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WESTERN WATER BULLETIN 1978

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

COLORADO RIVER
TIJUANA RIVER
SANTA CRUZ RIVER
SAN PEDRO RIVER
WHITEWATER DRAW

1978

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FOREWORD

This bulletin is the nineteenth annual compilation of stream discharges and other hydrographic data relating to international aspects of the Colorado River below Imperial Dam, the Tijuana River, and other streams crossing the western land boundary of the United States and Mexico. The compilation was prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission, solely for the purpose of presenting statistical 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 information for the year 1978.

Stream gaging on the Colorado River below Imperial Dam began in 1902 when the station at Yuma, Arizona was established. Stage records were obtained at this station from January 1878 until December 1973, when it was discontinued. 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. In addition, flows ranging from usually minor amounts to infrequent torrential floods may enter the lower Colorado River from the Bill Williams River draining about 717 square miles below Alamo Dam and Lake, completed in 1963, 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 1978.

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.

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 almost all the Colorado River flows that cross the northerly boundary (except emergency deliveries to Tijuana beginning in August 1972) have 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 Rio de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 21 miles from the Pacific Ocean to join the Rio 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 Rio 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.

FOREWORD

San Pedro River at Palominas, Arizona

The San Pedro River rises in Mexico and flows north into the United States, crossing the boundary near Palominas, Arizona and thence northwesterly into the Gila River. The river in the vicinity of the international boundary drains an area of 741 square miles, of which 649 square miles are in Mexico.

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 returning 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, 348 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.

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 National Weather Service, Department of Commerce; the Yuma County Water Users' Association; the Imperial Irrigation District; the city of San Diego, California; the Otay Municipal Water District; and the Ministry of Agriculture and 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 appreciation.

Units of Measure

Data collected by the Mexican Section are computed and published in a Spanish version of the water bulletin in metric units. The Mexican data are converted and reported in this bulletin in English units. Conversion factors conform generally to those in the National Bureau of Standards Miscellaneous Publication 286 "Units of Weight and Measure (United States Customary and Metric) - Definitions and Tables of Equivalents." However, for convenience some of the factors have been shortened and modified to facilitate conversion, reconversion to the original units when necessary, and checking of data. Conversion of the mean daily discharges, the monthly average discharge, and the monthly and annual 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. For the same reason, evaporation and rainfall data, when totaled, may not be equivalent to the direct conversion from metric to English units. The following factors have been used for data in this bulletin:

<u>METRIC UNITS</u>	<u>ENGLISH UNITS</u>
<u>LENGTHS</u>	
1 Centimeter	0.393701 Inch
1 Meter	3.28084 Feet
1 Kilometer	0.621371 Mile
<u>AREAS</u>	
1 Square Meter	10.76391 Square Feet
1 Hectare	2.471054 Acres
1 Square Kilometer	0.386102 Square Mile
<u>VOLUMES</u>	
1 Cubic Meter	61023.74 Cubic Inches
1 Cubic Meter	35.31467 Cubic Feet
1 Cubic Meter	1.30795 Cubic Yards
1000 Cubic Meters	0.81071 Acre-Foot
1 Liter	0.264172 U.S. Gallon
<u>WEIGHTS</u>	
1 Kilogram	2.204623 Pounds
1 Metric Ton	2204.623 Pounds
1 Metric Ton	1.102311 Short Tons (2000 lbs)

Beginning in 1976, as a step toward eventual publication of this bulletin in metric units only, both English and metric units are used to report the figures in the descriptive headings and for the yearly figures of the annual and period summaries of all gaging station pages. The yearly figures for the summaries are obtained by direct conversion, except for those stations operated by the Mexican Section, where the metric system of units is used.

GENERAL HYDROLOGIC CONDITIONS FOR 1978

Colorado River

Normally, there is no measurable amount of runoff from the portion of the Colorado River basin in the United States and Mexico below Hoover Dam, not including Bill Williams and Gila Rivers. There was no significant amount in 1978. The average seasonal (October 1977-September 1978) rainfall over the upper basin, as gaged at 13 index stations, was about 14.35 inches, compared to a seasonal average of about 14.20 inches for the 27 seasons (1952-1978). In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation (1978) measured at 6 index stations was 4.49 inches, compared to an average of 2.76 inches during the last 20 years (1959 to 1978).

The flow of the Colorado River reaching Imperial Dam was 5,699,700 acre-feet, about 72% of the 44-year average (1935-1978) of 7,954,539 acre-feet. At the northerly international boundary the total flow of the river during 1978 was 1,457,509 acre-feet, about 42% of the 1935-1978 average of 3,465,708 acre-feet. At the southerly international boundary, the flow during 1978 was only 61,569 acre-feet, or about 2.4% of the 1935-1978 average of 2,585,575 acre-feet. The total flow of the Colorado River reaching the M. C. Rodriguez gaging station, 24.5 miles downstream from the southerly international boundary and 4.5 miles upstream from the Sonora-Baja California railroad bridge, was 26,191 acre-feet in 1978, about 2.9% of the 1951-1978 average of 913,202 acre-feet.

The total of all flows of the Colorado River entering Mexico in 1978 amounted to 1,727,104 acre-feet, 43% of the 1935-1978 average of 4,049,248 acre-feet, as measured 1) in the Colorado River at the northerly international boundary, 2) in the Wellton-Mohawk Main Outlet Drain Extension near Morelos Dam, 3) in the wasteways that discharge into the limitrophe section of the river from the United States bank, 4) in the canal which discharges waste and drainage waters from the Yuma Project across the southerly land boundary into Mexico near San Luis, Arizona, 5) emergency delivery of Colorado River water for use in Tijuana, Baja California, and 6) in the Wellton-Mohawk Bypass Drain at southerly land boundary near San Luis, Arizona.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1978. A maximum instantaneous flow of 5,190 second-feet occurred in the Colorado River at the northerly boundary station on March 3, 1978.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 24,191,400 acre-feet, 85% of the usable capacity of 28,588,400 acre-feet. The greater part (21,960,000 acre-feet) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River for irrigation during 1978 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1978 was 1,180,910 acres; 674,690 acres in the United States and 506,220 acres in Mexico. An estimated 33% of acreage in Mexico is served by pumping from ground water.

The suspended sediment load passing the northerly boundary station in 1978 was 68.0 acre-feet, about 31% of the 1956-1978 average of 222 acre-feet.

Tijuana River Basin

During 1978, the temperatures at Barrett Dam, California (elevation 1,750 feet) in the upper portion of the basin in the United States averaged 62.5 degrees, 1.3 degrees above the 48-year mean. In the extreme upper portion of the basin in Mexico at San Juan de Dios, Baja California (elevation 3,280 feet), the recorded temperatures during the year averaged 55 degrees, equal to the long-term average; and at Rodriguez Dam, Baja California (elevation 459 feet), the recorded temperatures averaged 64 degrees, 2 degrees above the normal for many years.

At Barrett Dam in the upper portion of the basin in the United States, the 1978 recorded precipitation was 35.93 inches, 207% of normal; and at Chula Vista near the lower end of the basin, 17.26 inches, or 181% of normal. The recorded precipitation at San Juan de Dios in the upper portion of the basin in Mexico, was 33.58 inches, approximately 214% of the normal during the 23-year period; and at Rodriguez Dam in the lower portion of the basin in Mexico, 17.99 inches, 214% of the 41-year average.

Runoff in the basin during 1978 averaged more than 450% of normal. Above Morena Reservoir the runoff was 15,524 acre-feet, or about 288% of the 42-year 1937-1978 mean of 5,397 acre-feet. At Rodriguez Reservoir, the runoff was 88,881 acre-feet, or about 629% of the 41-year mean of 14,127 acre-feet.

The flow of the Tijuana River at the international boundary was 64,688 acre-feet during 1978, and the flow in the Tijuana River near Nestor was 72,369 acre-feet.

Whitewater Draw

During 1978, the average annual temperature over the watershed was slightly above normal, while the annual precipitation was below normal. Runoff for the year at the gaging station near Douglas, Arizona of 1,832 acre-feet was about 27% of average.

GENERAL HYDROLOGIC CONDITIONS FOR 1978

San Pedro River

During 1978, the average annual temperature was below normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 164% of the 1961-1978 mean of 20.24 inches. The stream flow at the international boundary was 39,836 acre-feet, 173% of the 1951-1978 normal.

Santa Cruz River

During 1978, the average annual temperature over the watershed was somewhat below normal and the annual precipitation was about 168% of the 40-year 1939-1978 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 62,310 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 2,571 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 59,739 acre-feet from the loop of the river lying in Mexico, or approximately 96% of the flow reaching the Nogales station.

Alamo and New Rivers

During 1978, the average annual temperature over the drainage area of the Alamo River, as recorded at El Centro, California, was 72.5 degrees, 0.3 degree above normal; and over the drainage area of the New River, as recorded at Mexicali, Baja California, it was 73.0 degrees, 2 degrees above the 53-year average.

At El Centro, the precipitation was 4.88 inches, about 194% of the 48-year average; and in Mexicali the annual precipitation was 3.82 inches, 124% of the 53-year average. The total flow of the New River at the international boundary in 1978 was 98,406 acre-feet, which was about 122% of the 1943-1978 normal.

Salton Sea

During 1978, the average annual temperature around the Salton Sea was about 100% of the long-term average, while the annual precipitation recorded at Brawley, California, was approximately 188% of the long-term mean of 2.52 inches. The water surface of the Salton Sea increased during the year. The maximum stage, 228.2 feet below mean sea level, was recorded May 5 to 15, inclusive. The minimum stage, 229.4 feet below mean sea level, was recorded October 10 to December 6.

EMERGENCY DELIVERIES OF COLORADO RIVER WATERS FOR USE IN TIJUANA, BAJA CALIFORNIA

DESCRIPTION: Delivery of water is measured at a metering station located adjacent to the international boundary near Tijuana, and approximately 2.5 miles (4.0 km) east of the International Boundary Monument #253. The metering station consists of two venturi tubes, 20 inches (50.8 cm) and 18 inches (45.7 cm) and two BIF recorders.

RECORDS: Based on totalizer readings read at approximately 8:00 a.m. each day and on continuous chart readings furnished by the Otay Municipal Water District. Records available since August 13, 1972. These records reflect a 12% loss incurred in conveying the water from the point of diversion above Parker Dam to the international boundary.

REMARKS: Emergency deliveries of Colorado River waters for use in Tijuana began August 13, 1972 pursuant to Minute No. 240 of this Commission. The deliveries are conveyed approximately 323 miles (520 km) using the following conveyance works: The diversion works from Lake Havasu above Parker Dam and the Colorado River Aqueduct, the San Diego Aqueducts, the Otay Reservoir and facilities of the Otay Municipal Water District. Furthermore, the following additional facilities were constructed as provided in Minute 240; new pumps at the Otay Pumping Station, approximately 5,800 feet (1,768 m) of 24-inch (61.0 cm) pipe and various valves, meters and accessories near the international boundary. The facilities were developed to circumvent serious water shortages predicted for Tijuana.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	16.1	14.6	14.7	11.2	11.1	8.6	6.8	8.9	8.8	5.8	5.3	1.8
2	15.0	14.6	14.7	11.3	11.1	8.6	6.8	9.0	8.8	5.6	3.0	2.0
3	14.8	14.6	14.7	11.3	11.1	9.1	6.8	9.0	8.9	5.5	3.8	2.3
4	14.7	14.6	14.7	11.3	11.0	9.1	6.8	9.0	9.0	5.6	3.1	1.8
5	14.7	14.6	14.7	11.2	11.1	9.1	6.8	8.8	7.6	5.6	2.7	2.1
6	14.7	14.6	14.7	11.2	11.1	9.1	6.8	9.1	7.1	5.5	1.8	1.9
7	14.6	14.6	12.2	11.2	11.1	9.1	6.8	8.8	5.2	5.7	2.9	1.7
8	14.7	14.6	10.8	11.1	11.0	9.1	6.8	8.8	4.8	5.6	2.9	1.7
9	14.5	14.6	12.4	11.2	11.1	9.1	6.8	8.8	4.0	5.6	3.1	1.7
10	14.5	14.7	12.9	11.1	11.0	9.1	6.9	8.9	4.3	5.6	3.2	1.7
11	14.4	14.4	12.9	11.2	11.1	9.2	6.9	8.8	4.1	5.6	3.1	2.4
12	14.6	14.7	12.9	11.2	11.0	9.1	6.9	8.9	4.3	5.5	2.8	3.4
13	14.6	14.7	12.9	11.2	11.1	9.0	6.9	8.9	4.3	5.6	2.0	2.3
14	14.4	14.7	12.9	11.2	11.1	9.0	6.7	9.0	4.1	5.6	3.2	2.5
15	14.6	14.5	12.5	11.2	10.9	9.1	6.9	8.8	4.3	5.6	3.2	3.1
16	14.6	14.7	12.5	11.3	10.9	9.1	6.9	8.8	4.1	5.5	3.0	2.9
17	14.6	14.7	13.3	10.2	10.9	9.1	6.7	8.8	4.3	5.6	3.0	1.8
18	14.6	14.7	13.1	6.6	10.9	9.1	6.7	8.8	4.3	5.6	2.8	1.7
19	14.7	14.7	13.1	1.1	10.9	9.1	6.8	9.0	4.4	5.6	2.6	2.0
20	14.7	14.5	13.1	6.9	10.9	8.9	6.8	9.1	4.0	5.6	2.9	1.9
21	14.6	14.7	13.1	7.2	11.0	9.1	6.7	8.7	4.1	5.5	3.4	2.1
22	14.6	14.7	13.1	9.0	11.0	9.2	6.7	8.8	4.2	5.6	3.4	1.7
23	14.5	14.5	12.0	9.0	11.0	8.0	6.8	8.9	4.3	5.7	2.9	1.9
24	14.5	14.7	11.2	8.8	11.0	7.8	6.8	8.9	4.3	5.5	1.5	1.7
25	14.5	14.7	11.3	10.2	11.1	7.8	6.3	8.7	4.9	5.5	1.9	1.2
26	14.4	14.7	11.3	11.2	7.2	7.6	5.7	8.9	5.7	5.5	1.7	2.1
27	14.8	14.7	11.3	11.0	8.5	7.6	5.7	8.9	5.8	5.5	2.1	2.4
28	14.5	14.7	11.2	11.3	8.6	7.6	5.7	8.7	5.7	5.5	2.6	2.4
29	14.7	11.3	11.2	8.5	7.7	5.7	8.7	8.7	5.9	5.6	2.2	1.9
30	14.7	11.3	11.2	9.0	7.3	5.8	8.7	8.7	5.7	5.6	2.6	2.2
31	14.7	11.3	11.3	8.6	8.6	8.0	8.9	8.9	5.6	5.6	2.0	2.0
Sum	454.6	409.8	394.1	304.3	325.9	260.4	206.2	274.8	161.3	173.0	84.7	64.3
Current Year 1978								Period 1973-1978				
Month	Extreme Gage Feet		* † Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.			1	16.1	111	14.4	14.7	902	768	902	603	
Feb.			110	14.7	11	14.4	14.6	813	690	813	530	
Mar.			1	14.7	8	10.8	12.7	782	723	849	666	
Apr.			1	11.3	19	1.1	10.1	604	720	857	591	
May			1	11.1	26	7.2	10.5	646	779	887	646	
June			111	9.2	30	7.3	8.7	516	780	986	516	
July			31	8.0	126	5.7	6.7	409	797	1,021	409	
Aug.			1	9.1	121	8.7	8.9	545	791	918	545	
Sept.			4	9.0	1	9	5.4	320	686	904	320	
Oct.			1	5.8	1	3	5.5	343	715	905	343	
Nov.			1	5.3	24	1.5	2.8	168	674	902	168	
Dec.			12	3.4	25	1.2	2.1	128	674	993	128	
Yearly				16.1		1.1	8.6	6,176	8,797	10,258	6,176	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				0.46		0.03	0.24	7,618	10,851	12,653	7,618	

* Includes 12% losses

† Mean daily

‡ And other days

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 (501 m) upstream from the intake of the Colorado River siphon, and 3.2 miles (5.1 km) downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side, 1,000 feet (305 m) upstream from Colorado River below Yuma Main Canal Wasteway, and 6.5 miles (10.5 km) 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. Records obtained and furnished by U. S. Geological Survey. Records available: April 1913 through 1978.

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; (367,333,000 m³); maximum annual flow, 913,700 acre-feet (1,127,040,000 m³), 1932; minimum annual flow, 114,900 acre-feet (141,728,000 m³), 1917. Since 1935: Maximum mean daily discharge, 220 second-feet (57.2 m³/sec), December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	38	15	20	14	16	445	13	15	680	125	74	268
2	159	16	20	14	50	606	14	15	550	263	30	639
3	155	119	24	13	493	637	14	15	584	262	30	724
4	90	110	19	13	325	665	14	15	433	284	39	837
5	21	116	19	13	303	849	14	15	183	284	40	900
6	19	233	19	13	235	845	14	15	177	185	8.3	788
7	19	289	19	12	261	743	14	15	198	166	6.9	13
8	20	407	19	13	282	7.4	14	15	323	241	11	13
9	19	569	20	14	278	8.5	14	15	318	227	15	13
10	24	713	20	13	174	9.8	14	15	195	212	67	13
11	19	724	21	13	184	12	15	15	219	220	193	13
12	20	618	26	14	243	13	14	15	253	235	222	13
13	24	26	19	19	479	16	15	15	246	234	233	13
14	22	18	19	16	460	15	14	15	235	264	226	14
15	22	18	18	16	515	13	15	15	175	244	244	14
16	23	17	18	16	547	11	15	15	189	252	258	14
17	24	19	18	16	458	11	15	15	195	259	255	14
18	28	20	18	16	401	11	15	15	205	250	249	14
19	26	19	18	16	386	10	15	14	227	254	228	14
20	24	19	18	16	383	10	15	14	159	240	266	15
21	24	19	18	16	385	11	14	15	184	154	329	18
22	24	19	17	15	367	11	15	15	199	18	337	16
23	24	19	18	14	380	13	15	16	318	21	349	16
24	25	19	16	15	386	13	15	15	342	23	334	17
25	23	19	16	15	290	13	15	15	279	21	313	17
26	23	19	16	15	339	13	15	15	227	23	376	18
27	96	19	16	15	436	13	15	15	225	23	86	23
28	84	19	15	15	402	14	14	15	226	23	11	22
29	103	15	15	15	422	14	14	15	250	87	14	22
30	231	14	15	15	438	13	15	14	279	78	11	22
31	168	14	14	14	432	13	15	47	103	103	21	21
Sum	1,621	4,237	567	440	10,750	5,065.7	449	495	8,273	5,275	4,855.2	4,558
Current Year 1978								Period 1935-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			30	231	1	19	52.3	3,215	54,136	110,700	3,215	
Feb.			11	724	1	15	151	8,404	47,424	89,140	2,856	
Mar.			12	26	130	14	18.3	1,125	47,574	90,190	469	
Apr.			13	19	7	12	14.7	873	48,064	86,580	873	
May			16	547	1	16	347	21,322	57,134	88,280	5,480	
June			5	849	8	7.4	169	10,048	49,982	86,960	1,857	
July			111	15	1	13	14.5	891	47,086	91,220	452	
Aug.			31	47	119	14	16	982	47,623	89,890	456	
Sept.			1	680	20	159	276	16,409	51,007	83,660	9,737	
Oct.			1	284	22	18	170	10,463	48,000	90,050	2,176	
Nov.			26	376	7	6.9	162	9,630	48,007	101,500	3,850	
Dec.			5	900	1	7	13	147	9,041	52,573	108,800	918
				900			6.9	128	92,403	598,610	1,042,850	75,950
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				25.5		0.20	3.62	113,978	738,379	1,286,345	93,684	

Ø Mean daily

! And other days

**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 (305 m) downstream from the mouth of the Yuma Main Canal Wasteway, 0.6 mile (1.0 km) downstream from the abandoned gaging station on the Colorado River at Yuma, 5.2 miles (8.4 km) downstream from the mouth of the Gila River, 19.6 miles (31.5 km) downstream from Imperial Dam, and 6.4 miles (10.3 km) upstream from the northerly international boundary. Zero of the gage is 101.99 feet (31.09 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements 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 1978. Records from January 1951 through September 1963 deduced from "Colorado River at Yuma" plus flows from "Reservation Main Drain No. 4" and "Yuma Main Canal Wasteway."

REMARKS: Reservoirs on the Colorado River, power developments, 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 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	494	1,230	1,750	648	520	1,230	924	742	1,490	768	675	1,090
2	1,320	1,130	3,060	607	647	1,260	557	676	1,270	800	645	1,370
3	1,300	884	2,190	616	1,420	1,240	546	611	1,270	770	653	1,340
4	1,260	910	798	601	1,350	1,220	551	581	1,310	741	642	1,310
5	1,630	911	709	579	1,320	1,390	553	610	1,280	726	595	1,300
6	1,460	1,040	668	574	1,300	1,380	540	613	1,310	720	642	1,250
7	1,240	1,040	762	593	1,270	1,320	506	612	1,310	656	650	549
8	1,040	1,130	758	575	1,270	526	603	609	1,440	668	653	569
9	1,130	1,170	716	578	1,270	469	768	602	1,450	665	622	552
10	1,300	1,250	604	563	1,230	476	707	601	1,330	661	633	554
11	2,250	1,200	582	594	1,240	553	567	601	1,300	648	638	539
12	2,180	1,130	596	835	1,220	529	543	595	1,340	659	648	541
13	2,180	565	555	785	1,280	524	529	587	1,350	649	647	531
14	2,090	551	532	702	1,240	511	531	582	1,370	658	653	517
15	2,050	525	595	634	1,260	529	520	541	1,360	638	662	502
16	1,990	489	696	617	1,270	521	531	491	1,350	648	670	506
17	1,960	480	693	612	1,310	497	527	484	1,350	650	679	513
18	1,930	484	665	612	1,280	489	532	473	1,330	650	691	621
19	1,870	478	626	623	1,270	485	538	482	1,350	645	667	1,910
20	1,750	468	595	633	1,260	489	529	522	1,310	647	696	2,090
21	1,690	478	594	630	1,270	485	509	513	1,320	642	766	778
22	1,610	480	591	604	1,270	493	514	499	1,300	1,150	761	610
23	1,530	499	585	601	1,260	498	525	497	1,360	1,240	778	569
24	1,350	627	563	558	1,290	487	521	483	1,320	1,620	782	554
25	939	607	564	519	1,260	484	530	478	1,350	1,820	768	542
26	984	516	659	511	1,230	477	528	466	1,360	1,640	860	549
27	950	459	1,280	517	1,260	485	554	468	1,360	795	1,070	737
28	955	473	747	526	1,260	486	551	467	1,390	665	882	713
29	957		648	572	1,260	476	533	466	1,400	638	777	633
30	1,120	820	556	556	1,280	564	562	469	1,430	620	815	533
31	1,070		770		1,270		768	524		665		459
Sum	45,579	21,204	25,971	18,175	38,137	20,573	17,697	16,945	40,460	25,162	21,320	24,831
Current Year 1978								Period 1951-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	12.34	9.42	11	2,250	1	494	1,470	90,405	197,636	979,890	29,857	
Feb.	11.01	9.44	10	1,250	27	459	757	42,058	147,734	826,600	33,790	
Mar.	13.56	9.60	2	3,060	14	532	838	51,513	160,417	1,073,270	34,604	
Apr.	10.22	9.54	12	835	26	511	606	36,050	152,529	843,010	33,687	
May	11.19	9.56	3	1,420	1	520	1,230	75,644	151,962	863,860	56,493	
June	11.17	9.39	5	1,390	9	469	686	40,806	140,015	833,970	33,856	
July	10.39	9.43	1	924	7	506	571	35,101	146,578	649,820	34,413	
Aug.	9.95	9.44	1	742	26	466	547	33,610	152,543	670,050	33,610	
Sept.	11.42	10.85	1	1,490	12	1,270	1,350	80,251	135,533	775,930	43,182	
Oct.	12.08	9.82	25	1,820	130	620	812	49,908	109,845	802,210	34,965	
Nov.	10.60	9.82	27	1,070	5	595	711	42,288	126,670	911,370	34,832	
Dec.	12.27	9.32	20	2,090	31	459	801	49,252	158,565	1,114,550	33,023	
Yearly	13.56	9.32		3,060		459	866	626,886	1,780,027	10,220,870	513,755	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	4.13	2.84		86.7		13.0	24.5	773,258	2,195,646	12,607,341	633,712	

