99.40	100.30	98.02	99.86	97.91	99.52	99.53	99.34	99.46	99.19	98.06
12	102.00	101.49	100.39	97.99	100.06	97.93	99.49	99.58	99.34	99.43	98.28	98.06
13	101.89	101.12	99.96	97.90	100.00	97.98	99.40	99.44	99.32	99.42	98.24	98.09
14	101.89	99.80	99.70	97.94	99.88	97.99	99.44	99.32	99.17	99.44	98.24	98.09
15	102.02	100.08	99.09	97.94	99.85	97.98	99.48	99.35	99.24	99.44	98.23	98.08
16	102.52	101.39	99.83	97.92	100.00	97.98	99.49	99.41	99.33	99.44	98.23	98.05
17	101.88	101.55	99.83	97.92	100.32	97.97	99.52	99.32	99.43	99.41	98.19	98.03
18	101.55	100.37	101.14	97.93	100.30	97.90	99.55	101.09	108.86	99.51	98.20	98.09
19	102.09	99.96	101.86	97.90	100.17	97.89	99.49	99.11	108.58	102.99	98.17	98.06
20	102.04	100.09	101.89	97.91	100.01	97.95	99.37	98.08	105.95	103.19	98.19	98.07
21	102.12	100.41	100.40	97.91	99.66	97.90	99.43	98.05	103.89	101.11	98.20	98.03
22	101.90	99.66	100.15	97.90	99.76	97.98	99.34	98.02	100.82	98.45	98.15	98.00
23	101.15	99.32	99.92	98.46	99.98	97.90	99.38	97.97	101.89	98.74	98.32	98.03
24	103.42	99.99	99.77	99.42	100.08	97.90	99.40	97.94	102.40	100.16	99.68	98.01
25	103.06	99.72	99.70	99.46	100.24	98.50	99.44	97.92	100.73	98.65	98.70	98.02
26	100.32	99.98	99.65	99.51	99.13	99.44	99.43	97.98	98.49	98.34	98.16	98.06
27	99.33	99.90	99.03	99.49	98.01	99.49	99.48	97.93	98.41	98.30	98.16	98.03
28	99.12	98.20	98.11	99.48	97.95	99.51	99.39	97.92	98.38	98.28	98.19	98.00
29	98.95		98.08	99.57	97.96	99.51	99.37	97.93	98.36	98.30	98.20	97.99
30	99.75		98.78	99.50	97.97	99.44	99.39	98.22	98.32	98.25	98.12	98.01
31	101.17		99.59		97.91		99.45	99.25		98.22		98.01
Avg.	101.18	100.45	99.81	98.76	99.54	98.20	99.44	98.97	100.46	99.35	98.31	98.06

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 1963, 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, 9,740 acre-feet, August 1940; 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20.3	30.3	10.5	30.9	14.1	15.2	22.7	0.9	6.6	6.3	u 18.0	14.5
2	27.0	11.0	19.6	12.6	18.7	24.2	12.1	8.6	1.8	11.4	u 21.0	13.5
3	46.0	39.8	60.9	39.4	17.6	14.2	3.7	13.4	11.9	40.2	u 19.0	2.4
4	35.8	30.9	30.9	38.1	5.0	1.9	27.2	89.8	11.1	35.9	*23.7	6.0
5	44.6	10.3	2.9	32.7	90.1	10.0	32.6	24.7	23.7	41.0	5.2	5.5
6	83.8	14.3	9.5	31.3	32.4	25.3	9.8	2.1	20.8	28.0	14.9	10.6
7	53.0	22.8	15.5	34.1	2.0	16.3	47.2	20.7	19.5	17.7	11.1	6.3
8	4.2	13.5	20.1	16.7	35.4	26.8	31.1	24.6	24.4	20.5	14.3	108
9	4.1	18.0	28.5	13.5	1.8	26.7	14.9	10.5	3.2	17.2	16.7	47.9
10	3.0	43.9	44.6	17.5	2.0	20.2	18.8	21.2	11.8	20.5	1.8	32.1
11	2.2	17.7	15.6	7.2	12.9	11.8	14.7	32.3	14.6	19.2	8.2	34.9
12	28.2	12.4	14.2	14.1	13.4	23.2	2.8	19.9	7.6	23.4	7.8	8.2
13	45.9	16.2	7.3	17.9	18.5	40.4	20.7	8.4	7.4	21.7	24.4	22.9
14	45.0	10.0	9.2	51.2	16.0	17.5	17.3	23.6	22.7	17.2	6.9	37.4
15	49.5	12.2	10.1	35.5	17.3	18.2	38.2	15.7	22.4	1.7	11.6	40.4
16	18.2	34.4	20.9	22.3	31.7	20.9	14.6	23.4	24.7	1.5	18.7	13.6
17	3.6	36.3	46.6	49.5	40.3	25.1	18.4	29.0	63.4	27.6	18.3	7.8
18	3.9	20.1	15.2	20.0	27.3	27.8	21.8	24.6	60.7	47.1	24.5	5.1
19	8.8	4.1	7.0	16.8	16.1	7.3	16.5	8.7	15.8	18.1	12.9	32.7
20	28.6	19.4	6.8	16.7	9.0	36.4	50.4	4.0	26.6	15.7	10.5	26.5
21	27.9	9.6	22.8	15.2	3.9	13.7	24.9	16.2	21.2	27.0	34.3	4.9
22	28.8	19.5	5.4	13.7	16.8	7.1	21.3	10.3	31.5	35.7	12.5	9.2
23	12.0	24.7	13.4	24.8	16.5	38.8	15.8	24.6	26.1	7.7	20.2	20.5
24	5.4	28.0	42.2	14.1	19.6	36.6	23.6	18.1	12.2	1.5	u 10.5	14.1
25	8.5	26.6	26.5	18.3	* 15.4	28.9	26.4	23.2	4.1	3.9	* 3.4	30.4
26	22.0	18.3	29.6	21.2	u 30.5	11.3	19.0	20.8	9.0	17.2	2.0	11.3
27	13.9	12.1	5.9	9.7	*23.1	16.2	42.6	8.9	1.6	27.8	12.0	12.1
28	21.7	3.7	11.4	38.2	17.8	16.7	22.4	79.5	5.8	* 59.9	27.1	10.7
29	7.8		13.2	27.0	7.4	26.1	12.9	22.7	9.8	u 45.0	10.6	32.9
30	31.5		23.1	16.6	1.5	35.3	9.5	1.3	10.7	u 15.0	16.3	19.6
31	6.9		96.4		6.4		4.8	1.0		u 0		15.7
Sum	742.1	560.1	685.8	716.8	580.5	640.1	658.7	632.7	532.6	672.6	438.4	657.7

Month	Current Year 1963 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 1935-1963 Acre-Feet Average	Maximum	Minimum
Jan.	116.23	111.84	6	346	1	1.7	23.9	1,472	4,499	9,570	263
Feb.	113.11	111.85	17	78.0	† 27	1.8	20.0	1,111	3,586	8,430	657
Mar.	116.48	111.84	31	396	† 2	1.7	22.1	1,360	3,365	6,230	1,000
Apr.	116.17	111.83	3	336	10	1.6	23.9	1,422	3,101	6,300	0
May	116.22	111.80	8	344	8	1.2	18.7	1,151	3,794	9,320	101
June	115.71	111.77	20	266	† 21	.8	21.3	1,270	3,608	7,440	910
July	113.43	111.78	† 20	94.6	26	.9	21.2	1,307	3,649	8,320	840
Aug.	116.00	111.76	4	310	† 7	.6	20.4	1,255	3,054	9,740	710
Sept.	116.11	111.77	17	326	19	.8	17.8	1,056	2,267	6,140	820
Oct.	116.58	111.80	28	420	25	1.2	21.7	1,334	3,036	5,680	1,035
Nov.	113.11	111.83	11	78.0	† 4	1.6	14.6	870	3,613	8,220	870
Dec.	116.33	111.83	8	366	18	1.6	21.2	1,305	4,868	9,430	1,305
Yearly	116.58	111.76		420		0.6	20.6	14,913	42,440	82,900	14,913

† 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 1963; 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, 95.37 feet, August 31, 1963.

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	95.98	98.53	95.93	97.68	95.64	95.70	95.67	95.43	95.45	95.73	95.82	95.65
2	96.01	98.74	96.42	97.99	95.71	95.74	95.58	95.49	95.42	95.73	95.85	95.65
3	97.12	100.00	97.31	97.89	95.70	95.67	95.50	95.53	95.59	95.88	95.79	95.57
4	99.82	98.95	97.21	97.59	95.61	95.58	95.07	95.99	95.65	95.77	95.88	95.58
5	97.23	97.71	96.97	97.67	96.10	95.66	95.64	95.70	95.68	95.78	95.65	95.58
6	96.41	97.34	97.82	96.45	95.86	95.71	95.50	95.51	95.68	95.76	95.74	95.65
7	97.41	97.32	97.28	96.12	95.59	95.64	95.72	95.60	95.60	95.70	95.72	95.59
8	99.77	99.67	98.30	95.95	95.69	95.74	95.69	95.77	95.63	94.74	97.06	96.12
9	99.72	97.54	97.89	95.89	96.58	95.72	95.56	95.60	95.48	95.68	97.42	95.90
10	99.37	97.49	97.50	95.88	97.60	95.62	95.54	95.69	95.52	95.80	97.42	95.72
11	99.02	96.97	97.69	95.81	97.32	95.62	95.55	95.78	95.56	95.72	96.83	95.72
12	98.99	98.51	97.79	95.83	97.45	95.67	95.47	95.73	95.52	95.75	95.81	95.57
13	98.96	98.39	97.40	95.78	97.47	95.81	95.54	95.60	95.47	95.73	95.81	95.72
14	98.95	97.23	97.23	96.00	97.38	95.70	95.53	95.68	95.52	95.71	95.70	95.79
15	99.05	97.33	96.65	95.97	97.32	95.70	95.69	95.60	95.58	95.57	95.71	95.84
16	99.54	98.57	97.30	95.82	97.50	95.72	95.52	95.67	95.64	95.56	95.78	95.61
17	98.94	98.75	97.36	96.05	97.73	95.73	95.56	95.70	95.81	95.75	95.75	95.54
18	98.59	97.87	98.38	95.84	97.70	95.73	95.66	97.92	104.41	95.90	95.80	95.57
19	99.10	97.36	98.95	95.77	97.59	95.54	95.55	96.88	105.10	99.48	95.73	95.73
20	99.09	97.51	99.14	95.75	97.42	95.80	95.77	95.76	102.62	100.12	95.68	95.69
21	99.13	97.75	97.85	*95.76	97.13	95.61	95.59	95.80	100.97	98.53	95.89	95.52
22	98.97	97.21	97.61	*95.73	97.21	95.62	95.57	95.71	97.77	96.14	95.67	95.53
23	98.13	96.95	97.42	95.72	97.42	95.79	95.55	95.80	98.87	96.01	95.78	95.66
24	100.37	97.43	97.40	95.64	97.51	95.80	95.63	95.69	99.28	97.39	97.04	95.52
25	100.10	97.28	97.25	95.69	97.63	95.70	95.64	95.72	98.07	96.15	96.26	95.67
26	97.82	97.42	*97.25	95.72	96.92	95.60	95.54	95.71	96.00	95.86	95.66	95.54
27	96.71	97.38	96.75	95.60	95.92	95.61	95.73	95.63	95.81	95.88	95.67	95.53
28	96.71	96.07	95.97	95.76	95.78	95.62	95.60	96.00	95.80	96.22	95.76	95.50
29	96.41		95.94	95.76	95.70	95.72	95.54	95.75	95.80	95.92	95.71	95.66
30	97.00		96.47	95.63	95.62	95.71	95.50	95.45	95.77	95.69	95.73	95.59
31	98.25		97.37		95.60		95.49	95.37		95.66		95.53
Avg.	98.34	97.83	97.35	96.16	96.69	95.69	95.59	95.78	97.04	96.20	96.00	95.65

* Partly estimated

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 1963, 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, 122 acre-feet, September 1950. 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.0	23.9	19.2	25.6	7.5	8.0	13.4	9.8	8.0	5.9	14.2	3.0
2	6.0	12.9	26.8	2.1	15.4	20.0	9.3	7.6	24.6	29.1	3.4	12.6
3	9.4	3.1	20.4	.8	3.8	13.1	8.9	10.2	20.0	16.2	12.9	14.6
4	13.2	7.4	16.5	19.2	4.8	9.6	23.7	28.9	10.4	11.5	13.0	18.6
5	2.9	.1	1.6	24.4	15.0	2.8	12.2	22.5	6.9	26.7	8.1	17.3
6	3.9	15.1	.3	15.7	16.5	2.7	4.6	.7	19.3	13.8	13.6	14.3
7	24.3	24.1	10.2	11.7	.3	10.3	.3	.3	2.7	32.2	12.8	13.8
8	5.3	15.3	12.5	4.4	1.4	11.8	.5	7.7	1.8	25.8	22.7	17.8
9	2.0	15.6	24.6	5.1	1.7	23.4	6.0	24.7	8.6	17.3	6.6	25.6
10	2.0	9.9	25.2	16.7	4.3	8.7	9.0	27.2	5.9	27.6	11.3	3.0
11	2.0	17.4	16.3	10.4	2.7	2.7	.2	22.6	5.7	5.1	17.8	1.2
12	2.0	13.9	23.7	6.4	7.9	.3	2.8	31.9	14.1	4.3	18.6	.7
13	6.0	2.0	14.8	7.0	17.2	9.0	11.2	28.8	8.6	8.5	8.1	.6
14	7.6	8.5	11.2	21.2	17.2	11.7	16.0	11.9	17.7	18.0	8.9	11.0
15	9.2	14.1	15.1	19.4	2.7	5.8	7.1	15.7	4.0	4.2	3.9	23.0
16	7.9	10.9	16.6	16.7	15.9	9.6	.3	21.6	20.9	12.1	1.6	14.2
17	5.9	26.1	25.4	19.0	17.8	5.0	3.3	15.6	30.1	2.7	9.3	17.4
18	13.3	15.7	13.6	14.6	11.3	6.1	5.2	17.4	25.4	14.7	8.9	10.7
19	15.9	4.3	8.8	7.2	12.1	7.2	1.4	18.9	1.4	27.7	3.6	26.1
20	8.3	6.6	14.4	19.8	22.8	10.0	2.8	8.0	13.3	22.2	15.2	22.4
21	15.5	21.3	6.9	24.3	4.2	6.3	5.9	7.0	27.5	23.0	29.2	21.4
22	9.7	18.8	4.8	18.9	10.0	15.0	2.8	11.0	24.9	6.8	19.9	15.0
23	6.4	23.1	5.2	7.2	.3	13.6	3.1	.5	33.4	4.4	15.8	20.4
24	7.3	21.9	16.5	13.5	12.6	5.7	.2	1.5	9.8	2.9	13.3	20.7
25	9.9	30.7	13.5	8.2	16.7	9.3	10.6	12.3	7.1	12.4	15.6	27.4
26	24.5	24.5	9.1	18.5	15.1	3.3	20.2	12.3	11.5	23.3	5.9	21.5
27	u 23.0	8.5	8.9	17.7	18.5	7.6	17.4	13.3	5.9	21.4	4.8	8.8
28	24.5	6.2	11.9	19.0	8.5	11.5	4.2	21.3	2.7	10.1	15.0	5.0
29	18.4		7.1	4.9	12.1	22.4	20.0	29.7	14.0	19.0	26.8	8.6
30	1.1		5.4	4.4	11.4	16.1	5.5	1.4	10.3	1.3	6.4	19.3
31	11.0		.1		7.9		.8	.5		.5		7.8
Sum	300.4	401.9	406.6	404.0	315.6	290.6	228.9	442.8	396.5	450.7	367.2	443.8

Month	Current Year 1963								Period 1939-1963		
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
			High		Low			Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	94.38	92.92	7	37.6	†14	0	9.7	596	1,132	2,860	397
Feb.	94.73	92.92	25	49.9	5	0	14.4	797	958	2,510	478
Mar.	94.89	92.92	9	55.9	† 7	0	13.1	806	857	1,660	293
Apr.	94.74	92.92	10	50.3	† 3	0	13.5	801	947	1,940	326
May	94.70	92.92	14	48.8	†30	0	10.2	626	1,183	2,470	183
June	94.85	92.92	17	54.4	† 1	0	9.7	576	1,043	2,350	292
July	95.02	92.92	19	60.9	†22	0	7.4	454	906	1,950	192
Aug.	94.86	92.94	9	54.8	† 7	.1	14.3	878	934	2,530	200
Sept.	95.27	92.92	17	70.9	† 4	0	13.2	786	836	2,180	122
Oct.	94.86	92.94	5	54.8	† 1	.1	14.5	894	1,003	2,100	238
Nov.	94.56	92.92	29	43.9	†19	0	12.2	728	1,167	2,380	327
Dec.	95.00	93.95	20	60.1	† 1	.2	14.3	880	1,332	2,680	477
Yearly	95.27	92.92		60.9		0	12.2	8,822	12,298	24,370	6,448

† And other days u 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: 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 1963.

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

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2	1	6	15	9	8	11	9	7	5	6	3
2	2	1	6	15	9	8	11	9	5	5	6	3
3	2	1	6	15	9	10	11	8	5	6	6	3
4	2	3	7	15	9	10	11	8	5	6	2	3
5	1	3	7	15	9	10	11	8	5	6	2	3
6	1	3	7	15	8	10	11	8	4	6	2	3
7	1	3	7	16	8	10	12	8	4	7	2	3
8	1	3	7	4	8	10	10	8	4	7	2	4
9	1	3	7	4	7	11	10	8	8	7	1	6
10	1	4	8	4	7	14	10	8	8	7	1	6
11	1	6	10	4	7	14	10	7	8	7	4	6
12	1	6	10	3	7	14	10	8	8	7	4	6
13	2	6	10	3	9	14	9	8	8	6	4	6
14	1	6	10	3	9	14	9	8	8	1	4	7
15	1	6	10	8	9	13	11	8	8	1	4	7
16	1	6	9	8	9	13	11	9	5	1	3	0
17	1	7	9	8	9	6	11	9	5	1	3	0
18	2	5	4	8	10	6	11	9	5	1	5	0
19	2	5	4	8	10	6	12	5	5	1	5	0
20	2	5	4	9	7	5	12	5	4	1	5	0
21	3	5	4	9	7	5	12	5	4	3	5	0
22	3	5	4	9	7	5	9	5	4	3	5	0
23	3	5	3	8	7	5	9	5	4	3	6	5
24	3	4	3	8	7	9	9	5	4	3	6	5
25	3	5	3	8	7	9	9	4	4	3	2	5
26	2	5	3	8	8	10	10	8	3	2	3	5
27	2	5	4	8	8	10	10	8	3	2	3	5
28	2	5	4	8	8	10	10	8	3	5	3	4
29	2		4	8	8	10	9	8	3	5	3	4
30	2		4	9	8	10	9	8	5	5	3	4
31	2		4		8		9	7		5		4
Sum	55	122	188	263	252	289	319	229	156	128	110	110

Month	Current Year 1963 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 1956-1963 Acre-Feet Average	Maximum	Minimum
Jan.			† 21	3	† 5	1	1.8	109	159	280	80
Feb.			17	7	† 1	1	4.4	242	329	500	210
Mar.			† 11	10	† 23	3	6.1	373	406	600	317
Apr.			7	16	† 12	3	8.8	522	472	571	389
May			† 18	10	† 9	7	8.1	500	522	770	400
June			† 10	14	† 20	5	9.6	573	605	800	385
July			† 7	12	† 13	9	10.3	633	615	820	460
Aug.			† 1	9	25	4	7.4	454	449	800	290
Sept.			† 9	8	† 26	3	5.2	309	410	940	194
Oct.			† 7	7	† 14	1	4.1	254	307	390	240
Nov.			† 1	6	† 9	1	3.7	218	237	330	90
Dec.			† 14	7	† 16	0	3.5	218	165	230	99.2
Yearly				15		0	6.1	4,405	4,676	6,480	3,941

† And other days Ø Mean daily

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 25 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 1963; daily discharges October 1946 through December 1963.

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.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	24.0	22.2	20.0	26.2	24.8	6.7	27.2	25.8	25.7	11.4	7.1	7.9
2	8.2	16.0	8.9	33.2	21.3	30.1	20.4	32.8	36.2	29.4	7.4	3.5
3	5.3	23.7	11.1	12.0	31.0	31.5	15.6	28.8	26.3	15.6	18.6	7.4
4	26.5	7.5	34.4	32.1	16.0	16.0	22.7	3.0	30.1	22.4	22.9	7.9
5	18.7	7.2	18.6	29.5	32.1	4.2	24.3	5.7	17.6	3.7	9.8	10.3
6	17.9	25.7	19.8	20.6	35.3	26.4	11.0	16.5	18.4	18.4	18.8	7.5
7	3.9	22.4	14.7	31.6	15.2	22.5	13.0	23.7	21.3	18.7	7.9	6.5
8	7.8	13.8	16.5	32.4	11.0	10.0	24.8	28.0	21.6	16.2	6.0	21.5
9	3.0	9.3	7.3	17.1	5.0	29.4	10.9	39.9	15.1	18.3	8.3	26.3
10	10.1	13.4	17.5	10.5	4.8	21.4	3.9	34.8	24.1	20.7	20.6	13.3
11	6.0	11.6	20.0	19.4	9.4	22.8	8.7	26.6	9.6	14.7	24.0	19.0
12	4.2	17.5	12.6	7.2	5.0	22.7	14.7	8.9	9.5	16.0	6.6	6.1
13	30.7	15.5	27.0	19.7	5.5	18.8	10.3	9.8	11.3	25.8	12.9	20.9
14	15.4	6.9	13.7	16.9	6.6	21.8	12.4	8.0	18.1	16.2	8.7	15.5
15	29.1	11.6	11.3	27.5	34.4	24.3	9.8	6.8	28.6	24.9	9.1	13.6
16	38.3	17.4	15.2	16.0	34.1	10.5	16.7	18.0	38.7	17.4	14.6	18.4
17	16.1	11.2	32.1	18.1	23.1	19.1	8.1	35.5	48.4	13.9	28.5	9.1
18	24.9	24.2	10.8	15.6	16.9	34.5	19.4	68.1	78.3	53.6	34.8	9.0
19	18.1	17.1	7.8	19.2	27.2	11.5	7.7	52.2	7.6	45.8	18.3	9.5
20	20.7	15.4	16.0	5.4	38.3	7.4	21.8	13.8	.6	14.7	13.3	18.3
21	14.4	18.0	14.7	0	20.6	0	22.4	19.3	9.4	13.5	8.7	26.7
22	2.4	16.7	16.5	17.7	24.6	13.6	14.5	16.0	11.8	10.4	26.2	19.7
23	9.0	2.1	26.8	13.8	14.8	18.1	6.7	22.4	12.2	3.7	12.9	9.5
24	21.9	19.9	24.0	13.0	29.4	43.5	9.7	54.0	6.9	6.2	25.3	5.9
25	36.3	37.8	14.0	17.4	21.2	22.1	2.4	45.2	6.0	22.0	8.8	16.4
26	27.5	16.5	26.4	19.8	51.4	16.0	20.4	40.7	10.1	19.6	9.4	23.1
27	25.4	19.8	12.4	25.5	27.5	5.8	27.5	26.9	6.7	10.2	16.4	10.3
28	5.6	28.4	31.4	28.0	50.4	13.6	4.6	21.1	15.2	13.6	18.9	5.1
29	23.8		17.0	21.2	37.1	4.0	21.4	20.3	12.6	8.6	14.8	7.1
30	7.5		14.2	15.5	36.6	28.7	9.5	16.8	14.1	7.4	11.2	14.5
31	24.5		24.4		22.6		16.5	25.5		2.9		10.0
Sum	527.2	468.8	557.1	582.1	733.2	557.0	459.0	794.9	592.1	535.9	450.8	399.8

Month	Current Year 1963 Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1935-1963 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			16	38.3	22	2.4	17.0	1,046	1,472	3,360	" 383
Feb.			25	37.8	23	2.1	16.7	930	1,209	3,170	" 383
Mar.			4	34.4	9	7.3	18.0	1,105	1,406	2,920	190
Apr.			2	33.2	21	0	19.4	1,155	1,379	3,170	197
May			26	51.4	10	4.8	23.7	1,454	1,531	3,040	385
June			24	43.5	21	0	18.6	1,105	1,314	3,660	175
July			27	27.5	25	2.4	14.8	910	1,432	3,590	198
Aug.			18	68.1	4	3.0	25.6	1,577	1,453	3,960	169
Sept.			18	78.3	20	.6	19.7	1,174	1,295	3,170	159
Oct.			18	53.6	31	2.9	17.3	1,063	1,355	3,280	504
Nov.			18	34.8	8	6.0	15.0	894	1,499	3,570	430
Dec.			21	26.7	2	3.5	12.9	793	1,467	3,080	438
Yearly				78.3		0	18.2	13,206	16,812	38,310	* 4,800

Ø Mean daily " Estimated * Partly estimated

YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorders located in the forebay and afterbay of the Morelos Pumping Plant on the Main Drain about 200 feet north of the international boundary near San Luis, Arizona, 1.0 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 obtained and computed by the United States Section of the Commission. Records available: Monthly discharges June 1919 through December 1963.

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.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	172	184	195	204	187	195	176	177	166	194	195	188
2	174	194	204	196	201	197	172	177	168	188	193	186
3	189	203	204	193	193	188	187	189	163	184	198	183
4	164	194	202	205	196	187	196	197	168	192	194	176
5	181	197	202	203	192	191	188	202	165	196	190	189
6	175	189	201	163	190	186	189	196	158	194	194	187
7	179	188	186	213	186	181	180	184	165	206	192	177
8	164	186	185	206	189	187	192	186	172	206	190	185
9	158	201	196	188	194	182	187	194	166	204	196	197
10	161	199	201	197	186	179	187	186	172	196	182	173
11	156	196	207	199	192	186	187	174	170	198	187	177
12	153	193	209	198	199	180	177	185	163	212	193	160
13	180	198	198	202	204	195	178	186	173	175	193	170
14	192	189	198	208	194	179	189	181	185	208	189	167
15	176	206	204	195	199	182	193	180	178	214	197	181
16	173	199	202	189	204	187	188	173	167	195	200	172
17	175	195	201	185	195	189	193	186	179	216	203	176
18	165	202	210	183	194	177	185	203	262	220	204	190
19	179	192	188	188	194	174	186	181	166	220	193	177
20	182	183	193	188	199	180	174	165	159	214	181	183
21	179	177	185	190	199	183	195	161	187	216	185	178
22	167	196	207	193	183	179	192	160	190	197	185	187
23	160	197	193	185	202	183	179	177	172	197	186	183
24	168	202	192	196	207	169	187	173	179	194	190	181
25	180	197	207	183	195	198	185	174	187	189	192	183
26	176	182	193	195	189	184	178	177	187	192	180	168
27	175	194	210	198	194	175	192	171	184	194	182	151
28	168	203	199	211	192	193	194	170	185	196	190	162
29	182		209	198	181	190	179	181	184	195	175	179
30	184		204	204	185	191	187	173	197	190	184	172
31	173		219		188		187	167		194		169
Sum.	5,360	5,436	6,204	5,850	6,003	5,547	5,759	5,560	5,317	6,186	5,713	5,507

Current Year 1963 — **Period 1935-1963**

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.			14	192	12	153	173	10,631	7,266	11,140	1,740
Feb.			15	206	23	177	194	10,782	7,175	10,940	1,640
Mar.			31	219	† 2	185	200	12,305	8,237	12,305	1,940
Apr.			7	213	3	183	195	11,603	8,001	11,890	1,920
May			24	207	29	181	194	11,907	8,052	13,140	1,950
June			25	198	24	169	185	11,002	7,381	12,040	2,290
July			4	196	2	172	186	11,423	7,116	11,830	2,530
Aug.			18	203	22	160	180	11,080	7,016	11,960	2,560
Sept.			18	262	6	158	177	10,546	7,150	11,560	2,280
Oct.			† 18	220	13	175	200	12,270	8,202	12,385	2,940
Nov.			18	204	29	175	190	11,332	8,088	12,010	2,800
Dec.			9	197	27	151	178	10,923	7,859	11,480	2,450
Yearly				262		151	188	135,804	91,543	139,380	27,040

† And other days ∅ 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 the periods April 6 through September 17, and October 11 through December 1963, a diversion dike across the river channel 2.8 miles 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 control methods. Records available: Daily discharges, January 1950 through December 1963; continuous record of gage heights, January 1947 through December 1963. 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 flow 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, 73.60 feet, July 23, 1962.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	86.0	727	127	458	53.9	50.2	36.0	14.6	14.0	86.2	74.4	60.8
2	77.0	751	120	470	51.4	64.4	20.6	12.4	28.2	91.8	77.0	70.4
3	92.0	1,060	222	474	36.0	54.3	18.1	15.0	21.1	95.4	79.1	64.4
4	909	1,160	350	446	36.1	43.8	33.7	47.0	17.4	86.2	84.0	66.1
5	809	659	258	518	69.0	22.9	24.9	58.5	19.3	80.8	68.3	54.3
6	198	512	880	250	118	28.6	21.3	9.6	40.2	75.5	68.0	59.7
7	192	324	446	134	45.9	39.7	16.0	9.7	20.4	75.5	70.6	65.9
8	888	1,060	466	101	38.4	54.0	35.6	30.5	15.9	77.2	189	84.0
9	1,210	835	782	82.6	62.2	76.6	29.4	34.7	18.6	72.0	403	142
10	1,150	506	510	89.0	388	47.8	19.6	31.2	8.7	80.8	395	44.2
11	973	425	410	79.0	315	38.7	6.9	47.2	11.0	68.5	396	48.7
12	961	539	522	69.0	314	21.2	7.4	59.4	22.1	51.4	139	51.7
13	979	865	438	70.8	386	34.9	19.8	47.6	17.8	61.6	81.7	52.7
14	979	534	329	83.8	347	25.1	30.6	23.5	29.0	70.2	76.3	63.1
15	1,000	320	230	110	286	18.1	24.3	23.4	16.4	56.5	61.7	108
16	1,150	578	224	56.9	382	44.7	24.5	28.8	32.2	50.1	70.2	78.0
17	1,040	709	299	90.0	405	45.2	10.8	27.2	47.6	47.1	74.3	63.8
18	727	623	520	64.4	459	47.8	12.7	206	800	90.9	77.5	54.0
19	889	390	620	51.6	429	39.4	9.7	495	3,800	439	68.6	79.3
20	949	370	1,440	63.1	359	45.7	15.2	70.5	3,220	1,440	73.0	86.2
21	985	475	941	81.0	304	35.2	23.1	42.1	2,360	1,240	103	71.2
22	1,030	435	478	64.3	285	36.8	21.6	39.4	1,120	235	81.3	57.2
23	655	316	374	53.6	330	47.8	12.0	23.1	832	114	58.0	73.6
24	1,180	304	380	61.0	367	45.9	13.2	13.9	910	253	177	68.2
25	1,500	405	320	50.4	423	31.9	24.4	30.6	910	274	200	77.2
26	1,140	380	320	59.7	399	21.0	33.6	39.8	398	116	82.1	75.9
27	338	390	285	50.1	124	38.0	26.3	42.7	150	104	54.6	37.2
28	310	289	206	58.1	51.8	28.2	18.8	35.9	115	91.5	72.8	47.2
29	198		101	59.3	77.1	49.1	30.0	90.9	111	141	94.2	56.1
30	174		100	41.4	51.6	45.5	11.0	11.1	97.3	71.1	70.2	63.7
31	555		214		41.1		6.1	7.0		61.9		48.0
Sum	23,323.0	15,941	12,412	4,340.1	7,026.3	1,222.0	637.2	1,668.3	15,203.2	5,898.2	3,619.0	2,072.8

Month	Current Year 1963 Extreme Gage Feet High	Low	Extreme Second-Feet High	Day	Low	Day	Average Second-Feet	Total Acre-Feet	Period 1935-1963 Acre-Feet Average	Maximum	Minimum
Jan.	77.73	74.82	1,510	25	72.5	2	752	46,260	524,137	1,672,000	32,160
Feb.	77.49	75.39	1,390	8	142	28	569	31,619	436,676	1,385,000	26,130
Mar.	78.19	75.03	1,520	20	87.0	30	400	24,619	351,676	1,127,000	3,683
Apr.	77.50	74.96	665	5	38.2	27	145	8,608	224,396	700,900	977
May	78.85	74.82	520	10	13.4	3	227	13,936	308,133	1,160,000	2,490
June	76.49	74.47	99.8	17	5.2	15	40.7	2,424	237,268	1,180,000	1,949
July	76.69	74.20	68.1	19	4.2	12	20.6	1,264	173,523	772,800	790
Aug.	76.96	73.94	697	19	4.9	1	53.8	3,309	193,367	796,000	1,160
Sept.	80.80	73.91	4,280	19	1.8	10	507	30,155	233,657	1,033,000	1,358
Oct.	78.92	74.70	1,500	20	33.4	16	190	11,699	295,964	1,192,000	9,120
Nov.	78.52	74.93	445	11	39.5	23	121	7,180	390,893	1,428,000	7,180
Dec.	76.74	74.82	198	9	24.4	28	66.9	4,111	493,948	1,839,000	4,111
Yearly	80.80	73.91	4,280		1.8		256	185,184	3,863,638	10,688,800	176,867

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	74.91	76.54	75.29	76.21	76.04	74.83	76.58	74.21	74.54	75.11	75.05	75.00
2	74.85	76.60	75.18	76.24	76.16	74.91	76.27	74.25	75.17	75.12	75.09	75.01
3	74.95	77.14	75.68	76.30	75.93	74.86	75.56	74.12	74.78	75.13	75.06	74.98
4	76.67	77.32	76.13	76.27	75.59	74.81	75.85	74.67	74.99	75.06	75.10	75.00
5	76.54	76.49	75.75	76.50	75.74	74.99	75.61	76.22	74.85	75.03	75.08	74.98
6	75.35	76.17	76.16	76.10	76.81	75.83	75.42	75.84	75.21	75.00	75.04	74.91
7	75.34	75.72	76.34	75.80	76.65	76.03	75.43	74.67	74.76	75.00	75.05	75.00
8	76.66	76.95	76.39	75.78	75.90	76.22	75.69	74.82	74.87	75.01	75.34	75.00
9	77.22	76.59	77.02	75.92	75.55	75.04	75.62	75.56	74.93	74.97	77.02	75.36
10	77.16	76.03	76.51	75.68	77.05	74.98	75.37	75.27	74.56	75.02	77.96	74.96
11	76.86	75.88	76.26	75.99	77.78	74.80	75.31	75.20	74.26	74.95	78.44	74.89
12	76.83	76.09	76.54	76.43	77.55	74.85	75.24	76.01	74.57	74.84	77.64	74.92
13	76.85	76.73	76.37	76.65	77.81	74.68	75.24	76.31	74.78	74.90	75.81	74.88
14	76.84	76.25	76.07	76.86	78.06	74.72	75.38	75.91	74.73	74.94	75.15	74.94
15	76.87	75.91	75.73	77.30	77.86	74.56	75.38	74.89	74.64	74.86	75.06	75.08
16	77.10	76.42	75.70	76.27	77.76	74.82	75.36	75.37	74.86	74.80	75.04	75.21
17	77.03	76.69	76.00	76.70	78.01	75.26	75.25	75.41	74.96	74.82	75.06	75.18
18	76.60	76.55	76.57	77.31	78.55	75.89	75.18	75.69	77.56	75.02	75.08	75.65
19	76.86	76.15	76.84	75.94	78.79	76.09	74.74	76.62	80.39	75.89	75.05	75.75
20	76.95	76.11	77.98	76.07	78.70	76.22	74.49	75.42	79.84	77.67	75.04	75.18
21	76.99	76.33	77.22	76.78	78.35	76.34	75.16	75.07	78.96	77.53	75.14	75.11
22	77.06	76.25	76.39	75.37	77.78	76.24	74.80	75.80	77.32	76.08	75.17	75.01
23	76.42	75.99	76.12	75.14	77.57	76.32	74.64	75.53	76.93	75.93	75.01	74.98
24	77.22	75.95	76.16	75.97	77.78	76.40	74.56	74.86	77.04	76.29	75.23	75.06
25	77.71	76.16	75.98	76.19	78.10	76.28	74.90	75.32	77.02	77.87	75.59	75.07
26	77.17	76.11	75.99	76.14	78.55	75.93	74.75	75.45	76.08	76.93	75.24	75.13
27	75.82	76.11	75.87	75.77	77.63	75.74	74.66	74.94	75.43	75.84	74.98	74.94
28	75.77	75.82	75.58	75.70	75.44	75.88	74.75	74.95	75.28	75.29	75.04	74.86
29	75.47		75.21	75.97	75.12	76.13	75.08	76.15	75.25	75.53	75.11	74.90
30	75.40		75.20	76.11	74.95	76.41	74.69	76.10	75.18	75.22	75.06	75.06
31	76.22		75.49		74.85		74.37	74.77		75.05		74.96
Avg.	76.44	76.32	76.12	76.18	77.05	75.54	75.20	75.34	75.79	75.51	75.49	75.06

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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	7.1	17.7	17.7	3.5	17.7	0	0	17.7	0	0
2	0	0	7.1	21.2	17.7	3.5	17.7	0	7.1	17.7	0	0
3	0	0	10.6	21.2	31.8	14.1	7.1	0	0	17.7	0	0
4	0	0	3.5	21.2	10.6	14.1	17.7	14.1	7.1	17.7	0	0
5	0	0	0	21.2	28.3	3.5	17.7	17.7	0	7.1	0	0
6	7.1	0	0	14.1	28.3	0	7.1	17.7	17.7	7.1	0	0
7	7.1	0	0	14.1	60.0	14.1	0	0	3.5	17.7	0	0
8	7.1	0	0	14.1	45.9	14.1	17.7	7.1	3.5	10.6	0	0
9	7.1	0	0	14.1	14.1	0	17.7	28.3	7.1	17.7	0	0
10	0	0	0	14.1	3.5	10.6	7.1	28.3	0	17.7	0	0
11	0	0	0	14.1	0	14.1	0	17.7	0	14.1	0	0
12	0	0	0	17.7	0	17.7	0	17.7	7.1	3.5	0	0
13	0	0	0	17.7	0	17.7	0	17.7	7.1	14.1	0	0
14	0	0	0	17.7	0	14.1	17.7	17.7	3.5	17.7	0	0
15	0	0	0	17.7	0	3.5	7.1	10.6	7.1	3.5	0	0
16	0	0	0	14.1	0	0	14.1	14.1	7.1	0	0	0
17	0	0	0	0	0	7.1	0	7.1	0	0	0	0
18	0	0	0	0	0	17.7	0	38.8	0	0	0	7.1
19	0	0	0	0	0	17.7	0	17.7	0	0	0	10.6
20	0	0	7.1	0	0	17.7	0	17.7	0	0	0	10.6
21	0	0	17.7	0	0	17.7	14.1	17.7	0	0	0	10.6
22	0	0	17.7	0	0	17.7	14.1	17.7	0	0	0	10.6
23	0	0	17.7	0	0	17.7	0	17.7	0	0	0	10.6
24	0	0	17.7	7.1	0	17.7	10.6	3.5	0	0	0	7.1
25	0	0	17.7	31.8	0	17.7	10.6	7.1	0	0	0	0
26	0	0	17.7	31.8	0	17.7	7.1	17.7	10.6	0	0	0
27	10.6	0	10.6	42.4	0	17.7	7.1	17.7	17.7	0	0	0
28	7.1	0	10.6	14.1	10.6	17.7	10.6	10.6	17.7	0	0	0
29	7.1		10.6	17.7	10.6	17.7	0	28.3	17.7	0	0	0
30	0		10.6	17.7	10.6	17.7	0	17.7	17.7	0	0	0
31	0		10.6		10.6		0	3.5		0		0
Sum	53.2	0	194.6	434.6	300.3	381.8	240.6	449.2	159.3	201.6	0	67.2

Month	Current Year 1963 Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1958-1963 Acre Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			27	10.6	† 1	0	2.1	131	561	2,675	0
Feb.				0		0	0	0	269	820	0
Mar.			†21	17.7	† 5	0	6.4	399	1,013	1,828	399
Apr.			27	42.4	†17	0	14.8	881	803	1,107	0
May			7	60.0	†11	0	10.2	630	684	1,016	564
June			†12	17.7	† 6	0	12.7	760	1,039	1,562	473
July			† 1	17.7	† 7	0	7.8	487	3,069	12,724	0
Aug			18	38.8	† 1	0	14.5	885	2,353	6,612	885
Sept.			† 6	17.7	† 1	0	5.3	321	789	1,660	152
Oct.			† 1	17.7	†16	0	6.7	409	160	409	0
Nov.				0		0	0	0	0	0	0
Dec.			†19	10.6	† 1	0	2.5	152	81.9	342	0
Yearly				60.0		0	6.7	5,055	10,796	22,963	2,599

† And other days Ø Mean daily

WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

DESCRIPTION: Water-stage recorder and cableway located on the left bank of the wasteway from the Canal de Conexión immediately upstream from where it discharges into the Colorado River, 0.6 mile downstream from the wasteway gates on Canal de Conexión, 16.8 miles downstream from Morelos Dam and 0.2 mile south of the junction of the Mexicali-San Luis and Algodones-Pescaderos highways.

RECORDS: Data obtained and computed by the Colorado River Irrigation District of the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission. 1963 records good. Records available: April 1956 through December 1963.

REMARKS: The Colorado River Irrigation District transports water for irrigation of land on the left bank of the Colorado River by the Canal de Conexión to a point called Kilometer 27 where waste flows are discharged to the Colorado River and pumped to the canals on the left bank of the river by the Bacanora-Monumentos pumping plant. A dike is constructed across the river channel at this point so that no flow, except for minor seepage, is allowed to pass downstream. This pumping plant has not operated since June 28, 1963, when the Sánchez Mejorada siphon was placed in operation.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	179	0	0	0	198	206	0	0	0	100	202	261
2	10.6	0	0	0	212	177	0	0	0	0	388	18.7
3	259	0	0	0	353	177	0	0	0	0	328	0
4	0	0	0	36.7	247	80.2	0	0	0	0	558	0
5	0	0	0	213	70.6	0	0	0	0	0	706	0
6	0	0	0	424	206	12.4	0	0	0	0	1,190	0
7	0	0	0	562	371	120	0	0	0	0	1,160	9.2
8	0	0	0	689	604	327	0	0	0	0	978	7.4
9	0	0	0	706	0	364	0	0	0	0	1,070	0
10	0	0	0	509	0	441	0	0	0	0	911	0
11	0	0	0	639	0	427	0	0	0	0	1,150	0
12	0	0	0	660	0	657	0	0	0	0	1,090	0
13	0	0	0	777	0	544	0	0	0	0	936	0
14	0	0	0	749	0	438	0	0	0	0	823	0
15	0	0	0	735	0	441	0	0	0	175	519	0
16	0	0	0	745	0	424	0	0	586	29.0	576	0
17	0	0	0	756	0	392	0	0	0	0	519	0
18	0	0	0	512	0	201	0	0	0	193	357	0
19	0	0	0	300	0	218	0	0	0	925	392	0
20	0	0	0	254	0	327	0	0	0	1,080	321	0
21	0	0	0	254	0	371	0	0	0	1,300	795	0
22	0	0	0	247	0	463	0	0	0	1,540	752	0
23	0	0	26.5	265	0	565	0	0	155	1,470	858	0
24	0	0	61.8	371	0	805	0	0	301	1,160	791	0
25	0	0	70.6	304	0	833	0	0	195	544	823	0
26	0	0	91.8	314	0	1,060	0	0	0	512	632	0
27	0	0	135	304	0	1,040	0	0	25.8	533	392	0
28	0	0	138	300	212	261	0	0	388	271	282	0
29	0		212	300	141	0	0	0	544	282	586	0
30	0		77.7	247	141	0	0	0	417	132	164	0
31	0		0		353		0	0		93.2		0
Sum	448.6	0	813.4	12,172.7	3,108.6	11,371.6	0	0	2,611.8	10,339.2	20,249	296.3

Month	Current Year 1963								Period 1956-1963		
	Extreme Gage Feet		∅ Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			3	259	† 4	0	14.5	891	12,278	69,527	0
Feb.				0		0	0	0	1,671	8,679	0
Mar.			29	212	† 1	0	26.1	1,614	15,594	35,492	770
Apr.			13	777	† 1	0	406	24,142	33,083	68,714	15,049
May			8	604	† 9	0	100	6,167	14,274	22,072	6,167
June			26	1,060	† 5	0	378	22,547	22,793	28,915	11,358
July				0		0	0	0	35,759	46,139	0
Aug.				0		0	0	0	38,634	55,497	0
Sept.			16	586	† 1	0	87.2	5,181	23,272	37,194	5,181
Oct.			22	1,540	† 2	0	334	20,512	8,428	20,512	0
Nov.			6	1,190	30	164	675	40,165	19,809	69,415	0
Dec.			1	261	† 3	0	9.5	589	12,036	70,213	0
Yearly				1,540		0	169	121,808	237,456	346,339	121,808

† And other days ∅ 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 June 1963.

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. Construction began February 2, 1962 on the Sanchez Mejorada Siphon and was completed and placed into operation June 28, 1963. Diversions are no longer made from the pumping plant. 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	272	177	170	0	0	0	0	0	0
2	0	0	0	321	155	170	0	0	0	0	0	0
3	0	0	102	378	152	148	0	0	0	0	0	0
4	0	0	258	346	159	81.2	0	0	0	0	0	0
5	0	0	230	530	134	84.8	0	0	0	0	0	0
6	0	0	244	565	194	38.8	0	0	0	0	0	0
7	0	0	283	607	286	77.7	0	0	0	0	0	0
8	0	0	311	650	367	170	0	0	0	0	0	0
9	0	0	424	643	424	155	0	0	0	0	0	0
10	0	0	371	622	31.8	194	0	0	0	0	0	0
11	0	0	332	643	0	237	0	0	0	0	0	0
12	0	0	353	565	0	470	0	0	0	0	0	0
13	0	0	293	678	0	413	0	0	0	0	0	0
14	0	0	304	657	0	353	0	0	0	0	0	0
15	0	0	222	639	0	360	0	0	0	0	0	0
16	0	0	162	632	0	374	0	0	0	0	0	0
17	0	0	251	509	0	424	0	0	0	0	0	0
18	0	0	325	459	0	226	0	0	0	0	0	0
19	0	0	445	505	0	205	0	0	0	0	0	0
20	0	0	523	279	0	222	0	0	0	0	0	0
21	0	0	569	283	0	275	0	0	0	0	0	0
22	0	0	399	410	0	332	0	0	0	0	0	0
23	0	0	353	318	0	311	0	0	0	0	0	0
24	0	0	360	335	0	477	0	0	0	0	0	0
25	0	0	357	254	0	537	0	0	0	0	0	0
26	0	0	321	254	0	590	0	0	0	0	0	0
27	0	0	374	254	0	696	0	0	0	0	0	0
28	0	0	321	226	222	452	0	0	0	0	0	0
29	0		251	251	170	63.6	0	0	0	0	0	0
30	0		219	198	233	0	0	0	0	0	0	0
31	0		254		170		0	0		0		0
Sum	0	0	9,211	13,283	2,874.8	8,307.1	0	0	0	0	0	0

Month	Current Year 1963 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 1958-1963 Acre Feet Average	Maximum	Minimum
Jan.				0		0	0	0	484	2,204	0
Feb.				0		0	0	0	487	1,282	0
Mar.			21	569	† 1	0	297	18,283	20,529	33,187	12,111
Apr.			13	678	30	198	441	26,348	31,214	38,007	26,348
May			9	424	†11	0	92.9	5,715	10,711	24,285	3,186
June			27	696	30	0	277	16,484	19,536	26,862	14,668
July				0		0	0	0	25,203	36,297	0
Aug				0		0	0	0	29,501	48,947	0
Sept.				0		0	0	0	24,233	78,396	0
Oct.				0		0	0	0	1,572	4,749	0
Nov.				0		0	0	0	0	0	0
Dec.				0		0	0	0	21.1	126	0
Yearly				696		0	92.5	66,830	148,961	213,722	66,830

† And other days Ø 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	28.3	70.6	124	0	0	0	0	0	0	0	10.6	74.2
2	88.3	70.6	88.3	0	0	0	0	0	0	0	3.5	81.2
3	106	70.6	17.7	0	0	0	0	0	0	10.6	3.5	56.5
4	56.5	88.3	17.7	0	0	0	0	0	0	7.1	3.5	3.5
5	0	70.6	10.6	0	0	0	0	0	0	7.1	3.5	10.6
6	0	70.6	21.2	0	0	0	0	0	0	7.1	3.5	10.6
7	0	106	28.3	0	0	0	0	0	0	7.1	3.5	10.6
8	28.3	53.0	28.3	0	0	0	0	0	0	7.1	3.5	10.6
9	0	14.1	24.7	0	0	0	0	0	0	7.1	3.5	10.6
10	0	106	31.8	0	0	0	0	0	0	3.5	3.5	10.6
11	0	106	31.8	0	0	0	0	0	0	3.5	3.5	10.6
12	0	106	0	0	0	0	0	0	0	3.5	3.5	0
13	0	88.3	0	0	0	0	0	0	0	3.5	3.5	0
14	0	53.0	0	0	0	0	0	0	0	3.5	3.5	0
15	0	70.6	0	0	0	0	0	0	0	7.1	3.5	0
16	0	70.6	0	0	0	0	0	0	0	7.1	3.5	0
17	141	70.6	0	0	0	0	0	0	0	7.1	3.5	0
18	159	70.6	0	0	0	0	0	0	0	7.1	3.5	0
19	21.2	70.6	0	0	0	0	0	0	0	7.1	3.5	0
20	28.3	88.3	0	0	0	0	0	0	0	7.1	3.5	0
21	0	70.6	0	0	0	0	0	0	17.7	7.1	3.5	0
22	0	70.6	0	0	0	0	0	0	0	7.1	7.1	0
23	0	70.6	0	0	0	0	0	0	10.6	7.1	81.2	0
24	0	70.6	0	0	0	0	0	0	10.6	7.1	56.5	0
25	106	70.6	0	0	0	0	0	0	3.5	7.1	77.7	0
26	106	70.6	0	0	0	0	0	0	0	10.6	70.6	0
27	106	56.5	0	0	0	0	0	0	0	10.6	84.8	0
28	124	70.6	0	0	0	0	0	0	3.5	10.6	81.2	0
29	88.3		0	0	0	0	0	0	0	10.6	81.2	0
30	88.3		0	0	0	0	0	0	0	10.6	81.2	0
31	0		0		0		0	0		10.6		0
Sum	1,275.5	2,065.7	424.4	0	0	0	0	0	45.9	212.4	702.1	289.6

Current Year 1963

Month	Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet
			High		Low			
	High	Low	Day		Day			
Jan.			18	159	† 5	0	41.0	2,529
Feb.			† 7	106	9	14.1	73.8	4,097
Mar.			1	124	†12	0	13.8	841
Apr.				0		0	0	0
May				0		0	0	0
June				0		0	0	0
July				0		0	0	0
Aug				0		0	0	0
Sept.			21	17.7	† 1	0	1.8	100
Oct.			† 3	10.6	† 1	0	7.4	464
Nov.			27	84.8	† 2	3.5	24.4	1,446
Dec.			2	81.2	†12	0	9.5	586
Yearly				159		0	14.1	10,063

Period 1957-1963

Month	Acre Feet		
	Average	Maximum	Minimum
Jan.	1,051	3,201	0
Feb.	743	4,097	0
Mar.	1,187	6,850	0
Apr.	915	3,707	0
May	208	1,163	0
June	109	625	0
July	614	4,296	0
Aug	589	1,926	0
Sept.	711	1,548	0
Oct.	213	791	0
Nov.	477	1,891	0
Dec.	628	3,047	0
Yearly	7,446	13,429	631

† And other days Ø Mean daily

COLORADO RIVER AT MIGUEL C. RODRIGUEZ 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: Data obtained and furnished by the Mexican Section of the Commission. 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 1963.

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 (estimated) on July 12, 1958, with zero flow; maximum mean daily discharge, 20,200 second-feet on December 19, 1952, gage height of 52.30 feet; minimum mean daily discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	224	611	420	14.8	13.4	26.8	1.4	10.9	9.2	505	285	470
2	364	848	308	14.1	10.9	13.4	1.4	10.6	8.8	289	360	378
3	445	911	153	12.0	8.5	0	1.4	10.6	8.8	200	466	291
4	593	1,190	108	13.1	7.8	0	1.4	10.6	7.8	169	537	182
5	1,070	1,170	86.2	14.5	7.8	4.6	11.7	10.6	6.7	135	611	84.8
6	703	759	73.1	13.1	8.1	8.8	9.5	9.2	5.3	66.4	699	69.9
7	249	632	125	13.1	8.5	13.4	9.2	7.8	4.6	35.3	922	56.9
8	307	583	119	14.5	8.5	14.1	9.2	6.0	4.2	28.3	1,160	48.0
9	918	1,080	130	12.7	8.8	14.5	9.2	4.6	3.5	28.3	950	47.0
10	1,120	840	146	13.8	15.2	17.0	9.5	3.2	3.5	28.3	1,050	49.4
11	1,090	622	157	12.0	259	12.7	8.5	1.4	4.2	16.2	1,200	56.2
12	964	530	93.6	12.4	724	8.5	7.8	0	4.9	9.5	1,350	41.7
13	950	735	52.6	12.4	851	4.2	8.1	0	5.3	9.5	1,270	38.8
14	943	833	35.0	13.8	946	0	7.1	0	6.4	9.5	1,070	35.0
15	943	498	38.5	15.2	777	1.4	7.1	0	6.7	9.5	1,000	31.1
16	950	445	44.5	15.9	689	1.4	7.8	0	7.8	9.5	795	29.7
17	1,070	685	35.0	14.8	791	1.4	7.8	0	12.4	9.2	664	27.9
18	1,110	823	38.8	14.1	989	1.4	7.4	0	278	12.4	607	28.6
19	915	752	70.6	13.4	1,050	1.4	7.1	0	332	287	565	29.3
20	975	526	25.1	13.4	738	1.4	7.8	0	2,200	943	551	29.7
21	1,000	501	81.2	13.4	639	1.4	8.1	0	2,470	1,900	667	26.8
22	1,010	554	59.0	12.4	614	1.4	8.5	0	2,010	2,100	840	24.0
23	943	487	30.7	10.9	562	1.4	8.8	0	1,030	1,560	855	23.3
24	703	438	28.3	10.6	537	1.4	9.5	5.3	901	1,200	890	22.6
25	1,160	466	25.4	11.3	537	1.4	10.2	10.2	1,140	1,190	964	21.9
26	1,510	501	27.5	10.6	597	1.4	10.6	15.5	1,230	795	992	21.5
27	1,030	487	24.4	12.0	441	1.4	10.9	14.5	516	678	756	23.0
28	509	498	17.7	13.4	97.1	1.4	10.9	13.1	158	664	501	20.1
29	459		17.3	13.8	69.2	1.4	9.9	12.0	325	537	480	21.5
30	343		20.5	13.4	49.8	1.4	9.5	10.9	530	434	523	25.1
31	287		16.6		40.3		9.2	10.2		347		26.5
Sum	19,005		394.9		160.4		177.2		14,204.9			2,281.3
	24,857		2,610.3		12,094.9		246.5		13,230.1		23,570	

Month	Current Year 1963 Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period #June 1951-1963 Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	44.46	40.39	26	1,610	7	198	802	49,312	395,218	1,047,732	31,871
Feb.	43.83	41.27	5	1,340	24	413	678	37,705	248,721	696,461	31,303
Mar.	41.54	38.65	1	491	† 28	15.9	84.0	5,169	175,849	807,342	2,387
Apr.	38.81	38.58	10	22.2	† 24	10.6	13.1	783	116,384	588,983	783
May	43.04	38.62	19	1,240	† 4	7.8	388	23,986	162,261	732,815	707
June	42.26	38.62	1	31.8	† 3	0	5.3	319	68,225	555,460	266
July	40.91	38.35	5	11.7	† 1	1.4	8.1	489	36,569	264,561	0
Aug.	41.83	38.35	26	15.5	† 12	0	5.7	352	54,316	309,320	352
Sept.	46.59	38.32	21	2,650	† 9	3.5	441	26,235	84,989	572,551	557
Oct.	45.37	38.19	21	2,190	17	9.2	459	28,165	137,204	769,939	2,859
Nov.	43.44	39.57	12	1,390	1	260	788	46,775	228,014	909,399	29,335
Dec.	41.44	38.16	1	547	† 22	20.1	73.5	4,525	310,050	1,060,767	4,525
Yearly	46.59	38.16		2,650		0	312	223,815	1,986,324	7,923,600	154,769

† And other days # Some months missing

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	40.52	41.83	41.24	38.65	38.65	38.91	40.09	38.39	38.58	40.72	39.73	41.08
2	41.11	42.55	40.75	38.62	38.65	39.07	39.37	38.45	38.55	39.60	40.19	40.62
3	41.37	42.75	39.96	38.58	38.65	40.03	39.07	38.42	38.55	39.04	40.75	40.09
4	41.80	43.50	39.70	38.62	38.62	40.03	38.91	38.39	38.55	38.81	41.08	39.34
5	43.04	43.44	39.53	38.65	38.62	39.04	38.71	38.48	38.55	38.55	41.34	38.75
6	42.16	42.32	39.44	38.62	38.62	38.71	38.52	38.52	38.45	38.42	41.63	38.65
7	40.65	41.93	39.80	38.62	38.62	38.65	38.52	38.91	38.42	38.35	42.32	38.55
8	40.94	41.77	39.76	38.65	38.62	38.65	38.52	39.34	38.42	38.32	42.95	38.48
9	42.85	43.18	39.83	38.62	38.62	38.65	38.55	39.70	38.39	38.32	42.29	38.48
10	43.37	42.52	39.93	38.65	38.75	38.68	38.58	39.90	38.32	38.32	42.55	38.48
11	43.31	41.86	39.99	38.62	40.75	39.76	38.52	40.06	38.42	38.25	42.95	38.52
12	42.98	41.57	39.57	38.62	42.13	41.54	38.45	40.22	38.45	38.19	43.34	38.39
13	42.95	42.19	39.21	38.62	42.39	41.99	38.52	40.42	38.45	38.19	43.14	38.32
14	42.95	42.65	39.01	38.65	42.55	41.80	38.42	40.58	38.52	38.19	42.62	38.29
15	42.95	41.73	39.04	38.68	42.26	41.77	38.45	40.91	38.52	38.19	42.42	38.25
16	42.98	41.50	39.07	38.71	42.09	41.31	38.48	41.04	38.62	38.19	41.90	38.25
17	43.31	42.32	38.94	38.71	42.29	40.68	38.48	41.31	39.01	38.19	41.57	38.22
18	43.41	42.72	38.98	38.71	42.62	40.39	38.42	41.63	40.09	38.22	41.47	38.22
19	42.91	42.49	39.30	38.71	42.75	40.35	38.39	41.80	40.29	39.60	41.27	38.22
20	43.11	41.73	38.88	38.71	42.22	39.63	38.45	41.73	45.83	42.26	41.17	38.22
21	43.21	41.63	39.53	38.71	42.03	39.40	38.48	41.57	46.29	44.59	41.63	38.19
22	43.18	41.80	39.44	38.68	41.96	39.67	38.48	41.14	45.14	45.37	42.22	38.16
23	42.95	41.57	39.01	38.65	41.83	39.73	38.48	40.16	42.42	44.49	42.29	38.16
24	42.29	41.37	38.88	38.65	41.77	39.47	38.52	39.57	42.06	43.83	42.42	38.16
25	43.47	41.47	38.78	38.68	41.73	39.90	38.52	39.07	42.62	43.67	42.68	38.16
26	44.26	41.60	38.81	38.68	41.83	40.29	38.52	38.78	43.44	42.26	42.85	38.16
27	43.11	41.54	38.78	38.68	41.40	40.65	38.52	38.55	40.98	41.73	42.13	38.19
28	41.67	41.57	38.68	38.68	39.70	41.37	38.52	38.55	39.37	41.60	41.14	38.16
29	41.47		38.68	38.65	39.44	42.13	38.48	38.55	40.09	41.08	41.11	38.16
30	41.04		38.75	38.68	39.24	41.63	38.42	38.55	40.81	40.58	41.34	38.19
31	40.78		38.68		39.14		38.39	38.55		40.09		38.19
Avg.	42.45	42.11	39.35	38.66	40.60	40.13	38.60	39.72	40.14	40.17	41.88	38.56

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 1963.