1 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 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.42	10.95	11.79	9.85	9.56	10.89	10.39	9.95	11.42	9.85	9.96	10.60
2	11.01	10.79	13.56	9.76	9.74	10.94	9.61	9.82	11.03	9.91	9.97	11.12
3	11.03	10.34	12.30	9.78	11.19	10.90	9.58	9.68	11.01	9.93	9.97	11.07
4	10.83	10.39	10.04	9.75	11.09	10.89	9.54	9.62	11.06	9.95	9.94	11.02
5	11.40	10.39	9.95	9.70	11.04	11.17	9.54	9.70	10.98	9.98	9.82	11.01
6	11.09	10.66	9.95	9.69	11.00	11.16	9.51	9.72	11.02	9.97	9.92	10.90
7	10.71	10.65	10.15	9.73	10.95	11.06	9.43	9.71	10.99	9.84	9.93	9.53
8	10.38	10.81	10.14	9.69	10.95	9.52	9.65	9.72	11.19	9.87	9.92	9.58
9	10.53	10.89	10.04	9.69	10.95	9.39	10.01	9.71	11.19	9.86	9.84	9.54
10	10.81	11.01	9.78	9.66	10.88	9.41	9.88	9.71	10.97	9.85	9.86	9.54
11	12.34	10.95	9.73	9.96	10.90	9.59	9.57	9.72	10.90	9.83	9.86	9.51
12	12.24	10.81	9.76	10.22	10.86	9.55	9.52	9.71	10.94	9.86	9.87	9.51
13	12.24	9.68	9.66	10.08	10.97	9.54	9.49	9.71	10.94	9.83	9.87	9.49
14	12.10	9.65	9.60	9.85	10.90	9.51	9.49	9.69	10.96	9.86	9.87	9.46
15	12.03	9.60	9.74	9.78	10.94	9.55	9.47	9.61	10.94	9.82	9.88	9.42
16	11.95	9.51	9.96	9.78	10.96	9.53	9.49	9.50	10.93	9.84	9.89	9.44
17	11.89	9.49	9.95	9.77	11.01	9.47	9.48	9.48	10.92	9.86	9.90	9.45
18	11.85	9.50	9.89	9.77	10.97	9.45	9.49	9.46	10.90	9.86	9.92	9.68
19	11.75	9.49	9.80	9.80	10.95	9.45	9.51	9.48	10.93	9.85	9.85	11.99
20	11.56	9.46	9.73	9.82	10.93	9.46	9.49	9.57	10.86	9.85	9.91	12.27
21	11.47	9.49	9.73	9.81	10.96	9.44	9.44	9.55	10.88	9.85	10.05	10.02
22	11.33	9.49	9.72	9.75	10.95	9.46	9.45	9.52	10.85	10.86	10.03	9.67
23	11.20	9.54	9.71	9.75	10.94	9.47	9.48	9.51	10.94	11.07	10.06	9.58
24	11.00	9.83	9.66	9.65	10.99	9.45	9.47	9.48	10.87	11.76	10.05	9.54
25	10.44	9.78	9.66	9.56	10.94	9.44	9.49	9.47	10.93	12.08	10.03	9.52
26	10.53	9.58	9.87	9.54	10.88	9.43	9.48	9.44	10.94	11.77	10.21	9.53
27	10.46	9.44	11.06	9.55	10.94	9.44	9.54	9.45	10.94	10.29	10.60	9.95
28	10.47	9.48	10.07	9.58	10.94	9.45	9.53	9.44	10.99	10.02	10.25	9.90
29	10.47		9.85	9.68	10.94	9.42	9.50	9.44	11.01	9.96	10.05	9.72
30	10.78		10.22	9.65	10.96	9.62	9.56	9.45	11.05	9.92	10.12	9.49
31	10.70		10.12		10.94		10.02	9.57		10.02		9.32
Avg.	11.16	10.06	10.17	9.76	10.87	9.84	9.58	9.60	10.98	10.16	9.98	10.01

DRAIN NO. 8-B (ARAZ DRAIN)

DESCRIPTION: This drain discharges into the Colorado River 4.0 miles (6.4 km) downstream from Colorado River below Yuma Main Canal Wasteway, and 2.5 miles (4.0 km) upstream from the northerly international boundary. Prior to October 1955, published as "Araz Drain".

RECORDS: Records are furnished by the U. S. Geological Survey from current meter measurements during the year. Records available: May 1948 through 1978.

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 (975 m) upstream, is affected by backwater from the river during ordinary high stages.

EXTREMES: Mean daily discharge: Maximum, 24 second-feet (0.68 m³/sec) on September 1, 1953; minimum, 0.1 second-foot (0.003 m³/sec) several days in February 1966.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.8	.8	.7	1.3	1.0	0.9	1.4	1.5	1.3	1.2	1.2	0.8
2	.8	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8
3	.8	.8	.7	1.3	1.0	1.0	1.4	1.5	1.3	1.2	1.2	.8
4	.8	.8	.7	1.3	1.0	1.0	1.4	1.5	1.3	1.2	1.2	.8
5	.8	.8	.7	1.3	1.0	1.0	1.4	1.4	1.3	1.2	1.1	.8
6	.8	.8	.7	1.3	1.0	1.0	1.4	1.4	1.3	1.2	1.1	.8
7	.8	.8	.7	1.3	1.0	1.1	1.4	1.4	1.3	1.2	1.1	.8
8	.8	.8	.7	1.2	1.0	1.1	1.4	1.4	1.3	1.2	1.1	.8
9	.8	.7	.7	1.2	1.0	1.1	1.4	1.4	1.3	1.2	1.1	.8
10	.8	.7	.7	1.2	1.0	1.1	1.4	1.4	1.3	1.2	1.1	.7
11	.8	.7	.7	1.2	1.0	1.2	1.4	1.4	1.3	1.2	1.1	.7
12	.8	.7	.8	1.2	1.0	1.2	1.4	1.4	1.2	1.2	1.0	.7
13	.8	.7	.9	1.2	1.0	1.2	1.4	1.4	1.2	1.2	1.0	.7
14	.8	.7	.9	1.1	1.0	1.2	1.4	1.4	1.2	1.2	1.0	.7
15	.8	.7	1.0	1.1	1.0	1.3	1.4	1.4	1.2	1.2	1.0	.7
16	.8	.7	1.1	1.1	.9	1.3	1.4	1.4	1.2	1.2	1.0	.7
17	.8	.7	1.1	1.1	.9	1.3	1.4	1.4	1.2	1.2	1.0	.7
18	.8	.7	1.2	1.1	.9	1.3	1.4	1.4	1.2	1.2	1.0	.7
19	.8	.7	1.3	1.1	.9	1.4	1.4	1.4	1.2	1.2	1.0	.6
20	.8	.7	1.3	1.1	.9	1.4	1.4	1.4	1.2	1.2	.9	.6
21	.8	.7	1.3	1.1	.9	1.4	1.5	1.4	1.2	1.2	.9	.6
22	.8	.7	1.3	1.1	.9	1.4	1.5	1.3	1.2	1.2	.9	.6
23	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.9	.6
24	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.9	.6
25	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.9	.6
26	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.9	.6
27	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8	.6
28	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8	.6
29	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8	.6
30	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8	.6
31	.8	.7	1.3	1.0	.9	1.4	1.5	1.3	1.2	1.2	.8	.6
Sum	24.8	20.4	31.6	34.2	29.4	37.0	44.5	42.8	37.1	37.2	30.0	21.3
Current Year 1978								Period 1948-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			1 1	0.80	1 1	0.80	0.80	49.2	318	899	39.3	
Feb.			1 1	.80	1 9	.70	.73	40.5	274	746	40.5	
Mar.			1 19	1.3	1 1	.70	1.02	62.7	336	853	62.7	
Apr.			1 1	1.3	1 23	1.0	1.14	67.8	354	1,000	66.8	
May			1 1	1.0	1 16	.9	.95	58.3	356	966	58.3	
June			1 19	1.4	1 1	.9	1.23	73.4	372	1,030	67.4	
July			1 21	1.5	1 1	1.4	1.44	88.3	424	1,260	72.8	
Aug.			1 1	1.5	1 22	1.3	1.38	84.9	471	1,350	73.8	
Sept.			1 1	1.3	1 12	1.2	1.24	73.6	451	1,370	53.6	
Oct.			1 1	1.2	1 1	1.2	1.20	73.8	458	1,220	55.3	
Nov.			1 1	1.2	1 27	.8	1.00	59.5	415	1,240	57.7	
Dec.			1 1	.8	1 19	.6	.69	42.2	373	1,050	42.2	
Yearly				1.5		0.6	0.98	774.2	4,602	12,429	774	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				0.04		0.02	0.03	955	5,677	15,331	955	

0 Mean daily

1 And other days

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 (33.5 km) downstream from the intake at Imperial Dam, 6 miles (9.7 km) west of Yuma, about one mile (1.6 km) north of the northerly international boundary and empties into the old Alamo Canal in the United States and thence into the Colorado River through Rockwood gates, about one mile (1.6 km) upstream from the northerly international boundary. Water-stage recorder is located in forebay on right bank of the All-American Canal, 550 feet (168 m) upstream from wasteway gates and 1,800 feet (549 m) from entrance to the power plant. Datum of gage is 150.00 feet (45.72 m) above mean sea level. Tailrace gage is on left bank, 680 feet (207 m) 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 (45.07 m), U. S. C. & G. S datum. Prior to October 1956, this station was 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 1978. 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 (236 m³/sec) on January 26, 1958; minimum daily discharge, no flow during long periods.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	963	0	1,850	2,600	1,460	0	1,350	2,320	0	0	0	0
2	0	0	1,950	2,630	1,100	0	1,870	2,380	0	0	0	0
3	0	0	1,750	2,830	0	0	2,050	2,590	0	0	0	0
4	0	0	1,590	2,840	0	0	2,080	2,680	0	0	0	0
5	0	0	1,750	2,920	0	0	2,090	2,670	0	0	0	0
6	0	0	1,600	3,000	0	0	2,260	2,660	0	0	0	34
7	0	0	1,420	2,970	0	0	2,310	2,580	0	0	0	973
8	0	0	1,420	3,120	0	1,030	2,190	2,490	0	0	0	947
9	0	0	1,540	3,110	0	1,140	1,940	2,500	0	0	0	1,020
10	0	0	1,650	3,240	0	1,110	2,010	2,520	0	0	0	1,100
11	0	0	1,930	3,280	0	1,060	2,230	2,510	33	0	0	1,160
12	0	43	1,880	3,010	0	1,100	2,280	2,490	0	0	0	1,150
13	0	1,030	2,000	3,040	0	1,140	2,340	2,500	0	0	0	1,200
14	0	1,390	2,040	3,130	0	1,270	2,300	2,230	0	0	0	1,150
15	0	1,490	1,960	3,240	0	1,240	2,350	2,280	0	0	0	1,180
16	0	1,520	1,870	3,240	0	1,220	2,280	2,240	0	0	0	1,300
17	0	1,660	1,890	3,260	0	1,330	2,310	2,160	0	0	0	1,210
18	0	1,760	1,900	3,220	0	1,320	2,320	2,100	0	0	0	1,200
19	0	1,750	1,940	3,220	0	1,410	2,250	2,000	0	0	0	1,200
20	0	1,880	2,210	3,180	0	1,400	2,310	1,930	0	0	0	1,140
21	0	1,870	2,180	3,220	0	1,380	2,350	1,930	0	0	0	1,040
22	0	1,860	2,170	3,240	0	1,460	2,380	1,740	0	0	0	1,470
23	0	1,890	2,370	3,290	0	1,480	2,320	1,590	0	0	0	1,490
24	0	1,700	2,430	3,260	0	1,490	2,350	1,500	0	0	0	1,500
25	0	1,760	2,510	3,060	0	1,550	2,350	1,450	0	0	0	1,520
26	0	1,810	2,560	2,810	0	1,560	2,310	1,370	0	0	0	1,550
27	0	1,910	1,830	2,600	0	1,700	2,390	1,360	0	0	0	1,250
28	0	1,870	2,420	2,290	0	1,720	2,420	1,400	0	0	0	1,260
29	0		2,550	1,940	0	1,650	2,390	1,380	0	0	0	1,380
30	0		2,360	1,660	0	1,530	2,350	1,300	0	0	0	1,440
31	0		2,410		0		2,040	1,010	0	0	0	1,330
Sum	963	27,193	61,930	88,450	2,560	31,290	68,770	63,860	33	0	0	31,194
Current Year 1978								Period 1944-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low	Feet	Acre-Feet	Average	Maximum	Minimum	
Jan.			1	963	1	0	31.1	1,910	38,431	400,200	0	
Feb.			27	1,910	1	0	971	53,937	23,217	149,500	0	
Mar.			26	2,560	1	1,420	1,998	122,836	78,656	279,300	0	
Apr.			23	3,290	30	1,660	2,948	175,438	104,630	260,900	0	
May			1	1,460	1	0	82.6	5,078	18,042	165,400	0	
June			28	1,720	1	0	1,043	62,063	60,246	204,300	0	
July			28	2,420	1	1,350	2,218	136,403	114,141	260,000	0	
Aug.			4	2,680	31	1,010	2,060	126,664	115,984	270,100	0	
Sept.			11	33	1	0	1.10	65.5	46,926	173,300	0	
Oct.				0	0	0	0	0	9,258	51,460	0	
Nov.				0	0	0	0	0	12,948	182,600	0	
Dec.			26	1,550	1	0	1,006	61,872	42,540	319,700	0	
Yearly				3,290		0	1,030	746,266	665,019	1,944,700	0	
Meters		Cubic Meters per Second				Thousands of Cubic Meters						
			93.2		0	29.2	920,512	820,294	2,398,768	0		

Ø Mean daily

! And other days

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 6.4 miles (10.3 km) downstream from Colorado River below Yuma Main Canal Wasteway, 5 miles (8.0 km) west of Yuma, Arizona, 1.1 miles (1.8 km) upstream from Morelos Diversion Structure, and about one mile (1.6 km) downstream from Rockwood Gate. Zero of the 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 274 current meter measurements during the year, 209 by the United States Section, 53 by the Mexican Section of the Commission, 12 by the U. S. Geological Survey, and a continuous record of gage heights. Discharges are computed on the basis of a water-stage recorder 1,680 feet (512 m) 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 1978; daily discharge records available January 1, 1950 through 1978.

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 1978, the flow at this point, and the emergency deliveries for Tijuana, Baja California shown on page 8, represented the total amount of the Colorado River water which crossed the northerly international boundary.

EXTREMES: Prior to January 1935: Maximum instantaneous discharge estimated about 250,000 second-feet, (7,080 m³/sec), January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 13,443,000 acre-feet (16,581,806,000 m³); maximum annual flow 25,480,000 acre-feet (31,429,325,000 m³), 1907; minimum annual flow 1,174,000 acre-feet (1,448,117,000 m³), 1934. Since January 1935: Maximum mean daily discharge, about 33,000 second-feet (934 m³/sec), February 7, 1942; minimum discharge, no flow during April 1935.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,700	1,200	3,280	3,410	2,020	1,350	2,420	3,200	1,580	873	830	1,230
2	1,480	1,280	4,810	3,410	1,750	1,380	2,520	3,190	1,500	803	796	1,450
3	1,510	982	4,450	3,600	1,440	1,390	2,680	3,290	1,470	781	807	1,500
4	1,390	1,050	2,460	3,600	1,480	1,390	2,680	3,320	1,510	768	772	1,490
5	1,550	1,040	2,550	3,700	1,400	1,520	2,690	3,370	1,510	803	706	1,470
6	1,640	1,180	2,390	3,760	1,390	1,520	2,780	3,370	1,510	803	772	1,490
7	1,400	1,160	2,330	3,760	1,380	1,510	2,780	3,320	1,470	741	821	1,660
8	1,090	1,270	2,340	3,910	1,380	1,640	2,800	3,200	1,480	784	844	1,670
9	1,180	1,300	2,410	3,890	1,400	1,650	2,800	3,200	1,510	784	798	1,730
10	1,290	1,450	2,410	4,050	1,360	1,650	2,810	3,200	1,410	784	786	1,830
11	2,010	1,420	2,630	4,050	1,380	1,710	2,880	3,190	1,400	772	786	1,860
12	2,160	1,400	2,630	4,050	1,350	1,740	2,890	3,160	1,380	807	786	1,840
13	2,160	1,710	2,660	4,060	1,370	1,740	2,920	3,160	1,380	807	786	1,940
14	2,100	2,020	2,680	4,070	1,360	1,890	2,920	2,950	1,390	796	810	1,900
15	2,010	2,150	2,660	4,030	1,360	1,870	2,920	2,940	1,390	807	798	1,880
16	2,010	2,140	2,660	4,050	1,380	1,870	2,920	2,890	1,380	807	810	2,000
17	1,970	2,280	2,680	3,980	1,410	1,900	2,900	2,820	1,380	818	798	1,990
18	1,940	2,410	2,680	3,900	1,380	1,920	2,920	2,760	1,360	807	810	2,000
19	1,940	2,410	2,680	3,920	1,400	1,980	2,920	2,660	1,380	807	798	2,920
20	1,750	2,520	2,900	3,890	1,390	2,020	2,920	2,660	1,360	818	798	3,570
21	1,750	2,550	2,900	3,900	1,390	1,990	2,930	2,660	1,360	796	913	2,200
22	1,640	2,520	2,880	3,880	1,400	2,060	2,930	2,450	1,350	1,250	890	2,150
23	1,550	2,560	3,070	3,920	1,380	2,070	2,930	2,310	1,350	1,340	902	2,260
24	1,500	2,520	3,120	3,890	1,400	2,070	2,940	2,190	1,360	1,700	902	2,260
25	1,070	2,520	3,230	3,670	1,400	2,120	2,950	2,090	1,380	1,860	867	2,260
26	1,120	2,520	3,360	3,420	1,380	2,120	2,950	1,990	1,390	1,890	902	2,280
27	1,080	2,560	3,300	3,180	1,360	2,230	2,990	1,990	1,360	1,100	1,080	2,210
28	1,090	2,550	3,330	2,860	1,390	2,250	3,020	1,990	1,390	784	1,090	2,190
29	1,080		3,340	2,580	1,360	2,210	3,020	2,000	1,400	784	867	2,200
30	1,250		3,340	2,270	1,390	2,160	3,020	1,920	1,430	772	878	2,190
31	1,240		3,340		1,360		2,980	1,840		807		2,010
Sum	48,650	52,672	91,500	110,680	43,990	54,920	88,730	85,280	42,520	29,053	25,203	61,630
Current Year 1978										Period 1935-1978		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.	106.80	102.49	12	2,220	27	1,030	1,569	96,496	386,854	1,644,000	31,900	
Feb.	104.15	102.44	23	2,630	3	812	1,881	104,473	326,416	1,378,000	60,400	
Mar.	108.26	103.79	3	5,190	7	2,260	2,952	181,488	337,320	1,120,000	19,400	
Apr.	105.45	103.63	11	4,190	30	2,200	3,689	219,531	271,439	823,850	0	
May	103.70	102.77	1	2,260	3	1,200	1,419	87,253	261,678	1,151,000	71,405	
June	103.78	102.77	128	2,280	1	1,330	1,831	108,932	250,099	1,175,000	8,500	
July	104.46	103.67	130	3,070	1	2,170	2,862	175,993	249,954	763,800	24,400	
Aug.	104.75	103.20	5	3,400	31	1,750	2,751	169,150	264,655	791,600	43,800	
Sept.	103.25	102.68	1	1,710	1	1,230	1,417	84,337	230,518	1,029,000	53,851	
Oct.	105.66	102.22	26	2,070	7	645	937	57,626	228,537	1,186,000	42,956	
Nov.	102.95	102.22	28	1,370	5	683	840	49,989	284,526	1,422,000	41,403	
Dec.	107.18	102.49	20	3,820	1	936	1,988	122,241	373,712	1,832,000	42,000	
Yearly	108.26	102.22		5,190		645	2,011	1,457,509	3,465,708	10,596,900	722,100	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	33.00	31.16		147		18.3	57.0	1,797,823	4,274,916	13,071,170	890,703	

! And other days

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	105.10	103.03	105.00	104.83	103.49	102.85	103.89	104.56	103.01	102.50	102.37	102.74
2	104.69	103.63	107.82	* 104.82	103.24	102.86	103.98	104.56	102.94	102.35	102.33	102.99
3	104.71	102.61	107.47	* 104.99	103.05	102.88	104.12	104.66	102.92	102.35	102.35	103.05
4	* 104.20	102.69	103.98	104.97	102.95	102.88	104.13	104.67	102.93	102.33	102.31	103.05
5	104.80	102.68	104.03	105.05	102.87	103.02	104.13	104.72	102.95	102.36	102.27	103.03
6	104.68	102.83	103.90	105.10	102.88	103.01	104.21	104.73	102.95	102.37	102.32	103.06
7	* 103.53	102.82	103.85	105.10	102.87	103.00	104.22	104.67	102.93	102.27	102.30	103.24
8	102.81	102.93	103.86	105.23	102.86	103.13	104.22	104.55	103.03	102.29	102.33	103.25
9	102.92	102.96	103.91	105.22	102.88	103.15	104.22	104.56	103.07	102.28	102.28	103.33
10	103.20	103.13	103.91	105.35	102.84	103.16	104.24	104.56	102.97	102.27	102.27	103.42
11	* 105.99	103.11	104.09	105.34	102.85	103.22	104.30	104.55	102.96	102.26	102.30	103.45
12	* 106.57	103.08	104.09	105.35	102.83	103.24	104.31	104.52	102.95	102.29	102.29	103.42
13	106.56	103.33	104.12	105.34	102.84	103.24	104.35	104.53	102.95	102.29	102.27	103.60
14	106.33	103.60	104.14	105.35	102.84	103.39	104.34	104.33	102.96	102.27	102.30	103.71
15	105.99	103.78	104.12	105.31	102.83	103.38	104.34	104.32	102.96	102.28	102.30	103.53
16	105.98	103.76	104.12	105.31	102.84	103.38	104.35	104.28	102.96	102.29	102.32	103.67
17	105.85	103.87	104.13	* 105.26	102.89	103.42	104.33	104.21	102.96	102.29	102.30	103.80
18	105.73	104.00	104.13	* 105.19	102.85	103.44	104.34	104.14	102.94	102.30	102.29	103.81
19	105.76	104.02	104.14	* 105.19	102.87	103.49	104.33	104.06	102.95	102.29	101.29	105.32
20	105.16	104.10	104.34	105.16	102.87	103.52	104.34	104.06	102.94	102.28	102.28	106.87
21	105.16	104.11	104.36	105.16	102.87	103.50	104.34	104.05	102.95	102.33	102.38	104.29
22	* 104.87	104.08	104.33	105.14	102.87	103.56	104.34	103.86	102.95	102.88	102.37	103.96
23	* 104.67	104.09	104.52	105.18	102.85	103.58	104.35	103.73	102.96	103.14	102.38	103.95
24	* 104.44	104.05	104.57	105.15	102.88	103.58	104.36	103.63	102.95	104.67	102.37	103.94
25	102.87	104.05	104.67	104.95	102.89	103.63	104.37	103.56	102.96	105.32	102.32	103.95
26	102.61	104.05	104.77	104.71	102.86	103.63	104.36	103.47	102.97	105.38	102.40	103.95
27	* 102.72	104.06	104.73	104.50	102.85	103.73	104.39	103.46	102.96	102.99	102.58	103.86
28	* 102.74	104.06	104.73	104.22	102.87	103.74	104.41	103.45	102.97	102.30	102.55	103.81
29	102.71		104.76	103.96	102.85	103.70	104.41	103.45	102.98	102.31	102.36	103.83
30	103.05		104.77	103.69	102.88	103.66	104.41	103.37	* 103.08	102.30	102.37	103.83
31	103.20		104.77		102.86		104.37	103.27		102.34		103.65
Avg.	104.50	103.52	104.52	105.00	102.90	103.33	104.28	104.15	102.97	102.65	102.34	103.72