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

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	56.5	84.8	35.3	14.1	0	0	42.4	7.1	21.2	0	0	0
2	24.7	77.7	17.7	14.1	0	0	21.2	7.1	17.7	0	0	0
3	127	45.9	53.0	14.1	0	0	21.2	0	10.6	0	0	0
4	131	28.3	0	14.1	0	109	17.7	0	10.6	0	0	0
5	131	45.9	0	17.7	0	84.8	17.7	0	17.7	0	0	0
6	88.3	74.2	17.7	14.1	0	49.4	17.7	0	17.7	0	0	0
7	88.3	81.2	0	24.7	0	28.3	17.7	0	17.7	0	0	0
8	88.3	91.8	17.7	14.1	0	3.5	17.7	0	14.1	0	0	0
9	0	91.8	0	14.1	0	3.5	17.7	0	14.1	0	0	0
10	0	70.6	0	14.1	0	0	17.7	0	3.5	0	0	0
11	0	49.4	21.2	14.1	0	0	17.7	0	14.1	0	0	0
12	0	31.8	17.7	14.1	0	35.3	17.7	0	3.5	0	0	0
13	0	49.4	0	14.1	0	63.6	17.7	0	7.1	0	0	0
14	0	63.6	14.1	14.1	0	28.3	17.7	0	14.1	0	0	0
15	0	84.8	14.1	14.1	0	35.3	21.2	0	17.7	0	0	0
16	0	70.6	14.1	14.1	0	24.7	21.2	0	3.5	0	0	0
17	0	60.0	14.1	14.1	0	21.2	21.2	0	7.1	0	0	0
18	106	74.2	0	14.1	0	0	21.2	0	0	0	0	0
19	53.0	91.8	0	21.2	0	21.2	21.2	0	0	0	0	0
20	0	88.3	0	14.1	0	17.7	21.2	0	0	0	0	0
21	0	98.9	0	14.1	0	0	21.2	21.2	0	0	0	0
22	0	84.8	0	14.1	0	0	21.2	31.8	0	0	0	0
23	0	74.2	17.7	14.1	0	21.2	21.2	31.8	0	0	0	0
24	70.6	63.6	14.1	14.1	0	0	10.6	31.8	0	0	0	14.1
25	113	53.0	10.6	14.1	0	0	21.2	31.8	0	0	0	17.7
26	127	63.6	10.6	3.5	0	0	21.2	31.8	0	0	0	17.7
27	98.9	91.8	10.6	14.1	0	0	21.2	31.8	0	0	0	17.7
28	84.8	98.9	10.6	14.1	0	24.7	21.2	28.3	0	0	0	17.7
29	84.8		14.1	14.1	0	28.3	7.1	24.7	0	0	0	17.7
30	67.1		21.2	14.1	0	49.4	7.1	21.2	0	0	0	17.7
31	70.6		14.1		0		7.1	21.2		0		17.7
Sum	1,610.9	1,984.9	360.3	433.7	0	649.4	587.0	321.6	212.0	0	0	138.0

Month	Current Year 1963								Period 1958-1963		
	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	131	† 9	0	52.3	3,214	6,200	10,045	3,214
Feb.			† 21	98.9	4	28.3	71.7	3,981	4,210	8,063	168
Mar.			3	53.0	† 4	0	12.0	739	3,839	6,641	739
Apr.			7	24.7	26	3.5	14.5	865	2,812	5,884	865
May				0		0	0	0	623	2,459	0
June			4	109	† 1	0	21.9	1,306	1,399	2,259	729
July			1	42.4	†29	7.1	19.1	1,177	1,924	2,606	1,177
Aug			† 22	31.8	† 3	0	10.6	648	3,293	6,144	648
Sept.			1	21.2	†18	0	7.1	429	2,542	5,104	429
Oct.				0		0	0	0	1,790	6,461	0
Nov.				0		0	0	0	200	1,054	0
Dec.			† 25	17.7	† 1	0	4.6	273	3,472	9,512	0
Yearly				131		0	17.7	12,632	30,192	43,674	12,632

† 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	53.0	0	0	0	0	0	0	0	0	81.2	191
2	0	70.6	0	0	0	0	0	0	0	14.1	0	205
3	0	53.0	0	0	0	0	0	0	0	0	0	131
4	0	53.0	0	0	0	0	0	0	0	0	0	81.2
5	0	35.3	0	0	0	0	0	0	0	0	0	0
6	0	53.0	0	0	0	0	0	0	0	0	0	0
7	10.6	17.7	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	17.7	0	0	0	0	0	0	0	0	0	0
11	0	53.0	0	0	0	0	0	0	0	0	0	0
12	0	35.3	0	0	0	0	0	0	0	0	0	0
13	0	53.0	0	0	0	0	0	0	0	0	3.5	0
14	0	35.3	0	0	0	0	0	0	0	0	10.6	0
15	0	35.3	0	0	106	0	0	0	0	0	7.1	0
16	0	35.3	0	0	124	0	0	0	0	21.2	3.5	0
17	106	35.3	0	0	106	0	0	0	0	3.5	0	0
18	106	0	0	0	106	0	0	0	0	24.7	0	0
19	0	0	0	0	53.0	0	0	0	0	28.3	0	0
20	0	0	0	0	88.3	0	0	0	0	28.3	7.1	0
21	0	17.7	0	0	67.1	0	0	0	17.7	31.8	7.1	0
22	0	35.3	0	0	53.0	0	0	0	17.7	42.4	21.2	0
23	0	45.9	0	0	67.1	0	0	0	28.3	49.4	127	0
24	28.3	24.7	0	0	124	0	0	0	28.3	60.0	205	0
25	106	35.3	0	0	141	0	0	0	0	81.2	219	0
26	88.3	35.3	0	0	222	0	0	0	0	56.5	198	0
27	124	35.3	0	0	17.7	0	0	0	0	84.8	180	0
28	141	7.1	0	0	0	0	0	0	0	88.3	215	0
29	106		0	0	0	0	0	0	0	88.3	219	0
30	70.6		0	0	0	0	0	0	0	159	219	0
31	0		0		0		0	0		180		0
Sum	886.8	872.4	0	0	1,275.2	0	0	0	92.0	1,041.8	1,723.3	608.2

Current Year 1963 — Period 1957-1963

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.			28	141	† 1	0	28.6	1,758	1,563	3,166	0
Feb.			2	70.6	† 8	0	31.1	1,730	901	2,788	0
Mar.				0		0	0	0	2,304	7,074	0
Apr.				0		0	0	0	1,678	4,462	0
May			26	222	† 1	0	41.0	2,528	2,073	4,413	0
June				0		0	0	0	431	1,505	0
July				0		0	0	0	939	4,296	0
Aug				0		0	0	0	501	1,857	0
Sept.			†23	28.3	† 1	0	3.2	183	705	1,800	0
Oct.			31	180	† 1	0	33.9	2,088	1,535	6,997	0
Nov.			†25	219	† 2	0	57.2	3,413	487	3,413	0
Dec.			2	205	† 5	0	19.4	1,205	560	1,205	0
Yearly				222		0	18.0	12,905	13,679	24,526	1,345

† And other days Ø Mean daily

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 1963.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	7.1	0	7.1	10.6	7.1	10.6	0	7.1	7.1	0	0
2	0	7.1	7.1	14.1	10.6	10.6	14.1	3.5	7.1	7.1	0	0
3	0	7.1	7.1	10.6	10.6	10.6	17.7	17.7	14.1	7.1	0	0
4	0	7.1	3.5	14.1	17.7	14.1	17.7	17.7	14.1	7.1	0	0
5	0	0	0	14.1	14.1	17.7	17.7	21.2	21.2	0	0	0
6	7.1	0	0	17.7	17.7	21.2	14.1	14.1	24.7	0	0	0
7	0	0	0	10.6	17.7	14.1	14.1	10.6	21.2	3.5	0	0
8	0	0	0	14.1	0	17.7	14.1	10.6	10.6	0	0	0
9	0	0	0	3.5	7.1	7.1	10.6	10.6	7.1	10.6	0	0
10	0	0	10.6	0	7.1	7.1	3.5	7.1	3.5	10.6	0	0
11	0	0	10.6	0	10.6	7.1	0	7.1	0	10.6	0	0
12	0	0	10.6	3.5	3.5	0	0	7.1	0	10.6	0	0
13	0	0	10.6	3.5	3.5	0	0	7.1	0	7.1	0	0
14	0	0	14.1	3.5	0	0	3.5	10.6	0	0	0	3.5
15	0	3.5	3.5	0	0	7.1	3.5	14.1	0	0	0	10.6
16	0	3.5	7.1	0	0	10.6	3.5	7.1	0	7.1	0	10.6
17	0	3.5	10.6	0	0	7.1	10.6	7.1	0	7.1	0	10.6
18	0	3.5	3.5	0	0	7.1	10.6	3.5	0	7.1	0	7.1
19	0	3.5	0	0	0	7.1	7.1	0	0	0	0	3.5
20	7.1	0	7.1	0	0	7.1	14.1	0	3.5	0	3.5	0
21	7.1	0	7.1	0	0	14.1	10.6	0	10.6	0	7.1	0
22	0	0	7.1	0	0	14.1	14.1	7.1	10.6	0	7.1	0
23	0	0	7.1	3.5	0	14.1	7.1	7.1	7.1	0	7.1	3.5
24	0	0	7.1	3.5	0	17.7	7.1	7.1	0	0	0	3.5
25	0	0	7.1	0	7.1	17.7	10.6	7.1	3.5	0	0	3.5
26	0	0	3.5	3.5	17.7	17.7	3.5	17.7	0	0	3.5	3.5
27	0	7.1	7.1	3.5	10.6	10.6	14.1	17.7	0	0	3.5	3.5
28	0	7.1	0	3.5	14.1	10.6	14.1	14.1	0	0	3.5	3.5
29	3.5		0	3.5	14.1	10.6	17.7	14.1	0	0	0	3.5
30	0		0	3.5	10.6	10.6	17.7	14.1	0	0	0	3.5
31	0		0		7.1		7.1	3.5		0		3.5
Sum	24.8	60.1	152.1	140.9	212.1	318.3	310.8	286.4	166.0	102.7	35.3	77.4

Month	Current Year 1963								Period 1958-1963		
	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.			† 6	7.1	† 1	0	1.1	59.2	148	358	0
Feb.			† 1	7.1	† 5	0	2.5	140	229	791	0
Mar.			14	14.1	† 1	0	5.7	346	161	346	0
Apr.			6	17.7	† 10	0	4.9	288	221	379	0
May			† 4	17.7	† 8	0	7.1	440	278	440	112
June			6	21.2	† 12	0	10.2	616	371	616	175
July			† 3	17.7	† 11	0	9.9	618	459	618	371
Aug			5	21.2	† 1	0	9.2	559	618	1,648	322
Sept.			6	24.7	† 11	0	5.3	331	426	1,240	199
Oct.			† 9	10.6	† 5	0	3.2	186	92.4	186	0
Nov.			† 21	7.1	† 1	0	1.1	66.5	36.5	112	0
Dec.			† 15	10.6	† 1	0	2.8	165	115	255	0
Yearly				24.7		0	5.3	3,814.7	2,760	3,814.7	2,022

† 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 77 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 through December 1963. 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	509	347	480	164	79.8	327	0	0	0	470	1,080	650
2	509	463	477	162	71.0	335	0	0	0	427	1,030	586
3	487	685	431	143	62.9	324	0	0	0	343	1,030	466
4	487	901	378	132	90.8	265	0	0	0	301	1,090	438
5	501	1,120	347	121	114	229	0	0	0	267	1,120	406
6	565	932	331	120	137	212	0	0	0	245	1,170	388
7	498	551	299	110	158	187	0	0	0	223	1,170	413
8	441	364	299	101	184	171	0	0	0	201	1,150	438
9	463	374	257	101	209	162	0	0	0	190	1,210	473
10	717	544	243	93.9	179	154	0	0	0	0	1,160	473
11	961	448	227	86.5	155	139	0	0	0	0	1,170	46.3
12	992	374	225	86.9	183	130	0	0	0	0	1,260	43.1
13	897	357	224	87.6	272	116	0	0	0	0	1,480	39.9
14	886	562	234	82.3	452	109	0	0	0	0	1,490	41.7
15	915	713	243	77.0	579	72.7	0	0	0	0	1,410	43.1
16	904	494	251	70.3	675	36.4	0	0	0	0	1,290	45.2
17	975	406	256	69.2	826	0	0	0	0	0	1,180	44.5
18	1,150	371	261	68.2	904	0	0	0	0	0	1,070	43.1
19	1,140	484	237	67.1	961	0	0	0	0	0	1,080	43.8
20	918	463	225	60.7	961	0	0	0	140	0	1,090	45.2
21	742	473	225	50.1	791	0	0	0	844	345	1,090	49.8
22	936	498	248	44.1	710	0	0	0	1,920	883	1,140	54.7
23	964	505	221	53.3	636	0	0	0	2,070	1,490	1,230	59.7
24	855	512	195	63.2	562	0	0	0	1,480	1,600	1,310	62.5
25	763	537	181	79.1	565	0	0	0	1,400	1,560	1,360	65.7
26	1,040	540	197	80.2	523	0	0	0	1,420	1,600	1,440	68.9
27	1,260	540	203	86.2	526	0	0	0	1,010	1,490	1,540	72.0
28	1,050	498	209	92.2	519	120	0	0	611	1,450	1,410	73.1
29	689		204	91.8	424	120	0	0	487	1,370	1,260	74.2
30	551		188	80.9	367	120	0	0	480	1,200	1,190	75.2
31	424		182		357		0	0		1,060		76.3
Sum	24,189	15,056	8,178	2,724.8	13,233.5	3,329.1	0	0	11,862	16,715	36,700	5,899.0

Month	Current Year 1963								Period 1960-1963		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	16.47	15.52	27	1,330	5	473	780	47,988	80,995	225,224	1,111
Feb.	16.27	15.52	5	1,240	1	347	537	29,862	38,033	55,735	12,045
Mar.	15.52	14.73	1	501	31	52.6	264	16,226	8,936	16,226	98.9
Apr.	14.76	14.27	21	182	1	44.1	90.8	5,404	4,604	9,978	269
May	15.85	14.14	20	1,010	3	62.9	427	26,241	19,643	31,886	128
June	15.03	13.91	1	357	†17	0	111	6,600	1,836	6,600	0
July	13.94	13.85		0		0	0	0	0	0	0
Aug.	14.21	13.85		0		0	0	0	0	0	0
Sept.	16.93	14.04	23	2,170	† 1	0	396	23,532	8,136	23,532	0
Oct.	16.60	14.76	† 24	1,600	†10	0	540	33,137	25,647	57,672	1,549
Nov.	16.80	16.14	27	1,540	3	1,030	1,220	72,784	65,363	94,442	30,553
Dec.	16.50	15.22	1	650	13	39.9	190	11,703	48,393	97,155	11,703
Yearly	16.93	13.85		2,170		0	378	273,477	301,587	503,260	84,799

† And other days

COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.58	15.68	15.49	14.70	14.37	14.96	13.91	13.91	14.07	15.68	16.17	16.50
2	15.58	15.78	15.49	14.70	14.34	14.93	13.91	13.88	14.07	15.62	16.14	16.47
3	15.55	15.91	15.42	14.63	14.30	14.86	13.91	13.88	14.07	15.49	16.14	16.37
4	15.55	16.01	15.32	14.60	14.30	14.76	13.91	13.88	14.14	15.42	16.21	16.27
5	15.58	16.21	15.26	14.57	14.27	14.67	13.88	13.91	14.14	15.32	16.24	16.14
6	15.68	16.17	15.22	14.57	14.24	14.63	13.88	13.91	14.17	15.26	16.31	16.08
7	15.62	15.94	15.16	14.53	14.21	14.57	13.88	13.94	14.17	15.19	16.31	15.98
8	15.52	15.81	15.16	14.50	14.21	14.50	13.91	13.94	14.14	15.12	16.31	15.91
9	15.52	15.81	15.12	14.50	14.21	14.47	13.91	13.94	14.11	15.09	16.37	15.91
10	15.78	16.01	15.16	14.47	14.17	14.44	13.91	13.94	14.11	15.06	16.34	15.91
11	15.94	15.88	15.19	14.44	14.17	14.37	13.91	13.94	14.11	15.03	16.37	15.85
12	15.98	15.78	15.12	14.44	14.47	14.34	13.88	13.94	14.11	14.96	16.47	15.78
13	15.91	15.75	15.06	14.44	14.90	14.27	13.88	13.94	14.11	14.93	16.67	15.75
14	15.91	15.81	15.03	14.40	15.16	14.24	13.88	13.98	14.07	14.90	16.70	15.72
15	15.94	15.81	14.99	14.37	15.32	14.21	13.88	13.98	14.11	14.83	16.67	15.68
16	15.94	15.68	14.96	14.34	15.39	14.17	13.88	14.01	14.11	14.80	16.60	15.65
17	16.01	15.65	14.93	14.34	15.49	14.17	13.85	14.01	14.11	14.76	16.54	15.62
18	16.14	15.75	14.90	14.34	15.62	14.14	13.85	14.11	14.24	14.80	16.47	15.58
19	16.17	15.81	14.83	14.34	15.75	14.11	13.88	14.11	14.34	14.83	16.47	15.55
20	16.08	15.75	14.80	14.34	15.81	14.11	13.88	14.14	14.80	14.96	16.47	15.52
21	16.11	15.68	14.80	14.30	15.72	14.11	13.88	14.17	16.04	15.49	16.47	15.49
22	16.14	15.65	14.86	14.30	15.68	14.11	13.91	14.14	16.77	16.11	16.50	15.42
23	16.17	15.62	14.83	14.34	15.65	14.11	13.91	14.14	16.86	16.50	16.57	15.39
24	16.11	15.58	14.80	14.37	15.62	14.04	13.91	14.11	16.54	16.60	16.63	15.39
25	16.04	15.58	14.80	14.44	15.65	14.04	13.91	14.11	16.40	16.57	16.67	15.35
26	16.27	15.58	14.83	14.40	15.62	14.01	13.91	14.14	16.44	16.60	16.73	15.35
27	16.44	15.58	14.83	14.40	15.65	14.01	13.91	14.11	16.21	16.50	16.80	15.32
28	16.31	15.52	14.83	14.40	15.55	13.94	13.91	14.11	15.81	16.47	16.70	15.29
29	16.04		14.80	14.37	15.32	13.94	13.91	14.11	15.68	16.44	16.57	15.29
30	15.91		14.76	14.34	15.16	13.94	13.91	14.11	15.68	16.34	16.50	15.26
31	15.78		14.76		15.09		13.94	14.07		16.24		15.26
Avg.	15.91	15.78	15.02	14.44	15.01	14.31	13.90	14.02	14.86	15.55	16.47	15.71

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, 400 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: Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1958 through December 1963.

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 measured discharge, 91.8 second-feet, November 10, 1958; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.0	2.3	0	3.0	0.8	1.2	0	0	0	5.7	4.8	3.4
2	2.2	2.1	.2	2.7	1.0	1.2	0	0	0	5.9	4.6	3.4
3	2.3	2.0	.5	2.4	1.2	1.2	0	0	0	6.2	4.3	3.4
4	2.4	1.8	.7	2.3	1.3	1.2	0	0	0	6.5	4.1	3.5
5	2.3	1.7	.9	2.1	1.5	1.2	0	0	0	6.7	3.5	3.6
6	2.2	1.6	1.1	1.9	1.6	1.2	0	0	0	7.0	2.9	3.6
7	2.0	1.4	1.4	1.8	1.7	1.2	0	0	0	7.3	2.3	3.7
8	1.9	1.3	1.6	1.6	1.9	1.2	0	0	0	7.6	1.7	3.8
9	1.8	1.1	1.8	1.6	2.0	1.2	0	0	0	7.8	1.2	3.8
10	1.8	.8	2.0	1.4	1.8	1.2	0	0	0	8.1	.6	3.8
11	1.8	.5	2.3	1.4	1.7	1.2	0	0	0	8.4	0	3.7
12	1.7	.2	2.6	1.3	1.6	1.2	0	0	0	8.7	0	3.7
13	1.7	0	2.9	1.2	1.4	1.2	0	0	0	8.9	0	3.6
14	1.7	0	3.1	1.1	1.4	1.2	0	0	0	9.2	0	3.5
15	1.7	0	3.4	1.1	1.3	1.2	0	0	0	9.0	0	3.5
16	1.6	0	3.7	1.0	1.3	1.1	0	0	0	8.7	0	3.4
17	1.6	0	4.0	1.0	1.2	1.1	0	0	0	8.5	0	3.6
18	1.5	0	4.2	.9	1.2	1.1	0	0	0	8.3	0	3.7
19	1.4	0	4.5	.8	1.2	1.0	0	0	0	8.1	.5	3.8
20	1.4	0	4.8	.8	1.1	1.0	0	0	0	7.8	1.0	4.0
21	1.3	0	5.1	.7	1.1	.9	0	0	0	7.6	1.4	4.2
22	1.3	0	5.4	.7	1.1	.8	0	0	0	7.3	1.9	4.3
23	1.2	0	5.2	.7	1.1	.8	0	0	0	7.1	2.4	4.4
24	1.3	0	5.0	.7	1.1	.7	0	0	.8	6.9	2.9	3.9
25	1.4	0	4.8	.6	1.1	.6	0	0	1.5	6.6	3.4	3.3
26	1.6	0	4.6	.6	1.1	.5	0	0	2.3	6.4	3.4	2.8
27	1.7	0	4.4	.6	1.1	.4	0	0	3.1	6.1	3.4	2.2
28	1.8	0	4.2	.6	1.1	.3	0	0	3.8	5.9	3.4	1.7
29	1.9		4.0	.6	1.1	.2	0	0	4.6	5.6	3.4	1.1
30	2.0		2.7	.7	1.1	.1	0	0	5.4	5.3	3.4	.6
31	2.2		3.4		1.2		0	0		5.1		0
Sum	54.7	16.8	95.5	37.9	40.4	28.6	0	0	21.5	224.3	60.5	101.0

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
				Current Year 1963					Period 1958-1963		
Jan.			4	2.4	23	1.2	1.8	109	853	1,980	21.1
Feb.			1	2.3	† 13	0	.6	33.2	675	1,891	33.2
Mar.			22	5.4	1	0	3.1	189	761	2,029	189
Apr.			1	3.0	29	.6	1.3	75.4	1,373	2,709	75.4
May			9	2.0	1	.8	1.3	81.1	1,561	2,615	81.1
June			† 7	1.2	30	.1	1.0	56.7	968	1,676	56.7
July				0		0	0	0	162	682	0
Aug.				0		0	0	0	329	1,001	0
Sept.			30	5.4	† 1	0	.7	43.0	833	2,059	0
Oct.			14	9.2	31	5.1	7.2	444	1,636	4,610	0
Nov.			1	4.8	† 11	0	2.0	120	1,137	4,084	120
Dec.			23	4.4	31	0	3.2	200	385	1,089	74.6
Yearly				9.2		0	1.8	1,351.4	10,674	24,596	1,351.4

† 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)	
	1963	Average 1935-1963	1963	Average 1951-1963	1963	Average 1939-1963	1963	Estimated Average
Jan.	22,679.0	16,815.4	1,682.0	1,635.9	540.9	559.7	24,901.9	19,011.0
Feb.	22,497.0	16,436.1	1,699.0	1,680.0	518.6	566.2	24,714.6	18,682.3
Mar.	21,867.0	16,111.9	1,703.0	1,679.4	556.0	581.3	24,126.0	18,372.6
April	21,062.0	16,331.8	1,734.0	1,694.9	592.2	607.8	23,388.2	18,634.5
May	20,201.0	17,692.3	1,803.0	1,730.5	600.4	600.2	22,604.4	20,023.0
June	19,538.0	19,598.6	1,596.0	1,596.4	593.2	606.0	21,727.2	21,801.0
July	18,695.0	19,906.4	1,465.0	1,453.6	556.5	596.0	20,716.5	21,956.0
Aug.	17,935.0	19,574.6	1,395.0	1,390.1	565.8	579.0	19,895.8	21,543.7
Sept.	17,373.0	19,126.6	1,406.0	1,404.7	542.9	574.9	19,321.9	21,106.2
Oct.	16,905.0	18,730.3	1,377.0	1,424.9	549.0	581.3	18,831.0	20,736.5
Nov.	16,515.0	18,342.1	1,389.0	1,506.2	545.8	568.1	18,449.8	20,416.4
Dec.	16,007.0	17,874.8	1,553.0	1,613.1	534.8	563.1	18,094.8	20,051.0
Avg.	19,272.8	18,045.1	1,566.8	1,567.5	558.0	582.0	21,397.6	20,194.6
Max.	22,679.0	27,780.0	1,803.0	1,808.0	600.4	688.7	24,901.9	28,235.0
Min.	16,007.0	* 10,727.0	1,377.0	1,186.0	518.6	76.9	18,094.8	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 deposited silt would occupy a volume of one acre-foot, or one cubic foot of deposited silt would weigh 85 pounds.