* Partly estimated

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 0.5 mile (0.8 km) downstream from the northerly international boundary and 0.6 mile (1.0 km) upstream from Morelos Diversion Dam. Prior to July 14, 1971, the wasteway was located 0.4 mile (0.6 km) downstream from Morelos Diversion Dam. This wasteway discharges waste water from the Valley Division of the Yuma Project in the United States into the Colorado River. Since July 14, 1971, zero of the gage is 117.64 feet (35.86 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, March 1950 through 1978 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 (1,127,000 m³) in January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 79.3 second-feet (2.25 m³/sec) on June 19, 1965, at a maximum gage height of 114.13 feet (34.79 m) (old datum); minimum instantaneous discharge, zero during parts of each month.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 0	* 0.3	* 0.8	0.8	0	0	4.2	0	0	0	3.7	2.7
2	* .2	* .2	* .8	1.8	0	0	.1	0	0	.7	.9	9.6
3	* .3	* .1	* .6	.2	1.6	0	0	2.8	.8	.1	.8	.6
4	* 0	3.2	* .4	0	.9	0	0	1.4	.8	0	.1	.1
5	* 0	.5	* .3	0	0	.6	13.7	1.2	.8	0	1.3	.1
6	* .4	.2	* .1	0	6.5	0	3.2	1.1	.7	0	.3	0
7	* .1	1.1	* 0	0	.2	0	1.4	.5	.7	4.3	0	.1
8	* 0	.2	* 0	0	.1	0	.2	1.5	.1	0	0	7.6
9	* 0	.1	* 0	1.6	.8	0	.2	.4	2.0	.9	0	11.1
10	* .4	.1	* 0	3.3	0	0	.2	.4	.2	0	.6	10.9
11	* 0	1.5	* 0	3.5	11.8	0	.6	.7	0	0	6.4	2.5
12	* 0	2.3	* 0	.1	11.0	0	.6	8.1	0	0	2.1	6.1
13	* .6	2.9	.9	2.5	.5	0	4.2	1.5	0	0	.2	3.5
14	* .4	.7	1.6	0	.3	3.5	1.0	.1	0	0	.9	5.3
15	* .1	2.4	3.8	0	1.5	.4	.5	0	0	.5	1.1	4.7
16	* .5	.5	.2	0	4.6	0	5.8	0	2.7	.9	5.4	4.7
17	* 1.0	.6	.2	0	3.4	2.1	.4	0	.9	2.5	1.3	3.4
18	* .9	.5	.2	3.0	.2	.2	.3	0	0	1.8	1.3	2.4
19	* .8	.3	.2	0	.3	0	.3	0	0	1.2	.9	.3
20	* .9	1.2	.1	0	.4	0	.1	0	0	.1	.7	.2
21	* .8	* .1	0	0	.2	.2	0	0	1.2	5.8	.5	4.1
22	* .8	* 0	0	2.2	.1	3.5	1.2	6.3	2.5	.9	4.9	.5
23	* .8	* 0	2.9	1.5	0	1.1	0	.4	.1	.1	2.2	.2
24	* 1.1	* 0	.3	1.5	0	.9	0	.4	3.0	0	.4	.2
25	* 1.0	* 0	2.6	0	0	1.1	0	0	1.3	0	.1	.1
26	* 1.0	* 0	.1	1.3	0	.1	0	0	0	0	.1	.7
27	* 1.3	* 0	.1	1.1	1.9	6.5	0	0	0	0	2.1	7.6
28	* 1.1	* .3	.1	0	2.9	.2	0	2.3	0	0	.6	0
29	* 1.9	.1	0	.2	.1	.1	2.8	.2	0	2.2	.1	1.1
30	* 1.1	1.3	0	0	.1	.1	.4	.1	3.0	1.9	0	1.1
31	* .3	.4	0	0	0	.1	.1	0	7.1	0	.1	.1

Sum 17.8 19.3 18.1 24.4 49.4 20.6 41.5 29.4 20.8 31.0 37.9 91.6

Month	Current Year 1978						Period 1935-1978				
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	0.38	0	29	3.0	1 1	0	0.6	35.3	167	914	0
Feb.	1.10	0	4	16.2	1 8	0	.7	38.3	148	400	6.0
Mar.	1.20	0	23	18.2	1 6	0	.6	35.9	160	517	0
Apr.	1.49	0	18	24.3	1 4	0	.8	48.4	168	425	27.8
May	2.15	0	111	38.8	1 1	0	1.6	98.0	166	440	40.3
June	2.34	0	27	43.1	1 1	0	.7	40.9	154	595	40.9
July	1.79	0	5	30.8	1 1	0	1.3	82.3	143	516	0
Aug.	2.06	0	12	36.7	1 1	0	.9	58.3	109	617	0
Sept.	2.02	0	16	35.8	1 1	0	.7	41.3	106	462	0
Oct.	1.81	0	31	31.2	1 1	0	1.0	61.5	135	490	0
Nov.	1.05	0	15	15.2	1 7	0	1.3	75.2	157	462	9.0
Dec.	1.47	0	14	23.9	1 1	0	3.0	182	180	592	13.7
Yearly	2.34	0		43.1		0	1.1	797	1,793	4,500	638
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	0.71	0		1.22		0	0.03	983	2,212	5,551	787

* Partly estimated

! And other days

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 (1.8 km) downstream from the northerly international boundary, and about 7.5 miles (12.1 km) downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 0.16 foot (0.05 m) below mean sea level.

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 1978.

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 elevation above mean sea level, 113.48 feet (34.59 m) on August 18, 1977; minimum mean daily elevation above mean sea level, 101.51 feet (30.94 m) on February 17, 1957.

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	104.95	102.49	104.17	103.61	102.85	102.36	103.12	103.51	102.46	102.03	101.87	102.17
2	104.53	103.22	107.45	103.61	102.66	102.40	103.18	103.51	102.40	101.87	101.87	102.33
3	104.49	102.07	107.05	103.74	102.43	102.40	103.25	103.54	102.36	101.87	101.87	102.36
4	103.97	102.13	103.08	103.74	102.46	102.40	103.25	103.54	102.40	101.87	101.84	102.36
5	104.56	102.10	103.08	103.81	102.43	102.49	103.28	103.58	102.40	101.87	101.80	102.36
6	104.46	102.20	102.99	103.81	102.43	102.49	103.31	103.58	102.40	101.90	101.84	102.36
7	103.15	102.20	102.95	103.84	102.40	102.49	103.35	103.54	102.40	101.80	101.84	102.49
8	102.33	102.30	102.99	103.90	102.40	102.62	103.35	103.48	102.46	101.84	101.84	102.49
9	102.40	102.30	103.02	103.94	102.43	102.62	103.35	103.48	102.49	101.84	101.80	102.53
10	102.79	102.43	103.02	104.00	102.40	102.62	103.35	103.48	102.36	101.84	101.80	102.62
11	105.84	102.40	103.12	103.97	102.40	102.69	103.38	103.48	102.26	101.84	101.84	102.62
12	106.43	102.40	103.15	104.00	102.40	102.69	103.41	103.44	102.26	101.84	101.84	102.59
13	106.40	102.49	103.15	103.97	102.40	102.66	103.41	103.44	102.26	101.84	101.84	102.85
14	106.17	102.69	103.18	104.00	102.36	102.82	103.41	103.31	102.26	101.84	101.84	103.05
15	105.81	102.95	103.15	104.00	102.36	102.79	103.41	103.31	102.26	101.84	101.84	102.79
16	105.81	102.92	103.15	104.00	102.40	102.76	103.44	103.28	102.26	101.84	101.84	102.89
17	105.68	102.95	103.18	103.97	102.43	102.82	103.41	103.22	102.26	101.84	101.84	103.15
18	105.58	103.08	103.22	103.94	102.40	102.82	103.41	103.22	102.26	101.84	101.84	103.15
19	105.61	103.12	103.22	103.94	102.40	102.85	103.38	103.18	102.26	101.84	101.84	104.76
20	104.99	103.18	103.31	103.90	102.40	102.89	103.41	103.15	102.26	101.84	101.84	106.46
21	104.99	103.18	103.35	103.94	102.40	102.85	103.44	103.15	102.26	101.84	101.90	103.71
22	104.66	103.15	103.31	103.90	102.40	102.92	103.41	103.05	102.26	102.43	101.90	103.18
23	104.46	103.15	103.41	103.94	102.40	102.92	103.41	102.95	102.26	102.72	101.94	103.15
24	104.23	103.08	103.44	103.94	102.40	102.92	103.41	102.85	102.26	104.40	101.90	103.18
25	102.40	103.08	103.51	103.81	102.43	102.95	103.44	102.82	102.30	105.05	101.87	103.18
26	101.90	103.08	103.58	103.71	102.40	102.95	103.41	102.76	102.30	105.09	101.94	103.15
27	102.17	103.12	103.54	103.54	102.40	103.02	103.44	102.76	102.25	102.76	102.07	103.02
28	102.17	103.08	103.54	103.38	102.40	103.05	103.44	102.76	102.30	101.84	102.07	102.95
29	102.13		103.58	103.18	102.40	103.02	103.44	102.76	102.30	101.84	101.90	102.99
30	102.49		103.58	103.02	102.40	102.99	103.44	102.69	102.43	101.84	101.94	102.99
31	102.79		103.58		102.40		103.41	102.66		101.87		102.85
Avg.	104.20	102.72	103.54	103.81	102.43	102.76	103.38	103.22	102.33	102.23	101.87	102.99

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

DESCRIPTION: Water-stage recorder and staff gage on left bank of Intake Canal, 200 feet (61.0 m) downstream from the intake at Morelos Dam, 1,350 feet (410 m) upstream from the point where it joins the old Alamo Canal, 2.2 miles (3.5 km) upstream from Matamoros Check, and about one mile (1.6 km) south of the northerly international boundary. The zero of the gage is 0.16 foot (0.05 m) below mean sea level, U. S. C. & G. S. datum.

RECORDS: The records are deduced from the flows arriving in the limitrophe section of the Colorado River at the northerly international boundary, the flows that pass downstream from the structure, and leakage through the structure. Records available: November 8, 1950 through 1978. Records obtained 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 in the canal do not permit measuring the flow 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 1978, and consequently the records reported below show the total water diverted from the Colorado River to the Alamo Canal during those years.

EXTREMES: Maximum mean daily discharge, 6,540 second-feet (185 m³/sec), August 3, 1958; maximum mean daily gage height 107.05 feet (32.63 m) November 8, 1950. Minimum daily discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	622	660	2,590	3,400	2,010	1,340	2,420	3,190	1,570	865	819	1,230
2	526	600	2,320	3,400	1,740	1,370	2,510	3,180	1,490	798	780	1,450
3	516	953	2,190	3,600	1,430	1,380	2,670	3,280	1,460	773	795	1,490
4	600	1,030	2,230	3,600	1,470	1,380	2,670	3,310	1,500	759	759	1,480
5	530	1,020	2,520	3,670	1,390	1,510	2,690	3,360	1,500	795	696	1,460
6	671	1,180	2,370	3,740	1,390	1,510	2,770	3,360	1,500	795	759	1,480
7	855	1,150	2,310	3,740	1,370	1,500	2,770	3,310	1,460	738	809	1,650
8	763	1,250	2,320	3,880	1,370	1,630	2,790	3,190	1,470	777	833	1,670
9	1,030	1,260	2,390	3,880	1,390	1,640	2,790	3,190	1,500	777	788	1,730
10	876	1,430	2,390	4,030	1,350	1,640	2,800	3,190	1,400	777	777	1,830
11	530	1,410	2,610	4,030	1,380	1,700	2,870	3,180	1,390	763	784	1,850
12	420	1,390	2,610	4,060	1,350	1,730	2,880	3,160	1,370	798	780	1,840
13	441	1,590	2,640	4,060	1,360	1,730	2,910	3,150	1,370	798	777	1,940
14	491	1,780	2,660	4,060	1,350	1,880	2,910	2,940	1,380	788	802	1,900
15	579	2,130	2,650	4,030	1,350	1,860	2,910	2,930	1,380	798	788	1,880
16	579	2,120	2,640	4,030	1,380	1,860	2,920	2,880	1,380	798	805	2,000
17	583	2,260	2,660	3,960	1,410	1,890	2,890	2,810	1,370	812	788	1,980
18	590	2,390	2,660	3,880	1,370	1,910	2,910	2,750	1,350	798	802	1,980
19	579	2,400	2,660	3,920	1,390	1,970	2,910	2,650	1,370	802	791	1,930
20	590	2,510	2,890	3,880	1,380	2,010	2,910	2,650	1,350	809	791	1,720
21	579	2,540	2,880	3,880	1,380	1,980	2,920	2,650	1,360	795	904	1,670
22	572	2,510	2,860	3,880	1,390	2,060	2,920	2,450	1,350	1,050	886	1,950
23	530	2,550	3,060	3,920	1,370	2,060	2,920	2,300	1,350	1,060	893	2,240
24	533	2,510	3,100	3,880	1,390	2,060	2,930	2,180	1,360	946	893	2,250
25	551	2,550	3,220	3,670	1,390	2,110	2,940	2,080	1,370	872	858	2,250
26	742	2,510	3,340	3,410	1,370	2,110	2,940	1,980	1,380	879	893	2,270
27	1,040	2,550	3,280	3,170	1,360	2,250	2,980	1,980	1,350	826	1,070	2,210
28	1,070	2,540	3,320	2,850	1,380	2,240	3,010	1,980	1,380	759	1,080	2,180
29	1,060		3,330	2,570	1,350	2,200	3,020	1,990	1,390	766	858	2,190
30	929		3,330	2,260	1,380	2,150	3,010	1,910	1,430	756	869	2,180
31	636		3,330		1,350		2,970	1,830		798		2,000
Sum	20,620	50,715	85,359	110,369	43,801	54,685	88,477	85,038	42,328	25,324	24,936	57,867
Current Year 1978										Period 1950-1978		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	102.26	100.43	28	1,070	12	420	664	40,900	64,917	116,737	966	
Feb.	102.92	100.69	23	2,550	2	600	1,810	100,592	65,662	107,233	9,232	
Mar.	103.05	101.84	26	3,340	3	2,190	2,750	169,306	168,252	216,994	97,902	
Apr.	103.61	101.84	112	4,060	30	2,260	3,670	218,913	194,686	264,127	153,792	
May	101.87	100.69	1	2,910	110	1,350	1,410	86,877	93,750	159,010	66,207	
June	101.97	100.95	27	2,250	1	1,340	1,820	108,465	151,324	269,632	95,177	
JULY	102.49	101.90	29	3,020	1	2,420	2,850	175,492	215,958	304,263	135,153	
Aug.	102.66	101.05	5	3,360	31	1,830	2,740	168,669	213,662	341,044	130,298	
Sept.	102.56	100.46	1	1,570	122	1,350	1,410	83,956	119,858	198,095	53,633	
Oct.	102.43	100.23	23	1,060	7	738	816	50,229	50,185	90,639	10,453	
Nov.	102.20	101.74	28	1,080	5	696	830	49,459	40,814	103,954	7,516	
Dec.	103.22	100.95	26	2,270	1	1,230	1,870	114,776	73,527	144,230	8,825	
Yearly	103.61	100.23		4,060		420	1,649	1,367,635	1,454,862	1,961,556	1,272,332	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	31.58	30.55		155		11.9	46.7	1,686,959	1,794,553	2,419,553	1,569,404	

! And other days

Ø Mean daily

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page for Description)

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	100.89	100.82	102.33	103.05	101.64	101.12	102.17	102.46	100.79	101.44	101.02	101.41
2	100.95	100.82	102.40	103.05	101.31	100.98	102.30	102.49	100.66	100.85	100.95	101.64
3	101.12	101.08	102.36	103.22	100.92	101.02	102.46	102.56	100.59	101.02	100.92	101.80
4	100.95	101.54	102.10	103.22	100.89	101.02	102.43	102.56	100.59	101.08	100.92	101.74
5	101.02	101.54	102.07	103.31	100.89	101.25	102.40	102.56	100.62	101.48	100.89	101.35
6	100.98	101.44	102.00	103.35	100.98	101.28	102.33	102.59	100.59	101.54	100.92	101.25
7	101.08	100.79	101.94	103.35	101.05	101.15	102.26	102.62	100.56	101.15	100.98	101.51
8	100.98	100.89	101.94	103.41	101.02	101.18	102.26	102.49	100.69	100.52	101.41	101.57
9	101.57	100.82	102.00	103.44	101.05	101.12	102.26	102.49	100.79	100.30	101.21	101.71
10	101.02	101.15	102.03	103.54	101.12	101.05	102.26	102.46	100.95	100.52	100.92	102.00
11	101.02	101.25	102.23	103.51	101.12	101.05	102.33	102.49	101.15	100.39	101.05	101.94
12	100.85	101.02	102.23	103.54	101.08	101.05	102.33	102.46	101.28	100.59	100.95	101.97
13	100.85	101.35	102.26	103.51	101.02	101.08	102.36	102.53	101.28	100.85	100.98	102.56
14	100.82	101.90	102.26	103.51	100.89	101.31	102.36	102.36	101.12	100.89	100.98	102.99
15	100.85	102.53	102.23	103.48	100.92	101.51	102.33	102.36	101.12	100.98	100.98	102.40
16	100.89	102.43	102.23	103.48	100.85	101.48	102.30	102.30	101.08	100.95	101.02	102.69
17	100.95	102.49	102.26	103.44	100.79	101.44	102.26	102.23	101.05	100.98	100.98	103.08
18	100.92	102.76	102.26	103.41	100.82	101.48	102.26	102.17	101.02	100.92	101.05	103.05
19	100.92	102.82	102.26	103.41	100.92	101.57	102.30	102.10	100.89	100.92	100.85	102.99
20	100.85	102.85	102.49	103.35	100.98	101.51	102.30	102.10	100.85	100.92	100.85	102.99
21	100.85	102.85	102.53	103.35	100.89	101.44	102.30	102.10	101.02	100.98	101.08	102.99
22	100.85	102.76	102.46	103.35	100.82	101.51	102.30	101.90	101.08	101.41	100.95	103.15
23	100.85	102.36	102.66	103.38	100.72	101.51	102.26	101.74	101.15	101.12	100.82	103.08
24	100.82	102.13	102.72	103.38	100.72	101.51	102.30	101.61	101.12	100.98	100.95	103.08
25	100.85	102.10	102.82	103.15	100.82	101.57	102.30	101.54	101.12	100.98	100.89	103.12
26	100.98	102.10	102.95	102.95	100.95	101.57	102.26	101.44	101.18	100.95	100.89	103.08
27	101.71	102.13	102.92	102.72	100.95	101.74	102.26	101.44	101.15	100.85	101.31	102.95
28	101.71	102.13	102.89	102.53	100.98	101.84	102.30	101.41	101.18	100.89	101.67	102.85
29	100.98		102.92	102.26	101.12	101.90	102.30	101.44	101.35	100.92	101.02	102.89
30	100.82		102.95	101.94	101.18	101.90	102.30	101.35	102.13	100.92	100.89	102.89
31	100.85		102.95		101.18		102.23	101.25		100.95		102.72
Avg.	100.98	101.80	102.40	103.22	100.98	101.38	102.30	102.13	101.02	100.95	101.02	102.43

COLORADO RIVER IMMEDIATELY BELOW MORELOS DAM - STAGES

DESCRIPTION: Water-stage recorder located on the right bank of the Colorado River in Mexico immediately downstream from Morelos Dam, 1.1 miles (1.8 km) downstream from the northerly international boundary, and about 7.5 miles (12.1 km) downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 0.16 foot (0.05 m) below mean sea level.

RECORDS: Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage heights, February 20, 1951 to June 6, 1966; continuous record of gage heights June 7, 1966 through 1978.

REMARKS: On June 7, 1966 a continuous water-stage recorder was installed; prior to this date, mean daily gage heights were determined from hourly readings of staff gage.

EXTREMES: Maximum mean daily gage height, 113.42 feet (34.57 m) on August 18, 1977; minimum mean gage height, 98.13 feet (29.91 m) several days during March and April 1967.

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	104.76	102.36	102.23	98.36	98.23	98.43	98.69	98.79	98.95	98.92	99.11	98.75
2	104.36	102.79	107.35	98.33	98.23	98.43	98.72	98.79	98.92	98.95	99.08	98.75
3	104.33	98.65	106.92	98.36	98.20	98.39	98.75	98.79	98.92	98.95	99.02	98.75
4	103.81	98.56	99.90	98.33	98.23	98.43	98.69	98.79	98.92	98.98	99.02	98.75
5	104.46	98.56	98.65	98.33	98.20	98.43	98.69	98.79	98.92	99.02	98.98	98.79
6	104.30	99.57	98.62	98.36	98.16	98.43	98.65	98.82	98.92	98.98	99.02	98.75
7	102.92	100.33	98.56	98.39	98.16	98.39	98.65	98.85	98.95	98.98	98.98	98.79
8	102.10	100.36	98.56	98.36	98.16	98.39	98.62	98.85	98.95	98.98	98.92	98.75
9	100.59	99.41	98.56	98.36	98.20	98.39	98.65	98.88	98.92	99.02	98.82	98.72
10	102.53	98.52	98.52	98.36	98.20	98.39	98.69	98.88	98.95	99.05	98.85	98.72
11	105.68	98.52	98.52	98.36	98.23	98.39	98.65	98.85	99.02	99.08	98.82	98.75
12	106.30	98.49	98.52	98.39	98.23	98.43	98.65	98.85	98.98	99.11	98.82	98.75
13	106.27	99.38	98.52	98.39	98.29	98.49	98.65	98.85	99.05	99.15	98.85	98.79
14	106.04	99.93	98.49	98.39	98.29	98.52	98.65	98.88	99.05	99.11	98.85	98.82
15	105.68	98.56	98.49	98.36	98.33	98.52	98.62	98.85	99.05	99.15	98.85	98.79
16	105.68	98.49	98.46	98.39	98.36	98.49	98.62	98.88	99.02	99.18	98.82	98.75
17	105.54	98.49	98.46	98.39	98.36	98.52	98.62	98.92	99.05	99.15	98.82	98.75
18	105.41	98.49	98.43	98.39	98.33	98.52	98.62	98.92	99.08	99.18	98.79	99.11
19	105.45	98.46	98.43	98.39	98.33	98.56	98.62	98.88	99.05	99.18	98.79	104.63
20	104.86	98.46	98.43	98.39	98.33	98.59	98.62	98.88	99.02	99.18	98.79	106.40
21	104.82	98.46	98.43	98.39	98.36	98.62	98.65	98.92	99.05	99.18	98.82	102.85
22	104.53	98.46	98.43	98.36	98.36	98.59	98.65	98.92	99.02	101.38	98.82	98.95
23	104.33	98.46	98.43	98.36	98.36	98.62	98.65	98.92	98.95	102.03	98.82	98.95
24	104.10	98.46	98.39	98.36	98.39	98.62	98.75	98.92	98.92	104.33	98.75	98.92
25	102.26	98.43	98.39	98.43	98.39	98.65	98.72	98.92	98.95	104.99	98.75	98.88
26	101.61	98.43	98.39	98.36	98.36	98.69	98.72	98.92	98.95	105.02	98.75	98.92
27	98.88	98.43	98.43	98.33	98.39	98.65	98.75	98.95	98.98	101.28	98.79	98.82
28	98.72	98.43	98.39	98.26	98.39	98.69	98.72	98.92	98.95	99.21	98.79	98.79
29	98.69		98.39	98.26	98.39	98.62	98.72	98.92	98.92	99.18	98.75	98.82
30	100.72		98.39	98.26	98.39	98.65	98.72	98.92	98.92	99.15	98.79	98.82
31	102.66		98.36		98.39		98.75	98.95		99.11		98.82
Avg.	103.61	99.08	99.18	98.36	98.29	98.52	98.69	98.88	98.98	99.87	98.85	99.34

WELLTON-MOHAWK DRAINAGE WATER DISCHARGED TO COLORADO RIVER BELOW MORELOS DAM

DESCRIPTION: Water-stage recorder located on downstream end of the Wellton-Mohawk Drainage Extension Channel on the Arizona bank of the Colorado River at the east end of the weir section of Morelos Dam, 1.1 miles (1.8 km) downstream from the northerly international boundary. The elevation of the zero of the gage has not been determined.

RECORDS: Based on discharge measurements and a continuous record of gage heights. Station is operated by the United States Section of the Commission. Records available: November 16, 1965 through 1978.