Month	1963							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 1956-1963

Jan.	159,018,000	20,100	13	0.0126	0.0330	0.0022	10.9	68.6	336	1.6
Feb.	167,419,000	16,300	12	.0097	.0189	.0059	8.8	27.7	116	1.6
Mar.	247,936,000	60,700	13	.0244	.0445	.0063	32.9	85.6	499	8.8
Apr.	270,631,000	38,500	13	.0142	.0278	.0056	20.8	82.8	434	9.4
May	139,602,000	13,400	14	.0096	.0243	.0045	7.3	31.9	201	4.3
June	242,707,000	35,100	12	.0144	.0246	.0065	19.0	28.9	92.6	6.3
July	285,807,000	41,000	14	.0143	.0322	.0078	22.2	37.9	89.3	12.8
Aug.	326,078,000	45,000	13	.0138	.0612	.0043	24.4	35.4	103	8.4
Sept.	242,140,000	56,400	16	.0233	.0591	.0044	30.5	16.2	43.6	2.9
Oct.	125,100,000	8,200	12	.0065	.0116	.0019	4.4	7.8	20.0	1.6
Nov.	147,392,000	12,000	11	.0081	.0407	.0033	6.5	24.2	89.9	1.0
Dec.	138,335,000	14,600	12	.0105	.0190	.0046	7.9	47.2	174	.6
Yearly	2,492,165,000	361,300	155	0.0145	0.0612	0.0019	195.6	494	2,198	98.1

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

Colorado River at Southerly International Boundary

Period 1946-1963

Jan.	62,867,000	8,500	7	0.0135	0.0224	[u]0.0030	4.6			
Feb.	42,970,000	2,800	8	.0065	.0170	.0020	1.5			
Mar.	33,457,000	1,400	7	.0042	.0050	.0031	.8			
Apr.	11,698,000	1,100	1	.0094	.0152	[u] .0020	.6			
May										
June										
July										
Aug.										
Sept.	40,981,000	12,100	2	.0294	.0505	[u] .0010	6.6			
Oct.										
Nov.										
Dec.										
Yearly										

Samples by U. S. Section, and Analyses by Mexican Section, Method A [u] Estimated

SUSPENDED SILT

Intake Canal at Morelos Diversion Structure

Period 1952-1963

Month	1963 Tons Water	1963 Tons Silt	1963 No. of Samples	1963 Gravimetric Percentages Average	1963 Gravimetric Percentages Maximum Sample	1963 Gravimetric Percentages Minimum Sample	1963 Acre-Feet at 1,847 Tons Per Acre Foot	Period of Record Average	Period of Record Maximum	Period of Record Minimum
Jan.	90,963,000	6,281	4	0.0069	0.0195	0.0029	3.4	6.6	22.3	0.2
Feb.	119,143,000	7,908	4	.0066	.0100	.0045	4.3	7.1	19.4	.9
Mar.	200,820,000	71,135	4	.0354	.0787	.0097	38.4	65.6	154	11.1
Apr.	251,249,000	65,933	5	.0262	.0503	.0092	35.6	60.6	121	16.1
May	116,944,000	9,407	4	.0080	.0108	.0049	5.1	17.6	51.2	5.1
June	23,443,000	35,200	4	.0150	.0216	.0083	19.1	52.1	109	14.8
July	274,936,000	59,013	4	.0214	.0459	.0142	31.9	70.3	156	25.9
Aug.	312,498,000	76,321	31	.0244	.0432	.0042	41.3	65.2	135	15.4
Sept.	188,049,000	41,381	23	.0220	.0622	.0017	22.4	27.6	64.7	2.8
Oct.	110,572,000	15,635	22	.0141	.0444	.0017	8.4	6.2	12.0	.3
Nov.	141,344,000	10,474	4	.0074	.0113	.0033	5.7	2.5	9.3	.2
Dec.	131,944,000	10,206	5	.0077	.0142	.0044	5.5	5.8	14.8	1.1
Yearly	1,961,905,000	408,894	114	0.0208	0.0787	0.0017	221.1	387	696	158

Samples and Analyses by Mexican Section, Method B

Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1963

Month	1963 Tons Water	1963 Tons Silt	1963 No. of Samples	1963 Gravimetric Percentages Average	1963 Gravimetric Percentages Maximum Sample	1963 Gravimetric Percentages Minimum Sample	1963 Acre-Feet at 1,847 Tons Per Acre Foot	Period of Record Average	Period of Record Maximum	Period of Record Minimum
Jan.	67,048,000	20,458	9	0.0305	0.1404	0.0111	11.0	68.3	251	4.9
Feb.	51,267,000	15,143	8	.0295	.0495	.0082	8.2	9.4	13.9	7.2
Mar.	7,028,000	847	8	.0120	.0245	.0049	.5	1.4	4.1	.4
Apr.	1,065,000	84	8	.0074	.0168	.0030	.1	.3	1.1	.1
May	32,614,000	2,649	9	.0081	.0092	.0030	1.5	1.1	1.5	.1
June	433,000	34	8	.0079	.0143	.0061	0	.1	.1	0
July	665,000	71	6	.0106	.0122	.0085	0	0	.1	0
Aug.	478,000	33	8	.0069	.0121	.0057	0	.1	.2	0
Sept.	35,670,000	8,394	13	.0235	.0508	.0049	4.5	1.2	4.5	0
Oct.	38,295,000	3,790	6	.0099	.0164	.0020	2.0	6.7	20.8	.1
Nov.	63,598,000	5,988	8	.0094	.0170	.0030	3.2	10.9	36.0	.7
Dec.	6,152,000	301	9	.0049	.0120	.0037	.2	8.2	13.0	.2
Yearly	304,313,000	57,792	100	0.0190	0.1404	0.0020	31.2	108	289	26.3

Samples and Analyses by Mexican Section, Method C

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES
1963

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	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C	Date	ECx10^6 @25°C

Colorado River at Northerly International Boundary

January		February		April		May		July		August		October		November	
1	*2,650	17	*2,200	3	*2,100	20	3,450	3	*2,100	19	1,790	1	*4,250	17	*2,500
2	*2,650	18	2,450	4	*2,000	20	*3,500	4	*2,350	19	*1,800	2	*3,200	18	2,410
3	*2,250	18	*2,550	5	*2,050	21	*3,600	5	*2,200	20	*1,950	3	*2,100	18	*2,400
4	*2,000	19	*2,650	6	*2,050	22	3,820	6	*2,200	21	*2,000	4	*2,000	19	*2,450
5	*2,650	20	*2,550	7	*1,950	22	*3,600	7	*2,200	22	*2,000	5	*1,650	20	*2,450
6	*2,450	21	*2,600	8	2,000	23	*3,250	8	2,020	23	*2,050	6	*1,750	21	*2,250
7	2,910	22	*2,650	8	*2,000	24	*3,400	8	*2,100	24	*2,150	7	1,640	22	*2,300
7	*2,800	23	*2,700	9	*1,950	25	*3,300	9	*2,100	25	*2,100	7	*1,650	23	*2,100
8	*3,250	24	*2,700	10	*2,000	26	*2,700	10	*2,100	26	2,240	8	*1,800	24	*2,050
9	*3,400	25	2,760	11	*2,000	27	2,760	11	*2,050	26	*2,200	9	*1,900	25	*2,100
10	*3,750	25	*2,700	12	*1,950	27	*2,700	12	*2,100	27	*2,050	10	*1,900	26	2,140
11	*3,800	26	*2,600	13	*1,900	28	*2,550	13	*2,100	28	*2,150	11	*1,900	26	*2,200
12	*4,000	27	*2,650	14	*1,900	29	*2,700	14	*2,050	29	*2,100	12	*1,900	27	*2,500
13	*4,150	28	*2,800	15	2,060	30	*2,700	15	1,960	30	*2,200	13	*1,850	28	*2,350
14	4,280	March		15	*2,000	31	*2,600	15	*1,950	31	*2,200	14	1,700	29	*2,300
14	*4,100	1	*2,600	16	*2,150	June		16	*2,050	September		14	*1,700	30	*1,250
15	*4,000	2	*2,500	17	*2,100	1	*2,450	17	*2,000	1	*2,350	15	*1,600	December	
16	*2,500	3	*2,550	18	*2,200	2	*2,450	18	*2,000	2	*2,200	16	*1,700	1	*2,300
17	*2,400	4	2,500	19	*2,300	3	2,500	19	*2,050	3	2,480	17	*1,750	2	2,420
18	*2,700	4	*2,550	20	*2,700	3	*2,500	20	*2,000	3	*2,350	18	*1,700	2	*2,400
19	*3,900	5	*2,450	21	*2,650	4	*2,550	21	*2,100	4	*2,400	19	*1,400	3	*2,600
20	*3,900	6	*2,100	22	2,650	5	*2,550	22	1,950	5	*2,150	20	*1,400	4	*2,550
21	3,920	7	*2,400	22	*2,550	6	*2,600	22	*2,000	6	*2,200	21	1,360	5	*2,450
21	*3,900	8	*2,350	23	*2,300	7	*2,400	23	*1,980	7	*2,200	21	*1,425	6	*2,500
22	*2,800	9	*2,300	24	*2,350	8	*2,450	24	*1,900	8	*2,200	22	*1,450	7	*2,500
23	*2,100	10	*2,250	25	*2,750	9	*2,450	25	*1,950	9	2,450	23	*1,600	8	*2,100
24	*2,050	11	2,370	26	*2,700	10	2,380	26	*2,000	9	*2,450	24	*1,600	9	2,230
25	*2,150	11	*2,300	27	*2,600	10	*2,350	27	*1,950	10	*2,450	25	*1,950	9	*2,200
26	*2,550	12	*2,200	28	*2,600	11	*2,200	28	*2,100	11	*2,850	26	*1,800	10	*2,450
27	*2,550	13	*2,300	29	2,640	12	*2,000	29	2,080	12	*2,550	27	*1,900	11	*2,550
28	2,500	14	*2,500	29	*2,600	13	*2,000	29	*2,000	13	*2,550	28	1,870	12	*2,500
28	*2,500	15	*2,400	30	*2,600	14	*2,300	30	*1,900	14	*2,450	28	*2,000	13	*2,500
29	*2,500	16	*2,400	May		15	*2,200	31	*1,980	15	*2,500	29	*2,000	14	*2,550
30	*2,400	17	*2,300	1	*2,700	16	*2,300	August		16	2,560	30	*2,050	15	*2,300
31	*2,450	18	2,150	2	*2,700	17	2,350	1	*1,950	16	*2,500	31	*2,200	16	2,490
February		18	*2,000	3	*2,600	17	*2,450	2	*1,900	17	*2,500	November		16	*2,450
1	*2,400	19	*1,900	4	*2,700	18	*2,450	3	*1,900	18	*1,400	1	*2,300	17	*2,300
2	*2,300	20	*1,900	5	*2,600	19	*2,450	4	*1,650	19	1,220	2	*2,300	18	*2,500
3	*2,200	21	*2,000	6	2,640	20	*2,200	5	1,840	19	*1,230	3	*2,450	19	*2,500
4	2,380	22	*2,200	6	*2,600	21	*2,200	5	*1,750	20	*1,375	4	2,470	20	*2,450
4	*2,300	23	*2,000	7	*2,700	22	*2,100	6	*1,800	21	*1,450	4	*2,450	21	*2,450
5	*2,550	24	*2,100	8	*2,600	23	*2,000	7	*1,800	22	*1,950	5	*2,400	22	*2,500
6	*2,550	25	2,090	9	*2,900	24	1,930	8	*1,700	23	1,950	6	*2,400	23	2,410
7	*2,800	25	*2,200	10	*3,200	24	*2,050	9	*1,750	23	*2,000	7	*2,500	23	*2,400
8	*2,650	26	*2,200	11	*3,500	25	*2,000	10	*1,800	24	*1,850	8	*2,550	24	*2,450
9	*2,600	27	*2,150	12	*3,400	26	*1,900	11	*1,850	25	*2,100	9	*2,450	25	*2,300
10	*2,600	28	*2,200	13	3,390	27	*1,850	12	2,010	26	*2,950	10	*2,400	26	*1,950
11	2,700	29	*2,100	13	*3,200	28	*1,850	12	*2,000	27	*3,200	11	2,290	27	*2,150
11	*2,650	30	*2,200	14	*3,400	29	*1,900	13	*1,950	28	*3,300	11	*2,200	28	*2,400
12	*2,300	31	*2,000	15	*3,400	30	*2,000	14	*1,900	29	*3,300	12	*2,200	29	*2,450
13	*2,200	April		16	*3,200	July		15	*1,900	30	3,330	13	*2,400	30	2,450
14	*2,500	1	2,070	17	*2,900	1	1,850	16	*1,950	30	*3,300	14	*2,250	30	*2,450
15	*2,400	1	*2,100	18	*2,650	1	*1,850	17	*1,900	October		15	*2,450	31	*2,500
16	*2,350	2	*2,000	19	*3,400	2	*1,950	18	*1,800	1	4,630	16	*2,300		

* Determinations made by the Mexican Section of this Commission

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES
1963

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

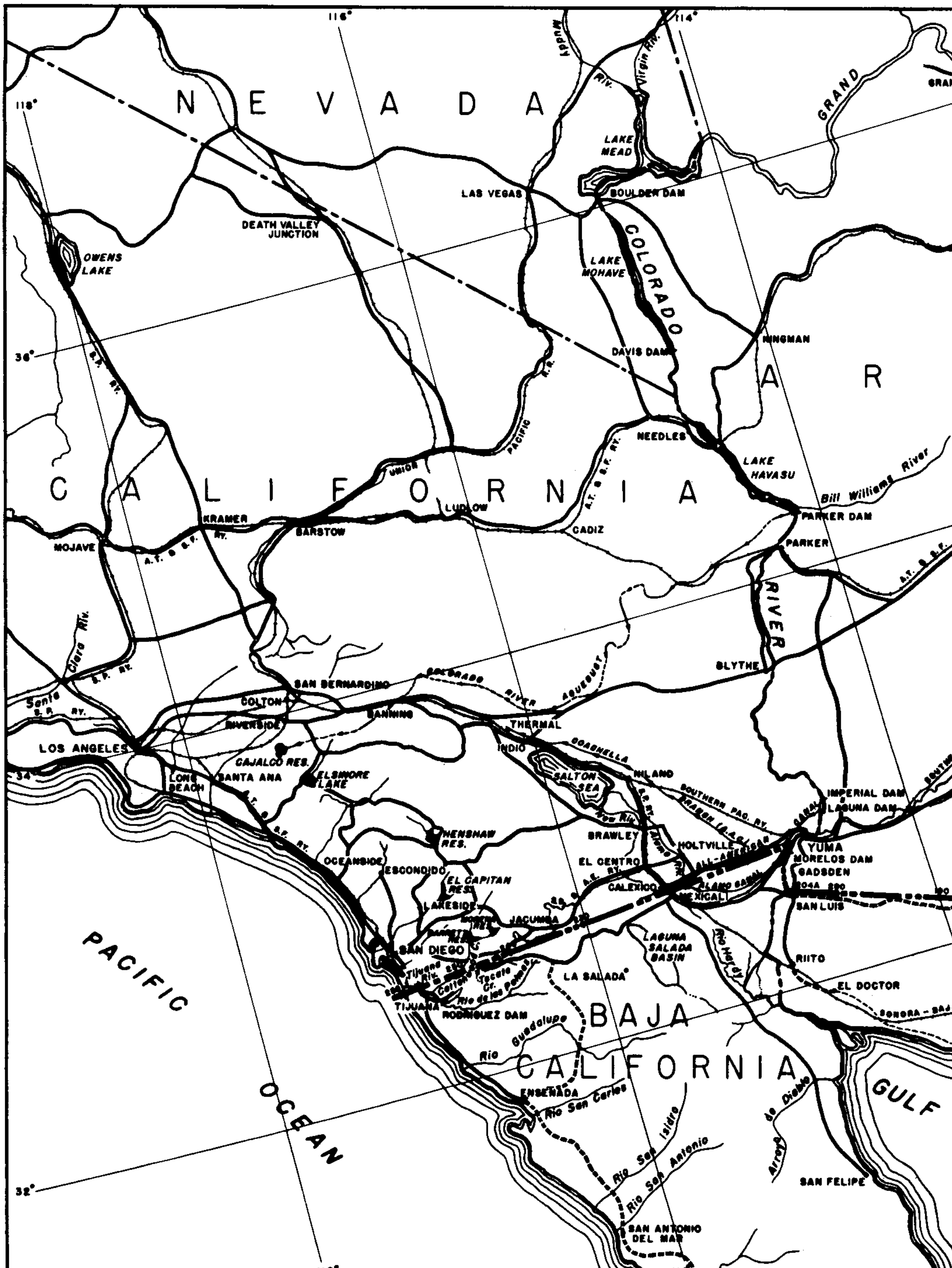
Colorado River at Southerly International Boundary

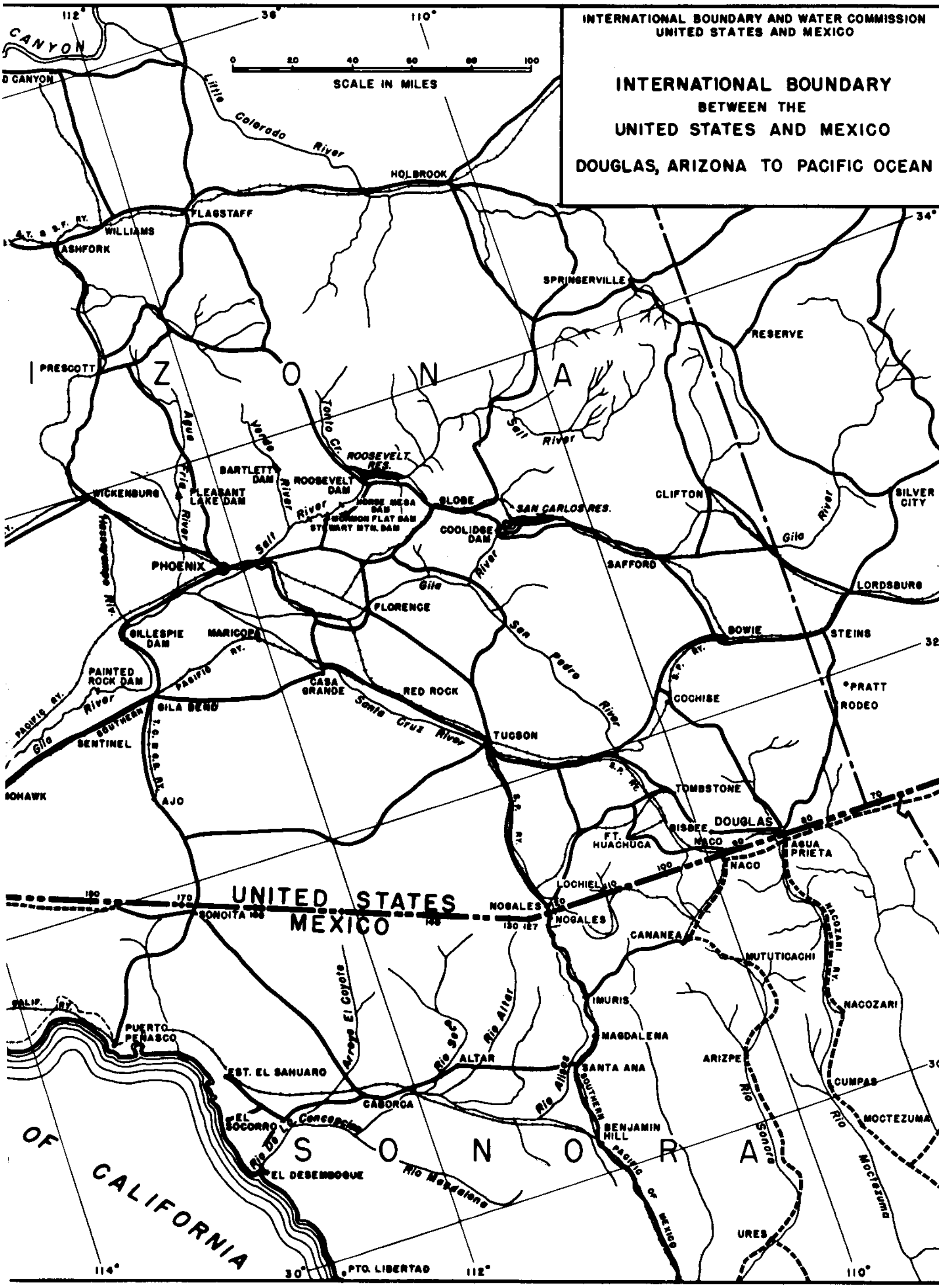
January		February		March		May		June		August		October		November	
2	*2,000	12	*2,400	29	2,360	2	1,810	11	*1,700	2	1,520	4	2,040	19	*1,800
4	2,250	15	2,430	30	*2,000	7	*1,550	14	1,770	6	*1,500	8	*1,600	22	1,700
8	*2,800	21	2,540	April		10	2,920	18	*1,250	9	1,970	10	1,570	26	*2,050
10	3,400	21	*2,500	5	2,400	14	3,150	21	1,760	16	1,410	15	*1,700	29	1,810
17	*2,800	27	*2,500	5	*2,400	14	*3,000	25	*1,700	23	1,820	23	*1,450	December	
18	2,840	March		9	*1,850	16	3,340	28	1,720	24	*1,800	24	1,790	3	*1,850
23	*3,700	1	2,370	12	1,850	21	*3,300	July		29	1,450	29	*1,700	6	1,890
25	2,350	7	2,730	16	*1,550	23	3,520	2	*1,650	29	*1,450	November		10	*1,450
30	*2,600	7	*2,400	19	1,620	30	*1,700	5	1,370	September		1	2,000	13	1,740
February		15	2,640	23	*1,800	31	1,860	9	*1,950	6	1,690	5	*1,800	17	*1,600
1	2,480	15	*2,500	26	1,830	June		12	1,550	7	*1,500	8	1,750	20	1,730
6	*2,500	22	2,730	30	*1,800	4	*1,850	16	*1,300	13	1,450	12	*2,300	27	1,620
8	2,810	23	*2,550			6	1,890	19	1,600	13	*1,500	15	1,780	27	*1,650
								26	*1,600	27	2,090			30	*1,700

* Determinations made by the Mexican Section of this Commission

Intake Canal at Morelos Diversion Structure

January		February		April		May		July		August		October		November	
1	2,650	16	2,300	2	1,850	18	2,650	2	1,950	17	1,850	1	4,250	16	2,350
2	2,600	17	2,200	3	1,900	19	3,400	3	2,100	18	1,700	2	3,200	17	2,500
3	2,200	18	2,550	4	1,850	20	3,500	4	2,100	19	1,750	3	2,100	18	2,400
4	1,800	19	2,650	5	1,900	21	3,600	5	2,200	20	1,900	4	2,000	19	2,450
5	2,650	20	2,550	6	1,900	22	3,600	6	2,200	21	1,950	5	1,650	20	2,450
6	2,450	21	2,600	7	1,900	23	3,250	7	2,200	22	1,950	6	1,700	21	2,250
7	2,800	22	2,600	8	1,950	24	3,400	8	2,100	23	2,000	7	1,650	22	2,250
8	3,300	23	2,700	9	1,850	25	3,300	9	2,100	24	2,100	8	1,800	23	2,100
9	3,400	24	2,700	10	1,950	26	2,700	10	2,100	25	2,150	9	1,900	24	2,050
10	3,750	25	2,700	11	1,950	27	2,650	11	2,000	26	2,200	10	1,900	25	2,100
11	3,800	26	2,600	12	1,900	28	2,600	12	2,000	27	2,000	11	1,900	26	2,200
12	4,000	27	2,600	13	1,800	29	2,600	13	2,100	28	2,100	12	1,900	27	2,500
13	4,200	28	2,800	14	1,850	30	2,700	14	2,100	29	2,100	13	1,850	28	2,350
14	4,100	March		15	1,950	31	2,550	15	1,950	30	2,200	14	1,700	29	2,300
15	4,100	1	2,600	16	2,100	June		16	2,000	31	2,200	15	1,600	30	1,250
16	2,400	2	2,500	17	2,100	1	2,450	17	2,000	September		16	1,700	December	
17	2,350	3	2,550	18	2,250	2	2,450	18	2,000	1	2,350	17	1,750	1	2,300
18	2,700	4	2,500	19	2,300	3	2,500	19	1,950	2	2,100	18	1,700	2	2,400
19	4,000	5	2,450	20	2,550	4	2,450	20	1,950	3	2,250	19	1,350	3	2,600
20	4,000	6	2,000	21	2,550	5	2,500	21	2,000	4	2,400	20	1,350	4	2,550
21	3,900	7	2,350	22	2,600	6	2,500	22	2,000	5	2,100	21	1,400	5	2,450
22	2,900	8	2,000	23	2,300	7	2,400	23	1,980	6	2,150	22	1,450	6	2,500
23	2,100	9	2,150	24	2,400	8	2,400	24	1,900	7	2,200	23	1,550	7	2,500
24	1,800	10	2,100	25	2,750	9	2,450	25	1,900	8	2,200	24	1,550	8	2,050
25	1,850	11	2,000	26	2,700	10	2,300	26	1,950	9	2,450	25	1,900	9	2,200
26	2,450	12	2,000	27	2,700	11	2,100	27	1,950	10	2,450	26	1,850	10	2,450
27	2,550	13	2,100	28	2,600	12	2,000	28	2,050	11	2,850	27	1,900	11	2,550
28	2,500	14	2,200	29	2,600	13	1,950	29	2,000	12	2,550	28	2,000	12	2,550
29	2,500	15	2,400	30	2,600	14	2,200	30	1,900	13	2,550	29	2,000	13	2,550
30	2,400	16	2,350	May		15	2,200	31	1,980	14	2,450	30	2,050	14	2,550
31	2,450	17	2,200	1	2,700	16	2,400	August		15	2,500	31	2,200	15	2,300
February		18	1,800	2	2,700	17	2,400	1	1,900	16	2,500	November		16	2,450
1	2,400	19	1,650	3	2,600	18	2,450	2	1,880	17	2,500	1	2,250	17	2,300
2	2,250	20	1,700	4	2,700	19	2,600	3	1,850	18	1,250	2	2,300	18	2,500
3	2,200	21	1,950	5	2,600	20	2,400	4	1,600	19	1,150	3	2,400	19	2,450
4	2,300	22	2,000	6	2,600	21	2,200	5	1,700	20	1,300	4	2,450	20	2,400
5	2,550	23	1,950	7	2,700	22	2,100	6	1,750	21	1,400	5	2,400	21	2,450
6	2,550	24	2,000	8	2,600	23	2,000	7	1,700	22	1,900	6	2,400	22	2,500
7	2,800	25	2,000	9	2,900	24	1,950	8	1,600	23	1,900	7	2,450	23	2,400
8	2,650	26	2,050	10	3,200	25	1,850	9	1,650	24	1,750	8	2,500	24	2,450
9	2,600	27	2,150	11	3,500	26	1,800	10	1,750	25	2,000	9	2,450	25	2,300
10	2,600	28	2,100	12	3,400	27	1,800	11	1,800	26	2,950	10	2,400	26	1,950
11	2,600	29	2,050	13	3,200	28	1,800	12	1,900	27	3,200	11	2,200	27	2,150
12	2,100	30	2,000	14	3,500	29	1,900	13	1,850	28	3,300	12	2,200	28	2,400
13	2,100	31	2,000	15	3,400	30	1,900	14	1,850	29	3,300	13	2,400	29	2,450
14	2,500	April		16	3,200	July		15	1,850	30	3,300	14	2,250	30	2,450
15	2,400	1	2,000	17	2,900	1	1,800	16	1,900			15	2,400	31	2,500


NEVADA
CALIFORNIA
ARIZONA
BAJA CALIFORNIA
PACIFIC OCEAN
GULF
LAS VEGAS
DEATH VALLEY JUNCTION
OWENS LAKE
LAKE MEAD
BOULDER DAM
LAKE MOHAVE
COLORADO RIVER
DAVIS DAM
KINGMAN
NEEDLES
LAKE HAVASU
PARKER DAM
PARKER
Bill Williams River
KRAMER
MOJAVE
BARSTOW
LUDLOW
CADIZ
BLYTHE
SAN BERNARDINO
COLTON
RIVERSIDE
BANNING
THERMAL
INDIO
LOS ANGELES
LONG BEACH
SANTA ANA
CAJALCO RES.
ELSINORE LAKE
SALTON SEA
NILAND
BRAWLEY
EL CENTRO
HOLTVILLE
CALEXICO
MEXICALI
YUMA
IMPERIAL DAM
LAGUNA DAM
MORELOS DAM
GADSDEN
SAN LUIS
HENSHAW RES.
OCEANSIDE
ESCONDIDO
EL CAPITAN RES.
LAKESIDE
JACUMBA
SAN DIEGO
TIJUANA
RODRIGUEZ DAM
LA SALADA
LAGUNA SALADA BASIN
RIITO
EL DOCTOR
ENSENADA
Rio San Carlos
Rio San Isidro
Rio San Antonio
Arroyo de Diablo
SAN FELIPE
SAN ANTONIO DEL MAR
Rio Guadalupe
Rio Hardy
COACHELLA
SOUTHERN PAC. RY.
ALL-AMERICAN CANAL
ALAMO CANAL
COLORADO RIVER AQUEDUCT
UNION PACIFIC R.R.
A.T. & S.F. RY.
S.P. RY.
Santa Clara Riv.
Muddy Riv.
Virgin Riv.
GRAND
SONORA - BAJA
118°
116°
114°
36°
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
CANYON
HOLBROOK
FLAGSTAFF
WILLIAMS
ASHFORK
SPRINGERVILLE
RESERVE
PRESCOTT
Z O N A
Little Colorado River
Verde River
Tonto Cr.
Salt River
ROOSEVELT RES.
BARTLETT DAM
ROOSEVELT DAM
HORSE MESA DAM
MORMON FLAT DAM
STEWART MTN. DAM
WICKENBURG
PLEASANT LAKE DAM
Agua Fria River
GLOBE
SAN CARLOS RES.
COOLIDGE DAM
CLIFTON
SILVER CITY
Gila River
PHOENIX
SAFFORD
LORDSBURG
FLORENCE
GILLESPIE DAM
MARICOPA
BOWIE
STEINS
PAINTED ROCK DAM
CASA GRANDE
RED ROCK
Santa Cruz River
San Pedro River
COCHISE
PRATT
RODEO
GILA BEND
SENTINEL
AJO
MOHAWK
TUCSON
TOMBSTONE
BISBEE
DOUGLAS
NACO
AGUA PRIETA
FT. HUACHUCA
LOCHIEL
UNITED STATES
MEXICO
SONOITA
NOGALES
CANANEA
MUTUTICACHI
NACOZARI
IMURIS
MAGDALENA
ARIZPE
PUERTO PEÑASCO
EST. EL SAHUARO
ALTAR
SANTA ANA
CUMPAS
MOCTEZUMA
CABORCA
Rio Altar
Rio Sonora
Rio Moctezuma
Arroyo El Coyote
EL SOCORRO
Rio De La Concepcion
BENJAMIN HILL
S O N O R A
OF CALIFORNIA
EL DESEMBOQUE
Rio Magdalena
URES
PTO. LIBERTAD
SOUTHERN PACIFIC OF MEXICO
NACOZARI RY.
114°
112°
110°
36°
34°
32°
30°

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. 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 53 in this bulletin.

In the United States

Month	Brawley, California		El Centro, California		Blythe, California		Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1963	Average 1931-1963	1963	Average 1931-1963	1963	Average 1931-1963	1963	Average 1955-1963	1963	Average 1931-1963
Jan.	0.04	0.33	0	0.38	* 0.35	0.48	0.18	0.51	0.55	0.39
Feb.	.16	.33	.07	.38	.34	.46	.66	.45	.16	.36
Mar.	.14	.12	.15	.19	.13	.37	.29	.30	* .14	.21
Apr.	T	.07	0	.11	T	.12	.09	.17	0	.10
May	0	.01	0	0	0	.02	0	.09	0	.01
June	0	.01	0	.01	0	.03	0	0	0	.02
July	0	.02	0	.09	0	.20	0	.20	.06	.18
Aug.	.21	.31	.13	.36	1.71	.83	.28	.65	.07	.46
Sept.	1.30	.30	1.02	.27	1.80	.35	1.11	.35	2.08	.36
Oct.	.30	.23	.37	.24	1.10	.28	.71	.42	1.05	.41
Nov.	.24	.10	.48	.10	.71	.22	.54	.37	.78	.13
Dec.	0	.44	0	.46	0	.54	0	.28	0	.40
Yearly	2.39	2.27	2.22	2.59	6.14	3.90	3.86	3.79	4.89	3.03

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Ampac, Baja California		Bataques, Baja California		San Luis, R. C., Sonora	
	1963	Average 1948-1963	1963	Average 1926-1963	1963	Average 1949-1963	1963	Average 1948-1963	1963	Average 1949-1963
Jan.	0.47	0.47	0.08	0.39	0.12	0.28	0	0.47	0.39	0.31
Feb.	.20	.16	.16	.35	.12	.12	.16	.08	.08	.08
Mar.	T	.12	.12	.20	.12	.12	T	.04	.12	.08
Apr.	0	.04	0	.08	0	.08	T	.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	.12	.08	0	.08	0	.04	0	0	T	.16
Aug.	T	.16	.08	.35	.28	.43	.08	.08	.16	.43
Sept.	2.36	.20	.98	.35	.16	.08	.71	.04	1.93	.16
Oct.	1.02	.35	1.30	.28	.94	.16	.12	.24	.59	.16
Nov.	1.06	.12	.31	.12	T	.04	.12	.04	.04	0
Dec.	0	.24	0	.87	0	.20	0	.16		.24
Yearly	5.23	1.81	3.03	3.11	1.74	1.54	1.19	1.10		1.54

Month	Delta, Baja California		Kilometer 50, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1963	Average 1948-1963	1963	⊖Average 1952-1963	1963	Average 1959-1963	1963	Average 1949-1963	1963	Average 1948-1963
Jan.	0.47	0.43	0	0.35	0.12	0.35	0.24	0.24	0.31	0.28
Feb.	.20	.08	.16	.16	.04	.31	.43	.08	0	.08
Mar.	.16	.12	T	.12	T	0	.20	.16	T	.20
Apr.	0	.04	0	0	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	.08	0	0	T	.08	0	.16
Aug.	.08	.12	0	.31	.71	.16	.31	.43	.79	.35
Sept.	1.10	.12	.08	.04		.28	2.32	.43	.20	.24
Oct.	.91	.20	.67	.20		.08	1.81	.24	.51	.35
Nov.	.08	.04	.43	.24	.20	.04	.08	.04		0
Dec.	0	.31	0	.20	0	.67	0	.31	.08	.39
Yearly	3.00	1.38	1.34	1.61		1.06	5.39	2.13		2.40

T Trace ⊖ Based on records for the period 1952-1959 and 1961-1963 * Partly estimated

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 1963. The state in which each station is located follows the name of the station.

In the United States

NAME OF STATION	LATITUDE	LONGITUDE	ð ELEV. (FT.)	RECORD BEGAN	OBSERVER
Blythe, California *	33° 37'	114° 36'	268	1909	State Division of Forestry
Brawley, California	32° 57'	115° 33'	100	1908	Agricultural Research Service
Davis Dam No. 2, Arizona *	35° 12'	114° 34'	657	1954	U. S. Bureau of Reclamation
El Centro, California	32° 46'	115° 34'	30	1930	El Centro Water Department
Yuma Citrus Station, Arizona	32° 37'	114° 39'	191	1923	University of Arizona Experimental Farm

In Mexico

NAME OF STATION	LATITUDE	LONGITUDE	ð 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 ð Elevation above mean sea level

EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at two stations in Arizona and at eight 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 Pacífico. 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 53 in this bulletin.

In the United States

Month	Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1963	Average 1955-1963	1963	Average 1931-1963
Jan.	7.78	7.51	3.09	3.96
Feb.	8.90	7.27	4.84	4.94
Mar.	10.25	10.52		
Apr.	12.69	13.85	9.22	10.37
May	17.56	17.36	12.52	13.52
June	20.08	20.43	13.21	14.70
July	21.57	21.12	16.11	16.09
Aug.	18.99	18.65	12.42	14.08
Sept.	14.02	14.99	9.99	11.28
Oct.	9.28	11.98	5.76	8.08
Nov.	9.19	9.56	3.70	5.22
Dec.	9.82	8.92	3.62	3.77
Total	160.13	162.16		

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Ampac, Baja California		San Luis, R. C., Sonora	
	1963	Av. 1949-55 1961-1963	1963	Average 1926-1963	1963	Average 1953-1963	1963	Average 1953-1963
Jan.	4.49	4.21	2.05	2.64	2.40	2.76	3.03	3.35
Feb.	5.12	5.04	3.82	3.46	4.17	3.78	4.33	4.21
Mar.	8.15	6.93	6.30	5.83	6.02	6.02	4.17	6.42
Apr.	9.45	9.29	7.72	7.91	8.19	8.74	5.59	8.58
May	13.70	11.97	10.79	10.51	11.06	11.54	9.06	11.02
June	14.06	12.32	11.93	11.46	12.40	11.46	11.69	12.87
July	15.04	12.44	12.68	11.73	12.36	11.57	14.84	14.61
Aug.	11.18	11.61	9.41	10.00	9.65	9.76	12.60	13.15
Sept.	9.37	9.45	7.24	8.15	7.13	7.36	12.17	10.31
Oct.	6.54	7.72	4.69	5.59	5.08	5.00	7.05	6.89
Nov.	4.29	4.72	2.99	3.39	3.27	3.31	4.06	4.41
Dec.	5.35	4.06	2.40	2.44	2.68	2.99		3.58
Total	106.74	101.93	82.02	83.11	84.41	83.31		101.54

Month	Delta, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1963	Average 1959-1963	1963		1963	Average 1953-1963	1963	Average 1952-1963
Jan.	2.60	3.66	2.20		3.39	3.39	3.82	5.24
Feb.	5.24	4.53	5.75		4.84	4.25	6.06	5.75
Mar.	6.97	6.57	7.68		6.97	6.34	7.40	6.89
Apr.	8.03	8.50	8.90		8.35	8.54	7.52	8.46
May	10.67	10.43	10.83		11.10	10.08	10.04	10.67
June	11.18	11.30	10.12		11.89	11.85	10.87	11.10
July	12.13	11.89	12.87		14.13	13.15	10.39	11.81
Aug.	8.66	9.84	9.49		11.89	12.05	8.66	10.71
Sept.	7.05	7.83			9.02	10.67	9.29	10.20
Oct.	4.25	5.75			8.23	8.19	7.01	8.62
Nov.	3.07	3.94	3.86		6.61	5.04		6.34
Dec.	2.68	3.23	3.70		4.25	3.43	5.55	5.28
Total	82.53	87.64			100.67	96.65		101.30

TEMPERATURE IN THE COLORADO RIVER BASIN

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. The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer oversvations, with averages for their periods of record. 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 53 in this bulletin.

Degrees Fahrenheit

In the United States

Month	Blythe, California				Davis Dam No. 2, Arizona				Yuma Citrus Station, Arizona			
	1963			Average 1931-63	1963			Average 1955-63	1963			Average 1931-63
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	50.2	76	22	52.6	49.1	68	20	53.1	49.3	73	22	53.2
Feb.	63.1	88	38	57.2	61.6	82	41	57.1	62.7	90	37	57.2
Mar.	61.2	91	33	63.2	61.5	87	34	62.7				
Apr.	66.5	95	40	70.9	67.0	95	46	71.1	63.6	95	36	69.5
May	78.6	105	51	77.5	80.7	104	53	78.9	76.5	104	50	76.3
June	81.5	110	52	85.1	84.6	110	58	89.4	79.1	109	52	83.7
July	90.0	112	63	92.0	94.4	# 115	# 70	94.9	90.0	114	62	91.4
Aug.	89.4	110	67	91.0	94.0	114	75	93.3	89.0	110	66	90.7
Sept.	85.2	111	60	85.4	86.9	111	63	86.5	86.1	112	60	85.6
Oct.	74.2	104	47	73.3	77.4	104	56	74.8	75.2	102	49	74.0
Nov.	60.0	85	34	60.1	62.0	83	40	61.7	61.7	87	35	61.6
Dec.	50.5	78	25	53.6	54.1	72	35	55.7	53.4	78	28	55.2
Yearly	70.9	112	22	71.8	72.8	115	20	73.3				

Month	Brawley, California				El Centro, California							
	1963			Average 1931-63	1963			Average 1931-63				
	Mean	Max.	Min.		Mean	Max.	Min.					
Jan.	50.6	73	21	53.8	51.4	74	20	53.6				
Feb.	63.9	91	40	58.2	64.4	91	42	57.9				
Mar.	61.6	88	37	63.8	60.8	90	33	63.3				
Apr.	65.3	95	43	71.3	64.5	96	39	70.6				
May	77.3	105	51	78.3	76.9	106	46	77.7				
June	81.1	111	54	85.8	81.1	110	51	85.2				
July	90.1	112	61	92.6	89.9	113	62	92.0				
Aug.	89.1	110	67	92.1	89.9	111	67	91.2				
Sept.	86.0	113	63	87.2	86.3	114	62	86.1				
Oct.	76.7	103	52	75.7	75.8	105	51	74.8				
Nov.	62.6	89	37	62.6	62.7	88	34	62.1				
Dec.	54.0	82	29	55.6	53.2	80	29	55.0				
Yearly	71.5	113	21	73.0	71.4	114	20	72.5				

In Mexico

Month	Los Algodones, Baja California				Mexicali, Baja California				Ampac, Baja California			
	1963		1948-1963		1963		1926-1963		1963		1949-1963	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	73	34	86	23	75	19	93	19	79	21	88	21
Feb.	90	43	95	29	91	41	93	23	91	39	91	23
Mar.	91	39	100	32	91	37	100	32	91	34	95	28
Apr.	97	41	106	37	95	41	106	34	97	39	106	27
May	109	52	117	43	111	45	117	45	108	48	115	41
June	109	59	126	52	111	52	120	52	113	52	120	52
July	113	66	118	61	113	66	118	55	115	64	120	54
Aug.	109	72	120	61	109	68	118	54	115	66	118	55
Sept.	113	64	122	54	113	63	122	48	111	63	118	48
Oct.	104	55	111	32	102	54	109	39	104	52	108	32
Nov.	90	43	100	27	86	37	99	28	90	36	93	27
Dec.	81	34	88	29	79	32	90	25	81	30	88	21
Yearly	113	34	126	23	113	19	122	19	115	21	120	21

One or more days missing

TEMPERATURE IN THE COLORADO RIVER BASIN

Degrees Fahrenheit

In Mexico

Month	Bataques, Baja California				San Luis, R. C., Sonora				Delta, Baja California			
	1963		1948-1963		1963		1949-1963		1963		1948-1963	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	84	25	113	25	84	25	100	19	77	32	97	30
Feb.	93	39	97	19	91	37	109	27	93	43	99	28
Mar.	93	39	109	25	90	37	102	32	100	39	108	28
Apr.	97	41	117	16	99	37	106	37	99	43	115	32
May	108	50	124	34	102	41	115	41	109	46	124	32
June	111	52	135	43	104	45	126	45	111	52	133	36
July	118	63	131	45	115	63	124	59	113	64	135	45
Aug.	115	61	129	46	111	64	122	59	113	70	140	52
Sept.	118	50	135	39	111	64	118	52	115	66	124	39
Oct.	111	50	118	41	109	45	118	43	106	55	113	36
Nov.	86	39	115	32	102	37	102	30	102	39	120	32
Dec.	84	36	95	28			102	23	84	32	104	28
Yearly	118	25	135	16			126	19	115	32	140	28

Month	Kilometer 50, Baja California				Riito, Sonora				El Mayor, Baja California			
	1963		1950-59&61-63		1963		1949-1963		1963		1949-1963	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	79	25	90	21	77	21	91	19	75	41	86	25
Feb.	86	34	97	21	91	37	95	21	86	41	93	27
Mar.	82	36	99	28	93	34	100	25	86	46	97	36
Apr.	82	43	106	32	95	37	106	37	97	41	108	36
May	106	50	117	39	106	50	115	43	102	46	113	37
June	111	50	117	39	109	50	124	45	113	48	122	37
July	115	59	120	45	113	63	140	55	113	52	122	39
Aug.	115	61	117	52	109	66	122	46	111	61	122	41
Sept.	111	61	115	39			118	39	118	55	120	37
Oct.	106	48	108	36			115	34	120	48	120	37
Nov.	97	34	104	25	88	36	102	27	120	46	120	34
Dec.	93	25	95	21	79	27	86	21	90	37	100	19
Yearly	115	25	120	21			140	19	120	37	122	19

Month	San Felipe, Baja California											
	1963		1948-1963									
	Max.	Min.	Max.	Min.								
Jan.	84	32	99	32								
Feb.	99	43	102	32								
Mar.	100	37	104	32								
Apr.	99	43	113	37								
May	120	52	120	41								
June	113	54	124	50								
July	117	64	124	50								
Aug.	113	70	135	41								
Sept.	117	64	126	37								
Oct.	113	55	117	41								
Nov.			118	34								
Dec.	90	37	97	32								
Yearly			135	32								

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM
1963

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	46,321
Reservation Division	11,313
Yuma Mesa	16,556
Yuma Aux. Project Unit "B" (Yuma Mesa)	3,129
South Gila Valley	11,638
North Gila Valley	5,625
Wellton-Mohawk	56,289
Coachella Valley	57,773
Imperial Valley	430,481
Total in United States	639,125
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 436,877
Total in United States and Mexico	1,076,002

* 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 Kilometer 1+500.

RECORDS: Data obtained and furnished by the Mexican Section of the Commission. Records available: July 25, 1956 through December 1963.

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 measured discharge, 78.0 second-feet, February 22, 1960; minimum measured discharge, 2.5 second-feet, August 14, 1963.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	40.6	51.2	46.6	47.7	46.6	35.3	14.8	4.2	5.3	43.1	31.1	37.4
2	40.3	49.4	47.3	47.0	46.6	35.3	14.5	5.7	5.7	41.0	31.4	37.1
3	41.0	47.3	48.0	47.3	46.6	35.3	14.1	7.1	6.0	38.5	31.4	36.7
4	42.0	45.6	48.7	47.7	46.3	35.3	13.8	8.5	6.4	36.4	31.8	36.7
5	43.1	43.4	49.4	47.7	46.3	35.3	13.4	9.9	7.4	34.3	32.1	37.8
6	44.1	41.7	49.4	48.0	46.3	35.3	13.1	11.3	8.5	32.1	32.5	39.2
7	44.8	42.7	49.1	48.0	46.3	35.3	13.1	12.7	9.5	30.0	32.8	40.6
8	45.9	43.8	49.1	48.4	46.3	35.3	13.1	11.3	10.6	27.5	33.2	41.7
9	46.3	44.8	48.7	48.4	46.3	33.2	13.1	9.9	12.0	25.4	33.5	43.1
10	46.3	45.9	48.7	48.7	46.3	31.1	13.1	8.5	13.1	25.4	33.9	44.5
11	46.6	47.0	48.4	48.7	46.3	29.0	13.1	7.1	15.9	25.1	34.3	45.6
12	47.0	48.0	48.4	49.1	45.2	26.8	13.1	5.3	18.7	25.1	34.6	46.3
13	47.0	48.0	48.4	49.1	44.5	24.7	13.1	3.9	21.5	24.7	35.0	46.6
14	47.3	48.0	48.0	48.0	43.8	22.6	13.4	2.5	24.4	24.7	35.3	47.0
15	47.7	48.4	48.0	46.6	42.7	20.5	13.4	4.6	27.5	24.4	35.3	47.7
16	47.7	48.4	47.7	45.6	42.0	18.7	13.8	7.1	30.4	24.4	35.7	48.0
17	47.7	48.4	48.0	44.1	41.3	16.6	14.1	9.2	33.2	29.0	36.0	48.7
18	47.7	48.4	47.7	43.1	40.3	14.5	14.5	11.7	36.0	33.2	36.4	49.1
19	47.7	48.4	47.7	41.7	39.6	12.4	14.5	13.8	38.8	37.8	36.4	49.4
20	47.3	47.7	48.0	40.6	38.8	10.2	14.8	16.2	41.7	42.0	36.7	50.1
21	47.3	47.3	48.4	41.3	38.1	8.1	15.5	18.4	44.5	46.6	37.1	50.5
22	47.3	46.6	48.7	42.4	37.1	6.0	16.2	15.9	47.7	51.2	37.1	50.9
23	48.4	46.3	48.7	43.1	36.4	7.4	17.0	13.4	50.5	55.4	37.4	51.6
24	49.4	45.9	49.1	44.1	35.3	8.8	18.0	10.9	53.3	60.0	37.8	51.9
25	50.1	45.2	49.4	44.8	34.6	9.9	15.9	8.5	56.2	64.3	37.8	52.6
26	51.2	44.5	49.8	45.9	34.6	11.3	13.4	5.7	54.0	53.0	38.1	53.0
27	52.3	45.2	49.4	46.6	35.0	12.7	11.3	3.2	51.9	41.3	38.5	52.6
28	53.3	45.9	49.1	46.6	35.0	14.1	9.2	3.5	49.4	30.0	38.1	51.9
29	54.4		48.7	46.6	35.0	15.2	7.1	3.9	47.3	30.4	37.8	51.2
30	55.1		48.4	46.6	35.3	14.8	4.9	4.6	45.2	30.4	37.4	50.9
31	53.3		48.0		35.3		2.8	4.9		30.7		50.1
Sum	1,470.2	1,303.4	1,503.0	1,383.5	1,280.1	651.0	405.2	263.4	872.6	1,117.4	1,056.5	1,440.5

Month	Current Year 1963								Period 1956-1963		
	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.			30	55.1	2	40.3	47.3	2,916	2,803	3,072	2,443
Feb.			1	51.2	6	41.7	46.6	2,585	2,701	3,439	2,269
Mar.			26	49.8	1	46.6	48.4	2,982	2,803	3,225	2,392
Apr.			†12	49.1	20	40.6	46.3	2,744	2,660	3,381	2,054
May			† 1	46.6	†25	34.6	41.3	2,538	2,693	3,365	2,147
June			† 1	35.3	22	6.0	21.5	1,292	2,265	3,324	1,231
July			24	18.0	31	2.8	13.1	803	2,178	2,688	803
Aug			21	18.4	14	2.5	8.5	522	2,482	3,468	522
Sept.			25	56.2	1	5.3	29.0	1,731	2,227	2,720	1,731
Oct.			25	64.3	†15	24.4	36.0	2,217	2,554	3,414	2,062
Nov.			27	38.5	1	31.1	35.3	2,096	2,540	3,416	1,708
Dec.			26	53.0	† 3	36.7	46.6	2,857	2,759	3,155	2,260
Yearly				64.3		2.5	35.0	25,283	29,306	34,661	25,283

† 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. 1963 records excellent. Records available: June 1942 through December 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.67	2.21	2.32	2.55	3.03	3.28	3.54	1.79	2.00	1.68	2.44	3.15
2	2.91	2.21	2.21	2.79	2.91	3.28	3.54	2.21	2.55	2.21	3.15	3.15
3	2.91	2.21	2.10	3.15	2.67	3.15	3.67	2.21	2.55	2.21	3.15	3.15
4	2.91	2.44	2.21	3.03	2.55	2.79	3.41	1.89	2.55	2.00	3.15	3.03
5	2.67	2.32	2.21	3.03	2.55	2.79	3.80	1.89	2.55	2.00	3.15	3.03
6	2.67	3.15	3.67	2.79	2.44	3.03	3.54	2.00	2.67	1.68	3.67	3.28
7	2.67	3.15	3.03	2.67	2.44	3.15	3.41	2.00	2.67	1.68	3.67	3.28
8	3.80	4.48	2.79	2.55	2.67	3.28	3.41	2.32	2.44	1.89	2.91	3.15
9	3.41	3.41	2.91	2.21	2.67	3.28	3.54	2.10	2.55	2.00	3.15	3.15
10	4.76	2.44	2.67	3.41	2.67	3.54	2.32	2.21	2.55	2.00	2.91	3.15
11	4.76	2.55	2.79	3.67	2.67	3.80	2.44	3.41	2.44	2.91	2.91	3.41
12	5.05	3.67	2.91	3.41	3.93	3.41	2.55	3.15	2.91	2.67	3.67	3.15
13	4.90	4.34	3.93	3.93	3.15	3.93	2.67	2.91	2.91	2.44	2.79	3.15
14	4.07	4.48	4.07	4.20	2.79	3.80	2.91	2.55	2.91	2.91	2.79	3.15
15	3.41	4.34	4.90	5.20	2.79	3.67	3.03	2.79	2.91	2.91	3.03	3.15
16	3.41	2.91	3.41	6.26	2.91	3.28	3.03	2.44	3.03	2.00	3.03	3.15
17	3.80	2.91	3.41	5.05	3.28	3.41	3.80	2.55	2.91	2.00	2.91	1.79
18	3.41	2.91	2.91	4.48	4.07	3.28	3.41	2.67	4.48	2.44	2.91	2.00
19	3.03	3.28	2.91	3.93	4.76	4.34	3.41	2.79	4.07	2.44	3.03	2.00
20	3.03	2.79	3.54	3.67	4.20	4.07	3.03	2.55	4.07	2.44	3.03	2.21
21	3.28	2.55	5.20	5.34	4.20	3.80	1.89	2.00	4.07	2.44	3.03	2.00
22	2.91	2.21	3.67	4.20	3.54	3.67	2.55	2.21	3.80	2.44	3.15	1.89
23	3.03	2.55	3.80	4.20	3.41	3.93	2.21	2.21	3.80	2.67	3.28	1.89
24	3.15	2.55	3.41	3.41	3.15	4.07	1.79	2.21	4.07	2.55	3.28	1.89
25	2.67	2.79	2.91	3.03	3.28	3.28	2.00	2.55	4.07	2.55	3.28	1.89
26	2.55	2.21	3.03	2.91	3.15	3.15	1.58	2.32	4.07	2.44	3.28	1.89
27	3.67	2.44	3.67	2.91	3.15	3.03	1.79	2.44	4.07	2.55	3.15	1.89
28	2.67	2.00	3.15	3.15	3.54	2.79	1.68	2.21	1.79	2.55	3.15	2.00
29	3.41		2.91	3.15	3.41	3.67	1.89	2.32	1.79	2.44	3.03	2.00
30	2.44		2.67	2.91	3.15	3.28	1.89	2.44	1.68	2.44	3.03	2.00
31	2.21		2.67		3.15		1.79	2.55		2.44		2.00
Sum	103.24	81.50	97.99	107.19	98.28	103.23	85.52	73.89	90.93	72.02	93.11	80.02

Month	Current Year 1963								Period 1943-1963		
	Extreme Gage Height ø		Extreme Second-Feet ø				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	0.52	0.30	12	5.05	31	2.21	3.33	205	483	2,790	99
Feb.	.48	.28	† 8	4.48	28	2.00	2.91	162	436	2,822	100
Mar.	.53	.29	21	5.20	3	2.10	3.16	194	488	3,154	111
Apr.	.60	.30	16	6.26	9	2.21	3.57	213	534	2,222	97
May	.50	.32	19	4.76	† 6	2.44	3.17	195	402	1,799	73
June	.47	.35	19	4.34	† 4	2.79	3.44	205	401	1,686	61
July	.43	.24	† 5	3.80	26	1.58	2.76	170	362	1,712	59
Aug.	.40	.26	11	3.41	1	1.79	2.38	147	443	1,672	83
Sept.	.48	.25	18	4.48	30	1.68	3.03	180	409	1,406	91
Oct.	.36	.25	† 11	2.91	† 1	1.68	2.32	143	445	1,845	102
Nov.	.42	.32	† 6	3.67	1	2.44	3.10	185	461	2,080	86
Dec.	.40	.26	11	3.41	17	1.79	2.58	159	420	1,686	80
Yearly	0.60	0.24		6.26		1.58	2.98	2,158	5,284	22,146	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. 1963 records good. Records available: June 1942 through December 1963.

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 from the Mexican system of canals 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, 691 second-feet on December 3, 1962; 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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	177	481	323	177	167	133	162	127	168	193	179	157
2	230	274	301	182	169	150	162	132	166	193	198	154
3	139	300	296	180	164	162	159	133	172	189	261	162
4	338	300	300	182	166	163	161	133	170	186	289	162
5	441	312	240	180	164	169	162	136	170	178	294	158
6	262	309	230	179	162	166	160	141	170	170	288	154
7	236	294	280	183	157	165	162	150	172	162	278	153
8	220	205	204	182	145	162	158	154	172	158	211	155
9	187	193	183	185	128	160	142	188	174	157	180	151
10	186	246	221	186	124	159	119	249	175	158	167	142
11	175	228	229	187	133	161	119	212	171	151	164	142
12	182	246	231	179	133	158	120	210	165	152	165	145
13	177	333	200	170	130	171	126	223	157	150	183	145
14	147	324	187	180	140	190	141	222	141	151	192	144
15	91	329	184	182	151	151	149	215	112	152	164	141
16	65	391	184	187	153	149	149	194	115	153	161	145
17	85	495	193	184	149	162	150	187	147	158	162	152
18	101	509	200	191	144	153	161	178	158	197	169	153
19	160	523	200	192	140	165	170	188	234	294	166	149
20	160	413	199	192	139	158	177	188	363	216	161	152
21	164	396	195	194	136	150	171	186	419	182	160	153
22	168	336	195	190	135	164	169	182	372	189	162	152
23	179	276	191	178	131	173	148	183	425	219	157	153
24	194	333	188	175	127	173	136	177	369	190	160	152
25	189	259	184	172	129	172	135	173	236	172	162	155
26	215	236	178	173	114	172	136	171	268	172	160	156
27	305	243	170	168	103	169	141	160	221	334	191	154
28	375	213	161	168	100	169	144	104	213	355	151	160
29	580		163	165	104	169	140	122	204	211	159	160
30	565		162	165	108	167	129	122	198	190	154	158
31	633		162		107		123	138		172		153
Sum	7,426	8,997	6,534	5,408	4,252	4,885	4,581	5,278	6,397	5,904	5,648	4,722

Month	Current Year 1963 — Extreme Gage Ø ** Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1943-1963 — Acre-Feet		
			Ø High		Ø Low						
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	36.36	41.53	31	633	16	65	240	14,729	6,274	20,160	1,751
Feb.	37.32	40.22	19	523	9	193	321	17,845	4,954	17,845	1,258
Mar.	38.91	40.47	1	323	28	161	211	12,960	5,174	12,960	1,008
Apr.	40.14	40.51	21	194	† 29	165	180	10,727	5,407	14,489	1,390
May	40.47	41.19	2	169	28	100	137	8,434	4,727	10,618	629
June	40.25	40.85	14	190	1	133	163	9,689	4,219	9,689	1,087
July	40.46	41.16	20	177	† 10	119	148	9,086	3,977	9,086	817
Aug.	39.78	41.36	10	249	28	104	170	10,469	4,999	10,921	1,139
Sept.	38.00	41.36	23	425	15	112	213	12,688	5,353	12,688	1,795
Oct.	38.79	40.86	28	355	13	150	190	11,710	5,970	11,710	2,081
Nov.	39.48	40.95	5	294	28	151	188	11,203	5,746	12,323	2,483
Dec.	40.77	40.97	† 3	162	15	141	152	9,366	6,264	21,205	1,763
Yearly	36.36	41.53		633		65	192	138,906	63,064	138,906	24,573

† And other days Ø Mean daily ** Feet below mean sea level

VOLCANO DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Volcano Drain is measured at a point about 1,000 feet downstream from the highway bridge at the junction of the Tijuana-San Felipe highway, 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: Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1963.