REMARKS: Pursuant to Minute 218 of the Commission, an extension to the Wellton-Mohawk Drainage Conveyance Channel was constructed along the left bank of the Colorado River to a point immediately below Morelos Dam, a distance of about 12 miles (19.3 km), and placed in operation on November 16, 1965. Drainage flows may be discharged on an emergency basis to the Gila River and thence to the Colorado River at the diversion structure, Main Outlet Drain Extension No. 1, at the upstream end of the extension; directly to the Colorado River at Main Outlet Drain Extension No. 2, 1.9 miles (3.1 km) upstream from Morelos Dam; and directly to the Colorado River immediately below Morelos Dam at this station, Main Outlet Drain Extension No. 3. On July 14, 1972, Minute No. 241 of the Commission became effective. The Minute called for discharge of all Wellton-Mohawk drainage waters to be made below Morelos Dam. On August 30, 1973, Minute No. 242 of the Commission became effective. The Minute called for construction of a concrete-lined bypass drain from Morelos Dam to the Santa Clara Slough in Mexico. On June 23, 1977, the first flow was recorded in the bypass drain. Drainage flows through Main Outlet Extension No. 3 will be only on an emergency basis.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	0.4	0	0	0	0	0	0	0	0	0	0	0	
2	.3	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	168	0	0	0	0	0	0	0	0	0	0	
7	0	273	0	0	0	0	0	0	0	0	0	0	
8	0	270	0	0	0	0	0	0	0	0	0	0	
9	0	111	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	.3	0	0	0	0	
19	0	0	0	0	0	0	0	.1	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	1.9	0	0	0	0	
28	0	0	0	0	0	0	0	12.7	0	0	0	0	
29	0	0	0	0	0	0	0	.7	0	0	0	0	
30	0	0	0	0	0	0	0	0	0	0	0	0	
31	0	0	0	0	0	0	0	0	0	0	0	0	
Sum	0.7	822.0	0	0	0	0	0.4	15.3	0	0	0	0	
	Current Year 1978								Period 1966-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum		
Jan.	0.05	0	1 1	0.6	1 3	0	0	1.4	14,932	18,718	1,4		
Feb.	3.02	0	1 6	273	1 1	0	29.4	1,630	11,621	16,992	1,630		
Mar.				0	0	0	0	0	8,113	18,506	0		
Apr.				0	0	0	0	0	6,755	18,061	0		
May				0	0	0	0	0	11,061	19,091	0		
June				0	0	0	0	0	8,587	18,756	0		
July	.20	0	18	4.5	1 1	0	0	.8	7,867	18,946	0		
Aug.	.43	0	27	12.7	1 1	0	.5	30.3	8,128	19,188	30.3		
Sept.				0	0	0	0	0	11,355	18,474	0		
Oct.				0	0	0	0	0	15,648	19,200	0		
Nov.				0	0	0	0	0	15,250	18,478	0		
Dec.				0	0	0	0	0	13,853	19,121	0		
Yearly	3.02	0		273		0	29.9	1,662	133,170	214,781	1,662		
	Meters		Cubic Meters per Second				Thousands of Cubic Meters						
	0.92	0		7.73		0	0.85	2,050	164,264	264,930	2,050		

! And other days

COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, and cableway 1.8 miles (2.9 km) downstream from the northerly international boundary, 0.7 mile (1.1 km) downstream from Morelos Diversion Dam, and about 9 miles (14.5 km) downstream from Yuma, Arizona, along the river levee. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements and a continuous record of gage heights. Computations by shifting control methods. Records available: Daily discharges, January 1, 1954 through 1978; continuous record of gage heights, July 20, 1952 through 1978.

REMARKS: Reservoirs, diversions in the United States and Mexico, drainage returns, and waste flows modify the river flow at this station. The record at this station, less Main Outlet Drain Extension No. 3, represents the river flow passing Morelos Diversion Dam.

EXTREMES: Maximum instantaneous discharge, 22,240 second-feet (630 m³/sec) on January 4, 1955; maximum gage height, 112.85 feet (34.40 m) on August 18, 1977. Minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,080 *	539 *	690 *	12.7	9.8	8.2	8.6	9.3	8.6	6.4	15.8	8.2
2	956	679	2,490	12.4	9.6	7.2	8.6	9.6	8.4	7.0	15.6	8.3
3	995	29.3	2,260	12.4	9.8	7.5	8.9	10.0	8.4	7.0	14.1	8.3
4	791	20.5	234	12.7	9.6	7.7	8.9	9.8	8.6	7.5	13.1	9.1
5	1,020	17.5	27.0	13.3	8.9	8.4	9.6	9.3	8.9	8.4	12.5	9.8
6	97.1	169	24.2	13.0	8.2	8.4	9.6	9.6	8.2	8.2	12.5	9.2
7	545	288	21.3	12.7	8.0	9.1	9.6	9.8	8.4	7.7	13.0	9.3
8	328	288	22.6	12.4	8.0	8.9	9.3	9.8	8.4	7.5	12.2	8.6
9	146	150	22.0	12.4	7.7	8.6	9.6	10.3	8.2	8.0	10.0	8.0
10	414	18.0	20.5	12.7	8.2	8.2	9.8	9.8	8.0	8.2	10.6	8.0
11	1,480	16.5	19.8	12.7	7.7	8.2	9.8	9.8	8.2	9.1	10.0	8.2
12	1,740	15.4	19.8	13.6	7.5	8.4	9.8	9.8	7.7	9.1	9.4	7.7
13	1,720	126	19.8	13.9	7.2	8.6	10.0	10.0	7.2	9.3	9.7	8.4
14	1,610	236	19.8	13.3	7.2	10.0	10.0	10.3	7.0	9.1	10.0	9.0
15	1,430	18.6	20.2	12.7	7.7	9.3	9.8	10.3	7.0	8.6	10.0	9.1
16	1,430	16.8	18.3	12.7	7.5	8.6	9.8	10.3	6.8	9.3	10.2	8.6
17	1,390	15.6	17.6	13.3	7.5	8.4	9.8	10.0	6.8	8.9	9.7	8.9
18	1,350	14.7	16.6	13.0	7.7	8.4	9.8	9.8	7.0	9.1	9.4	22.5
19	1,360	14.3	16.6	13.0	7.5	8.6	10.0	9.8	7.0	8.4	9.2	991
20	1,160	14.4	16.9	13.0	7.0	8.9	10.0	9.8	6.4	8.4	9.2	1,850
21	1,170	14.7	16.9	12.7	7.2	9.6	9.3	9.8	7.0	8.4	9.2	534
22	1,070	14.2	16.2	12.4	7.7	9.1	9.3	9.6	6.2	197	9.7	201
23	1,020	14.3	16.2	11.8	7.7	8.4	9.6	10.0	6.0	285	9.1	19.0
24	967	14.0	14.8	12.1	8.4	8.4	9.8	9.3	5.7	752	8.0	15.5
25	519	13.6	14.5	13.6	8.0	8.4	9.6	9.3	6.2	987	8.0	13.8
26	38.1	13.5	14.5	12.1	7.7	8.6	9.8	10.3	6.4	1,010	7.7	14.9
27	38.6	13.7	14.8	11.6	7.5	8.2	9.6	20.2	6.8	275	8.0	12.2
28	21.6	13.6	14.8	11.0	7.0	8.6	8.9	10.3	6.8	23.6	8.3	11.5
29	17.3		13.6	10.6	7.2	8.2	8.9	8.6	6.4	19.0	7.5	11.9
30	324		13.3	10.3	7.2	8.4	9.1	8.6	6.6	17.6	8.2	11.9
31	605		13.6		7.5		9.1	8.4		16.6		11.5
Sum	28,049.5	2,798.2	6,160.2	376.1	245.4	255.5	294.3	311.6	219.3	3,756.4	309.9	3,867.4

Month	Current Year 1978						Period 1954-1978					
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.	106.13	97.64 *	12	1,870	30	15.7	905	55,635	131,047	969,540	949	
Feb.	103.40	97.22	2	930	126	13.5	99.9	5,550	67,046	414,310	977	
Mar.	107.40	97.24	3	2,730	129	13.0	199	12,219	44,606	630,230	659	
Apr.	97.90 *	97.13 *	25	46.7	30	10.3	12.5	746	35,075	532,320	746	
May	97.36	97.02	4	16.6	116	6.8	7.9	487	41,653	375,970	460	
June	97.39	97.02	21	18.0	1	7.0	8.5	507	12,713	119,980	507	
July	97.45	97.10 *	27	17.2	1	8.6	9.5	584	12,224	89,430	584	
Aug.	97.57	97.17 *	27	20.2	1	8.4	10.1	618	20,946	125,590	618	
Sept.	97.75	97.16	1	13.0	113	5.5	7.3	435	18,638	87,830	113	
Oct.	104.69	97.57	26	1,100	1	6.4	12.1	7,451	39,841	172,940	383	
Nov.	97.92	97.50	2	21.7	129	7.5	10.3	615	66,595	356,390	355	
Dec.	106.18	97.50	20	2,060	1	7.2	125	7,671	90,273	643,850	1,111	
Yearly	107.40	97.02		2,730		5.5	126	92,518	580,656	3,957,730	92,518	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	32.74	29.57		77.3		0.16	3.57	114,120	716,233	4,881,820	114,120	

* Partly estimated January 27 to September 19

! And other days

COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1978

Day	Jan. *	Feb. *	March *	April *	May *	June *	July *	Aug. *	Sept. *	Oct.	Nov.	Dec.
1	104.25	101.55	100.92	97.23	97.12	97.07	97.10	97.18	97.21	97.57	97.75	97.53
2	103.82	102.15	106.94	97.22	97.11	97.03	97.10	97.19	97.21	97.60	97.74	97.53
3	103.79	97.63	106.63	97.22	97.12	97.03	97.11	97.21	97.21	97.60	97.70	97.53
4	103.17	97.47	99.25	97.22	97.12	97.04	97.11	97.20	97.23	97.63	97.67	97.56
5	103.87	97.41	97.74	97.24	97.09	97.06	97.14	97.18	97.24	97.67	97.65	97.58
6	103.75	98.89	97.68	97.23	97.07	97.06	97.14	97.19	97.23	97.67	97.65	97.56
7	102.21	99.99	97.61	97.22	97.06	97.09	97.14	97.20	97.24	97.65	97.66	97.56
8	101.23	99.99	97.63	97.21	97.07	97.08	97.13	97.20	97.24	97.64	97.64	97.54
9	99.19	98.76	97.60	97.21	97.06	97.07	97.14	97.22	97.23	97.66	97.57	97.52
10	101.50	97.42	97.54	97.22	97.08	97.05	97.15	97.20	97.23	97.67	97.59	97.52
11	105.25	97.38	97.50	97.22	97.07	97.05	97.15	97.31	97.24	97.71	97.57	97.54
12	105.88	97.34	97.48	97.25	97.06	97.06	97.15	97.21	97.22	97.71	97.55	97.56
13	105.85	98.22	97.46	97.26	97.05	97.07	97.16	97.22	97.20	97.72	97.56	97.59
14	105.62	99.34	97.44	97.24	97.05	97.12	97.16	97.24	97.19	97.71	97.57	97.61
15	105.24	97.42	97.45	97.22	97.07	97.09	97.15	97.24	97.19	97.70	97.57	97.62
16	105.23	97.38	97.40	97.22	97.06	97.06	97.15	97.24	97.18	97.73	97.58	97.60
17	105.11	97.34	97.38	97.24	97.06	97.05	97.16	97.24	97.18	97.72	97.56	97.61
18	104.99	97.31	97.35	97.23	97.06	97.05	97.16	97.23	97.19	97.75	97.55	97.80
19	105.03	97.29	97.35	97.23	97.05	97.06	97.17	97.23	97.19	97.74	97.54	103.67
20	104.35	97.30	97.36	97.23	97.03	97.08	97.18	97.23	97.55	97.75	97.54	105.88
21	104.36	97.30	97.36	97.21	97.03	97.11	97.15	97.23	97.58	97.75	97.55	101.93
22	104.02	97.28	97.34	97.20	97.05	97.10	97.16	97.22	97.54	99.80	97.57	99.74
23	103.80	97.29	97.34	97.19	97.04	97.08	97.17	97.25	97.53	100.62	97.55	97.87
24	103.56	97.26	97.30	97.20	97.07	97.08	97.18	97.22	97.52	103.43	97.52	97.77
25	101.43	97.23	97.29	97.25	97.05	97.09	97.18	97.22	97.55	104.31	97.52	97.72
26	100.68	97.22	97.29	97.20	97.05	97.10	97.19	97.26	97.56	104.40	97.51	97.75
27	97.93	97.24	97.30	97.18	97.04	97.09	97.19	97.57	97.58	100.32	97.52	97.66
28	97.71	97.23	97.30	97.16	97.03	97.11	97.16	97.27	97.58	97.96	97.53	97.64
29	97.66		97.26	97.14	97.04	97.09	97.16	97.20	97.56	97.85	97.50	97.65
30	99.89		97.25	97.13	97.04	97.10	97.17	97.20	97.57	97.81	97.53	97.65
31	101.90		97.26		97.04		97.17	97.20		97.78		97.64
Avg.	102.98	98.06	98.19	97.21	97.06	97.07	97.15	97.23	97.34	98.57	97.58	98.29

* Partly estimated: January 27 to September 19

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 (6.9 km) downstream from the northerly international boundary and 3.2 miles (5.1 km) 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.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1978, obtained by the United States Section; monthly discharge, January 1924 through 1950, by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 9,740 acre-feet (12,014,000 m³) in August 1940; minimum monthly discharge, zero in April 1941. Since January 1, 1951, maximum instantaneous discharge, 800 second-feet (22.7 m³/sec) on December 3, 1961, at a maximum gage height of 117.60 feet (35.84 m); minimum instantaneous discharge, zero during parts of most years.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.2	0.5	0.2	0.1	0.2	0.1	0	0.1	0.1	0.1	0.1	0.2
2	.2	.4	.1	44.1	.2	.1	0	.1	.1	.1	.2	.1
3	.2	.5	1.8	27.7	.1	.1	0	.1	.1	.1	.2	40.4
4	.5	.5	49.6	3.8	.2	39.8	.1	.2	.2	.1	.2	16.7
5	.1	32.8	41.5	2.5	.1	16.0	.1	.2	.2	.1	41.4	4.4
6	0	15.0	16.0	.1	.2	3.9	.1	.2	.2	.2	32.3	1.4
7	0	1.6	4.2	.1	.1	2.8	.1	.1	.2	.2	4.2	.1
8	0	.5	1.8	.1	.1	.2	.1	.2	.2	.2	2.9	.2
9	.2	.2	.2	.2	.3	.2	.1	.2	.2	.1	.8	.2
10	6.3	.3	.1	.1	.1	.2	.2	.1	.2	.2	.1	.1
11	.5	.2	.1	.1	.2	.3	.1	.2	.2	.2	.1	.1
12	.4	.3	.3	.2	.2	.3	.1	.2	.2	.2	.2	.1
13	.4	.4	.1	.2	.2	.2	.1	23.7	.1	.2	.1	.2
14	.4	.2	.1	.1	.2	.2	.1	19.3	.1	.2	.1	.1
15	.4	.2	.1	.1	.3	.2	.1	2.0	.2	.2	.4	.1
16	.3	.3	.1	.1	.2	.2	.1	.3	.2	.1	.1	.1
17	.3	.4	.1	.1	.2	.2	.1	.2	.1	.2	.1	.1
18	.4	.2	.1	0	.3	.2	.1	.2	.1	.2	.1	.2
19	.3	.2	.1	0	.2	.2	.1	.2	.1	.2	.1	.3
20	.3	.2	.1	0	.2	.2	3.7	.1	.2	.2	.2	.2
21	.3	.3	.1	0	.2	.2	.1	.2	.2	.4	.1	.2
22	.3	.3	.1	0	.2	.2	.1	.1	.2	.2	.1	.2
23	.2	.3	.1	.1	.1	.2	.1	.2	.1	.2	.1	.2
24	.3	.3	.2	0	.1	.2	.1	.2	.2	.2	.1	.2
25	.4	.3	.2	0	0	.2	.1	.1	.2	.3	.1	.2
26	.4	.5	.2	0	.1	.2	.1	.2	.2	.3	.1	.2
27	.4	.2	.2	0	.1	.1	.1	.2	.2	.2	.2	.3
28	.4	.2	.2	.1	.1	.1	.1	.1	.2	.3	.1	.2
29	.4	.2	.2	.1	.1	.1	.1	.1	.1	.3	.1	.2
30	.6	.2	.2	.1	.1	0	.1	.1	.1	.2	.1	.2
31	.4	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.2
Sum	15.5	57.3	118.5	80.1	5.1	67.1	6.4	49.6	4.9	6.0	85.0	67.6

Current Year 1978

Period 1935-1978

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day				Average	Maximum	Minimum
					Day	Low					
Jan.	115.28	111.72	10	218	16	0	0.5	30.7	3,045	9,570	0
Feb.	115.48	111.74	5	239	14	.1	2.0	114	2,464	8,430	14.5
Mar.	115.94	111.72	4	301	31	0	3.8	235	2,324	6,230	59.1
Apr.	115.58	111.72	2	250	11	0	2.7	159	2,144	5,300	0
May	111.78	111.72	16	4	123	0	2.2	10.1	2,554	9,320	8.3
June	115.09	111.72	4	200	12	0	2.2	133	2,435	7,440	71.2
July	114.15	111.72	20	137	11	0	.2	12.7	2,449	8,320	12.7
Aug.	115.64	111.73	13	257	11	.1	1.6	98.4	2,108	9,740	98.4
Sept.	111.76	111.73	11	.3	11	.1	.2	9.7	1,528	6,140	6.0
Oct.	111.81	111.73	21	.7	11	.1	.2	11.9	2,083	5,680	11.9
Nov.	115.79	111.74	5	278	11	.1	2.8	169	2,493	8,220	18.8
Dec.	115.04	111.73	3	196	16	.1	2.2	134	3,298	9,430	61.9
Yearly	115.94	111.72		301		0	1.6	1,118	28,925	82,900	943
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	35.34	34.05		8.52		0	0.05	1,379	35,679	102,256	1,163

1 And other days

COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, 4.3 miles (6.9 km) downstream from northerly international boundary, 3.2 miles (5.1 km) downstream from Morelos Diversion Dam, about 50 feet (15 m) downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 11 miles (17.7 km) downstream from Yuma, Arizona, along the river levee. The zero of the 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 1978; 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 (32.98 m) on January 2, 1958; minimum mean daily gage height, 94.95 feet (28.94 m) on June 22, 1968.

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	100.50	98.44	97.72	95.73	96.65	95.58	95.58	95.59	95.60	95.68	95.84	95.62
2	100.05	99.10	102.60	95.99	95.64	95.57	95.58	95.60	95.61	95.68	95.82	95.62
3	99.97	96.12	102.73	96.03	95.64	95.57	95.58	95.61	95.61	95.69	95.79	95.91
4	99.68	95.93	97.82	95.81	95.64	95.86	95.59	95.60	95.61	95.70	95.77	95.88
5	99.99	96.06	96.44	95.80	95.62	95.80	95.60	95.59	95.61	95.70	96.05	95.71
6	100.09	96.68	96.23	95.76	95.61	95.66	95.61	95.60	95.62	95.71	96.09	95.64
7	98.96	97.33	96.08	95.76	95.61	95.64	95.60	95.61	95.62	95.70	95.81	95.61
8	98.27	97.32	96.02	95.76	95.61	95.59	95.59	95.61	95.63	95.70	95.77	95.61
9	96.71	96.71	95.98	95.76	95.61	95.57	95.59	95.61	95.62	95.70	95.70	95.60
10	98.26	95.85	95.95	95.76	95.61	95.57	95.59	95.62	95.62	95.70	95.68	95.59
11	100.90	95.81	95.93	95.75	95.62	95.55	95.59	95.61	95.62	95.71	95.68	95.59
12	101.82	95.79	95.92	95.74	95.61	95.57	95.59	95.61	95.63	95.72	95.66	95.60
13	101.83	96.11	95.91	95.74	95.62	95.56	95.60	95.85	95.62	95.72	95.66	95.61
14	101.63	97.10	95.89	95.73	95.61	95.57	95.59	95.86	95.64	95.71	95.66	95.61
15	101.34	95.85	95.88	95.72	95.62	95.56	95.58	95.65	95.63	95.72	95.66	95.61
16	101.34	95.79	95.86	95.72	95.62	95.56	95.58	95.61	95.64	95.73	95.66	95.60
17	101.24	95.77	95.85	95.72	95.61	95.57	95.60	95.62	95.64	95.73	95.65	95.61
18	101.08	95.76	95.84	95.71	95.60	95.56	95.59	95.61	95.65	95.74	95.64	95.63
19	101.16	95.76	95.83	95.71	95.59	95.57	95.60	95.61	95.65	95.74	95.64	95.56
20	100.61	95.77	95.83	95.71	95.59	95.57	95.62	95.61	95.64	95.75	95.64	102.00
21	100.62	95.75	95.82	95.70	95.58	95.59	95.58	95.61	95.65	95.75	95.64	99.12
22	100.28	95.75	95.82	95.70	95.58	95.58	95.58	95.61	95.65	96.83	95.65	97.26
23	100.12	95.74	95.80	95.70	95.58	95.57	95.58	95.61	95.65	97.60	95.65	95.98
24	100.02	95.72	95.79	95.70	95.59	95.57	95.60	95.60	95.64	99.62	95.64	95.86
25	98.67	95.70	95.79	95.75	95.59	95.58	95.60	95.60	95.64	100.55	95.63	95.81
26	98.02	95.69	95.78	95.71	95.59	95.59	95.59	95.60	95.65	100.67	95.62	95.80
27	96.35	95.69	95.78	95.69	95.59	95.59	95.58	95.75	95.69	97.95	95.62	95.75
28	96.04	95.69	95.77	95.68	95.58	95.60	95.58	95.67	95.53	96.08	95.63	95.72
29	95.98		95.76	95.66	95.58	95.60	95.58	95.60	95.56	95.96	95.62	95.71
30	97.11		95.75	95.65	95.58	95.58	95.58	95.60	95.69	95.90	95.62	95.70
31	98.76		95.74		95.58		95.58	95.60		95.86		95.68
Avg.	99.59	96.24	96.45	95.74	95.60	95.60	95.59	95.63	95.63	96.35	95.71	96.18

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. On September 27, 1977 recorder moved upstream to site used prior to May 1, 1971. The site used from May 1, 1971 to September 20, 1977 was located 200 feet (61 m) downstream on wasteway. This wasteway is located in Arizona, 18.5 miles (29.8 km) downstream from the northerly international boundary, 17.4 miles (28.0 km) downstream from Morelos Diversion Dam, and 2.2 miles (3.5 km) upstream from the southerly international boundary. It is the farthest downstream of the two wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River. The elevation of the zero of the gage at the new location has not been determined.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1978, obtained by the United States Section; monthly discharge, March 1939 through 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. The West Main Canal Wasteway was completed in February of 1971, and the waste water from the West Main Canal is normally discharged across the southerly land boundary.

EXTREMES: Prior to January 1951, maximum monthly discharge 2,860 acre-feet (3,528,000 m³) in January 1946; minimum monthly discharge, 122 acre-feet (150,000 m³) in September 1950. Since January 1, 1951, maximum instantaneous discharge, 102 second-feet (2.89 m³/sec) on January 24, 1954, at a maximum gage height of 95.46 feet (29.10 m) (old datum); minimum instantaneous discharge, zero during a part of most months.

Mean Daily Discharge in Second-Feet 1978 — 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	2.2	0	0	0	0	0	0
18	0	0	0	0	0	.9	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	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	3.1	0	0	0	0	0	0
Current Year 1978								Period 1939-1978				
Month	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	0		0		0	0	753	2,860	0		
Feb.	0	0		0		0	0	650	2,510	0		
Mar.	0	0		0		0	0	598	1,660	0		
Apr.	0	0		0		0	0	643	1,940	0		
May	0	0		0		0	0	783	2,470	0		
June	2.40	0	17	72.8	1	0	.1	6.1	684	2,350	0	
July	0	0		0		0	0	590	1,950	0		
Aug.	0	0		0		0	0	620	2,530	0		
Sept.	0	0		0		0	0	556	2,180	0		
Oct.	0	0		0		0	0	675	2,100	0		
Nov.	0	0		0		0	0	779	2,380	0		
Dec.	0	0		0		0	0	859	2,680	0		
Yearly	2.40	0		72.8		0	0	6.1	8,190	24,370	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.73	0		2.06		0	0	7.52	10,102	30,060	0	

! And other days

EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir located about 300 feet (91.4 m) north of the international boundary near San Luis, Arizona and 1.5 miles (2.4 km) east of the Colorado River. From September 28, 1977 to April 6, 1978, recorder moved west 100 feet (30.5 m) to a temporary bypass channel. On April 7, 1978 recorder was moved back to original site.