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, 27.2 second-feet on November 26, 1962.

Mean Daily Discharge in Second-Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	143	112	137	182	160	108	130	96.8	72.0	133	127	127
2	142	113	137	184	158	116	131	95.7	78.0	124	127	126
3	141	114	138	186	155	124	132	95.0	84.4	115	127	126
4	140	115	138	188	153	133	126	93.9	90.4	106	127	126
5	139	116	139	190	150	141	120	93.2	87.9	97.5	127	124
6	139	115	139	191	148	139	113	92.2	85.8	88.6	127	122
7	138	113	139	194	145	137	107	91.5	83.3	79.5	127	120
8	136	112	139	195	143	135	100	92.5	80.9	70.6	126	118
9	133	111	139	197	140	133	93.9	93.2	78.4	61.8	126	116
10	131	109	139	199	137	131	87.6	94.3	76.3	68.9	126	114
11	129	108	139	197	135	129	90.1	95.3	73.8	76.3	125	112
12	126	111	139	196	132	126	92.5	96.4	81.6	83.3	124	114
13	124	114	139	194	130	127	95.0	97.1	89.3	90.8	124	115
14	121	117	143	192	127	128	97.5	98.2	97.5	97.8	124	117
15	121	120	146	191	125	129	99.9	95.3	105	105	125	119
16	120	123	150	189	125	130	102	92.5	113	112	125	120
17	119	126	154	188	125	131	105	89.7	121	109	125	122
18	118	130	157	186	124	132	105	87.2	129	105	125	124
19	118	132	161	184	124	132	105	84.4	137	102	126	123
20	117	136	164	183	124	131	105	81.6	144	98.5	126	123
21	116	136	164	181	124	130	105	78.8	153	95.0	126	123
22	115	135	164	179	123	129	105	74.2	161	91.5	126	123
23	114	135	164	178	118	129	106	69.9	170	88.3	127	123
24	113	135	164	176	112	127	106	65.3	178	84.8	127	122
25	111	135	164	174	106	126	105	60.7	186	81.2	127	122
26	110	135	164	171	100	125	103	56.2	178	96.4	127	122
27	109	136	163	169	94.6	126	102	51.9	169	112	128	122
28	108	136	167	167	89.0	127	101	47.3	160	127	127	123
29	109		171	165	83.3	129	99.9	53.3	151	127	127	123
30	110		174	162	91.5	129	98.5	59.7	142	127	127	123
31	111		178		99.9		97.5	65.7		127		123
Sum	3,821	3,430	4,713	5,528	3,901.3	3,869	3,266.4	2,539.0	3,556.6	3,081.8	3,785	3,757

Month	Current Year 1963 Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1957-1963 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			1	143	28	108	123	7,579	6,661	9,142	4,076
Feb.			†20	136	11	108	123	6,808	6,068	8,165	3,536
Mar.			31	178	† 1	137	152	9,347	7,095	9,347	4,491
Apr.			10	199	30	162	184	10,961	7,640	10,961	4,373
May			1	160	29	83.3	126	7,735	6,931	8,542	4,675
June			5	141	1	108	129	7,676	6,275	7,676	3,547
July			3	132	10	87.6	105	6,482	5,874	7,902	2,809
Aug.			14	98.2	28	47.3	81.9	5,036	6,216	8,367	3,647
Sept.			25	186	1	72.0	119	7,053	7,064	9,027	4,912
Oct.			1	133	9	61.8	99.2	6,112	6,572	8,118	4,570
Nov.			27	128	†12	124	126	7,511	5,994	7,511	3,570
Dec.			1	127	11	112	121	7,447	6,536	7,528	4,511
Yearly				199		47.3	124	89,746	78,924	95,812	50,244

† And other days Ø Mean daily

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 highway 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 a continuous record of gage heights and a rating curve for the weir. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1952 through December 1963. 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 of the Commission.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0.4	0	0	0	0	0	0	0
2	0	0	0	0	.4	0	0	0	0	0	0	0
3	0	0	0	0	.4	0	0	0	0	0	0	0
4	0	0	0	0	.4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	.4	0
6	0	0	.4	0	0	0	0	0	0	0	0	0
7	0	0	.4	0	0	0	0	0	0	0	0	0
8	0	0	.4	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	.4	0	0	0	0	0	.4	0	0	0	0
11	0	.4	0	0	.4	0	0	.4	0	0	0	0
12	0	.4	0	0	0	0	0	.4	0	0	0	0
13	0	.4	0	0	.7	0	0	0	0	0	0	0
14	0	.4	0	0	.4	0	0	0	0	0	0	0
15	1.1	.4	0	0	0	0	0	0	0	0	0	0
16	1.4	0	0	0	0	0	0	0	0	0	0	0
17	1.4	0	0	0	0	0	0	0	0	0	0	0
18	1.4	0	0	0	0	0	0	0	0	0	0	0
19	1.4	0	0	0	0	0	0	0	0	0	0	.4
20	1.4	0	0	0	0	0	0	0	0	0	0	0
21	.4	0	0	0	0	0	0	0	0	0	0	0
22	.4	0	.4	0	0	0	0	0	0	0	0	0
23	.4	0	0	0	0	0	0	0	0	0	0	0
24	.4	0	0	0	0	0	0	0	0	0	0	0
25	.4	0	.4	0	0	0	0	0	0	0	0	0
26	0	0	.4	0	.7	0	0	0	0	0	0	0
27	0	0	.4	0	1.1	0	0	0	0	0	0	0
28	0	0	.4	0	.4	0	0	0	0	0	0	0
29	0		0	0	.4	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	10.1	2.4	3.2	0	5.7	0	0	1.2	0	0	0.4	0.4

Month	Current Year 1963						Average Second-Feet	Total Acre-Feet	Period 1952-1963		
	Extreme Gage Feet		Extreme Second-Feet						Acre-Feet		
	High	Low	High Day	High	Low Day	Low			Average	Maximum	Minimum
Jan.	0.10	0	†16	1.4	† 1	0	0.4	19.5	55.9	293	1.6
Feb.	.07	0	† 9	.4	† 1	0	0	4.1	45.4	96.5	.8
Mar.	.03	0	† 6	.4	† 1	0	0	5.7	174	597	0
Apr.	0	0	† 1	0	† 1	0	0	0	77.0	660	0
May	.20	0	13	3.5	† 6	0	0	10.5	55.9	141	.8
June	0	0	† 1	0	† 1	0	0	0	38.9	186	0
July	.03	0	27	.4	† 1	0	0	0	53.5	164	0
Aug.	.16	0	†11	.4	† 1	0	0	2.4	122	561	2.4
Sept.	0	0	† 1	0	† 1	0	0	0	69.7	225	0
Oct.	0	0	† 1	0	† 1	0	0	0	120	524	0
Nov.	.03	0	5	.4	† 1	0	0	.8	180	1,367	0
Dec.	.03	0	19	.4	† 1	0	0	.8	79.4	233	0
Yearly	0.20	0		3.5		0	0	43.8	1,073	3,249	43.8

† And other days

WISTERIA 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, 1,000 feet downstream from their confluence in Colonia Wisteria, 4.3 miles upstream from the international boundary, 1.9 miles east of the highway to Tijuana at the Tijuana-San Felipe junction, and 3.0 miles west of the highway to San Felipe.

RECORDS: Based on 46 meter measurements made during the year, 30 double and 16 single, a continuous record of gage heights, and rating curve for the weir and wasteway gate openings. The measurements include the flows from Wisteria Drain which are subtracted in order to obtain the discharge of the wasteway. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1951 through December 1963.

EXTREMES: Maximum instantaneous discharge, 675 second-feet, January 24, 1962; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	51.2	298	167	0	0	0	0	0	0	0	10.6	7.8
2	84.8	94.6	79.5	0	0	0	0	0	0	0	22.2	7.4
3	61.4	136	119	0	0	0	0	0	0	0	106	7.4
4	191	124	77.0	0	0	0	0	0	0	0	113	7.1
5	259	149	40.6	0	0	0	0	0	0	0	111	7.1
6	65.0	142	32.5	0	0	0	0	0	0	0	113	7.1
7	86.9	126	140	0	0	0	0	0	0	0	82.6	7.1
8	32.5	21.2	0	0	0	0	0	0	0	0	34.6	6.7
9	0	25.4	0	0	0	0	0	0	0	0	0	6.7
10	0	60.4	106	0	0	0	0	90.1	0	0	0	6.7
11	0	25.1	142	0	0	0	0	19.1	0	0	0	6.7
12	30.7	52.6	32.5	0	0	0	0	0	0	0	5.7	6.4
13	10.9	158	3.5	0	0	0	0	0	0	0	21.2	6.0
14	2.8	136	0	0	0	0	0	0	0	0	31.8	5.7
15	0	136	0	0	0	0	0	0	0	0	0	4.9
16	0	222	0	0	0	0	0	0	0	0	0	4.6
17	0	289	0	0	0	0	0	0	0	0	0	4.2
18	0	290	0	0	0	0	0	0	53.3	40.3	10.9	3.9
19	5.3	287	0	0	0	0	0	0	108	120	0	3.9
20	0	197	0	0	0	0	0	0	199	22.2	0	3.9
21	0	181	0	0	0	0	0	0	207	0	0	4.2
22	0	172	0	0	0	0	0	0	138	40.3	0	4.2
23	0	66.7	0	0	0	0	0	0	181	38.5	0	4.2
24	24.7	138	0	0	0	0	0	0	123	0	0	4.2
25	5.7	59.0	0	0	0	0	0	0	11.3	16.6	0	4.6
26	107	27.5	0	0	0	0	0	0	22.2	201	0	4.6
27	200	21.9	0	0	0	0	0	0	0	111	0	4.6
28	262	5.3	0	0	0	0	0	0	0	0	0	4.6
29	385		0	0	0	0	0	0	0	33.2	0	4.6
30	399		0	0	0	0	0	0	0	9.9	0	4.6
31	445		0		0		0	0		0		4.6
Sum	2,709.9	3,640.7	939.6	0	0	0	0	109.2	1,042.8	633.0	662.6	170.3

Month	Current Year 1963								Period 1951-1963		
	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	445	† 9	0	87.2	5,374	2,624	8,735	388
Feb.			1	298	28	5.3	130	7,218	1,606	7,218	486
Mar.			1	167	† 8	0	30.4	1,863	1,193	2,568	172
Apr.				0		0	0	0	1,177	4,433	0
May				0		0	0	0	815	1,891	0
June				0		0	0	0	479	1,448	0
July				0		0	0	0	370	2,039	0
Aug			10	90.1	† 1	0	3.5	217	741	1,925	129
Sept.			21	207	† 1	0	34.6	2,068	1,023	2,915	101
Oct.			26	201	† 1	0	20.5	1,254	1,401	2,993	127
Nov.			† 4	113	† 9	0	22.2	1,316	1,567	3,768	646
Dec.			1	7.8	†18	3.9	5.7	337	1,932	8,669	337
Yearly				445		0	27.9	19,647	14,931	27,083	5,296

† 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.

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 1963.

EXTREMES: Maximum mean daily discharge, 2.1 second-feet, February 6, 1961; minimum, no flow on various occasions. Maximum monthly volume, 55.9 acre-feet, August 1959; minimum monthly volume, 4.9 acre-feet, July 1963.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.4	0.4	0.7	1.8	0.4	0	0.4	0	0.4	0.4	0.7	0.7
2	1.4	.4	.7	1.4	.4	0	.4	0	.4	.4	.7	.7
3	1.4	.4	.7	1.4	.4	0	.4	0	.4	.4	.7	.7
4	1.4	.4	.7	1.4	.4	0	.4	.4	.4	.4	.7	.7
5	1.4	.4	.7	1.1	.4	.4	.4	.4	.4	.4	.4	1.1
6	1.4	.4	.7	1.1	.4	.4	.4	.4	.4	.4	.4	1.1
7	1.4	.4	.7	.7	.4	.4	.4	.4	.4	.4	.4	1.1
8	1.4	.4	.7	.7	.4	.4	0	.4	.4	.4	.4	1.4
9	1.1	.4	.7	.7	.4	.4	0	.4	0	.4	.7	1.4
10	1.1	.4	.7	.4	.4	.4	0	.4	0	.4	.7	1.4
11	.7	.4	.7	.7	.4	.4	0	.4	0	.4	.7	1.4
12	.7	.4	.7	.7	.4	.4	0	.4	.4	.4	.7	1.4
13	.4	.4	.7	.7	.4	.4	0	.4	.4	.4	.7	1.4
14	.4	.4	.7	1.1	.4	.4	0	.4	.7	0	.7	1.1
15	.4	.4	.7	1.1	.4	.4	0	.4	.7	0	.7	1.1
16	.4	.4	.7	1.1	.4	.4	0	.4	1.1	0	.7	1.1
17	.4	.4	.7	1.4	.4	.4	0	.4	1.1	0	.7	.7
18	.4	.4	.7	1.1	.4	.4	0	.4	1.4	0	.7	.7
19	.4	.4	.7	1.1	.4	.4	0	.4	1.4	0	.7	.7
20	.7	.4	.7	.7	.4	.4	0	.4	1.8	0	.7	.7
21	.7	.4	.7	.7	.4	.4	0	.4	1.4	0	1.1	.7
22	.7	.4	.7	.4	.4	.4	0	.4	1.1	0	1.1	.4
23	.7	.4	.7	.4	.4	.4	0	.4	.7	.4	1.1	.4
24	.7	.4	.4	.4	.4	0	0	.4	.4	.4	1.1	.4
25	.4	.4	.4	.4	.4	0	0	.4	0	.4	1.1	.4
26	.4	.4	.4	.4	0	0	0	.4	0	.4	1.1	.4
27	.4	.7	.4	.4	0	0	0	0	0	.7	1.1	.4
28	.4	.7	.4	.4	0	0	0	.4	0	.7	1.1	.4
29	.4		.7	.4	0	0	0	.4	.4	.7	1.1	.4
30	.4		1.1	.4	0	0	0	.4	.4	.7	1.1	.4
31	.4		1.4		0		0	.4		.7		.4
Sum	23.9	11.8	21.3	24.7	10.0	7.6	2.8	10.8	16.6	10.3	23.8	25.3

Month	Current Year 1963								Period 1957-1963		
	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.			† 1	1.4	†13	0.4	0.7	46.2	25.9	46.2	13.0
Feb.			†27	.7	† 1	.4	.4	21.1	19.5	32.4	12.2
Mar.			31	1.4	†24	.4	.7	42.2	24.3	52.7	8.1
Apr.			1	1.8	†10	.4	.7	47.8	31.6	47.8	13.0
May			† 1	.4	†26	0	.4	17.8	16.2	19.5	13.0
June			† 5	.4	† 1	0	.4	13.0	19.5	27.6	13.0
July			† 1	.4	† 8	0	.1	4.9	21.1	35.7	4.9
Aug			† 4	.4	† 1	0	.4	18.6	25.1	55.9	13.0
Sept.			20	1.8	† 9	0	.4	31.6	18.6	31.6	6.5
Oct.			†27	.7	†14	0	.4	18.6	18.6	26.8	13.0
Nov.			†21	1.1	† 5	.4	.7	46.2	22.7	46.2	13.0
Dec.			† 8	1.4	†22	.4	.7	48.7	25.1	48.7	13.0
Yearly				1.8		0	0.4	356.7	268.3	356.7	155

† And other days ø Mean daily

RIVERA DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Parshall flume located 5.0 miles from the confluence of the drain with the New River and 328 feet south of the point where the Mexicali-Compuertas highway crosses the drain.

RECORDS: Based on 55 double measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1963. Prior to January 1963, measurements were obtained at a rectangular control section in the channel of the drain between "K" and "L" streets in the city of Mexicali.

REMARKS: Rivera Drain begins near the right bank of the West Main Canal, 0.9 mile south of 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: Since January 1963: Maximum measured discharge, 3.9 second-feet on March 6, 1963; minimum measured discharge, 0.9 second-foot on July 30, 1963.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	u 1.4	1.8	2.8	2.1	1.1	1.4	1.8	1.1	1.1	1.1	1.8	1.4
2	u 1.4	1.8	2.8	2.1	1.1	1.4	1.8	1.1	1.1	1.1	1.8	1.4
3	u 1.4	1.8	3.2	1.8	1.1	1.4	1.8	1.1	1.1	1.1	1.8	1.8
4	u 1.4	2.1	3.5	1.8	1.1	1.4	1.8	1.1	1.4	1.1	1.8	1.8
5	u 1.4	2.1	3.5	1.8	1.4	1.4	1.8	1.1	1.1	1.1	1.8	1.8
6	u 1.4	2.1	3.9	1.8	1.4	1.4	1.4	1.1	1.4	1.1	1.8	1.8
7	u 1.4	2.1	3.5	1.8	1.4	1.4	1.4	1.1	1.4	1.1	1.8	1.8
8	1.4	2.1	3.2	1.8	1.8	1.4	1.4	1.1	1.4	1.1	1.8	1.8
9	1.4	2.1	3.2	1.8	1.4	1.4	1.4	1.1	1.4	1.1	1.4	1.4
10	1.4	2.1	2.8	1.8	1.4	1.4	1.4	1.1	1.4	1.1	1.4	1.4
11	1.4	2.1	2.5	1.8	1.4	1.4	1.4	1.1	1.4	1.4	1.4	1.4
12	1.4	2.1	2.5	1.4	1.4	1.4	1.4	1.1	1.4	1.4	1.4	1.8
13	1.4	2.1	2.1	1.4	1.4	1.4	1.4	1.1	1.4	1.4	1.1	1.8
14	1.4	2.1	2.1	1.4	1.1	1.4	1.4	1.1	1.4	1.4	1.1	1.8
15	1.4	2.1	2.1	1.4	1.1	1.4	1.4	1.1	1.4	1.4	1.4	1.8
16	1.8	1.8	2.1	1.4	1.4	1.4	1.1	1.4	1.4	1.8	1.4	1.8
17	1.8	1.8	2.1	1.4	1.4	1.4	1.1	1.4	1.4	1.8	1.4	1.8
18	1.8	1.8	2.1	1.4	1.4	1.1	1.1	1.4	1.4	1.4	1.4	1.8
19	1.8	1.8	1.8	1.4	1.8	1.1	1.1	1.8	1.4	1.4	1.4	1.8
20	1.8	1.4	1.8	1.4	1.8	1.1	1.1	1.8	1.4	1.4	1.4	1.8
21	1.8	1.8	1.8	1.4	1.8	1.4	1.1	1.8	1.4	1.4	1.4	1.8
22	1.8	1.8	1.8	1.4	2.1	1.4	1.1	1.8	1.4	1.4	1.4	1.8
23	1.8	1.8	1.8	1.4	1.8	1.4	1.1	1.8	1.4	1.4	1.4	1.8
24	1.8	1.8	1.8	1.1	1.8	1.4	1.1	1.4	1.1	1.4	1.4	1.8
25	1.8	2.1	1.8	1.1	1.8	1.4	1.1	1.4	1.1	1.1	1.4	1.8
26	1.8	2.1	1.8	1.1	1.8	1.4	1.1	1.4	1.1	1.4	1.4	1.8
27	1.8	2.5	1.8	1.1	1.8	1.4	1.1	1.1	1.1	1.4	1.4	1.8
28	1.8	2.5	1.8	1.1	1.4	1.4	1.1	1.1	1.1	1.8	1.4	2.1
29	1.8		1.8	1.1	1.4	1.4	1.1	1.1	1.1	1.8	1.4	2.1
30	1.8		1.8	1.1	1.4	1.8	.7	1.1	1.1	1.8	1.4	2.1
31	1.8		2.1		1.4		.7	1.1		1.8		2.1
Sum	49.8	55.6	73.7	44.9	45.9	41.5	39.8	39.4	38.7	42.5	44.6	55.0

Month	Current Year 1963								Period		
	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.			†16	1.8	† 1	1.4	1.8	98.1			
Feb.			†27	2.5	20	1.4	2.1	110			
Mar.			6	3.9	†19	1.8	2.5	146			
Apr.			† 1	2.1	†24	1.1	1.4	88.4			
May			22	2.1	† 1	1.1	1.4	90.0			
June			30	1.8	†18	1.1	1.4	82.7			
July			† 1	1.8	†30	.7	1.4	77.8			
Aug			†19	1.8	† 1	1.1	1.4	76.2			
Sept.			† 4	1.4	1	1.1	1.4	76.2			
Oct.			†16	1.8	† 1	1.1	1.4	83.5			
Nov.			† 1	1.8	†13	1.1	1.4	88.4			
Dec.			†28	2.1	† 1	1.4	1.8	108			
Yearly				3.9		0.7	1.8	1,125.3			

† And other days Ø Mean daily u Estimated

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 1963.

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 during some months of each year. Estimated maximum discharge, 3.5 second-feet, June 9, 1958; minimum discharge, no flow on numerous occasions.

Mean Daily Discharge in Second Feet 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	1.4	0	1.1	0	0	0	0.4	1.1	0	1.1	0.4
2	.4	1.4	0	1.1	0	0	0	.7	1.4	0	.7	.4
3	.4	1.4	0	1.1	0	0	0	1.1	1.8	0	.7	.4
4	.4	1.8	0	.7	0	0	0	1.1	2.1	0	.7	.4
5	.4	1.8	0	.7	0	0	0	1.4	0	0	.7	.4
6	.4	1.8	0	.7	0	0	0	1.8	0	0	.7	.4
7	.4	2.1	0	.7	0	0	0	2.1	0	0	.7	.4
8	.4	2.1	.4	.4	0	0	0	1.8	0	0	.7	.7
9	.4	2.5	.4	.4	0	0	0	1.4	0	0	.7	.7
10	.4	2.5	.4	.4	0	0	0	1.1	0	0	.7	.7
11	.4	2.1	.4	.4	0	0	0	1.1	0	0	.4	.7
12	.7	2.1	.7	.4	0	0	0	.7	0	0	.4	.7
13	.7	1.8	.7	.4	0	0	0	.4	0	0	.4	.7
14	.7	1.4	.7	0	0	0	0	0	0	0	.4	.7
15	.7	1.4	.7	0	0	0	0	0	0	0	.4	.4
16	.7	1.1	.7	0	0	0	0	0	0	0	.4	.4
17	.7	.7	.4	0	0	0	0	0	0	0	.4	.4
18	.7	.4	.4	0	0	0	0	0	0	0	.4	.4
19	.4	.4	.4	0	0	0	0	0	0	.4	.4	.4
20	.4	0	.4	0	0	0	0	0	0	.4	.4	.4
21	.4	0	.4	0	0	0	0	0	0	.4	.7	.4
22	.4	0	.4	0	0	0	0	0	0	.4	.7	.4
23	.4	0	.4	0	0	0	0	0	0	.7	.7	.4
24	.4	0	0	0	0	0	0	0	0	.7	.7	.4
25	.7	0	0	0	0	0	0	0	0	.7	.7	.4
26	.7	0	0	0	0	0	0	0	0	.7	.7	.4
27	.7	0	0	0	0	0	0	0	0	1.1	.7	.4
28	.7	0	.4	0	0	0	0	0	0	1.1	.7	.4
29	.7		.4	0	0	0	0	.4	0	1.1	.7	.4
30	1.1		.7	0	0	0	0	.7	0	1.1	.7	.4
31	1.1		.7		0		0	1.1		1.1		.4
Sum	17.4	30.2	10.1	8.5	0	0	0	17.3	6.4	9.9	18.4	14.5

Month	Current Year 1963 Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1956-1963 Acre Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			†30	1.1	† 1	0.4	0.7	32.9	39.7	136	0
Feb.			† 9	2.5	†20	0	1.1	59.5	38.9	92.4	0
Mar.			†12	.7	† 1	0	.4	18.9	27.6	62.4	0
Apr.			† 1	1.1	†14	0	.4	16.1	27.6	60.0	4.1
May				0		0	0	0	25.1	69.7	0
June				0		0	0	0	19.5	63.2	0
July				0		0	0	0	19.5	43.8	0
Aug			7	2.1	†14	0	.7	33.6	18.6	48.6	0
Sept.			4	2.1	† 5	0	.4	12.6	13.8	32.4	1.4
Oct.			†27	1.1	† 1	0	.4	18.9	28.4	50.3	4.9
Nov.			1	1.1	†11	.4	.7	35.8	37.3	61.6	14.6
Dec.			† 8	.7	† 1	.4	.4	26.6	24.3	44.6	0
Yearly				2.5		0	0.4	254.9	320	645	143

† 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 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 1963. 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. The area and capacity table, dated January 8, 1965, is based on resurveys made in 1957 above elevation -240 feet and in 1962 below elevation -236 feet.

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 is 277.7 feet below mean sea level, U. S. C. & G. S. datum.

EXTREMES: Maximum elevation during year 232.1 feet below mean sea level. Minimum elevation during year 233.5 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 1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	233.5	233.2	232.9	232.6	232.5	232.5	232.7	232.7	232.7	232.6	232.3	232.3
2	233.5	233.2	232.9	232.6	232.5	232.5	232.7	232.7	232.7	232.6	232.3	232.3
3	233.5	233.2	232.8	232.6	232.4	232.5	232.7	232.7	232.7	232.6	232.3	232.3
4	233.5	233.2	232.8	232.6	232.4	232.5	232.7	232.7	232.7	232.6	232.3	232.3
5	233.5	233.2	232.8	232.6	232.4	232.5	232.7	232.7	232.7	232.6	232.3	232.3
6	233.5	233.2	232.8	232.6	232.4	232.5	232.7	232.7	232.7	232.6	232.3	232.3
7	233.4	233.1	232.8	232.6	232.4	232.5	232.7	232.7	232.7	232.6	232.3	232.3
8	233.4	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
9	233.5	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
10	233.5	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
11	233.5	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
12	233.5	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
13	233.5	233.1	232.8	232.6	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
14	233.5	233.0	232.8	232.5	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.3
15	233.5	233.0	232.8	232.5	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.2
16	233.4	233.0	232.8	232.5	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.2
17	233.4	233.0	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.6	232.3	232.2
18	233.4	233.0	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.5	232.3	232.2
19	233.4	233.0	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.4	232.3	232.2
20	233.4	233.0	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.4	232.3	232.2
21	233.4	233.0	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.4	232.3	232.2
22	233.4	232.9	232.7	232.5	232.4	232.6	232.7	232.7	232.7	232.4	232.3	232.2
23	233.4	232.9	232.7	232.5	232.4	232.6	232.7	232.7	232.6	232.4	232.3	232.2
24	233.4	232.9	232.7	232.5	232.4	232.6	232.7	232.7	232.6	232.4	232.3	232.2
25	233.4	232.9	232.7	232.5	232.4	232.6	232.7	232.7	232.6	232.4	232.3	232.2
26	233.3	232.9	232.6	232.5	232.4	232.6	232.7	232.7	232.6	232.3	232.3	232.2
27	233.3	232.9	232.6	232.5	232.4	232.6	232.7	232.7	232.6	232.3	232.4	232.2
28	233.3	232.9	232.6	232.5	232.5	232.6	232.7	232.7	232.6	232.3	232.2	232.1
29	233.3		232.6	232.5	232.5	232.7	232.7	232.7	232.6	232.3	232.3	232.1
30	233.3		232.6	232.5	232.5	232.7	232.7	232.7	232.6	232.3	232.3	232.1
31	233.2		232.6		232.5		232.7	232.7		232.3		232.1
Avg.	233.42	233.04	232.74	232.54	232.42	232.58	232.70	232.70	232.67	232.49	232.30	232.23

Current Year 1963			Period 1935-1963		
Month	ø Extreme Elev. Feet		Elevation Feet		
	High	Low	# Average	# Maximum	‡ Minimum
Jan.	233.2	233.5	240.33	233.42	249.3
Feb.	232.9	233.2	240.00	233.04	248.8
Mar.	232.6	232.9	239.73	232.74	248.6
Apr.	232.5	232.6	239.53	232.54	248.7
May	232.4	232.5	239.50	232.42	248.5
June	232.5	232.7	239.67	232.58	248.8
July	232.7	232.7	239.84	232.70	249.1
Aug.	232.7	232.7	240.04	232.70	249.4
Sept.	232.6	232.7	240.22	232.67	249.4
Oct.	232.3	232.6	240.29	232.49	249.8
Nov.	232.2	232.4	240.27	232.30	250.0
Dec.	232.1	232.3	240.08	232.23	249.6
Yearly	232.1	233.5	239.96	232.65	250.0

Area and Capacity Table		
Elevation Feet below M. S. L.	Area Acres	Capacity Acre-Feet
277.7	0	0
274.0	20,600	25,700
270.0	62,900	188,700
266.0	94,600	510,600
260.0	122,600	1,170,000
256.0	134,700	1,684,000
252.0	148,800	2,250,000
244.0	179,700	3,562,000
240.0	196,900	4,315,000
235.0	221,800	5,360,000
230.0	235,800	6,504,000
220.0	262,000	8,993,000
210.0	288,500	11,740,000
200.0	315,500	14,760,000

ø Mean daily # Mean monthly ‡ Reading near first day of month

CHEMICAL ANALYSES AND ELECTRICAL CONDUCTIVITY
1963

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 1963.