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. Records available: October 1946 through 1978. Records of monthly discharges also are available for the periods January 1924 through June 1928, January 1932 through 1933, and April 1935 through September 1946.

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 and are considered as part of the volumes arriving at the limitrophe section of the Colorado River.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.7	10.7	1.4	6.9	7.9	0	0.5	7.1	4.3	7.1	2.3	3.5
2	2.4	9.1	0	3.9	5.3	2.9	12.3	1.5	.3	18.5	8.0	8.7
3	3.0	1.0	0	5.6	1.7	4.0	1.5	10.3	7.9	1.6	3.2	7.0
4	1.1	.8	6.0	12.2	9.6	5.8	5.3	6.8	16.4	1.5	3.9	9.3
5	0	2.1	1.6	13.0	1.4	1.3	.7	5.6	4.5	3.2	7.9	5.9
6	0	2.3	.6	4.6	1.9	4.6	4.2	9.5	-3.6	13.2	13.7	4.8
7	0	6.2	.7	5.4	.8	8.7	4.9	7.1	3.2	5.6	1.5	2.5
8	0	1.8	.3	1.9	0	5.6	7.3	4.2	.4	.6	.3	9.9
9	0	.8	.6	1.0	0	4.6	8.6	7.7	4.9	2.0	0	9.8
10	5.0	4.0	3.7	.1	.8	1.4	2.0	.7	2.1	5.0	1.1	11.4
11	2.2	11.1	4.3	2.9	.3	.8	1.6	2.4	5.0	2.6	12.6	6.8
12	2.1	.6	2.0	1.1	3.6	1.1	8.3	11.1	1.2	2.2	6.2	11.3
13	5.2	2.0	3.2	2.0	2.6	3.0	10.0	1.7	8.3	.6	2.7	4.7
14	.1	.7	3.8	1.5	4.2	3.0	3.4	.9	7.2	.6	11.3	6.7
15	4.0	0	6.1	2.9	2.1	10.2	6.4	.4	9.5	2.7	13.0	2.6
16	3.3	2.1	* 10.6	6.4	7.9	4.2	5.8	11.5	21.7	8.7	7.6	17.0
17	7.9	6.4	* 9.4	9.5	11.9	2.3	4.4	.4	19.0	1.0	2.4	1.6
18	1.6	2.6	1.0	2.3	3.7	5.3	1.4	2.0	6.4	.3	1.8	15.2
19	0	5.8	10.5	.1	8.3	17.1	4.5	2.5	8.2	10.2	6.0	4.3
20	0	11.6	5.0	0	7.2	1.7	.9	1.2	7.5	3.9	25.6	.6
21	0	2.5	.4	10.0	8.4	.1	7.1	15.8	8.3	9.8	4.9	.3
22	0	.3	0	2.3	3.5	.4	2.3	2.7	7.2	12.6	2.7	5.4
23	0	1.4	0	6.5	4.9	1.6	5.5	5.9	1.5	6.1	.9	4.5
24	0	13.2	3.8	4.1	5.5	4.2	7.2	6.0	1.7	3.0	.9	6.8
25	0	3.8	5.1	2.6	2.6	2.6	5.5	11.5	1.9	5.5	13.0	1.2
26	0	.9	11.7	14.6	3.2	2.7	11.1	2.7	.6	19.6	1.9	.6
27	0	9.4	5.8	10.8	2.8	3.0	4.1	1.1	2.3	3.2	.4	.6
28	0	3.1	9.4	5.9	.1	1.9	1.7	.6	.6	.5	6.8	.5
29	1.6	10.3	3.9	.1	14.5	.3	.9	7.7	12.0	7.8	1.2	1.2
30	3.7	9.7	4.8	.3	5.7	4.6	3.3	5.2	13.7	1.3	2.0	2.0
31	1.5	3.3		2.2		.7		4.4	2.7		7.5	
Sum	45.4	116.3	130.3	148.8	114.8	124.3	144.1	149.5	178.6	179.8	171.7	174.2

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1935-1978 Acre-Feet		
	High	Low	Day	High	Low		Feet	Acre-Feet	Average	Maximum	Minimum
				Day	Day	Day					
Jan.	1.50	0.72	10	13.5	1 1	0	1.5	90.0	1,120	3,360	90.0
Feb.	2.04	.72	1	24.1	1 1	0	4.2	231	942	3,170	231
Mar.	1.88	.72	10	20.9	1 2	0	4.2	258	1,090	2,920	190
Apr.	24.37 **	.72	28	54.8	1 1	0	5.0	295	1,058	3,170	197
May	23.81	23.00	16	24.0	1 6	0	3.7	228	1,165	3,040	228
June	23.95	23.00	29	31.4	1 1	0	4.1	247	995	3,660	175
July	24.30	23.01	2	50.7	29	.1	4.6	286	1,074	3,590	182
Aug.	23.90	23.01	16	28.7	29	.1	4.8	297	1,092	3,960	169
Sept.	23.92	23.00	16	29.8	2	0	6.0	354	1,020	3,170	159
Oct.	23.84	23.00	2	25.6	18	0	5.8	357	1,065	3,280	357
Nov.	24.40	23.00	14	56.5	1 9	0	5.7	341	1,160	3,570	254
Dec.	23.92	23.00	16	29.8	22	0	5.6	346	1,129	3,080	247
Yearly	24.40	23.00		56.5		0	4.6	3,330	12,910	38,310	3,330
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	7.44	7.01		1.60		0	0.13	4,108	15,924	47,255	4,108

! And other days

** Change in gage datum

* Partly estimated

YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorders located in the forebay and afterbay, with flow meters in the four discharge pipes at the Boundary Pumping Plant on the Main Drain about 200 feet (61 m) north of the international boundary near San Luis, Arizona, 1.3 miles (2.1 km) east of the Colorado River.

RECORDS: Main Drain discharges are lifted 10 (3.05) to 12 feet (3.66 m) at the pumping plant. Prior to April 1, 1969, discharges were computed from pump ratings and the differential head measured by the two gages. Beginning April 1, 1969, discharges were computed from flow meter charts. Pump ratings and flow meter discharges are checked by current meter measurements. Records obtained and computed by the United States Section of the Commission. Records available: Monthly discharges, June 1919 through 1951; daily discharges January 1952 through 1978.

REMARKS: Flows in the Main Drain are principally drainage waters from the Valley Division of the Yuma Project. The Main Drain, the East Main Canal Wasteway, West Main Canal Wasteway, and 242 Lateral 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 and is considered as part of the volumes arriving at the limtrophe section of the river.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	89.0	* 91.3	143	110	116	110	118	107	102	110	99.7	84.2
2	66.2	* 80.1	105	104	106	117	118	110	116	99.7	106	85.3
3	84.6	* 90.3	98.8	105	106	109	105	112	116	104	101	88.7
4	92.2	* 86.2	104	101	107	112	107	99.5	106	109	110	86.7
5	86.3	* 87.3	116	103	112	125	117	102	89.2	120	118	80.0
6	91.6	* 85.1	85.4	116	104	104	110	111	85.0	105	119	79.9
7	91.8	* 92.3	95.2	94.8	105	102	107	105	104	108	105	87.3
8	91.2	* 89.2	85.4	116	108	105	121	107	101	99.3	95.1	95.3
9	86.9	* 96.3	92.3	101	103	97.4	105	109	108	102	93.4	100
10	106	* 87.9	99.3	104	108	83.3	97.5	103	103	109	88.8	88.2
11	135	* 97.5	102	107	119	82.3	103	111	99.1	103	98.0	87.3
12	103	* 99.6	109	103	105	98.0	104	115	113	104	101	90.2
13	89.6	* 96.5	110	104	102	106	117	110	114	111	97.6	97.4
14	88.4	* 91.7	94.7	118	90.5	110	113	111	115	111	103	85.5
15	91.8	* 85.0	104	113	85.5	106	97.1	108	114	99.6	106	91.3
16	89.4	* 92.1	103	119	106	107	98.7	105	114	104	118	93.8
17	85.4	* 101	99.4	116	106	104	91.3	110	115	101	111	96.0
18	85.4	* 90.4	98.4	102	115	104	98.6	101	109	93.9	101	99.2
19	85.4	* 109	121	99.1	104	101	111	118	103	101	94.9	83.8
20	89.4	* 93.8	132	101	105	109	110	114	104	108	89.4	82.3
21	83.5	* 98.1	105	104	104	94.3	101	91.3	103	107	97.2	79.8
22	88.0	* 90.3	92.3	104	97.7	99.3	112	95.7	102	103	92.3	83.2
23	83.1	* 92.4	99.6	104	103	101	107	96.5	115	103	83.6	82.6
24	86.0	110	96.7	107	111	97.6	112	103	105	104	89.3	82.0
25	82.0	97.8	106	101	103	84.7	91.7	105	110	96.6	86.2	81.3
26	82.4	95.8	99.4	118	112	86.3	104	100	109	95.8	82.0	81.5
27	87.3	115	98.6	113	112	108	81.4	107	106	95.2	86.9	81.3
28	85.8	110	104	107	107	118	103	106	114	93.1	91.3	80.3
29	79.2	107	103	108	109	114	103	111	103	103	88.9	83.2
30	85.3	103	109	108	108	120	123	116	109	103	84.3	89.1
31	86.5	110	98.7	108	98.7	108	116	106	106	95.6	88.8	88.8
Sum	2,757.7	2,661.0	3,219.5	3,208.9	3,277.4	3,110.2	3,314.3	3,298.0	3,214.3	3,201.8	2,937.9	2,695.5

Month	Current Year 1978						Period 1935-1978				
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.			11	135	2	66.2	89.0	5,470	7,749	11,203	1,740
Feb.			27	115	2	80.1	95.0	5,278	7,642	11,988	1,640
Mar.			1	143	1	85.4	104	6,386	8,750	12,430	1,940
Apr.			16	119	7	94.8	107	6,365	8,564	11,890	1,920
May			11	119	15	85.5	106	6,501	8,764	13,140	1,950
June			5	125	11	82.3	104	6,169	8,123	12,400	2,290
July			30	123	27	81.4	107	6,574	8,003	11,830	2,530
Aug.			19	118	21	91.3	106	6,541	7,940	11,960	2,560
Sept.			1	116	6	85.0	107	6,375	7,952	11,568	2,280
Oct.			5	120	28	93.1	103	6,351	8,865	12,385	2,940
Nov.			6	119	26	82.0	97.9	5,827	8,486	12,010	2,800
Dec.			9	100	21	79.8	87.0	5,346	8,167	11,480	2,450
Yearly				143		66.2	101	73,183	99,005	139,380	27,040
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
			4.05		1.87	2.86	90,270	122,122	171,924	33,354	

* Partly estimated Ø Mean daily † And other days

WEST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder located about 0.3 mile (0.5 km) upstream from outlet to Yuma Main Drain, which is 175 feet (53.3 m) upstream from East Main Canal Wasteway and 0.4 mile (0.6 km) west of San Luis, Arizona. Prior to August 1, 1975, the recorder was located about 150 feet (45.7 m) upstream from outlet to Yuma Main Drain.

RECORDS: Wasteway discharges computed by United States Section of the Commission beginning February 23, 1971, from water-stage recorder and ratings as determined by current meter measurements.

REMARKS: Wasteway discharges from West Main Canal Wasteway comprise regulatory waste from the West Main Canal.

Mean Daily Discharge in Second-Foot 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.7	2.2	15.4	0.7	0	1.4	4.2	0.3	2.3	1.1	3.2	0.9
2	4.8	.6	5.9	5.2	1.7	.5	6.1	8.8	5.6	5.8	7.5	4.0
3	3.7	.3	12.9	35.4	9.0	.3	3.2	4.7	13.7	6.8	2.1	19.7
4	1.6	.6	20.0	5.2	.3	.1	.7	2.0	1.7	8.4	1.4	29.9
5	6.0	2.2	23.9	.6	.1	11.8	.4	.7	.1	3.4	7.0	3.9
6	4.7	9.6	15.2	0	3.4	2.6	3.2	.3	.4	.2	28.4	.9
7	.8	3.3	1.5	2.2	3.0	.4	.1	8.3	4.4	.9	3.4	.4
8	.5	.9	.6	.1	5.5	.5	2.8	4.0	2.2	4.2	.6	8.1
9	1.3	.4	.2	0	.6	.2	.2	.7	5.8	9.7	.2	1.0
10	1.8	10.8	5.7	0	2.4	1.4	.2	2.6	.6	9.0	6.2	.6
11	6.1	.5	5.3	0	2.6	.4	.2	1.1	4.4	5.4	5.8	10.2
12	5.9	.2	.3	.4	2.7	8.9	.2	4.0	6.4	8.0	1.2	2.2
13	1.2	9.3	4.6	.4	1.8	3.0	.2	6.3	1.3	7.4	5.8	4.5
14	1.4	9.6	2.1	3.1	.7	2.9	3.1	30.4	5.2	11.3	8.4	.7
15	1.4	.7	11.4	0	1.6	.7	.7	2.4	9.6	9.2	8.4	4.7
16	2.5	.4	9.8	.8	0	3.8	.6	.5	2.2	3.2	2.5	3.8
17	3.2	1.1	1.5	.5	2.1	6.5	2.3	.3	14.9	5.3	19.7	6.2
18	5.5	.4	2.2	0	2.3	11.0	0	4.9	13.6	10.9	9.9	6.6
19	3.8	6.1	.8	4.5	1.1	.8	0	1.6	1.6	.5	7.1	4.7
20	1.6	4.5	.9	1.6	4.5	.2	1.1	.8	5.0	15.2	11.3	3.2
21	.9	11.3	.2	3.1	2.0	.8	.2	2.6	1.9	13.1	1.2	.7
22	7.9	7.3	0	1.6	.7	3.4	.2	3.8	2.8	6.5	1.8	.1
23	5.6	.3	.2	4.5	6.0	3.7	2.2	3.0	7.1	1.1	1.5	.6
24	1.3	14.2	.5	6.1	2.6	.4	8.6	.8	7.8	.8	3.0	4.1
25	.6	16.0	.5	1.7	4.8	3.9	.7	2.3	7.9	10.4	2.4	7.5
26	.6	9.9	.1	.3	1.2	2.4	1.6	5.8	3.8	6.3	.5	1.0
27	.4	4.1	0	.4	3.6	1.4	.4	4.9	15.6	.9	.5	1.6
28	4.3	.3	.2	1.5	1.8	.4	1.1	1.1	.2	9.5	.2	12.3
29	14.0	0	1.0	2.2	7.8	1.9	1.6	2.0	2.6	2.5	0	7.8
30	9.5	0	3.0	.7	6.1	0	0	2.6	.3	5.0	0	1.0
31	8.4	0	.4	0	3.8	0	.9	6.0	0	1.7	0	7.0
Sum	117.0	127.1	146.3	82.8	85.8	75.7	47.0	119.6	151.0	183.7	151.2	159.9

Month	Extreme Gage Feet		Current Year 1978				Average Second-Foot	Total Acre-Feet	Period 1971-1978		
	High	Low	Extreme Second-Foot		Total	Acre-Feet					
			Day	Low		Day			Average	Maximum	Minimum
Jan.	2.01	0.05	29	33.0	27	0.2	3.8	232	391	565	232
Feb.	2.05	0	10	34.2	124	0	4.5	252	491	681	252
Mar.	2.28	0	5	38.4	122	0	4.7	290	540	939	203
Apr.	2.30	0	3	42.3	11	0	2.8	164	407	664	164
May	1.68	0	29	23.2	11	0	2.8	170	300	434	148
June	2.12	0	18	36.4	18	0	2.5	150	322	480	107
July	1.55	0	2	19.8	11	0	1.5	93.2	319	556	93.2
Aug.	2.27	0	14	41.3	5	0	3.9	237	326	536	98.0
Sept.	2.23	0	27	40.0	15	0	5.0	300	414	768	190
Oct.	1.72	.03	17	24.3	7	.2	5.9	364	413	728	133
Nov.	2.06	0	6	34.6	129	0	5.0	300	419	541	175
Dec.	2.21	0	4	39.3	11	0	5.2	317	408	610	188
Yearly	2.30	0		42.3		0	4.0	2,869	4,750	6,229	2,869
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	0.70	0		1.20		0		0.11	3,539	5,859	3,539

1 And other days

TOTAL FLOWS CROSSING INTERNATIONAL BOUNDARY INTO MEXICO NEAR SAN LUIS, SONORA

DESCRIPTION: The tabulated data below are the combined flows of the East Main Canal Wasteway, West Main Canal Wasteway, 242 Lateral, and the Yuma Main Drain and represent the total water crossing the international land boundary into the Sanchez Mejorada Canal near San Luis, Arizona. The Mexican Section maintains a water-stage recorder in Mexico on right bank of Sanchez Mejorada Canal and obtains check measurements on a bridge located 0.2 mile (0.3 km) downstream from the international boundary, 1.2 miles (1.9 km) east of the Colorado River and 0.6 mile (1.0 km) west of San Luis, Sonora.

RECORDS: Records obtained and computed by the United States Section of the Commission. Records available: East Main Canal Wasteway and Yuma Main Drain from January 1935 through 1978; West Main Canal Wasteway from February 23, 1971 through 1978; 242 Lateral November and December 1978.

REMARKS: Descriptions and flows of the individual stations, East Main Canal Wasteway, West Main Canal Wasteway, and the Yuma Main Drain, are published separately in this bulletin on pages 29, 31, and 30; 242 Lateral is not published in 1978.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	95.4	104	160	118	124	111	123	114	109	118	105	88.6
2	73.4	89.8	111	113	113	120	136	120	122	124	122	98.0
3	91.3	91.6	112	146	117	113	110	127	138	112	106	115
4	94.9	87.6	130	118	117	118	113	108	124	119	115	126
5	92.3	91.6	142	117	114	138	118	108	93.8	127	133	89.8
6	96.3	97.0	101	121	109	111	117	121	89.0	118	161	85.6
7	92.6	102	97.4	102	109	111	112	120	112	114	110	90.2
8	91.7	91.9	86.3	120	114	111	131	115	104	104	96.0	113
9	88.2	97.5	93.1	102	104	102	114	117	119	114	101	111
10	113	112	109	104	111	86.1	99.7	106	106	123	96.8	100
11	143	109	112	110	122	83.5	105	114	108	111	116	104
12	111	100	111	104	111	108	112	130	121	114	108	104
13	96.0	108	118	106	106	112	127	118	124	119	106	107
14	89.9	102	101	123	95.4	116	120	142	127	123	123	94.8
15	97.2	85.7	122	116	89.2	117	104	111	133	112	127	99.1
16	95.2	94.6	123	126	114	115	105	117	138	116	128	115
17	96.5	108	110	126	120	113	98.0	111	149	107	133	104
18	92.5	93.4	102	104	121	120	100	108	129	105	113	122
19	89.2	121	132	104	113	119	116	122	113	112	108	93.0
20	91.0	110	138	103	117	111	112	116	116	127	126	86.1
21	84.4	112	106	117	114	95.2	108	110	113	130	103	80.8
22	95.9	97.9	92.3	108	102	103	114	102	112	122	96.8	88.7
23	88.7	94.1	99.8	115	114	106	115	105	124	110	86.0	87.7
24	87.3	137	101	117	119	102	128	110	114	108	93.2	92.9
25	82.6	118	112	105	110	91.2	97.9	119	120	112	102	90.0
26	83.0	107	111	133	116	91.4	117	108	113	122	84.4	83.1
27	87.7	128	104	124	118	112	85.9	113	124	99.3	87.8	83.5
28	90.1	113	114	114	109	120	106	108	115	103	113	93.1
29	94.8	118	109	116	116	125	116	106	121	118	113	92.2
30	98.5	116	114	114	114	126	128	122	114	122	86.2	92.1
31	96.4	114	114	105	105	105	118	116	116	100	103	103
Sum	2,920.0	2,903.7	3,498.9	3,439	3,477.6	3,307.4	3,506.5	3,564	3,544.8	3,565.3	3,299.2	3,033.3
Current Year 1978									Period 1935-1978			
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.			11	143	2	73.4	94.2	5,792	9,260	12,131	* 2,123	
Feb.			24	137	15	85.7	104	5,761	9,075	12,970	* 2,023	
Mar.			1	160	8	86.3	113	6,934	10,380	13,704	* 2,322	
Apr.			3	146	1	102	115	6,824	10,029	12,982	2,117	
May			1	124	15	89.2	112	6,899	10,229	13,900	2,473	
June			5	138	11	83.5	110	6,566	9,440	12,570	2,525	
July			2	136	27	85.9	113	6,953	9,396	12,420	2,927	
Aug.			14	142	22	102	115	7,075	9,358	12,657	2,989	
Sept.			17	149	6	89.0	118	7,029	9,386	12,450	2,602	
Oct.			21	130	27	99.3	115	7,072	10,343	13,898	3,444	
Nov.			6	161	26	84.4	110	6,547	10,065	12,712	3,407	
Dec.			4	126	21	80.8	97.8	6,016	9,704	12,050	2,888	
Yearly	Meters			161		73.4	110	79,468	116,665	149,010	31,840	
	Cubic Meters per Second			4.56		2.08	3.12	98,023	143,905	183,802	39,274	

‡ Mean daily

* Partly estimated

! And other days

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 (305 m) upstream from the southerly international boundary, 2 miles (3.2 km) west of San Luis, Arizona, and 21.9 miles (35.2 km) downstream from Morelos Dam. The zero of the gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Records obtained and furnished by the United States Section of the Commission. Computations by shifting control methods. Records available: Daily discharges, January 1950 through 1978; continuous record of gage heights, January 1947 through 1978. Monthly flows for this station have been derived for the period January 1935 through 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.

EXTREMES: Since January 1950: Maximum instantaneous discharge, 28,610 second-feet (810 m³/sec) on December 18, 1952; maximum gage height, 84.84 feet (25.86 m) on November 29, 1957. Minimum discharge, no flow on several occasions since September 1, 1956.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	850	439	0	0	0	0	0	0	0	0	0	0
2	766	460	512	0	0	0	0	0	0	0	0	0
3	679	362	1,750	0	0	0	0	0	0	0	0	0
4	683	76.1	1,370	0	0	0	0	0	0	0	0	0
5	594	47.9	195	0	0	0	0	0	0	0	0	0
6	719	57.0	86.9	0	0	0	0	0	0	0	0	0
7	677	173	60.7	0	0	0	0	0	0	0	0	0
8	431	198	40.1	0	0	0	0	0	0	0	0	0
9	246	196	25.3	0	0	0	0	0	0	0	0	0
10	222	68.4	15.0	0	0	0	0	0	0	0	0	0
11	419	22.2	9.3	0	0	0	0	0	0	0	0	0
12	1,060	13.6	6.3	0	0	0	0	0	0	0	0	0
13	1,330	8.6	3.6	0	0	0	0	0	0	0	0	0
14	1,350	95.2	.4	0	0	0	0	0	0	0	0	0
15	1,300	110	0	0	0	0	0	0	0	0	0	0
16	1,210	16.1	0	0	0	0	0	0	0	0	0	0
17	1,200	5.8	0	0	0	0	0	0	0	0	0	0
18	1,150	1.8	0	0	0	0	0	0	0	0	0	0
19	1,130	0	0	0	0	0	0	0	0	0	0	0
20	1,110	0	0	0	0	0	0	0	0	0	0	304
21	937	0	0	0	0	0	0	0	0	0	0	766
22	896	0	0	0	0	0	0	0	0	0	0	206
23	832	0	0	0	0	0	0	0	0	0	0	81.9
24	790	0	0	0	0	0	0	0	0	0	0	4.0
25	676	0	0	0	0	0	0	0	0	123	0	0
26	380	0	0	0	0	0	0	0	0	294	0	0
27	242	0	0	0	0	0	0	0	0	403	0	0
28	72.5	0	0	0	0	0	0	0	0	77.3	0	0
29	50.1	0	0	0	0	0	0	0	0	.4	0	0
30	41.1	0	0	0	0	0	0	0	0	0	0	0
31	313	0	0	0	0	0	0	0	0	0	0	0
Sum		2,350.7		0	0	0	0	0	0	897.7		1,361.9
	22,355.7		4,074.6									
Current Year 1978									Period 1935-1978			
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	79.30	74.40	113	1,370	30	39.0	721	44,342	350,889	1,672,000	1,821	
Feb.	77.29	73.47	3	589	119	0	84.0	4,663	291,233	1,385,000	2,040	
Mar.	80.10	73.23	13	2,010	115	0	131	8,082	234,497	1,127,000	798	
Apr.				0		0	0	0	149,862	700,900	0	
May				0		0	0	0	205,518	1,160,000	0	
June				0		0	0	0	158,132	1,180,000	0	
July				0		0	0	0	115,847	772,800	0	
Aug.				0		0	0	0	129,977	796,000	0	
Sept.				0		0	0	0	157,023	1,033,000	0	
Oct.	76.86	73.05	27	443	129	0	29.0	1,781	200,140	1,192,000	0	
Nov.				0		0	0	0	262,219	1,428,000	0	
Dec.	78.03	73.05	21	850	11	0	43.9	2,701	330,238	1,839,000	2,320	
Yearly	80.10	73.05		2,010		0	84.1	61,569	2,585,575	10,688,800	61,569	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	24.41	22.27		56.9		0	2.38	75,945	3,189,281	13,184,528	75,945	

1 And other days

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	78.22	76.75	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
2	78.00	76.82	76.64	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
3	77.78	76.32	79.70	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
4	77.79	74.68	79.00	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
5	77.52	74.36	75.70	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
6	77.88	74.47	74.92	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
7	77.76	75.49	74.51	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
8	76.95	75.65	74.26	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
9	76.03	75.64	74.04	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
10	75.91	74.56	73.84	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
11	76.86	73.98	73.70	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
12	78.65	73.81	73.61	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
13	79.22	73.69	73.48	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
14	79.26	74.73	72.38	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
15	79.17	74.93	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
16	78.99	73.86	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
17	78.96	73.62	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
18	78.86	73.52	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
19	78.84	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05
20	78.79	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	75.47
21	78.42	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	77.76
22	78.32	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	75.66
23	78.18	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	75.05	74.78
24	78.07	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.34
25	77.75	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	75.08	73.05	73.10
26	76.75	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	76.22	73.05	73.10
27	76.06	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	76.70	73.05	73.10
28	74.89	73.47	73.23	73.23	73.23	73.23	73.23	73.23	73.23	74.47	73.05	73.10
29	74.60		73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.11	73.05	73.10
30	74.44		73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.05	73.05	73.10
31	76.18		73.23		73.23		73.23	73.23		73.05		73.10
Avg.	77.58	74.34	74.03	73.23	73.23	73.23	73.23	73.23	73.23	73.52	73.05	73.44

WELLTON-MOHAWK BYPASS DRAIN AT SOUTHERLY INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and Parshall Flume located 80 feet (24.4 m) upstream from the southerly land boundary, 550 feet (168 m) east of the Colorado River and 1.8 miles (2.9 km) west of San Luis, Arizona. The zero of the gage has not been determined.