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 ECx10^6 at 25°C, is a relative measure of the total salt concentration.

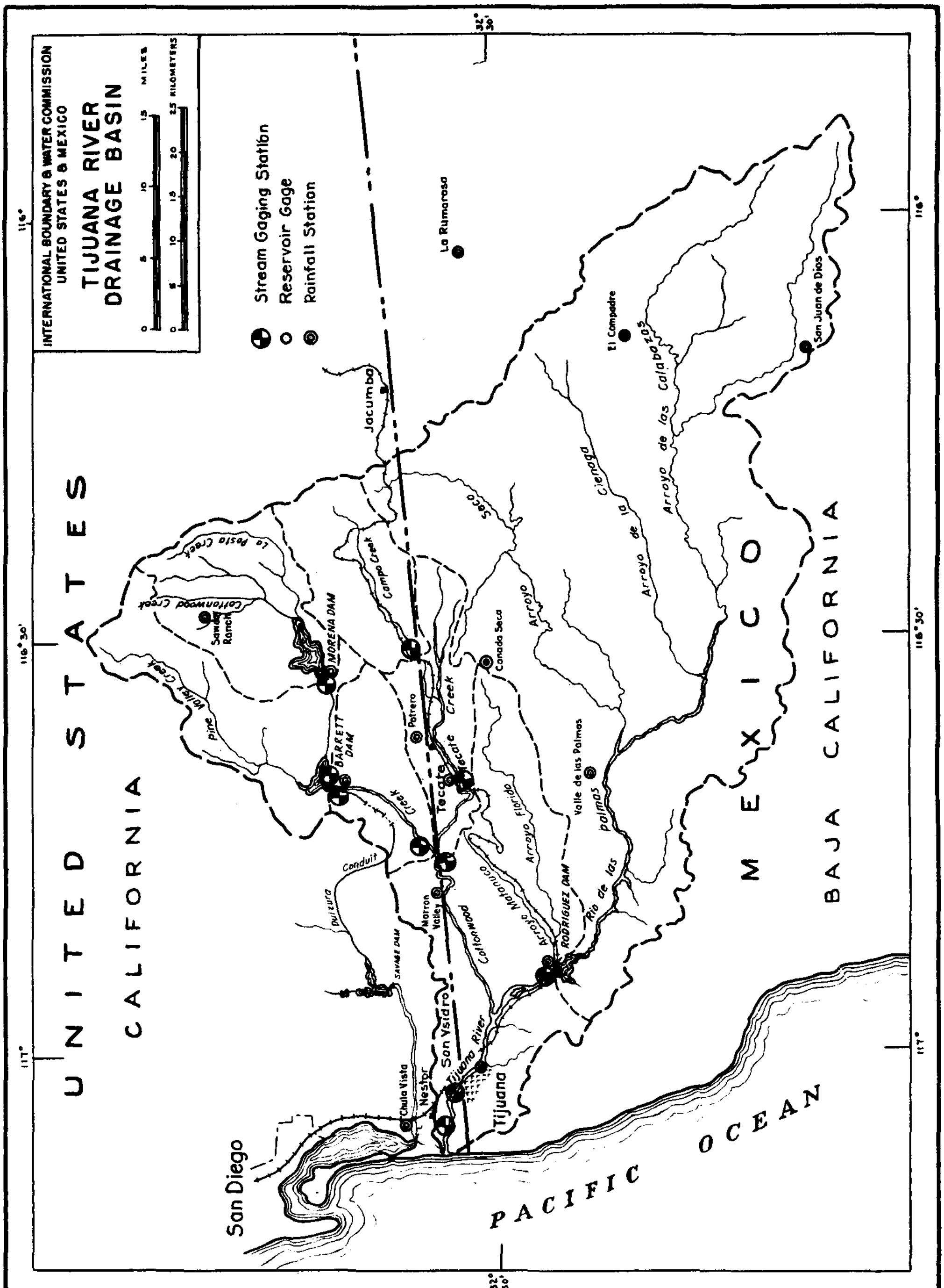
Alamo River

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	ECx10^6 @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			4,476	1.10	7.7	70				28.01	4.88		23.91	
Feb.															
Mar.	1			2,870	.72	7.9	58				17.14	4.30		12.97	
Apr.															
May	1	5.82		6,173	2.00	8.0	63	53	12.72	12.49	43.50	6.00	26.22	36.10	0.12
June															
July	1			5,614	1.80	7.9	61				38.98	5.68		32.99	
Aug.															
Sept.	1	3.76		4,065	1.35	7.4	59	49	9.23	8.55	26.10	5.24	17.31	21.43	.10
Oct.															
Nov.	1	3.05		3,407	.86	7.5	57	46	7.78	7.86	21.40	5.08	14.25	16.36	.14
Dec.															
Total	6														

New River

Month	No. of Samples	Dissolved Solids: Tons Per Acre-Foot	Dissolved Solids: Total Tons	ECx10^6 @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			4,433	0.98	7.5	63				27.80	4.20		28.06	
Feb.															
Mar.	1			4,437	.88	7.4	65				28.28	3.92		27.64	
Apr.															
May	1	5.36		6,024	1.25	7.7	64	68	11.93	9.21	39.59	4.52	15.34	42.02	0.08
June															
July	1			5,636	1.20	7.3	66				39.50	3.72		40.89	
Aug.															
Sept.	1	5.60		6,310	1.45	7.5	65	68	11.38	10.85	43.50	4.16	16.79	44.56	.14
Oct.															
Nov.	1	3.58		4,120	.78	7.4	61	63	7.39	8.15	25.23	3.76	11.31	26.23	.34
Dec.															
Total	6														

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


INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
TIJUANA RIVER
DRAINAGE BASIN
MILES
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
Tecate
Tecate Creek
Campo Creek
Jacumba
La Rumorosa
El Compadre
San Juan de Dios
Arroyo de los Calabozos
Arroyo de la Cienaga
Arroyo Seco
Canada Seca
Valle de las Palmas
Rio de las Palmas
RODRIGUEZ DAM
Arroyo Florido
Arroyo Matanuco
Cottonwood
Potrero
Barrett Dam
Morena Dam
Sawday Ranch
Cottonwood Creek
La Posta Creek
Pine Valley Creek
Dulzura
Conduit
Savage Dam
Marron Valley
116°
116°30'
117°
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 1963.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1963 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 1963	Period 1937-1963		
		Average	Maximum	Minimum
January	4.8	558	3,520	4.8
February	43.6	1,349	16,700	8
March	26.8	2,085	13,220	25.3
April	20.1	1,339	11,490	3.3
May	0	472	3,550	0
June	.9	244	1,660	0
July	5.6	174	1,010	0
August	7.7	123	1,260	0
September	14.6	85.6	1,070	0
October	10.6	100	1,270	0
November	11.1	176	1,380	0
December	5.4	571	3,590	4.4
Yearly	151.2	7,276.6	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 1963.

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 1963	Period 1937-1963		
		Average	Maximum	Minimum
January	3.2	160	1,700	1
February	2.9	437	4,260	1.5
March	3.2	302	1,490	1.7
April	3.1	1,118	12,950	1
May	1.7	305	3,040	1
June	1.7	419	7,360	0
July	1.7	238	2,340	.8
August	.6	198	1,550	.6
September	.6	388	5,880	0
October	1.7	116	529	0
November	1.7	155	1,260	0
December	1.7	432	5,350	1
Yearly	23.8	4,268	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 1963. 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 58.88 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 1963	Period 1937-1963		
		Average	Maximum	Minimum
January	5.2	669	3,430	5.2
February	41.9	1,862	26,790	10
March	21.2	3,247	18,860	20
April	18.8	2,212	21,630	10.2
May	4.3	675	5,130	0
June	.6	275	1,730	0
July	7.4	180	1,010	0
August	1.9	110	579	0
September	14.9	125	759	0
October	11.2	78.5	645	.6
November	17.7	133	1,200	0
December	5.5	489	3,380	5.5
Yearly	150.6	10,055.5	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 1963. 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 Dam, 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.

Mean Daily Discharge in Second-Feet 1963 — 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 1963								Period 1937-1963		
	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	479	2,350	0
Feb.								0	483	2,130	0
Mar.								0	645	2,330	0
Apr.								0	1,015	2,860	0
May								0	1,129	3,040	0
June								0	1,087	2,920	0
July								0	957	2,920	0
Aug.								0	884	2,820	0
Sept.								0	613	2,320	0
Oct.								0	469	2,450	0
Nov.								0	646	2,760	0
Dec.								0	564	2,305	0
Yearly								0	8,971	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 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 1963. 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 1963	Period 1937-1963		
		Average	Maximum	Minimum
January	0	22.3	590	0
February	0	38.1	990	0
March	0	1,025	13,390	0
April	0	1,505	33,400	0
May	0	341	7,520	0
June	0	48.0	890	0
July	0	2.7	21	0
August	0	2.4	21	0
September	0	1.9	21	0
October	0	1.7	21	0
November	0	1.3	15	0
December	0	2.0	21	0
Yearly	0	2,991.4	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. 1963 records good. Records available: October 1936 through December 1963.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 and 18 miles, respectively, upstream from this station. During 1963 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 1963 — 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 1963								Period 1937-1963		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.								0	236	1,190	0
Feb.								0	737	9,940	0
Mar.								0	2,138	20,880	0
Apr.								0	2,074	40,240	0
May								0	484	10,040	0
June								0	93.0	1,590	0
July								0	10.4	206	0
Aug.								0	.5	7.7	0
Sept.								0	2.8	72	0
Oct.								0	5.3	101	0
Nov.								0	13.0	203	0
Dec.								0	119	1,110	0
Yearly								0	5,913.0	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. 1963 records good. Records available: October 1936 through December 1963.

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.

Mean Daily Discharge in Second-Feet 1963 — 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 1963 — **Period 1937-1963**

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	173	906	0
Feb.								0	305	1,730	0
Mar.								0	437	2,360	0
Apr.								0	306	3,250	0
May								0	140	1,540	0
June								0	54.4	719	0
July								0	21.9	361	0
Aug.								0	15.8	321	0
Sept.								0	15.0	264	0
Oct.								0	26.9	543	0
Nov.								0	49.7	542	0
Dec.								0	138	808	0
Yearly								0	1,682.7	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. 1963 records good. Records available: October 1936 through December 1963.

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 1963 — 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 1963								Period 1937-1963		
	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	507	2,750	0
Feb.								0	1,332	13,680	0
Mar.								0	3,389	27,140	0
Apr.								0	2,833	51,060	0
May								0	717	14,110	0
June								0	146	2,630	0
July								0	22.7	312	0
Aug.								0	7.9	171	0
Sept.								0	11.3	152	0
Oct.								0	29.4	705	0
Nov.								0	57.8	839	0
Dec.								0	334	3,330	0
Yearly								0	9,387.1	97,900	0

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 1963. 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 1963	Period 1938-1963		
		Average	Maximum	Minimum
January	21.7	1,136	6,569	0
February	17.8	2,853	41,295	6
March	18.4	7,687	68,321	4
April	19.0	4,002	77,765	0
May	19.2	493	9,962	0
June	19.4	88.5	890	0
July	20.4	94.0	327	0
August	22.5	58.0	771	0
September	18.8	57.2	465	0
October	20.4	74.2	344	0
November	24.6	117	1,012	0
December	30.9	988	15,685	12.8
Yearly	253.1	17,648	177,642	253.1

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 1963.

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 1963 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, August 1960, and December 1962.

Monthly Discharge in Acre-Feet

Month	Current Year 1963	Period 1938-1963		
		Average	Maximum	Minimum
January	2.3	286	781	2.3
February	1.9	318	1,131	1.9
March	1.8	388	1,222	0
April	1.7	565	1,602	0
May	1.8	786	1,675	1.8
June	1.9	918	1,856	1.9
July	2.0	962	1,963	2.0
August	2.0	826	1,859	0
September	1.8	664	1,421	1.8
October	1.9	572	1,187	1.9
November	19.5	433	1,037	2.2
December	20.9	374	981	0
Yearly	59.5	7,092	15,315	59.5

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on right bank about 550 feet downstream from the international boundary and about 0.8 mile west of the international gate at San Ysidro. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 5 current meter measurements and observations of no flow and a continuous record of gage heights. Records obtained and furnished by the United States Section of the Commission. Records available: May 1947 through December 1963.

EXTREMES: Since May 1947: Maximum instantaneous discharge, 2,570 second-feet, March 15, 1952; minimum discharge, no flow during part or all of each year since 1951.

Mean Daily Discharge in Second-Feet 1963 — 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	9.3	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	.2
12	0	0	0	0	0	0	0	0	0	0	0	.1
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	63.0	.9	0	0	0	0	4.8	0	0	0
18	0	0	1.2	0	0	0	0	0	6.4	0	0	0
19	0	0	0	0	0	0	0	0	1.6	0	0	0
20	0	0	0	.1	0	0	0	0	0	0	28.1	0
21	0	0	0	1.5	0	0	0	0	0	0	15.5	0
22	0	0	0	0	0	0	0	0	0	0	.3	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	1.7	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	.6	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	64.8	4.2	0	0	0	0	22.1	0	43.9	0.3

Month	Current Year 1963								Period 1947-1963		
	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	559	4,603	0
Feb.				0		0	0	0	202	1,496	0
Mar.			17	63.0	† 1	0	2.1	129	1,123	13,309	0
Apr.			21	1.5	† 1	0	.1	8.3	341	2,926	0
May				0		0	0	0	59.7	312	0
June				0		0	0	0	39.3	309	0
July				0		0	0	0	30.9	239	0
Aug.				0		0	0	0	26.9	193	0
Sept.			4	9.3	† 1	0	.7	43.8	34.9	216	0
Oct.				0		0	0	0	51.7	305	0
Nov.			20	28.1	† 1	0	1.5	87.1	78.5	480	0
Dec.			11	.2	† 1	0	0	.6	157	1,447	0
Yearly				63.0		0	0.4	268.8	2,703.9	19,882	0

† And other days ∅ Mean daily

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 1963 (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 Río 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.

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 1963 — 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	2.6	0	0	0	0	0	0	0	0	0
18	0	0	.2	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	2.8	0	0	0	0	0	0	0	0	0

Month	Current Year 1963								Period 1937-1963		
	Extreme Gage Feet		Ø 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	951	4,070	0
Feb.				0		0	0	0	5,161	66,920	0
Mar.			17	2.6	† 1	0	.09	5.6	9,139	107,000	0
Apr.				0		0	0	0	7,853	181,900	0
May				0		0	0	0	877	18,340	0
June				0		0	0	0	148	3,060	0
July				0		0	0	0	29.4	523	0
Aug				0		0	0	0	20.9	242	0
Sept.				0		0	0	0	30.7	234	0
Oct.				0		0	0	0	105	1,340	0
Nov.				0		0	0	0	167	1,490	0
Dec.				0		0	0	0	862	7,930	0
Yearly				2.6		0	0.008	5.6	25,344.0	332,749	0

† And other days Ø Mean daily

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, through May 1961. Beginning June 1961 through December 1963, records obtained and furnished by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California.

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)	
	1963	Average 1937-1963	1963	Average 1937-1963	1963	Average 1937-1963	1963	Average 1937-1963
Jan.	470	20,448	1,435	14,114	23.5	41,268	1,928.5	75,830
Feb.	501	21,242	1,460	15,780	23.8	42,278	1,984.8	79,300
Mar.	514	22,846	1,460	17,549	23.5	46,780	1,997.5	87,175
Apr.	514	22,814	1,452	18,244	23.3	46,779	1,989.3	87,837
May	476	22,617	1,418	17,459	20.3	45,942	1,914.3	86,018
June	441	22,000	1,376	16,667	19.6	44,585	1,836.6	83,252
July	401	21,425	1,318	15,754	17.5	43,165	1,736.5	80,344
Aug.	363	20,892	1,270	14,840	18.6	41,877	1,651.6	77,609
Sept.	347	20,224	1,246	14,478	17.3	40,773	1,610.3	75,475
Oct.	342	19,937	1,238	14,025	19.6	39,854	1,599.6	73,816
Nov.	342	19,790	1,238	13,526	15.7	39,149	1,595.7	72,465
Dec.	337	19,814	1,231	13,800	15.2	39,414	1,583.2	73,028
Avg.	421	21,171	1,345	15,520	19.8	42,655	1,785.8	79,346
Max.	514	# 61,670	1,460	θ 45,920	23.8	109,610	1,997.5	213,600
Min.	337	10	1,231	106	15.2	15.2	1,583.2	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	
	1963	Average 1906-1963	1963	Average 1907-1963	1963	Average 1951-1963	1963	Average 1914-1963
Jan.	0.69	3.97	0.73	3.47	0.03	2.95	0.45	3.54
Feb.	3.00	4.07	3.57	3.60	2.87	2.20	4.72	4.00
Mar.	2.03	3.50	1.92	2.98	1.47	2.39	2.34	3.04
Apr.	1.55	1.81	1.59	1.55	1.09	1.29	1.57	1.79
May	0	.67	0	.60	0	.52	0	.70
June	.10	.14	.08	.06	0	.05	.14	.08
July	0	.40	0	.09	0	.02	0	.20
Aug.	1.70	.54	.25	.21	.02	.18	.07	.19
Sept.	2.32	.35	2.26	.27	2.40	.27	2.24	.27
Oct.	1.72	.94	.98	.75	.43	.38	2.07	.78
Nov.	2.58	1.40	2.70	1.15	3.01	1.08	2.20	1.24
Dec.	.52	3.27	.29	2.80	.13	1.51	.40	3.18
Yearly	16.21	21.06	14.37	17.53	11.45	12.84	16.20	19.01

Month	Sawday Ranch, California		Chula Vista, California	
	1963	Average 1950-1963	1963	Average 1930-1963
Jan.	0.47	3.34	T	1.92
Feb.	3.32	2.51	.86	1.92
Mar.	1.99	2.92	.88	1.52
Apr.	2.01	1.66	.65	.80
May	0	.53	.07	.27
June	0	.05	.37	.05
July	0	.56	0	.01
Aug.	3.40	.80	0	.08
Sept.	1.80	.47	2.22	.19
Oct.	.94	.45	.08	.45
Nov.	2.43	1.23	1.99	.82
Dec.	.39	1.70	.02	1.71
Yearly	16.75	16.22	7.14	9.74

In Mexico

Month	La Rumorosa, *Baja California*		Tecate, *Baja California*		Tijuana, *Baja California*		Rodriguez Dam, *Baja California*	
	1963	Average 1946-1963	1963	Av. 1946-59 & 1961-1963	1963	Av. 1948-59 & 1961-1963	1963	Average 1938-1963
Jan.	0.04	0.83	0.12	2.52	0	2.01	0.08	1.50
Feb.	.28	.43	.98	1.22	1.50	1.34	1.69	1.38
Mar.	0	.55	1.81	1.69	1.54	1.06	.94	1.42
Apr.	.24	.20	1.93	.94	.43	.59	.55	.71
May	0	.08	.08	.31	.31	.28	.12	.12
June	0	.04	.31	.08	0	.04	.12	0
July	0	.20	0	.08	0	0	T	0
Aug.		.75	.08	.16	.08	.08	.08	.08
Sept.		.24	1.57	.12	2.32	.20	2.01	.28
Oct.		.35	1.18	.35	.16	.31	.12	.31
Nov.		.28	3.07	.83	1.89	.71	1.54	.59
Dec.		.67	1.81	1.57	0	.83	.04	1.61
Yearly		4.49	12.94	10.55	8.23	7.95	7.29	7.91

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	
	1963	Average 1952-1963	1963	Average 1948-1963	1963	Average 1948-1963	1963	Average 1956-1963
Jan.	1.97	1.42	0.16	1.77		2.36	0.55	2.44
Feb.	1.02	1.61	1.77	1.02		1.34	.67	2.36
Mar.	2.56	1.89	.98	1.18		1.93	2.01	2.01
Apr.		.79	.79	.59		.91		1.14
May		.39	0	.16		.47	0	.31
June		.04	T	0		.04	0	.31
July		.67	0	.08		.94	0	.98
Aug.	.39	.87	T	.04	.94	.75	.12	.59
Sept.		.16	1.38	.20	.94	.83	1.54	.55
Oct.		.51	.55	.24	.63	.47	.35	.63
Nov.		.47	1.57	.63	3.15	.94	1.89	.91
Dec.		.79	.08	.87		1.54	.31	.71
Yearly		9.84	7.28	6.97		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 Rumorosa, 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 84 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 1963, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

2. Chula Vista: September 1918 through December 1963, 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 April 30, 1963, same type of pan 22.5 inches in diameter. From April 30, 1963 to date, 2-foot diameter screened pan, same type.

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 1963, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

In the United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Chula Vista, California	
	1963	Average 1916-1963	1963	Average 1921-1963	1963	Average 1951-1963	1963	Average 1919-1963
Jan.	1.88	2.33	1.86	1.90	3.88	2.82	3.58	2.79
Feb.	2.94	2.36	2.94	2.22	5.14	3.26	3.51	3.29
Mar.	2.54	3.71	3.68	3.66	4.58	4.13	5.90	4.95
Apr.	4.04	5.02	4.66	4.98	5.80	5.52	6.84	5.85
May	6.46	7.00	6.72	7.16	5.54	6.86	7.41	6.89
June	7.26	9.03	7.52	8.78			6.55	7.04
July	10.48	10.55	10.38	10.42			7.98	7.64
Aug.	11.12	9.79	9.31	9.75			7.35	7.27
Sept.	8.90	7.99	6.59	8.01	7.25	8.36	6.65	6.06
Oct.	3.28	5.56	3.68	5.61	5.48	6.53	4.79	4.81
Nov.	1.65	3.78	2.06	3.63	3.52	4.70	3.58	3.65
Dec.	2.03	2.72	2.39	2.25	3.40	3.42	3.80	2.76
Total	62.58	69.84	61.79	68.37			67.94	63.00

In Mexico

Month	Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de las Palmas, Baja California	
	1963	Average 1961-1963	1963	Av. 1952-59 1961-1963	1963	Av. 1939-42 1946-1963	1963	Average 1952-1963
Jan.	3.15	3.74	3.82	2.72	4.84	3.86	3.74	3.50
Feb.	2.68	2.99	3.19	3.15	5.71	3.86	4.09	3.31
Mar.	3.58	3.58	4.45	4.06	5.87	5.12	5.39	5.08
Apr.	5.16	6.02	4.33	4.76	7.13	5.87	6.34	6.81
May	6.65	6.34	6.10	5.71	9.41	7.56	8.07	7.87
June	7.17	5.12	6.14	5.51	9.37	8.31	9.09	9.65
July	10.04	9.37	8.11	6.42	11.65	9.29	12.60	11.02
Aug.		8.78	7.44	6.50	9.76	8.39	11.50	10.24
Sept.	6.85	7.56	6.57	5.91	8.70	7.28	9.65	8.74
Oct.	4.57	6.42	4.13	4.25	5.28	5.98	5.79	6.34
Nov.	2.76	3.66	3.11	3.50	4.21	5.51	3.74	4.69
Dec.	3.58	3.23	4.45	2.99	6.14	4.61	4.92	4.25
Total		71.85	61.84	55.51	88.07	76.22	84.92	80.75

Month	San Juan de Dios, Baja California	
	1963	Average 1956-60&63
Jan.		1.93
Feb.		2.44
Mar.		3.98
Apr.		3.86
May	6.34	5.47
June	7.20	5.43
July	9.61	7.99
Aug.	8.23	6.97
Sept.	6.77	6.18
Oct.	4.06	3.98
Nov.		3.70
Dec.		3.50
Total		56.30

TEMPERATURE IN THE TIJUANA RIVER BASIN

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. 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. 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 84 in this bulletin.

Degrees Fahrenheit

In the United States

Month	Barrett Dam, California				* Chula Vista, California			
	1963			Average 1931-1963	1963			Average 1931-1963
	Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	46.3	71	19	48.6	52.6	80	24	52.3
Feb.	56.6	86	35	50.5	58.7	80	25	53.7
Mar.	51.3	83	28	53.4	55.0	72	42	55.1
Apr.	54.0	83	31	58.3	55.7	67	41	58.0
May	62.3	90	36	63.0	61.5	70	48	60.7
June	65.3	94	43	68.3	62.5	70	51	63.0
July	73.8	102	45	76.2	65.5	73	56	
Aug.	75.3	102	49	76.1	69.1	77	59	68.0
Sept.	74.0	105	51	72.8	72.7	108	61	
Oct.	65.2	92	42	64.2	65.4	78	52	62.5
Nov.	54.4	86	31	56.0	58.9	76	42	
Dec.	50.1	82	25	51.0	56.0	86	37	54.4
Yearly	60.7	105	19	61.5	61.1	108	24	

In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1963		1946-1963		1963		1946-59&61-63		1963		1948-59&61-63	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	70	19	81	5	73	21	86	21	90	32	90	30
Feb.	79	32	82	10	88	36	90	21	102	45	102	32
Mar.	88	30	88	16	82	32	88	27	90	41	90	34
Apr.	81	28	91	23	79	36	99	32	90	34	90	34
May	88	39	97	28	86	36	100	36	88	46	97	43
June	113	39	113	34	90	43	104	39	95	50	99	41
July	99	55	104	50	97	43	115	36	120	54	120	46
Aug.			102	46	100	46	113	34	106	59	106	52
Sept.			104	34	104	50	115	37	120	59	120	46
Oct.			91	25	90	39	106	34	117	50	117	43
Nov.			88	14	90	32	97	27	99	41	99	34
Dec.			81	10	81	27	90	23	99	36	99	25
Yearly			113	5	104	21	115	21	120	32	120	25

Month	Rodriguez Dam, Baja California				Cañada Seca, Baja California				Valle de las Palmas, Baja California			
	1963		1946-1963		1963		1951-1963		1963		1948-1963	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	77	28	88	28	90	36	100	19	82	18	88	12
Feb.	91	41	91	34	104	37	104	19	93	36	99	23
Mar.	79	36	88	34	99	37	102	19	86	34	93	28
Apr.	79	39	91	36			113	21	84	36	104	32
May	81	46	99	41			104	25	90	41	100	39
June	81	46	108	46			113	30	93	45	108	43
July	88	52	104	52			111	32	102	50	120	48
Aug.	90	54	104	52	97	52	113	36	100	52	108	48
Sept.	106	57	108	48			118	30	108	54	117	43
Oct.	84	48	108	43			113	28	91	46	108	37
Nov.	88	37	99	36			108	19	90	36	95	19
Dec.	82	32	93	27			113	21	81	30	91	21
Yearly	106	28	108	27			118	19	108	18	120	12

* Chula Vista temperature not read on most week ends or holidays

TEMPERATURE IN THE TIJUANA RIVER BASIN

Degrees Fahrenheit
In Mexico

Month	El Compadre, Baja California				San Juan de Dios, Baja California							
	1963		1948-1963		1963		1956-1963					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.			100	10	70	18	84	7				
Feb.			97	14	75	23	84	16				
Mar.			93	23	77	19	84	18				
Apr.			104	28			102	19				
May			109	30	86	28	91	21				
June			115	28	90	32	106	28				
July			120	37	102	37	120	36				
Aug.	99	41	120	39	95	41	106	32				
Sept.	100	41	115	32	95	41	100	25				
Oct.	90	36	118	36	93	25	99	19				
Nov.	77	32	106	27	99	23	99	12				
Dec.			113	19	88	21	88	16				
Yearly			120	10			120	7				