RECORDS: Based on current meter measurements and a continuous record of gage heights. Station is operated by United States Section of the Commission. Records available: June 23, 1977 through 1978.

REMARKS: Pursuant to Minute No. 242 of the Commission, a bypass drain of the Wellton-Mohawk extension channel was constructed from Morelos Dam to the Santa Clara Slough in Mexico along the left bank of the Colorado River.

Mean Daily Discharge in Second-Foot 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	289	281	287	277	279	262	250	232	243	226	264	254
2	289	277	279	281	281	266	254	222	230	228	262	251
3	289	277	287	283	279	264	250	237	228	236	262	232
4	289	279	285	285	277	266	242	225	237	234	262	236
5	289	279	289	287	270	264	244	228	232	240	256	230
6	287	176	287	301	262	264	238	221	237	232	258	224
7	285	5.1	289	291	262	260	144	224	232	226	250	224
8	287	1.0	285	287	260	254	168	232	235	230	244	224
9	287	79.3	283	289	262	258	230	246	226	228	248	218
10	287	262	285	287	260	256	238	250	220	224	244	214
11	287	270	291	287	262	254	230	254	229	224	236	214
12	289	268	298	287	262	254	236	256	212	228	245	212
13	289	277	291	279	260	256	228	254	202	228	243	212
14	287	281	287	285	266	252	225	248	195	228	228	206
15	289	279	281	287	262	250	230	250	204	228	224	196
16	289	277	279	285	258	256	226	252	220	228	224	194
17	293	272	277	281	258	252	232	254	222	220	218	196
18	298	272	281	281	264	252	218	258	227	234	214	204
19	289	274	283	281	268	250	238	246	216	234	210	206
20	274	274	287	277	260	250	221	246	224	236	220	191
21	272	277	283	264	260	250	239	244	227	252	214	193
22	279	277	281	268	258	244	230	244	222	244	218	200
23	277	277	281	272	258	254	226	238	226	244	230	198
24	279	279	274	270	260	258	234	236	240	242	236	196
25	274	274	272	272	264	244	244	243	230	256	234	196
26	274	274	279	274	262	238	227	232	230	268	232	200
27	283	279	283	274	254	236	233	222	238	264	224	198
28	283	279	283	277	254	232	218	234	232	264	217	198
29	285	281	277	277	256	234	210	236	228	262	199	200
30	287	279	279	279	266	251	226	230	226	260	260	204
31	289		279		264		224	236		260		200

Sum	8,844	6,876.4	8,786	8,425	8,168	7,581	7,053	7,430	6,770	7,408	7,076	6,521
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Month	Current Year 1978							Period 1977-1978			
	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low	Second-Foot	Acre-Feet	Average	Maximum	Minimum
Jan.	2.25	2.11	117	300	121	272	285	17,542	17,542		
Feb.	2.20	.05	1	289	8	0	246	13,639	13,639		
Mar.	2.35	2.10	3	321	124	268	283	17,427	17,427		
Apr.	2.38	2.10	6	325	21	262	281	16,711	16,711		
May	2.21	2.04	2	285	29	250	263	16,201	16,201		
June	2.19	1.94	23	279	28	228	253	15,037	15,037		
July	2.37	1.29	19	316	7	112	228	13,989	15,506	17,022	13,989
Aug.	2.25	1.76	3	291	4	193	240	14,737	16,466	18,196	14,737
Sept.	2.27	1.65	1	293	15	169	226	13,428	15,426	17,423	13,428
Oct.	2.19	1.88	26	277	17	214	239	14,694	16,618	18,543	14,694
Nov.	2.28	1.62	30	296	29	165	236	14,035	15,508	16,980	14,035
Dec.	2.39	1.75	2	319	6	180	210	12,934	15,595	18,256	12,934
Yearly	2.39	0.05		325		0	249	180,374	191,676		
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	0.73	0.02		9.20		0	7.05	222,490	236,430		

! And other days

WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

DESCRIPTION: Water-stage recorder and cableway located on the left bank of the canal wasteway immediately upstream from where it discharges into the Colorado River, 0.6 mile (1.0 km) downstream from the wasteway gates on the Central Feeder Canal on the right bank of the Colorado River, 16.8 miles (27.0 km) downstream from Morelos Dam, and 820 feet (250 m) 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 Agriculture and Hydraulic Resources and furnished by the Mexican Section of the Commission. Records shown in table below are waste returns to the Colorado River. Records available: April 1956 through 1978.

REMARKS: The Colorado River Irrigation District transports water for irrigation of land on the left bank of the Colorado River by the Central Feeder Canal to a point called Kilometer 27. At this point, flows may be returned to the river through the wasteway or diverted to the Bacanora-Monumentos Canal system through the Sanchez Mejorada Siphon, which was placed in operation on June 28, 1963. As part of the rehabilitation works, started in 1968, of the Colorado River Irrigation District, the Canal de Conexion was enlarged and lined, and is now known as the Central Feeder Canal.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1956-1978		
		Average	Maximum	Minimum
January	1,523	5,244	69,527	0
February	677	1,857	14,279	0
March	1,900	5,342	35,492	0
April	7,490	12,209	68,714	0
May	0	4,982	22,072	0
June	0	7,934	28,915	0
July	0	12,438	46,139	0
August	0	13,856	55,497	0
September	2,214	8,932	37,194	0
October	356	3,520	20,512	0
November	0	6,994	69,415	0
December	11,793	5,397	70,213	0
Yearly	25,954	82,656	346,339	0
	Thousands of Cubic Meters			
	32,014	101,955	427,205	0

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - DISCHARGES

DESCRIPTION: Water-stage recorder and cableway located in Mexico on the left bank of the Colorado River about 24.5 miles (39.4 km) downstream from the southerly international boundary, 44.5 miles (71.6 km) downstream from Morelos Dam and 4.5 miles (7.2 km) upstream from the Sonora-Baja California railroad bridge. The zero of the gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 12 double 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. 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 1978.

REMARKS: The flows at this gage show the seepage from canals that run parallel at higher elevations and adjacent to the river. On June 23, 1977 the drainage water discharged below Morelos Dam was diverted to the Santa Clara Estuary, also better utilization of irrigation waters has reduced the waste returns to a minimum. Normal flows are measured by wading at a section located 2,000 feet (600 m) below the gage. Occasionally there are high flows from excess water arriving at Morelos Dam, discharge-measurements are then made at the gage and the discharge-relationship curve extended for greater flows.

EXTREMES: Since January 1, 1952: Maximum mean daily gage height, 53.28 feet (16.24 m) on January 4, 1958 with a discharge of 18,500 second-feet (524 m³/sec); minimum mean daily gage height, 37.73 feet (11.50 m) on July 18 and 19, 1970 with a discharge of 2.8 second-feet (0.08 m³/sec); maximum mean daily discharge, 20,200 second-feet (571 m³/sec) on December 19, 1952 with a gage height of 52.30 feet (15.94 m); minimum mean daily discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	216	138	34.6	8.5	9.2	6.0	3.9	3.5	2.1	1.8	5.7	8.8
2	220	120	128	7.1	9.2	5.7	3.9	3.5	2.1	1.8	6.0	8.8
3	229	80.5	185	5.7	9.2	5.7	3.9	3.5	2.1	1.8	6.0	9.2
4	226	62.5	456	5.7	9.5	5.3	3.9	3.5	2.1	2.1	6.0	9.2
5	226	53.0	544	6.0	9.5	5.3	3.9	3.5	2.1	2.1	6.4	9.2
6	226	43.4	319	6.0	9.5	5.3	3.9	3.5	2.1	2.1	6.4	9.2
7	244	36.4	115	6.0	9.9	5.3	3.9	3.5	2.1	2.5	6.4	8.8
8	262	70.6	56.9	6.4	9.9	5.3	3.9	3.5	2.1	2.5	6.7	8.8
9	244	85.1	37.8	6.4	9.9	4.9	3.9	3.5	2.1	2.8	6.7	8.8
10	175	83.0	24.7	6.4	9.5	4.9	3.9	3.5	2.1	2.8	6.7	8.8
11	169	43.4	17.7	6.7	9.5	4.9	3.9	3.2	2.1	2.8	6.7	8.8
12	216	21.5	13.8	6.7	9.2	4.9	3.9	3.2	2.1	3.2	7.1	8.8
13	232	16.2	11.3	6.7	9.2	4.9	3.9	3.2	2.1	3.2	7.1	8.5
14	330	13.8	9.9	7.1	8.8	4.9	3.9	3.2	2.1	3.2	7.1	8.5
15	371	19.1	9.9	7.1	8.8	4.9	3.9	3.2	2.1	3.5	7.4	8.5
16	392	56.9	9.9	7.1	8.5	4.6	3.9	3.2	2.1	3.5	7.4	8.5
17	396	29.7	9.9	7.4	8.5	4.6	3.9	3.2	2.1	3.9	7.4	8.5
18	396	12.4	11.3	7.4	8.1	4.6	3.9	2.8	1.8	3.9	7.4	8.5
19	403	8.8	11.3	7.4	8.1	4.6	3.9	2.8	1.8	3.9	7.8	8.1
20	403	8.8	9.9	7.8	7.8	4.6	3.9	2.8	1.8	4.2	7.8	8.1
21	403	7.1	9.9	7.8	7.8	4.6	3.5	2.8	1.8	4.2	7.8	8.1
22	392	7.1	9.9	8.1	7.4	4.6	3.5	2.8	1.8	4.2	8.1	8.1
23	378	7.1	8.8	8.1	7.4	4.2	3.5	2.8	1.8	4.6	8.1	8.1
24	360	7.1	8.8	8.1	7.4	4.2	3.5	2.8	1.8	4.6	8.1	8.1
25	357	6.0	16.2	8.5	7.1	4.2	3.5	2.5	1.8	4.9	8.1	7.8
26	339	6.0	11.3	8.5	7.1	4.2	3.5	2.5	1.8	4.9	8.5	7.8
27	289	6.0	11.3	8.5	6.7	4.2	3.5	2.5	1.8	4.9	8.5	7.8
28	223	8.8	9.9	8.8	6.7	4.2	3.5	2.5	1.8	5.3	8.5	7.8
29	96.1		9.9	8.8	6.4	4.2	3.5	2.5	1.8	5.3	8.8	7.8
30	60.0		9.9	8.8	6.4	3.9	3.5	2.5	1.8	5.3	8.8	7.8
31	61.8		9.9	9.9	6.0		3.5	2.5		5.7		7.4
Sum	8,530.9	1,058.4	2,131.2	219.3	258.2	144.1	116.5	94.6	59.0	111.6	219.3	261.0

Month	Current Year 1978						Period 1951-1978				
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low			Average	Maximum	Minimum	
Jan.	44.23	40.58	119	403	31	47.7	275	16,921	181,069	1,047,732	426
Feb.	42.19	39.57	1	* 167	125	6.0	37.8	2,099	113,944	696,461	317
Mar.	44.19	39.67	5	* 593	114	8.8	68.9	4,227	80,524	807,342	0
Apr.	42.06	39.57	25	8.8	113	* 5.7	7.4	435	53,183	588,983	0
May	38.32	37.96	1	9.9	31	6.0	8.5	512	73,355	732,815	0
June	38.09	37.73	1	6.0	30	3.9	4.9	286	32,620	555,460	0
July	38.16	38.06	1	3.9	121	3.5	3.9	231	17,703	264,561	0
Aug.	38.09	38.02	1	3.5	25	2.5	3.2	188	26,592	309,320	0
Sept.	38.06	37.96	1	2.1	118	1.8	2.1	117	42,339	572,551	0
Oct.	38.29	37.99	31	5.7	1	1.8	3.5	221	66,982	769,939	0
Nov.	38.22	38.12	129	8.8	1	5.7	7.4	435	110,015	909,399	173
Dec.	42.09	38.06	1	9.2	31	7.4	8.5	517	148,150	1,060,767	502
Yearly	44.23	37.73		593		1.8	36.0	25,191	913,202	7,923,600	25,036
	Meters		Cubic Meters per Second			Thousands of Cubic Meters					
	13.48	11.50		16.8		0.05	1.02	32,306	1,126,422	9,773,655	30,882

0 Mean daily 1 And other days * Instantaneous

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	42.72	41.83	40.26	39.67	39.96	39.37	39.73	39.73	39.67	39.63	39.80	39.86
2	42.75	41.60	41.70	39.63	39.96	39.37	39.73	39.70	39.67	39.63	39.83	39.90
3	42.85	41.04	42.39	39.63	39.96	39.37	39.73	39.70	39.63	39.63	39.80	39.86
4	42.82	40.75	43.70	39.63	39.93	39.37	39.73	39.73	39.63	39.63	39.80	39.86
5	42.82	40.58	44.03	39.63	39.93	39.37	39.73	39.73	39.67	39.63	39.80	39.90
6	42.82	40.42	43.24	39.63	39.90	39.63	39.73	39.73	39.67	39.63	39.80	39.86
7	43.01	40.29	41.54	39.63	39.86	39.63	39.70	39.73	39.67	39.63	39.76	39.86
8	43.18	40.88	40.65	39.63	39.86	39.63	39.70	39.73	39.67	39.63	39.80	39.86
9	43.01	41.11	40.32	39.60	39.86	39.70	39.70	39.73	39.70	39.63	39.80	39.90
10	42.29	41.08	40.06	39.60	39.76	39.70	39.70	39.73	39.70	39.63	39.80	39.90
11	42.22	40.42	39.90	39.60	39.76	39.70	39.70	39.73	39.70	39.63	39.80	39.90
12	42.72	39.99	39.80	39.60	39.76	39.73	39.70	39.70	39.70	39.63	39.83	39.76
13	42.88	39.86	39.73	39.57	39.76	39.70	39.70	39.70	39.67	39.63	39.83	39.83
14	43.73	39.80	39.70	39.57	39.76	39.63	39.73	39.70	39.63	39.67	39.86	39.80
15	44.03	39.93	39.70	39.57	39.76	39.63	39.76	39.70	39.60	39.67	39.86	39.80
16	44.16	40.65	39.70	39.57	39.70	39.63	39.76	39.70	39.63	39.70	39.83	39.76
17	44.19	40.16	39.70	39.60	39.70	39.63	39.80	39.73	39.70	39.70	39.83	39.70
18	44.19	39.76	39.73	39.60	39.70	39.67	39.80	39.73	39.70	39.70	39.83	39.70
19	44.23	39.67	39.73	39.60	39.70	39.67	39.80	39.73	39.70	39.73	39.83	39.70
20	44.23	39.67	39.70	39.60	39.70	39.67	39.76	39.70	39.70	39.76	39.86	39.73
21	44.23	39.60	39.70	39.86	39.70	39.70	39.73	39.70	39.70	39.76	39.86	40.19
22	44.16	39.60	39.70	40.29	39.70	39.70	39.73	39.70	39.67	39.80	39.83	40.32
23	44.06	39.60	39.67	40.42	39.63	39.70	39.76	39.67	39.67	39.83	39.86	40.65
24	43.96	39.60	39.67	41.47	39.63	39.70	39.80	39.67	39.67	39.86	39.86	41.01
25	43.93	39.57	39.86	42.06	39.63	39.70	39.76	39.70	39.63	39.86	39.86	41.08
26	43.80	39.57	39.73	42.06	39.63	39.70	39.76	39.70	39.63	39.90	39.86	41.37
27	43.41	39.57	39.73	41.83	39.63	39.73	39.76	39.73	39.63	39.93	39.86	41.57
28	42.78	39.67	39.70	41.21	39.63	39.73	39.73	39.73	39.60	39.90	39.83	41.67
29	41.37		39.70	40.29	39.63	39.73	39.76	39.73	39.60	39.86	39.83	41.83
30	40.81		39.70	40.06	39.63	39.73	39.73	39.73	39.60	39.86	39.86	41.96
31	40.85		39.70		39.60		39.73	39.73		39.83		42.09
Avg.	43.18	40.22	40.39	40.06	39.76	39.63	39.73	39.70	39.67	39.73	39.83	40.32

WASTEWAY TO COLORADO RIVER AT KILOMETER 38 IN MEXICO

DESCRIPTION: Wasteway to the Colorado River on the left bank of new Barrote Canal at old dam and bridge at Kilometer 18+251 (old Kilometer 38+000). The wasteway is located in the Colonia Bojorquez 0.8 mile (1.3 km) upstream from the Sonora-Baja California railroad bridge, 3.7 miles (5.9 km) downstream from the Miguel C. Rodriguez gaging station, and 28.1 miles (45.3 km) downstream from the southerly international boundary.

RECORDS: The records are computed by the Ministry of Agriculture and Hydraulic Resources and based upon gate openings. Records available: January 1964 through 1978.

REMARKS: The wasteway structure on the left bank of the Colorado River has two manually operated radial gates 9.8 feet (3.0 m) wide. It discharges into a dirt canal 656 feet (200 m) long with a total capacity of 459 second feet (13.0 m³/sec) which discharges to the river.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1964-1978		
		Average	Maximum	Minimum
January	774	184	1,453	0
February	291	128	953	0
March	153	92.4	572	0
April	51.9	3.49	51.9	0
May	0	30.6	378	0
June	0	0	0	0
July	0	0	0	0
August	0	5.67	85.1	0
September	45.4	63.1	901	0
October	473	292	1,719	0
November	143	153	800	0
December	666	90.0	666	0
Yearly	2,598	1,042	3,853	0
	Thousands of Cubic Meters			
	3,204	1,285	4,753	0

COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

DESCRIPTION: Water-stage recorder and cableway in Mexico, 47.6 miles (76.6 km) downstream from the southerly international boundary, 18.6 miles (30.0 km) downstream from the Sonora-Baja California railroad bridge and 3.7 miles (6.0 km) east of Kilometer 70 of the Mexicali-San Felipe highway. The recorder is located on the right bank of the Colorado River. The zero of the gage is 9.84 feet (3.00 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Records obtained and computed by the Mexican Section of the Commission. Records available: Mean daily discharges from January 1960 through 1968. 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. Mean daily gage heights, January 1960 through 1978.

REMARKS: In former years, the flow past this station was affected by the tides in the Gulf of California. After July 1968, measurement by current meter was suspended; beginning in 1969, twice daily readings of gage heights and no record of mean daily discharges.

EXTREMES: January 1960 through 1968: Maximum daily discharge, 4,380 second-feet (124 m³/sec), January 21 and December 7 and 8, 1960; minimum discharge, no flow on various occasions. Maximum monthly discharge, 225,224 acre-feet (277,811,000 m³) January 1960; minimum monthly discharge, zero during various months of several years. Annual maximum discharge, 503,260 acre-feet (620,765,000 m³) during 1960; minimum 59,335 acre-feet (73,189,000 m³) in 1968. January 1960 through 1978. Maximum instantaneous gage height, 18.73 feet (5.71 m) on January 21, 1960; minimum gage height, 12.47 feet (3.80 m) on August 31 and September 1, 1960.

Mean Daily Gage Height in Feet 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.42	15.88	15.75	15.55	15.42	15.09	14.70	14.63	14.57	14.47	14.50	14.57
2	15.42	15.88	15.75	15.55	15.42	15.09	14.70	14.63	14.57	14.47	14.50	14.57
3	15.42	15.88	15.75	15.55	15.42	15.09	14.70	14.63	14.57	14.47	14.53	14.57
4	15.42	15.88	15.75	15.55	15.42	15.09	14.70	14.63	14.57	14.44	14.53	14.60
5	15.42	15.88	15.75	15.52	15.42	15.09	14.70	14.63	14.57	14.44	14.57	14.60
6	15.42	15.88	15.81	15.52	15.42	15.09	14.70	14.63	14.57	14.44	14.57	14.60
7	15.42	15.88	15.75	15.52	15.42	15.09	14.70	14.63	14.57	14.44	14.57	14.60
8	15.45	15.91	15.78	15.52	15.39	15.06	14.70	14.63	14.57	14.44	14.53	14.63
9	15.49	15.91	15.75	15.49	15.39	15.06	14.70	14.63	14.57	14.44	14.53	14.63
10	15.55	15.91	15.72	15.49	15.35	15.03	14.70	14.63	14.57	14.44	14.50	14.63
11	15.55	15.94	15.75	15.49	15.35	15.03	14.67	14.63	14.57	14.44	14.50	14.63
12	15.62	15.94	15.75	15.49	15.32	14.99	14.67	14.63	14.53	14.44	14.50	14.63
13	15.62	15.94	15.68	15.45	15.32	14.99	14.67	14.63	14.53	14.44	14.50	14.67
14	15.68	15.94	15.68	15.45	15.29	14.96	14.67	14.63	14.53	14.44	14.50	14.67
15	15.68	15.91	15.65	15.45	15.29	14.96	14.63	14.63	14.53	14.40	14.50	14.70
16	15.75	15.88	15.62	15.42	15.29	14.93	14.63	14.60	14.53	14.40	14.50	14.70
17	15.78	15.88	15.62	15.42	15.29	14.93	14.63	14.60	14.53	14.40	14.50	14.70
18	15.88	15.85	15.62	15.39	15.26	14.90	14.63	14.60	14.53	14.40	14.50	14.76
19	15.88	15.81	15.62	15.35	15.26	14.90	14.63	14.60	14.53	14.37	14.50	14.76
20	15.94	15.78	15.62	15.39	15.22	14.86	14.63	14.57	14.50	14.37	14.50	14.76
21	15.98	15.75	15.62	15.42	15.22	14.83	14.63	14.57	14.50	14.37	14.50	14.80
22	16.01	15.75	15.62	15.42	15.22	14.83	14.63	14.57	14.50	14.37	14.50	14.83
23	16.01	15.72	15.62	15.42	15.19	14.80	14.63	14.57	14.50	14.34	14.50	14.83
24	16.01	15.68	15.62	15.42	15.19	14.76	14.60	14.57	14.50	14.34	14.50	14.86
25	16.04	15.65	15.58	15.42	15.16	14.76	14.60	14.57	14.50	14.30	14.50	14.90
26	16.04	15.62	15.58	15.42	15.16	14.76	14.60	14.57	14.50	14.34	14.50	14.90
27	16.04	15.58	15.58	15.42	15.16	14.76	14.63	14.57	14.50	14.37	14.53	14.93
28	16.01	15.55	15.55	15.42	15.12	14.76	14.63	14.57	14.50	14.30	14.53	14.96
29	16.01		15.55	15.42	15.09	14.73	14.63	14.57	14.50	14.40	14.57	14.99
30	15.94		15.55	15.42	15.09	14.73	14.63	14.57	14.50	14.44	14.57	15.03
31	15.91		15.55		15.09		14.63	14.57		14.47		15.09
Avg.	15.75	15.81	15.65	15.45	15.29	14.93	14.67	14.60	14.53	14.40	14.53	14.73

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 U. S. Geological Survey.