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

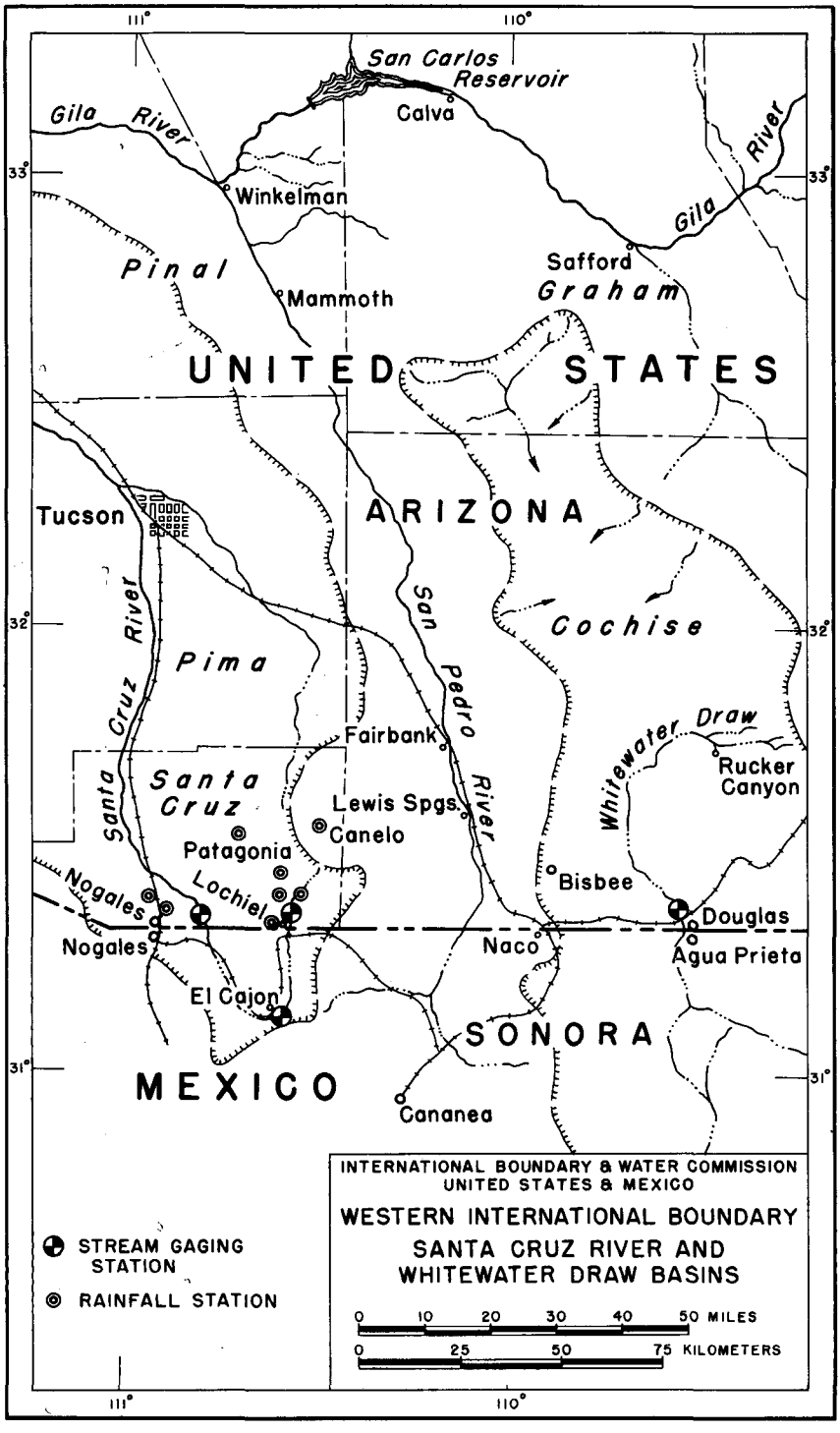
1963

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 1963 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) 350	3,350

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 1963 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir, but an estimated area of about 350 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
Calva
Gila River
Winkelman
Gila River
33°
Pinal
Safford
Graham
Mammoth
UNITED STATES
ARIZONA
Tucson
San Pedro River
Cochise
32°
Pima
Santa Cruz River
Fairbank
Whitewater Draw
Rucker Canyon
Santa Cruz
Lewis Spgs.
Canelo
Patagonia
Nogales
Lochiel
Bisbee
Douglas
Nogales
Naco
Agua Prieta
El Cajon
SONORA
31°
MEXICO
Cananea
INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
WESTERN INTERNATIONAL BOUNDARY
SANTA CRUZ RIVER AND
WHITEWATER DRAW BASINS
STREAM GAGING STATION
RAINFALL STATION
0 10 20 30 40 50 MILES
0 25 50 75 KILOMETERS

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 16 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 1963 (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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.02	0.01	0.02	0	0.01	0	0	550	155	0	0	0.04
2	.02	.01	.01	0	0	0	0	423	142	0	0	¤ .04
3	.02	.01	.01	0	0	0	0	27	75	0	0	.01
4	.03	.01	.01	0	0	0	0	11	12	0	0	.01
5	.03	.01	.01	0	0	0	0	64	4.0	0	0	.01
6	.02	.01	.01	0	0	0	0	36	1.6	0	0	.01
7	.02	0	.01	0	0	0	0	4.5	.7	0	0	0
8	.01	0	.01	0	0	0	0	2.7	.4	0	0	0
9	.01	0	.01	0	0	0	0	2.6	.3	0	0	0
10	.01	0	0	0	0	0	29	1.1	¤ .3	0	0	0
11	.01	.01	0	0	0	0	4.2	1.8	.4	0	0	.01
12	.02	.02	0	0	0	0	1.3	.6	.3	0	0	.02
13	.02	.02	0	0	0	0	.1	.5	.3	0	0	.02
14	.02	.02	0	0	0	0	.05	.5	.2	0	0	.01
15	.02	.01	0	0	0	0	.02	3.3	.2	0	0	.01
16	.02	.01	0	0	0	0	.1	3.0	.1	0	0	0
17	.02	.01	0	0	0	0	.5	1.2	.09	0	0	0
18	.02	.01	0	0	0	0	.08	.7	.06	0	0	0
19	.02	.01	0	0	0	0	.03	.5	28	0	35	0
20	.02	.01	0	0	0	0	.02	.4	6.7	0	1.2	0
21	.02	.01	0	0	0	0	0	.4	.8	0	7.6	0
22	.02	.01	0	0	0	0	0	53	.3	.04	45	0
23	.02	.01	0	0	0	0	¤ 0	18	.2	.05	1.3	0
24	.01	.01	0	0	0	0	0	31	.1	.05	1.0	0
25	.01	.02	0	.01	0	0	0	5.8	.09	.04	.5	0
26	.01	.02	0	.01	0	0	14	16	.06	.02	.3	0
27	.01	.02	0	.01	0	0	196	272	.03	.01	.2	0
28	.01	¤ .02	0	.01	0	0	2.0	43	.02	0	.09	0
29	.01		0	.01	0	0	135	11	0	0	.08	0
30	.01		0	.01	0	0	29	71	0	0	.05	0
31	.01		0		0		3.3	184		0		¤ 0
Sum	0.52	0.31	0.10	0.06	0.01	0	414.70	1,839.6	429.25	0.21	92.32	0.19

Month	Current Year 1963 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 1936-1963 Acre-Feet Average	Maximum	Minimum
Jan.			† 4	0.03	† 8	0.01	0.017	1.0	52.0	451	1.0
Feb.			† 12	.02	† 7	0	.011	.6	29.6	132	.6
Mar.			1	.02	†10	0	.003	.2	32.2	130	.2
Apr.			† 25	.01	† 1	0	.002	.1	29.6	173	.1
May			1	.01	† 2	0	.0003	.02	22.1	138	0
June			0		0	0	0	0	189	1,590	0
July			27	196	† 1	0	13.4	823	# 2,192	8,110	39
Aug.			1	550	†20	.4	59.3	3,650	# 3,557	14,480	.3
Sept.			1	155	†29	0	14.3	851	# 735	3,170	.8
Oct.			† 23	.05	† 1	0	.007	.4	182	2,210	.4
Nov.			22	45	† 1	0	3.08	183	54.3	352	.2
Dec.			† 1	.04	† 7	0	.006	.4	93.7	1,050	.4
Yearly				550		0	7.61	5,510		22,321	900

¤ Estimated Ø Mean daily # 1947 Records not available † And other days

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 1963.

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 1963			Period 1952-1963		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	26.987	10.201	37.188	1.298	1.080	1.200	1.368	0.619	0.954
Feb.	23.968	9.717	33.685	1.290	1.093	1.203	1.784	.584	.958
Mar.	26.989	9.499	36.488	1.252	.980	1.177	1.288	.590	.951
Apr.	28.323	7.277	35.600	1.267	1.085	1.187	1.354	.619	.966
May	30.972	8.084	39.056	1.339	1.125	1.260	1.428	.619	.977
June	29.672	9.090	38.762	1.377	1.153	1.292	1.692	.626	1.047
July	31.637	11.689	43.326	1.547	1.246	1.398	1.692	.619	1.083
Aug.	31.853	11.967	43.820	1.574	1.249	1.414	1.829	.619	1.116
Sept.	30.213	12.697	42.910	1.778	1.244	1.430	1.884	.626	1.107
Oct.	28.335	13.451	41.786	1.408	1.204	1.348	1.667	.626	1.049
Nov.	26.288	11.553	37.841	1.336	1.163	1.261	1.354	.619	1.004
Dec.	26.026	12.007	38.033	1.306	1.097	1.227	1.582	.619	1.007
Yearly	341.263	127.232	468.495	1.778	0.980	1.284	1.884	0.584	1.018

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 16 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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.02	0.04	0.02	0	0	0	0	11	9.2	2.3	0.8	0.7
2	.03	.04	.02	0	0	0	0	1.5	16	2.3	.8	.7
3	.04	.04	.02	0	0	0	0	4.5	19	2.3	.8	.7
4	.04	.04	.03	0	0	0	0	33	9.9	2.3	.8	.6
5	.03	.04	.03	0	0	0	0	59	6.3	2.3	.8	.6
6	.02	.03	.02	0	0	0	0	23	6.7	2.2	.8	.5
7	.01	.03	.01	0	0	0	0	3.6	6.5	1.8	1.1	.4
8	.01	.03	.01	0	0	0	0	3.8	7.0	2.0	1.1	.5
9	.01	.03	.01	0	0	0	0	4.0	7.0	1.8	.9	.4
10	.02	.05	.01	0	0	0	36	4.0	7.0	1.8	.8	.7
11	.02	.07	.02	0	0	0	0	4.0	7.0	1.7	.8	.6
12	.02	.05	.02	0	0	0	0	57	7.2	1.7	.6	.6
13	.01	.03	.01	0	0	0	0	10	7.3	1.3	.5	.6
14	.01	.03	.01	0	0	0	0	7.8	8.0	1.3	.5	.6
15	.01	.03	.01	0	0	0	0	23	7.3	1.5	.5	.5
16	.01	.03	.02	0	0	0	4.7	14	7.0	1.6	.5	.5
17	.01	.03	.02	0	0	0	0	4.2	7.0	1.6	.5	.4
18	.02	.03	.04	0	0	0	13	4.8	6.5	1.6	.6	.4
19	.02	.03	.02	0	0	0	5.7	4.8	6.7	2.5	.7	.4
20	.02	.03	.01	0	0	0	41	13	6.5	1.7	.7	.5
21	.03	.02	0	0	0	0	.05	3.8	6.2	1.1	1.7	.5
22	.04	.02	0	0	0	0	.01	4.0	5.9	1.1	1.0	.4
23	.03	.03	0	0	0	0	0	4.0	5.6	1.1	.7	.4
24	.03	.03	0	0	0	0	0	4.5	4.5	1.3	.7	.3
25	.02	.03	0	0	0	0	0	206	4.2	1.2	.6	.3
26	.02	.02	0	0	0	0	20	126	3.8	1.1	.7	.4
27	.02	.02	0	0	0	0	64	69	3.2	1.0	.7	.3
28	.02	.03	0	0	0	0	19	10	3.0	1.0	.6	.2
29	.02		0	0	0	0	71	14	2.8	.9	.7	.2
30	.03		0	0	0	0	1.6	10	2.5	.8	.7	.3
31	.04		0		0		.05	8.0		.8		.3
Sum	0.68	0.93	0.36	0	0	0	276.11	749.3	206.8	49.0	22.7	14.5

Month	Current Year 1963 Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1949-1963 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			† 3	0.04	† 7	0.01	0.022	1.3	26.8	70	1.3
Feb.			11	.07	† 21	.02	.033	1.8	21.3	62	1.8
Mar.			18	.04	† 21	0	.012	.7	17.1	57	.7
Apr.				0		0	0	0	9.3	29	0
May				0		0	0	0	2.9	10	0
June				0		0	0	0	.3	4.4	0
July			29	71	† 1	0	8.91	548	673	4,270	1.6
Aug.			25	206	2	1.5	24.2	1,490	1,206	10,120	.08
Sept.			3	19	30	2.5	6.89	410	210	1,110	0
Oct.			19	2.5	† 30	.8	1.58	97	64.2	337	0
Nov.			21	1.7	† 13	.5	.76	45	28.9	90	0
Dec.			† 1	.7	† 28	.2	.47	29	27.1	74	0
Yearly				206		0	3.62	2,620	2,287	12,633	126

† 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 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, 1961 through December 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.2	3.2	4.6	3.2	3.9	1.0	1.0	31.4	60.6		6.3	6.2
2	3.5	3.2	4.6	3.2	3.9	1.0	1.0	54.6	97.9		6.5	6.2
3	3.2	3.2	4.6	3.2	3.9	1.0	1.0	39.7	115		7.0	7.2
4	3.2	3.2	4.6	3.2	3.9	1.0	1.6	29.7	78.2		7.2	7.4
5	3.2	3.2	4.6	3.2	3.9	1.6	2.0	37.5	53.0		7.2	6.9
6	3.2	3.2	4.9	3.2	3.9	2.0	1.6	35.3			7.0	6.7
7	3.5	3.2	5.3	3.5	3.9	2.0	1.6	33.4			7.4	6.7
8	3.5	3.5	5.3	3.9	4.2	1.6	2.0	17.0			7.3	6.7
9	3.5	3.9	5.7	3.9	4.6	1.6	2.0	15.7			7.2	6.0
10	3.5	4.2	6.0	4.2	4.6	2.0	2.0	14.6			6.9	6.6
11	3.9	4.6	6.0	4.2	4.6	2.0	2.6	13.4			6.4	7.6
12	3.5	4.2	5.7	3.9	4.9	2.0	13.4	13.4			5.7	8.1
13	3.2	3.9	5.3	3.9	5.3	2.0	6.0	15.9			5.5	7.8
14	3.2	3.9	5.3	4.2	5.7	2.0	2.0	37.8			5.4	7.8
15	3.5	3.2	5.7	4.6	6.0	2.0	3.9	29.0		7.7	5.8	7.8
16	3.9	3.5	6.0	4.6	5.7	2.0	6.9	42.3		8.5	6.1	7.8
17	3.9	3.1	6.0	4.6	4.9	2.0	9.4	32.0		8.3	6.9	7.8
18	3.5	2.6	5.9	4.6	4.6	2.0	21.2	29.1		7.9	7.1	7.9
19	3.5	2.6	5.3	4.6	4.6	2.0	3.2	67.0		9.6	7.1	7.3
20	3.9	2.3	4.2	4.6	4.6	2.0	39.7	44.7		7.7	7.2	7.8
21	3.9	3.4	3.2	4.2	4.6	2.0	6.0	39.1		5.9	10.2	7.8
22	3.5	4.6	3.2	3.9	3.2	1.6	6.0	44.3		5.1	7.7	7.9
23	3.2	4.6	3.2	3.9	1.5	1.6	6.0	40.4		5.3	7.2	8.2
24	3.2	4.6	3.2	3.9	1.0	1.6	5.3	27.0		6.3	7.0	8.5
25	3.2	4.6	3.2	4.2	1.6	1.6	5.3	48.9		7.2	6.4	8.2
26	3.2	4.6	3.2	4.2	2.0	1.6	8.5	175		6.4	6.4	7.9
27	3.2	4.6	3.2	3.9	1.6	1.6	29.7	113		6.1	6.4	7.6
28	3.2	4.6	3.2	3.9	1.0	1.0	29.7	47.1		6.3	6.5	7.3
29	3.2		3.2	3.9	1.0	1.0	122	42.8		6.2	6.7	7.0
30	3.2		3.2	3.9	1.0	1.0	97.1	97.4		6.3	6.5	6.7
31	3.2		3.2		1.0		84.6	73.6		6.3		6.6
Sum	105.7	103.5	140.8	118.4	111.1	49.4	524.3	1,382.1			204.2	228.0

Month	Current Year 1963								Period		
	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	0.11	0.10	† 2	3.9	† 1	3.2	3.4	209			
Feb.	.13	.07	†10	4.6	†21	2.0	3.7	204			
Mar.	.16	.10	† 9	6.0	†20	3.2	4.5	278			
Apr.	.13	.10	†15	4.6	† 1	3.2	4.0	235			
May	.16	.03	†15	6.0	†23	1.0	3.6	220			
June	.07	.03	† 6	2.0	† 1	1.0	1.7	98.8			
July	1.61	.03	29	122	† 1	1.0	16.9	1,041			
Aug	2.40	.30	26	332	† 1	13.4	44.6	2,742			
Sept.											
Oct.											
Nov.	.30	.10	21	13.8	14	5.3	6.8	405			
Dec.	.18	.13	11	8.5	† 9	6.0	7.3	452			
Yearly											

† And other days

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 22 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 1963.

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 1963.

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 1963 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	1.7	2.3	0.9	0.7	0.2	0	325	29	0.5	0.7	3.4
2	.4	1.7	1.2	.9	.5	.2	0	279	19	.7	.7	3.1
3	.5	1.7	.7	1.2	.5	.1	0	490	164	.7	.5	2.7
4	.7	1.7	.7	1.2	.4	.1	0	272	85	.7	.5	2.7
5	.5	1.7	.7	1.2	.4	.1	2.9	291	45	.7	.5	2.3
6	.5	2.0	.7	1.2	.4	.1	0	166	31	.5	.5	2.3
7	.5	2.0	.7	1.2	.4	0	0	102	20	.5	.7	2.3
8	.7	2.0	.9	1.2	.4	0	0	52	17	.5	.7	2.7
9	.7	2.0	1.2	1.2	.4	0	41	37	17	.5	.7	3.1
10	.7	2.3	1.4	1.2	.4	0	221	10	11	.5	.7	3.4
11	.9	2.7	1.7	1.2	.4	0	58	26	8.5	.5	.7	3.9
12	1.2	2.7	1.7	.9	.4	0	13	136	5.2	.5	.5	3.9
13	.9	2.7	1.7	.9	.4	0	1	93	4.3	.5	.5	3.9
14	.9	2.7	1.7	.9	.4	0	0	98	32	.5	.5	3.9
15	.9	2.7	1.7	.9	.5	0	0	102	73	.5	.5	3.4
16	1.2	2.7	1.7	.9	.5	0	0	111	24	.5	.5	3.4
17	1.2	2.7	1.7	.9	.5	0	56	42	18	.5	.5	3.4
18	1.2	2.7	2.3	.9	.5	0	62	25	13	.7	.9	3.4
19	1.2	2.7	2.3	.9	.5	0	48	137	10	1.2	.9	3.4
20	1.2	2.7	2.3	.9	.4	0	71	83	9.2	.9	.7	3.4
21	1.2	2.7	2.3	.9	.4	0	13	63	6.2	.9	6.4	3.9
22	1.2	2.7	2.3	.9	.4	0	7.7	42	5.2	.9	5.7	3.9
23	1.2	2.7	2.3	.9	.4	0	2	101	2.7	.7	4.3	3.4
24	1.2	2.7	2.3	.9	.4	0	.5	38	.7	.9	3.9	3.9
25	1.2	2.7	2.0	.7	.4	0	.2	25	.5	.9	3.4	3.9
26	1.4	2.7	1.7	.9	.4	0	0	794	.5	.9	3.4	3.9
27	1.4	2.7	1.4	.7	.3	0	57	415	.5	.7	3.4	3.9
28	1.4	2.3	1.2	.7	.3	0	162	69	.5	.7	3.1	3.9
29	1.7		1.2	.5	.3	0	659	44	.5	.7	3.1	3.9
30	1.7		.9	.5	.3	0	825	67	.5	.7	3.4	3.4
31	1.4		.9		.2		442	90		.7		3.4
Sum	31.4	67.0	47.8	28.3	12.8	0.8	2,742.3	4,625	653.0	20.8	52.5	105.4

Current Year 1963 — **Period 1936-1963**

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.			† 29	1.7	† 1	0.4	1.01	62	1,187	16,710	62
Feb.			† 11	2.7	† 1	1.7	2.39	133	575	2,710	59
Mar.			† 1	2.3	† 3	.7	1.54	95	435	1,580	95
Apr.			† 3	1.2	† 29	.5	.94	56	172	475	19
May			1	.7	31	.2	.41	25	62.4	180	2
June			† 1	.2	† 7	0	.03	1.6	80.0	1,020	0
July			30	825	† 1	0	88.5	5,440	2,683	15,610	45
Aug.			26	794	10	10	149	9,170	5,995	45,790	91
Sept.			3	164	† 25	.5	21.8	1,300	1,118	5,540	17
Oct.			19	1.2	† 1	.5	.67	41	278	1,550	8.5
Nov.			21	6.4	† 3	.5	1.75	104	233	1,140	14
Dec.			† 11	3.9	† 5	2.3	3.40	209	520	5,920	27
Yearly				825		0	23.0	16,640	13,338	57,671	3,499

† And other days ∅ 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 1963.

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 1963			Period 1952-1963		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	28.906	29.150	58.056	2.002	1.602	1.873	4.162	0.650	1.702
Feb.	22.450	29.350	51.800	2.002	1.502	1.850	3.762	.650	1.804
Mar.	25.006	33.200	58.206	2.102	1.602	1.878	3.662	.750	1.764
Apr.	21.200	32.300	53.500	2.000	1.550	1.783	3.962	.700	1.721
May	22.600	34.050	56.650	2.000	1.400	1.827	3.634	.550	1.637
June	20.800	33.800	54.600	2.100	1.600	1.820	3.317	.700	1.514
July	27.250	31.300	58.550	2.100	1.500	1.889	3.502	.700	1.561
Aug.	33.000	36.700	69.700	2.900	1.700	2.248	3.587	.750	1.938
Sept.	36.448	34.900	71.348	2.932	1.800	2.378	4.112	.800	2.203
Oct.	42.700	36.000	78.700	2.900	2.100	2.539	3.761	.700	2.049
Nov.	35.800	31.900	67.700	2.600	2.000	2.257	3.510	.800	1.820
Dec.	37.850	32.450	70.300	2.500	2.000	2.268	3.360	.350	1.811
Yearly	354.010	395.100	749.110	2.932	1.400	2.052	4.162	0.350	1.794

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 alphabetical listing of stations at bottom of page following the monthly record.

Month	Meigs Ranch, Arizona		Jones Ranch, Arizona		Greene Cattle Company, Arizona		Nogales Sanitation Plant 2N, Arizona	
	1963	Average 1952-1963	1963	Average 1952-1963	1963	Average 1953-1963	1963	Average 1953-1963
Jan.	0.62	1.10	0.60		0.61	1.03	0.71	1.24
Feb.	.88	.42	.90		.70	.49	.50	.47
Mar.	.35	.97	.30		.20	.82	.18	.90
Apr.	.30	.27	.34	0.31	.40	.12	.49	.12
May	T	.05	T	.04	T	.06	T	.07
June	0	.57	0		0	.47	0	.34
July	6.04	4.47	11.05	5.53	4.50	4.54	4.01	4.33
Aug.	6.50	4.52	6.55		5.00	3.11	6.31	4.34
Sept.	1.22	.95	1.80		.90	.94	1.09	.95
Oct.	.65	.87	.65		.60	.90	.84	1.12
Nov.	1.86	.52	2.40		2.00	.46	1.91	.56
Dec.	.38	.65	.60	.80	.60	.56	.16	.77
Yearly	18.80	15.36	25.19		15.51	13.50	16.20	15.21

Month	Nogales, Arizona		San Rafael Ranch, Arizona		Canelo, Arizona		Patagonia, Arizona	
	1963	Average 1914-1963	1963	Average 1924-1963	1963	Average 1930-1963	1963	Average 1930-1963
Jan.	0.70	1.12	0.34		0.80	1.25	0.97	1.32
Feb.	.50	.84	.74		1.00	1.12	1.18	1.03
Mar.	.18	.78	.23		.26	.78	.27	.84
Apr.	.46	.31	.41	0.41	.39	.38	.47	.35
May	T	.14	0	.11	0	.12	T	.17
June	0	.45	0	.78	0	.97	0	.49
July	4.06	4.01	4.83	4.51	6.21	4.19	4.94	4.48
Aug.	5.55	3.97	3.31	4.06	4.91	4.58	5.89	4.28
Sept.	.83	1.54	1.21	1.72	1.70	1.57	2.53	1.57
Oct.	.75	.75	.50		.65	.90	.69	.83
Nov.	2.23	.71	2.12	.65	2.21	.78	2.20	.78
Dec.	.15	1.15	.62	1.10	.61	1.23	.53	1.16
Yearly	15.41	15.77	14.31		18.74	17.87	19.67	17.30

T Trace

LOCATION OF RAINFALL STATIONS

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

S Standard 8" rain gage R Recording rain gage

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

Tabulated below are the monthly records of temperature, humidity, evaporation, and wind at the station two miles north of the Nogales Sanitation Plant in Arizona. 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.

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

TEMPERATURE - DEGREES FAHRENHEIT

Month	Nogales Sanitation Plant - 2N		
	1963		
	Mean	Max.	Min.
Jan.	Ø 43.9	76	12
Feb.	51.4	84	23
Mar.	50.6	84	19
Apr.	56.3	90	25
May	Ø 67.4	95	36
June	Ø 70.9	101	41
July	Ø 79.7	104	57
Aug.	74.7	95	56
Sept.	73.4	97	45
Oct.	Ø 65.2	94	40
Nov.	Ø 52.9	87	27
Dec.	46.6	77	19
Yearly	61.1	104	12

Ø One or more days missing

MEAN RELATIVE HUMIDITY - PERCENT

Month	Nogales Sanitation Plant - 2N	
	1963	
	Max.	Min.
Jan.	96	50
Feb.	90	20
Mar.	86	10
Apr.	90	20
May	40	10
June	40	15
July	94	36
Aug.	98	60
Sept.	96	20
Oct.	90	14
Nov.	95	50
Dec.	90	20
Yearly	98	10

EVAPORATION - INCHES

Month	Nogales Sanitation Plant - 2N	
	1963	Average #1953-1963
Jan.	3.02	3.40
Feb.	4.93	4.54
Mar.	7.97	7.28
Apr.	9.29	9.72
May	11.70	12.42
June	14.32	13.52
July	10.22	9.79
Aug.	5.68	7.18
Sept.	7.35	7.54
Oct.	6.23	6.60
Nov.	3.92	4.31
Dec.	2.85	3.12
Total	87.48	89.42

Some months missing

MEAN WIND SPEED - MILES PER HOUR

Month	Nogales Sanitation Plant - 2N	
	1963	Average 1953-1963
Jan.	1.7	2.1
Feb.	2.0	2.4
Mar.	2.8	2.7
Apr.	2.3	2.5
May	1.8	2.5
June	.4	2.2
July	1.6	1.6
Aug.	.6	.8
Sept.	.7	1.0
Oct.	.7	1.5
Nov.	.9	1.3
Dec.	.9	1.6
Yearly	1.4	1.8

DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS ALONG SANTA CRUZ RIVER AND WHITEWATER DRAW 1963

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	2,300	2,300
Above Nogales, Arizona Gaging Station	185	348	533	200	2,300	2,500
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	15,351	0	15,351

CORRECTIONS TO PREVIOUS WATER BULLETINS

COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES

In the 1960, 1961, and 1962 Water Bulletins, the maximum gage height in the "Extremes" paragraph should be 112.18 feet on January 28, 1958 instead of 112.05 feet on December 24, 1957 as shown.

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - DISCHARGES

In the 1960 Water Bulletin, the maximum mean daily gage height in the "Extremes" paragraph should be 53.28 feet on January 4, 1958 instead of 53.38 as shown.

In the 1961 and 1962 Water Bulletins, the gage height in the "Extremes" paragraph should be 52.30 feet on December 19, 1952 instead of 15.94 as shown.

ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

In the 1960, 1961, and 1962 Water Bulletins, the maximum monthly discharge in the "Extremes" paragraph should be 9,740 acre-feet, August 1940 instead of 9,570 acre-feet, January 1949 as shown.

SUSPENDED SILT

In the 1960 Water Bulletin, the yearly average gravimetric percentage for "Colorado River at Miguel C. Rodriguez Gaging Station" should be 0.0720 instead of .0072 as shown and in the 1962 Water Bulletin it should be 0.0340 instead of 0.0208 as shown.

In the 1962 Water Bulletin, the yearly average gravimetric percentage for "Intake Canal at Morelos Diversion Structure" should be 0.0145 instead of 0.0119 as shown.

In the 1960, 1961, and 1962 Water Bulletins, the maximum acre-feet for the period of record for "Colorado River at Northerly International Boundary" should be 336 acre-feet for the month of January instead of 341 and the yearly should be 2,198 acre-feet instead of 2,202 as shown.

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

In the 1960, 1961, and 1962 Water Bulletins, the April maximum monthly discharge for the period of record should be 2,926 acre-feet instead of 1,499 as shown.

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

In the 1960, 1961, and 1962 Water Bulletins, the minimum monthly discharge in the "Extremes" paragraph should be 122 acre-feet, September 1950 instead of zero for various months as shown.