In Thousands of Acre-Feet

Month	LAKE MEAD (Capacity 26,159.0)		LAKE MOHAVE (Capacity 1,810.0)		HAVASU LAKE (Capacity 619.4)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 28,588.4)	
	1978	Average 1935-1978	1978	Average 1951-1978	1978	Average 1939-1978	1978	Estimated Average
	Jan.	20,959	17,036	1,676	1,648	555.8	554.1	23,190.8
Feb.	21,169	16,778	1,647	1,674	558.1	557.9	23,374.1	19,009.9
Mar.	21,281	16,505	1,618	1,670	570.5	572.7	23,469.5	18,747.7
Apr.	20,966	16,616	1,611	1,678	597.0	603.0	23,174.0	18,897.0
May	20,754	17,520	1,721	1,736	611.2	603.9	23,086.2	19,859.9
June	20,778	18,794	1,517	1,622	611.4	605.5	22,906.4	21,021.5
July	20,583	18,974	1,393	1,489	590.4	592.9	22,566.4	21,055.9
Aug.	20,641	18,755	1,443	1,429	574.9	575.5	22,658.9	20,759.5
Sept.	20,869	18,487	1,484	1,416	571.6	570.8	22,924.6	20,473.8
Oct.	21,041	18,242	1,587	1,438	560.7	572.4	23,188.7	20,252.4
Nov.	21,321	18,028	1,636	1,516	561.1	561.1	23,518.1	20,105.1
Dec.	21,960	17,789	1,682	1,604	549.4	556.3	24,191.4	19,949.3
Avg.	21,027	17,794	1,585	1,577	576.0	577.2	23,187.4	19,947.5
Max.	21,960	27,780	1,721	1,808	611.4	688.7	24,191.4	28,235.0
Min.	20,583	* 10,727	1,393	1,186	549.4	76.9	22,566.4	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-48 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	1978						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 1956-1978

Jan.	131,138,000	5,500	4	0.0042	0.0089	0.0021	3.0	25.7	336	1.4
Feb.	141,979,000	10,400	4	.0073	.0112	.0025	5.6	12.6	116	1.6
Mar.	246,642,000	24,800	5	.0100	.0137	.0055	13.4	40.4	499	8.8
Apr.	298,343,000	32,600	4	.0109	.0142	.0072	17.7	38.0	434	7.9
May	118,577,000	5,000	5	.0042	.0067	.0029	2.7	13.3	201	2.3
June	148,039,000	6,400	4	.0043	.0051	.0033	3.5	13.7	92.6	2.8
July	239,174,000	15,600	4	.0065	.0077	.0052	8.4	19.0	89.3	3.4
Aug.	229,875,000	10,900	5	.0047	.0066	.0022	5.9	19.3	103	3.8
Sept.	114,614,000	4,200	4	.0037	.0050	.0030	2.3	8.0	43.6	1.6
Oct.	78,314,000	2,200	4	.0028	.0040	.0016	1.2	3.7	20.0	.5
Nov.	67,935,000	1,300	5	.0019	.0036	.0012	.7	9.4	89.9	.5
Dec.	166,126,000	6,700	4	.0040	.0051	.0020	3.6	18.7	174	.6
Yearly	1,980,756,000	125,600	52	0.0054	0.0142	0.0012	68.0	221.8	2,198	59.2

Samples by U. S. Section and analyses by United States Bureau of Reclamation, Method A

Intake Canal at Morelos Diversion Structure

Period 1952-1978

Jan.	55,610,000	18,738	5	0.0337	0.0600	0.0055	10.1	5.4	22.3	0.2
Feb.	136,774,000	8,072	4	.0059	.0134	.0033	4.4	5.5	19.4	.9
Mar.	230,203,000	24,862	4	.0108	.0754	.0038	13.5	38.8	154	5.3
Apr.	297,653,000	75,029	4	.0252	.0387	.0038	40.5	36.2	121	7.5
May	118,126,000	9,561	5	.0081	.0123	.0060	5.2	9.7	51.2	1.5
June	147,478,000	7,244	4	.0049	.0100	.0031	3.9	26.2	109	3.1
July	238,614,000	8,470	4	.0035	.0043	.0030	4.5	37.8	156	4.1
Aug.	229,337,000	14,614	5	.0064	.0079	.0044	7.9	35.6	135	3.8
Sept.	114,154,000	5,357	4	.0047	.0057	.0038	2.9	14.8	64.7	1.9
Oct.	68,296,000	4,138	4	.0061	.0110	.0026	2.3	3.8	12.0	.3
Nov.	67,249,000	4,441	4	.0093	.0053	.0066	2.4	2.1	9.3	.2
Dec.	156,060,000	15,274	4	.0098	.0149	.0048	8.3	5.3	18.6	1.1
Yearly	1,859,553,000	195,801	51	0.0107	0.0754	0.0026	106	221	696	51.4

Samples and analyses by Mexican Section, Method B

Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1978

Jan.	23,007,000	3,848	1	0.0167	0.0175	0.0155	2.1	15.1	251	0
Feb.	2,854,000	471	1	.0165	.0178	.0103	.2	2.3	13.9	0
Mar.	5,747,000	488	1	.0085	.0099	.0061	.2	5.3	4.1	0
Apr.	592,000	28.5	1	.0048	.0061	.0037	0	.2	1.1	0
May	697,000	29.5	1	.0042	.0059	.0030	0	.3	1.5	0
June	389,000	21.8	1	.0056	.0065	.0044	0	.1	.7	0
July	314,000	11.6	1	.0037	.0043	.0033	0	.1	.2	0
Aug.	256,000	7.4	1	.0029	.0033	.0022	0	.2	.2	0
Sept.	159,000	5.7	1	.0036	.0059	.0021	0	.4	4.5	0
Oct.	301,000	15.7	1	.0052	.0062	.0044	0	1.8	20.8	0
Nov.	592,000	26.3	1	.0045	.0049	.0040	0	2.7	36.0	0
Dec.	703,000	29.5	1	.0042	.0066	.0050	0	2.6	13.0	0
Yearly	35,611,000	4,983	12	0.0069	0.0178	0.0021	2.6	25.9	289	1.6

Samples and analyses by Mexican Section, Method C

There were no samples taken during 1978 at the Colorado River at Southerly International Boundary

CHEMICAL ANALYSES OF WATER SAMPLES

1978

The table below is based on chemical analyses of weekly samples from the Colorado River at the Northerly International Boundary taken by the United States Section of the Commission and analyzed by the U.S. Geological Survey.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na 22.99; (CO₃ plus HCO₃) expressed as CO₃, 30.00; SO₄, 48.03; Cl, 35.45; NO₃, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as EC x 10⁶ at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		ECx10 ⁶ @25°C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO ₃ + HCO ₃	SO ₄	Cl	NO ₃

Colorado River at Northerly International Boundary

Jan.	5	1.41	136,000	1,645		7.9	50	32	5.49	2.95	8.48	3.54	7.92	5.49
Feb.	4	1.32	138,000	1,528		8.0	49	32	5.25	2.76	7.65	3.31	7.33	5.12
Mar.	4	1.21	219,000	1,410		8.0	47	31	4.99	2.70	6.78	3.10	6.95	4.46
Apr.	4	1.17	256,000	1,352		8.0	46	29	4.88	2.61	6.34	3.11	6.78	4.01
May	5	1.28	112,000	1,510		8.0	48	31	5.13	2.92	7.47	3.35	7.38	4.87
June	4	1.26	137,000	1,473		8.0	48	30	5.02	2.87	7.22	3.25	7.33	4.58
July	5	1.18	208,000	1,378		7.9	46	29	4.76	2.79	6.53	3.05	7.03	4.06
Aug.	4	1.21	205,000	1,421		7.9	47	30	4.84	2.87	6.85	3.09	7.16	4.34
Sept.	4	1.28	108,000	1,505		8.0	49	31	4.94	2.98	7.54	3.27	7.45	4.75
Oct.	5	1.36	78,600	1,599		8.0	50	32	5.28	2.98	8.11	3.42	7.81	5.21
Nov.	4	1.46	73,000	1,695		8.0	51	33	5.53	3.04	8.80	3.63	8.05	5.74
Dec.	4	1.38	169,000	1,655		7.9	50	33	5.43	3.06	8.55	3.53	7.84	5.69
Mean	Ø 52	1.26	Ø 1,839,600	1,477		8.0	48	31	5.05	2.83	7.26	3.24	7.28	4.67
Period Avg.		1.58	2,273,753	1,893		8.0			5.82	3.50	9.77	3.32	8.26	7.55
Tons of Constituents		1978							200,000	68,200	331,000	193,000	692,000	329,000
Avg. Tons		Period 1962-1978							229,000	83,800	444,000	194,000	777,000	535,000

** Percent of total cations

*** Percent of total anions

Ø Weighted mean

Ø Total

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1978

The following tables show electrical conductivity, expressed in mhos per centimeter x 10⁶ at 25°C, of individual water samples taken at Colorado River stations and in Mexican canals. Samples were taken at the northerly international boundary by both Sections of the Commission and at the southerly international boundary by the United States Section. Conductivity determinations were made by the United States Geological Survey. Samples for the Intake Canal at Morelos Dam and Miguel C. Rodriguez Gaging Station were taken by the Mexican Section of the Commission, and determinations were made by the Ministry of Agriculture and Hydraulic Resources of Mexico.

Electrical conductivity is a relative indication of the concentration of dissolved solids in the water samples.

Date @25°C	ECx10 ⁶ @25°C								
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Colorado River at Northerly International Boundary

January	February	April	May	July	August	October	November
1 1,600	15 1,520	1 1,340	16 1,540	1 1,420	16 1,400	1 1,530	16 1,700
2 1,500	16 1,490	2 1,350	17 1,510	2 1,430	17 1,400	2 1,660	17 1,680
3 1,650	17 1,540	3 1,350	18 1,480	3 1,400	18 1,410	3 1,660	18 1,650
4 1,740	18 1,470	4 1,340	19 1,470	4 1,390	19 1,450	4 1,630	19 1,660
5 1,730	19 1,510	5 1,350	20 1,480	5 1,390	20 1,450	5 1,600	20 1,680
6 1,660	20 1,520	6 1,310	21 1,490	6 1,390	21 1,490	6 1,580	21 1,680
7 1,670	21 1,440	7 1,340	22 1,490	7 1,370	22 1,470	7 1,600	22 1,680
8 1,720	22 1,460	8 1,330	23 1,510	8 1,410	23 1,450	8 1,620	23 1,680
9 1,710	23 1,470	9 1,370	24 1,530	9 1,400	24 1,460	9 1,650	24 1,660
10 1,720	24 1,470	10 1,340	25 1,520	10 1,400	25 1,490	10 1,650	25 1,630
11 1,570	25 1,490	11 1,330	26 1,530	11 1,360	26 1,510	11 1,640	26 1,680
12 1,650	26 1,490	12 1,330	27 1,560	12 1,360	27 1,530	12 1,620	27 1,650
13 1,600	27 1,470	13 1,320	28 1,550	13 1,360	28 1,510	13 1,620	28 1,630
14 1,600	28 1,460	14 1,330	29 1,580	14 1,360	29 1,500	14 1,640	29 1,730
15 1,590	March 15 1,350	30 1,550	15 1,380	30 1,490	15 1,650	30 1,710	
16 1,580	1 1,600	16 1,390	31 1,540	16 1,400	31 1,500	16 1,670	December
17 1,570	2 1,330	17 1,350	June 17 1,380	September 17 1,670	17 1,670	17 1,690	
18 1,600	3 1,270	18 1,350	1 1,550	18 1,380	1 1,580	18 1,650	2 1,720
19 1,600	4 1,410	19 1,360	2 1,570	19 1,370	2 1,580	19 1,650	3 1,750
20 1,620	5 1,450	20 1,360	3 1,570	20 1,370	3 1,570	20 1,630	4 1,740
21 1,610	6 1,500	21 1,350	4 1,580	21 1,370	4 1,530	21 1,620	5 1,770
22 1,610	7 1,540	22 1,350	5 1,560	22 1,370	5 1,480	22 1,460	6 1,700
23 1,620	8 1,540	23 1,370	6 1,550	23 1,380	6 1,450	23 1,450	7 1,630
24 1,620	9 1,540	24 1,350	7 1,520	24 1,350	7 1,470	24 1,410	8 1,650
25 1,720	10 1,520	25 1,370	8 1,510	25 1,370	8 1,470	25 1,420	9 1,650
26 1,720	11 1,500	26 1,400	9 1,490	26 1,360	9 1,470	26 1,460	10 1,590
27 1,760	12 1,490	27 1,420	10 1,560	27 1,370	10 1,470	27 1,590	11 1,610
28 1,750	13 1,460	28 1,460	11 1,550	28 1,360	11 1,490	28 1,660	12 1,600
29 1,740	14 1,440	29 1,470	12 1,530	29 1,390	12 1,460	29 1,750	13 1,600
30 1,720	15 1,430	30 1,430	13 1,520	30 1,420	13 1,470	30 1,760	14 1,600
31 1,770	16 1,420	May 14 1,470	14 1,470	31 1,360	14 1,470	31 1,790	15 1,570
February 17 1,370	1 1,420	15 1,450	August 15 1,450	November 16 1,570			
1 1,670	18 1,390	2 1,440	16 1,470	1 1,370	16 1,490	1 1,800	17 1,580
2 1,510	19 1,400	3 1,470	17 1,460	2 1,360	17 1,480	2 1,810	18 1,580
3 1,650	20 1,370	4 1,450	18 1,480	3 1,370	18 1,520	3 1,800	19 1,450
4 1,610	21 1,360	5 1,460	19 1,430	4 1,360	19 1,500	4 1,770	20 1,390
5 1,630	22 1,360	6 1,460	20 1,430	5 1,360	20 1,480	5 1,760	21 1,500
6 1,640	23 1,370	7 1,480	21 1,400	6 1,370	21 1,510	6 1,700	22 1,570
7 1,680	24 1,360	8 1,510	22 1,400	7 1,360	22 1,500	7 1,670	23 1,610
8 1,690	25 1,380	9 1,490	23 1,370	8 1,370	23 1,530	8 1,620	24 1,640
9 1,740	26 1,360	10 1,460	24 1,410	9 1,360	24 1,530	9 1,630	25 1,710
10 1,660	27 1,320	11 1,460	25 1,450	10 1,370	25 1,510	10 1,640	26 1,710
11 1,630	28 1,330	12 1,490	26 1,410	11 1,350	26 1,470	11 1,740	27 1,760
12 1,620	29 1,330	13 1,560	27 1,390	12 1,360	27 1,430	12 1,700	28 1,630
13 1,600	30 1,320	14 1,540	28 1,360	13 1,380	28 1,430	13 1,720	29 1,580
14 1,570	31 1,320	15 1,560	29 1,390	14 1,400	29 1,420	14 1,730	30 1,580
			30 1,400	15 1,390	30 1,420	15 1,730	31 1,610

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES
1978

| Date ECx10 ⁶ @25°C |
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Intake Canal at Morelos Diversion Structure

January	February	April	May	July	August	October	November
1 1,600	15 1,540	1 1,360	16 1,560	2 1,430	16 1,420	1 1,510	16 1,730
2 1,500	16 1,520	2 1,360	17 1,500	1 1,450	17 1,420	2 1,690	17 1,700
3 1,650	17 1,540	3 1,360	18 1,490	3 1,410	18 1,410	3 1,650	18 1,660
4 1,740	18 1,490	4 1,350	19 1,480	4 1,410	19 1,470	4 1,640	19 1,680
5 1,720	19 1,500	5 1,350	20 1,490	5 1,390	20 1,480	5 1,610	20 1,700
6 1,660	20 1,530	6 1,320	21 1,500	6 1,400	21 1,510	6 1,630	21 1,700
7 1,690	21 1,460	7 1,350	22 1,490	7 1,390	22 1,490	7 1,610	22 1,710
8 1,730	22 1,470	8 1,340	23 1,520	8 1,420	23 1,460	8 1,640	23 1,710
9 1,710	23 1,480	9 1,360	24 1,540	9 1,420	24 1,480	9 1,670	24 1,660
10 1,710	24 1,470	10 1,360	25 1,530	10 1,390	25 1,500	10 1,660	25 1,630
11 1,570	25 1,590	11 1,330	26 1,520	11 1,350	26 1,520	11 1,660	26 1,680
12 1,660	26 1,510	12 1,340	27 1,560	12 1,370	27 1,530	12 1,640	27 1,650
13 1,670	27 1,470	13 1,330	28 1,570	13 1,360	28 1,530	13 1,650	28 1,640
14 1,590	28 1,470	14 1,340	29 1,600	14 1,380	29 1,520	14 1,630	29 1,730
15 1,600		15 1,340	30 1,550	15 1,400	30 1,510	15 1,660	30 1,720
16 1,590	1 1,600	16 1,400	31 1,560	16 1,400	31 1,500	16 1,680	
17 1,560	2 1,300	17 1,360		17 1,400		17 1,680	December
18 1,620	3 1,280	18 1,360	1 1,560	18 1,390	1 1,590	18 1,660	1 1,710
19 1,630	4 1,410	19 1,360	2 1,570	19 1,360	2 1,560	19 1,650	2 1,770
20 1,630	5 1,450	20 1,360	3 1,580	20 1,390	3 1,570	20 1,630	3 1,750
21 1,620	6 1,500	21 1,370	4 1,580	21 1,380	4 1,590	21 1,620	4 1,780
22 1,630	7 1,540	22 1,360	5 1,550	22 1,390	5 1,500	22 1,470	5 1,720
23 1,620	8 1,550	23 1,360	6 1,560	23 1,400	6 1,470	23 1,460	6 1,630
24 1,630	9 1,550	24 1,370	7 1,520	24 1,370	7 1,490	24 1,440	7 1,660
25 1,740	10 1,510	25 1,380	8 1,510	25 1,390	8 1,480	25 1,430	8 1,680
26 1,750	11 1,500	26 1,420	9 1,510	26 1,370	9 1,500	26 1,470	9 1,590
27 1,770	12 1,520	27 1,430	10 1,560	27 1,380	10 1,510	27 1,610	10 1,610
28 1,760	13 1,470	28 1,470	11 1,550	28 1,380	11 1,530	28 1,670	11 1,600
29 1,760	14 1,450	29 1,470	12 1,530	29 1,410	12 1,470	29 1,770	12 1,620
30 1,740	15 1,430	30 1,440	13 1,530	30 1,410	13 1,470	30 1,770	13 1,630
31 1,770	16 1,440		14 1,490	31 1,380	14 1,480	31 1,800	14 1,630
		May					15 1,560
		1 1,420	15 1,460	August	15 1,440	November	16 1,590
		2 1,450	16 1,480	1 1,390	16 1,510	1 1,820	17 1,590
		3 1,470	17 1,460	2 1,380	17 1,520	2 1,830	18 1,600
		4 1,470	18 1,490	3 1,370	18 1,550	3 1,800	19 1,520
		5 1,460	19 1,440	4 1,370	19 1,530	4 1,800	20 1,420
		6 1,480	20 1,440	5 1,360	20 1,490	5 1,770	21 1,510
		7 1,480	21 1,420	6 1,380	21 1,530	6 1,730	22 1,530
		8 1,530	22 1,420	7 1,360	22 1,520	7 1,670	23 1,610
		9 1,500	23 1,380	8 1,380	23 1,530	8 1,620	24 1,660
		10 1,450	24 1,410	9 1,360	24 1,520	9 1,650	25 1,700
		11 1,470	25 1,470	10 1,380	25 1,530	10 1,640	26 1,730
		12 1,480	26 1,400	11 1,370	26 1,490	11 1,750	27 1,780
		13 1,560	27 1,400	12 1,360	27 1,430	12 1,720	28 1,620
		14 1,540	28 1,370	13 1,390	28 1,440	13 1,750	29 1,600
		15 1,560	29 1,400	14 1,400	29 1,430	14 1,730	30 1,600
			30 1,410	15 1,410	30 1,430	15 1,730	31 1,630

Colorado River at Southerly International Boundary

January	January	January	January	February	March	October	December
10 1,710	12 1,620	24 1,620	31 1,720	14 2,160	4 1,310 7 1,540	27 1,470	21 1,460

Colorado River at Miguel C. Rodríguez Gaging Station

January	February	March	April	May	July	September	November
2 2,410	6 1,290	6 1,210	3 1,300	8 1,270 5 1,310	3 1,510 August 7 1,360	4 1,280 October 2 3,960	6 2,460 December 4 3,990

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 the Commission. For location, elevation, period of record, and the observer, see alphabetical listings of these stations on page 50 in this bulletin.

In the United States

Month	Brawley, California		El Centro, California		Blythe, California		Yuma Citrus Station, Arizona			
	1978	Average 1931-1978	1978	Average 1931-1978	1978	Average 1931-1978	1978	Average 1931-1978		
Jan.	1.28	0.32	1.11	0.34	1.94	0.44	1.59	0.38		
Feb.	.28	.30	.35	.32	.50	.42	.46	.35		
Mar.	.75	.17	.30	.17	.48	.38	.79	.24		
Apr.	.08	.10	.05	.11	.02	.14	.05	.12		
May	0	.01	0	0	.07	.02	0	.01		
June	0	.01	0	.01	0	.04	0	.02		
July	T	.05	0	.09	T	.18	0	.15		
Aug.	.10	.37	0	.33	2.18	.78	.06	.50		
Sept.	0	.35	0	.28	0	.38	.11	.37		
Oct.	.82	.26	1.04	.25	.91	.31	.64	.43		
Nov.	.65	.17	1.20	.19	.67	.25	.42	.19		
Dec.	.78	.41	.83	.43	1.03	.50	.89	.39		
Yearly	4.74	2.52	4.88	2.52	7.80	3.84	5.01	3.15		

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1978	Average 1948-1978	1978	Average 1926-1978	1978	Average 1948-1978	1978	Average 1949-1978	1978	Average 1948-1978
Jan.	1.42	0.35	0.91	0.35	1.42	0.35	1.38	0.28	1.14	0.32
Feb.	.75	.24	.32	.32	.79	.16	1.18	.28	1.18	.20
Mar.	.16	.12	.08	.20	.43	.08	.43	.16	.43	.12
Apr.	0	.08	T	.12	0	.08	T	.08	0	.08
May	0	T	0	T	0	T	0	T	0	T
June	0	T	0	T	0	.04	0	.04	0	T
July	.04	.08	T	.12	0	.04	.16	.24	.08	.04
Aug.	.04	.35	T	.35	0	.12	.04	.43	.08	.16
Sept.	0	.20	T	.39	0	.12	T	.28	0	.24
Oct.	.59	.35	1.46	.32	1.22	.32	.87	.43	2.52	.35
Nov.	.32	.16	.59	.20	.24	.16	.12	.51	.20	.16
Dec.	.59	.32	.47	.75	.55	.24	.75	.51	.43	.32
Yearly	3.90	2.28	3.82	3.07	4.65	1.65	4.92	2.68	6.06	1.93

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		San Felipe, Baja California		Santa Clara, Sonora	
	1978	Average 1952-1978	1978	Average 1974-1978	1978	Average 1959-1978	1978	Average 1948-1978	1978	Average 1971-1978
Jan.	1.14	0.47	*	0.32	#0.98	0.24	0.43	0.28	0.39	0.16
Feb.	.87	.28	*	0	.75	.20	*	.12	.35	.20
Mar.	.24	.24	*	T	.28	.12	0	.16	.16	.08
Apr.	0	.12	*	.20	0	.04	0	.08	0	.08
May	0	.04	*	T	0	T	0	.04	0	0
June	0	T	*	0	0	.04	0	.08	0	T
July	.12	.12	.71	.24	.12	.08	*	.12	0	0
Aug.	.16	.32	0	.47	.20	.20	*	.32	0	.04
Sept.	0	.32	0	1.42	0	.59	0	.39	0	.43
Oct.	1.18	.51	1.06	.28	.32	.51	*	.24	3.14	.94
Nov.	.12	.28	.47	.32	.32	.28	*	.16	0	.08
Dec.	.79	.35	.20	.47	.79	.39	*	.39	.39	.28
Yearly	4.61	2.40		3.78	3.74	2.72		2.40	4.45	2.32

* No record

Estimated

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**RAINFALL ON THE COLORADO RIVER WATERSHED
IN INCHES**

In Mexico

Month	La Ventana, Baja California								
	1978	Average 1975-1978							
Jan.	0.32	0.20							
Feb.	.12	.12							
Mar.	.16	.43							
Apr.	0	.08							
May	0	0							
June	0	.08							
July	0	0							
Aug.	*	1.38							
Sept.	*	.39							
Oct.	*	.20							
Nov.	*	0							
Dec.	*	.63							
Yearly		3.50							

* No record

LOCATION OF RAINFALL STATIONS ON THE COLORADO RIVER WATERSHED

The precipitation records of the stations listed alphabetically below began on the date shown and extend through 1978.

In the United States

NAME OF STATION	LATI-TUDE	LONGI-TUDE	Ø 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
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	LATI-TUDE	LONGI-TUDE	Ø ELEV. (FT.)	RECORD BEGAN	OBSERVER
Bataques, Baja California	32° 33'	115° 04'	** 66	1948	# S. A. R. H.
Deita, Baja California	32° 21'	115° 11'	** 39	1948	S. A. R. H.
Colonia Juarez, Baja California	32° 15'	115° 03'	49	1952	S. A. R. H.
Laguna Salada, Baja California	32° 12'	115° 44'	236	1974	S. A. R. H.
La Ventana, Baja California	31° 42'	115° 04'	246	1975	S. A. R. H.
Los Algodones, Baja California	32° 42'	114° 44'	115	1948	S. A. R. H.
Mexicali, Baja California	32° 40'	115° 28'	13	1926	S.A. R. H.
Riito, Sonora	32° 10'	114° 57'	** 39	1959	S. A. R. H.
* San Felipe, Baja California	31° 02'	114° 53'	33	1948	S. A. R. H.
San Luis, R. C., Sonora	32° 28'	114° 47'	131	1949	S. A. R. H.
Santa Clara, Sonora	31° 42'	114° 29'	49	1971	S. A. R. H.

* Not shown on map Ø Elevation above mean sea level except Brawley and El Central which are elevations below mean sea level

** Elevations obtained from International Boundary and Water Commission topographic maps

Ministry of Agriculture and Hydraulic Resources

EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at one station in Arizona and at ten stations in Baja California and Sonora, Mexico. The station in the United States is operated by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Agriculture and Hydraulic Resources. The type of pan used at all these stations was the National Weather Service standard pan of 4-foot diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," page 50 in this bulletin.

In the United States

Month	Yuma Citrus Station, Arizona	
	1978	Average 1931-1978
Jan.	2.42	3.89
Feb.	3.73	4.83
Mar.	6.26	7.54
Apr.	8.65	10.15
May	11.83	13.11
June	14.27	14.37
July	14.53	15.49
Aug.	12.95	13.72
Sept.	10.36	10.82
Oct.	6.64	7.64
Nov.	3.86	4.99
Dec.	3.13	3.67
Yearly	98.63	110.22

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1978	Average 1949-1955 1961-1978	1978	Average 1926-1978	1978	Average 1963-1978	1978	Average 1953-1978	1978	Average 1948-1978
Jan.	2.91	4.33	2.09	2.64	2.68	3.78	2.05	3.35	*	3.27
Feb.	4.29	5.24	3.23	3.54	3.78	4.76	3.46	4.06	*	4.41
Mar.	7.17	7.52	5.59	5.94	4.96	7.01	5.51	6.34	*	6.38
Apr.	10.39	10.12	8.27	7.99	8.90	9.02	7.72	8.43	*	8.19
May	13.62	12.80	11.46	10.55	12.05	11.81	10.87	11.10	*	10.39
June	18.35	13.82	14.49	11.69	14.96	12.72	11.77	12.76	*	11.69
July	16.02	13.62	13.11	11.81	12.91	12.60	12.91	14.02	13.07	12.05
Aug.	14.96	12.14	11.65	10.16	11.18	10.87	12.60	12.60	12.36	10.79
Sept.	12.09	10.16	8.66	8.15	8.86	9.02	9.49	9.69	9.76	8.62
Oct.	8.39	7.95	5.91	5.79	6.02	6.30	6.42	6.54	6.42	6.26
Nov.	5.12	5.16	3.31	3.43	4.45	4.69	3.58	4.25	4.02	4.37
Dec.	4.09	4.17	2.17	2.48	3.39	3.43	2.48	3.19	2.80	3.27
Yearly	117.40	108.74	89.92	84.13	94.13	92.48	88.86	97.13		90.28

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		San Felipe, Baja California		Santa Clara, Sonora	
	1978	Average 1970-1978	1978	Average 1974-1978	1978	Average 1963-1978	1978	Average 1952-1978	1978	Average 1971-1978
Jan.	2.32	3.39	*	4.17	#2.05	3.15	3.27	5.00	6.42	5.51
Feb.	3.90	4.21	*	4.53	3.70	4.17	*	5.79	3.74	4.92
Mar.	5.28	6.30	*	7.28	6.10	6.06	6.30	7.01	6.26	6.30
Apr.	7.91	7.60	*	8.58	7.80	7.68	7.99	8.27	8.43	7.64
May	10.59	9.96	*	11.73	11.22	10.20	9.88	10.35	8.82	8.46
June	13.15	11.65	*	13.94	13.11	11.61	11.77	10.87	10.83	11.50
July	11.93	11.61	11.46	13.19	12.40	12.24	*	11.65	11.06	11.06
Aug.	10.63	10.59	9.96	12.13	10.91	10.31	11.77	10.98	7.48	10.79
Sept.	9.96	8.78	7.99	6.85	8.82	8.15	9.49	9.76	9.41	9.21
Oct.	7.36	6.42	5.75	6.73	5.98	5.55		8.39	6.73	7.52
Nov.	4.37	4.53	4.25	4.84	3.11	3.62		6.22	7.17	5.87
Dec.	3.15	3.31	2.52	3.46	2.28	2.83		4.80	7.95	5.43
Yearly	90.55	88.39		98.94	87.48	87.95		101.06	94.29	94.57

* No record

Estimated

TEMPERATURE IN THE COLORADO RIVER BASIN IN DEGREES FAHRENHEIT

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 observations, with maximum and minimum 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 50 in this bulletin.

In the United States

Month	Blythe, California				Yuma Citrus Station, Arizona				Brawley, California			
	1978			Average 1931-78	1978			Average 1931-78	1978			Average 1931-78
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	53.6	75	32	52.5	54.3	76	31	53.0	55.2	76	31	53.6
Feb.	58.0	83	34	57.3	56.9	81	33	57.0	57.7	82	34	58.0
Mar.	* 67.0	* 94	* 45	62.9	65.3	93	39	62.1	65.1	92	43	63.2
Apr.	67.9	95	44	69.9	68.1	95	43	68.5	67.2	93	43	69.8
May	* 79.0	*109	53	77.4	76.1	109	50	75.8	76.8	107	50	77.3
June	# 88.1	114	58	85.2	87.2	114	58	83.6	89.3	116	56	85.1
July	93.3	117	61	92.2	92.1	115	60	91.1	92.5	117	61	91.9
Aug.	89.4	111	59	91.0	89.2	111	58	90.3	90.1	112	61	91.4
Sept.	83.9	109	55	85.0	83.1	110	55	84.9	83.2	109	54	86.1
Oct.	77.3	104	49	73.2	77.0	104	50	73.6	78.4	107	51	75.0
Nov.	59.4	87	35	60.2	59.7	89	35	61.4	61.1	91	37	62.4
Dec.	49.3	74	22	53.1	49.2	74	25	54.4	50.7	74	25	54.9
Yearly	72.2	117	22	71.7	71.5	115	25	71.3	72.3	117	25	72.4

Month	El Centro, California											
	1978			Average 1931-78								
	Mean	Max.	Min.									
Jan.	55.7	76	33	53.6								
Feb.	58.7	82	33	57.9								
Mar.	65.5	91	43	63.0								
Apr.	68.5	96	43	69.4								
May	77.1	108	48	77.2								
June	89.5	115	59	85.0								
July	92.7	117	64	91.8								
Aug.	90.1	111	65	91.1								
Sept.	82.7	108	48	85.6								
Oct.	78.5	107	52	74.6								
Nov.	# 60.7	90	36	62.2								
Dec.	# 50.6	73	23	54.6								
Yearly	72.5	117	23	72.2								

In Mexico

Month	Laguna Salada, Baja California				Los Algodones, Baja California				Mexicali, Baja California			
	1978		1974-1978		1978		1948-1978		1978		1926-1978	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	**	**	84	18	75	34	88	23	75	37	93	19
Feb.	**	**	95	27	81	36	95	28	84	41	93	23
Mar.	**	**	95	32	95	43	100	32	95	48	100	30
Apr.	**	**	100	36	93	43	109	37	97	48	106	34
May	**	**	111	39	108	48	117	43	108	50	117	43
June	**	**	120	50	117	59	126	52	115	55	120	48
July	120	79	122	54	115	63	118	61	117	63	118	55
Aug.	117	68	118	52	111	63	120	61	111	63	118	54
Sept.	117	64	117	59	108	54	122	54	108	55	122	48
Oct.	118	59	118	36	106	54	111	32	104	54	109	32
Nov.	90	45	95	28	90	36	100	27	91	39	104	28
Dec.	70	34	86	19	72	23	90	23	77	27	90	23
Yearly			122	18	117	23	126	23	117	27	122	19

One or more days of record missing

* Blythe FAA Airport figures

** No record

**TEMPERATURE IN THE COLORADO RIVER BASIN
IN DEGREES FAHRENHEIT**

In Mexico

Month	San Luis, R. C., Sonora				Delta, Baja California				Colonia Juarez, Baja California			
	1978		1949-1978		1978		1948-1978		1978		1964-1978	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	75	32	100	19	73	36	104	27	72	32	91	19
Feb.	84	36	109	27	86	39	104	28	82	37	97	21
Mar.	95	45	108	28	97	45	113	28	93	43	99	25
Apr.	95	45	115	37	97	46	118	32	95	45	115	30
May	109	52	115	41	111	52	129	32	108	50	117	36
June	115	64	126	45	*	*	133	36	113	50	122	39
July	118	64	126	59	118	66	135	45	115	57	122	45
Aug.	113	64	122	55	111	64	140	52	108	55	118	50
Sept.	109	50	118	50	108	64	135	39	111	52	122	39
Oct.	108	54	118	32	108	54	117	34	106	52	118	36
Nov.	91	37	113	28	91	46	120	32	88	34	104	25
Dec.	77	25	102	23	79	36	104	27	72	25	97	19
Yearly	118	25	126	19	118	36	140	27	115	25	122	19

Month	Riito, Sonora				San Felipe, Baja California				Santa Clara, Sonora			
	1978		1949-1978		1978		1948-1978		1978		1971-1978	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	1 75	1 28	91	19	75	37	99	30	75	41	90	18
Feb.	81	34	95	21	*	*	102	32	82	43	90	23
Mar.	95	41	100	25	88	39	104	32	86	50	90	37
Apr.	97	43	109	36	90	45	113	34	86	50	102	46
May	109	46	115	41	104	50	120	41	106	59	106	50
June	115	57	124	45	113	57	124	50	115	66	117	57
July	117	61	140	52	*	*	124	50	115	72	115	64
Aug.	111	57	122	46	*	*	135	41	104	77	106	68
Sept.	108	52	118	39	100	50	126	37	102	61	108	61
Oct.	106	50	115	30			117	41	102	61	102	41
Nov.	88	34	118	27			118	21	90	46	93	36
Dec.	73	23	86	21			97	28	72	34	82	25
Yearly	117	23	140	19			135	21	115	34	117	18

Month	La Ventana, Baja California				Bataques, Baja California							
	1978		1975-1978		1978		1948-1978					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.	73	48	82	32	79	34	113	16				
Feb.	77	48	90	43	81	37	99	21				
Mar.	*	*	88	41	102	43	113	25				
Apr.	90	50	97	43	95	45	118	16				
May	106	54	108	48	108	48	124	34				
June	109	63	111	59	120	59	135	43				
July	108	72	108	66	118	61	133	45				
Aug.	*	*	111	70	109	54	129	46				
Sept.	*	*	106	64	108	50	135	39				
Oct.	*	*	99	50	108	50	118	32				
Nov.	*	*	93	45	90	37	115	32				
Dec.	*	*	82	41	70	25	97	25				
Yearly			111	32	120	25	135	16				

* No record

! Estimated

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM 1978

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 Agriculture and 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	43,979
Reservation Division	12,321
Yuma Mesa	17,798
Yuma Aux. Project Unit "B" (Yuma Mesa)	3,293
South Gila Valley	10,004
North Gila Valley	5,932
Wellton-Mohawk	60,314
Coachella Valley	56,261
Imperial Valley	452,148
Warren Act	80
Non-Project lands adjacent to Colorado River	12,560
Total in United States	674,690
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 506,220
Total in United States and Mexico	1,180,910

* An estimated 33% of total acreage is served by pumping from ground water in Mexicali Valley

NEW RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder located on the left (west) bank of the river in the limits of the city of Calexico, California, 1,400 feet (427 m) downstream (north) from 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. Records computed and furnished by the District. Records available: June 1942 through 1978.

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 (43,172,000 m³) during any successive five-year period under the provisions of Minute No. 197 of the Commission.

EXTREMES: Maximum mean daily discharge, 691 second-feet (19.6 m³/sec) on December 3, 1962; minimum mean daily discharge, 2 second-feet (0.06 m³/sec) 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 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	126	218	204	156	150	119	103	109	111	127	133	123
2	131	170	224	161	158	116	102	116	117	117	130	130
3	135	135	221	165	158	120	108	118	122	104	123	128
4	142	130	209	156	158	126	108	116	125	100	124	135
5	162	134	189	155	154	118	105	120	129	104	126	132
6	163	136	179	161	152	116	100	126	131	105	134	130
7	160	153	150	159	151	115	99	118	121	109	128	126
8	163	155	153	164	153	111	101	108	121	116	120	121
9	179	144	148	169	156	102	94	112	128	112	116	122
10	219	143	154	177	155	96	93	117	128	109	116	128
11	190	132	157	185	145	97	93	118	119	116	110	135
12	174	133	155	188	141	91	92	132	108	108	105	142
13	155	136	157	183	139	93	94	137	103	105	107	152
14	151	142	155	180	140	93	108	144	106	108	105	155
15	144	147	149	186	136	93	110	136	108	112	112	152
16	150	138	149	172	130	96	113	124	113	112	114	156
17	140	135	150	185	127	97	121	130	118	112	112	173
18	148	132	148	187	128	98	116	132	121	109	118	208
19	159	128	149	225	136	98	107	131	114	109	123	261
20	154	136	154	234	136	92	103	132	108	132	132	209
21	158	136	153	209	136	95	110	114	97	161	120	181
22	164	134	148	210	136	96	110	116	98	146	115	141
23	148	140	143	204	123	100	106	111	118	175	111	134
24	147	136	144	197	128	101	110	126	130	195	159	144
25	140	137	147	181	123	104	115	128	123	203	171	159
26	132	142	150	180	124	101	114	128	124	169	162	169
27	132	154	154	178	124	101	110	136	119	151	154	165
28	140	177	152	169	120	97	108	135	125	148	127	161
29	140	149	149	165	113	103	116	118	125	140	113	150
30	159	145	145	159	111	100	120	111	128	135	118	137
31	182	151	151	120	120	114	111	111	130	130	130	130
Sum	4,787	4,033	4,990	5,400	4,261	3,085	3,303	3,810	3,538	3,979	3,738	4,689
Current Year 1978												
Month	Extreme Gage Feet **		Extreme Second-Feet				Average Second-Feet	Total	Acree-Feet			
	High	Low	Day	High	Low	Day	Acree-Feet	Average	Maximum	Minimum		
Jan.	41.04	42.00	10	219	1	126	154	9,495	7,693	20,160	1,751	
Feb.	40.93	42.06	1	218	19	128	144	7,999	6,477	17,845	1,258	
Mar.	41.13	41.91	2	224	23	143	161	9,898	7,221	12,960	1,008	
Apr.	40.85	41.87	20	234	5	155	180	10,711	7,485	14,489	1,390	
May	41.86	42.39	12	158	30	111	137	8,452	6,619	10,618	629	
June	42.19	42.64	4	126	12	91	103	6,119	5,551	9,689	1,087	
July	42.32	42.51	17	121	12	92	107	6,551	5,519	9,390	817	
Aug.	42.08	42.45	14	144	8	108	123	7,557	6,587	11,720	1,139	
Sept.	41.92	42.44	6	131	21	97	118	7,018	6,684	12,688	1,795	
Oct.	41.52	42.39	25	203	4	100	128	7,892	6,929	13,902	2,081	
Nov.	41.65	42.49	25	171	112	105	125	7,414	6,596	12,323	2,483	
Dec.	40.81	42.27	19	261	8	121	151	9,300	7,357	21,205	1,763	
Yearly	40.81	42.64		261		91	136	98,406	80,718	138,906	24,573	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	12.44	13.00		7.4		2.6	3.9	121,383	99,565	171,339	30,311	

∅ Mean daily

** Feet below mean sea level

! And other days

WASTES FROM MEXICALI POTABLE WATER PLANT TO NEW RIVER IN MEXICO

DESCRIPTION: An 11.5-foot (3.50 m) Parshall flume installed by the State Commission of Public Services of Mexicali. Located 1.2 miles (2.0 km) upstream of the pumping plant on the supply canal. Excess water discharges into an open channel, thence into a 36-inch (91 cm) diameter pipe that empties into Rivera Drain (Drain 134), which is 1.2 miles (2.0 km) below the plant and 1.2 miles (2.0 km) south of the international boundary. From this point the waste is carried by a closed concrete box conduit into New River.

RECORDS: During 1978 the mean daily flows were computed from the total inflow to the potable water plant as measured at the Parshall flume, less the water pumped to the city and the water used in the maintenance of the plant. The records are obtained and furnished by the State Commission of Public Services of Mexicali. Records available: January 1968 through December 1978.

REMARKS: The plant began operation on September 28, 1963 by the State Commission of Public Services of Mexicali. Before 1968 the flow was small and infrequent. The potable water plant obtains water from the West Main Canal, which is a part of Mexico's system of canals in the Colorado Irrigation System. Excess water discharges into a closed conduit that empties into New River 0.9 mile (1.4 km) upstream of the international boundary.

EXTREMES: Maximum instantaneous discharge, 81.9 second-feet (2.32 m³/sec) on March 26, 1969; minimum instantaneous discharge, zero during several days in 1977 and 1978.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	2.8	2.1	1.8	2.1	2.1	5.3	2.8	1.8	3.2	2.1	1.4
2	1.8	0	1.4	3.2	1.8	2.1	2.1	2.8	1.8	4.6	2.1	2.5
3	2.1	0	1.8	2.1	.7	2.1	2.1	2.1	1.8	2.1	2.1	0
4	2.1	2.1	1.8	2.1	0	2.1	2.1	2.1	2.8	2.1	2.8	2.1
5	2.1	3.9	1.8	.4	2.8	2.1	2.1	2.1	3.2	2.1	3.9	2.1
6	2.1	4.6	1.4	3.2	0	2.1	2.8	2.1	3.2	2.1	0	2.1
7	2.1	3.2	2.1	1.1	0	2.8	2.1	2.1	3.2	2.1	0	2.5
8	2.1	2.1	2.1	2.1	2.8	3.2	2.1	2.1	1.8	3.9	6.0	2.1
9	1.8	4.6	1.4	2.8	2.1	2.1	2.1	0	3.2	2.1	1.1	2.1
10	6.7	2.1	0	2.1	2.8	1.8	1.8	2.8	3.2	2.1	1.1	2.1
11	3.9	1.8	1.8	2.8	2.1	1.8	2.1	4.6	.7	2.1	0	2.1
12	2.1	3.9	3.9	3.2	2.1	2.1	2.1	2.1	0	2.1	1.1	2.1
13	2.1	3.2	2.1	2.1	2.1	2.1	.7	2.1	1.8	2.8	1.1	.7
14	2.1	2.1	2.1	2.1	.7	2.1	2.1	1.8	2.1	1.8	2.8	2.1
15	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.8	2.1	1.8	2.1	2.1
16	2.1	2.8	1.8	2.1	3.2	1.8	2.1	0	2.1	2.8	2.8	2.1
17	2.1	2.1	0	2.1	3.2	2.1	2.1	2.1	2.1	2.1	1.4	2.5
18	2.1	2.1	2.1	2.8	3.9	2.8	2.1	2.8	2.1	2.8	1.1	2.8
19	2.1	2.8	2.1	2.1	2.1	2.8	2.1	1.8	2.1	2.1	1.1	1.4
20	3.2	0	2.1	2.1	2.1	2.1	.7	.7	0	.7	2.1	2.1
21	3.9	2.1	2.1	2.1	2.8	2.1	0	0	1.1	2.1	2.1	2.1
22	3.9	2.1	2.1	2.1	2.1	3.2	0	3.9	3.9	1.1	2.1	2.1
23	3.2	0	2.1	2.1	1.8	2.1	3.9	1.8	2.1	2.1	2.1	1.4
24	1.8	2.1	2.1	2.1	3.2	2.1	3.9	1.1	2.1	2.1	1.1	1.4
25	1.8	5.7	2.1	2.1	2.8	2.1	4.6	1.1	2.1	2.1	2.5	2.1
26	2.1	0	4.6	4.9	2.1	2.1	4.6	1.1	1.1	3.2	1.4	1.8
27	2.1	2.1	2.1	1.8	2.1	2.8	0	2.1	2.8	2.1	2.5	1.1
28	2.1	1.8	2.8	2.1	2.1	2.8	0	2.8	3.2	2.1	2.1	1.8
29	3.9	2.1	1.8	1.8	0	2.1	2.1	2.1	2.1	2.1	0	1.8
30	1.8	1.8	1.8	1.8	1.1	2.8	4.9	2.1	2.1	2.1	2.5	1.8
31	2.1		2.1		3.2		2.1	0		2.1		1.8
Sum	77.3	64.3	62.2	67.5	62.2	68.9	69.2	59.0	63.6	71.0	55.1	58.3
Current Year 1978								Period 1968-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			10	6.7	1	1.8	2.5	153	258	520	153	
Feb.			25	5.7	2	0	2.3	127	216	311	127	
Mar.			26	4.6	10	0	2.0	123	298	871	123	
Apr.			26	4.9	5	.4	2.2	134	274	431	134	
May			18	3.9	4	0	2.0	123	304	435	123	
June			18	3.2	10	1.8	2.3	136	269	409	116	
July			1	5.3	12	0	2.2	137	346	528	137	
Aug.			11	4.6	9	0	1.9	117	370	596	117	
Sept.			22	3.9	12	0	2.1	126	362	549	114	
Oct.			2	4.6	20	.7	2.3	141	327	507	139	
Nov.			8	6.0	6	0	1.8	109	276	504	109	
Dec.			18	2.8	3	0	1.9	116	276	597	115	
Yearly			6.7				0	2.1	1,544	3,578	5,359	1,544
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
		0.19				0	0.06	1,904	4,413	6,610	1,904	

! And other days

Ø Mean daily

WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

DESCRIPTION: During 1978 the only flow to the New River in Mexico was from the Mexicali Potable Water Plant, which discharges into Rivera Drain (Drain 134), and thence to New River. There were no discharges during 1978 from Wisteria Wasteway, located 4.3 miles (7.0 km) upstream from the international boundary in Colonia Wisteria.

RECORDS: Records of the Potable Water Plant are based on flows measured on a Parshall flume less pumping to the city. Records obtained and furnished by the State Commission of Public Services of Mexicali. Records available: Wisteria Wasteway, January 1951 through 1975; Sifon Wasteway, January 1952 through April 30, 1964; Pueblo Nuevo Wasteway, January 1956 through 1965; and the Potable Water Plant, January 1968 through December 1978.

REMARKS: To obtain data for Sifon and Pueblo Nuevo Wasteways, see bulletins 1 to 6 (1960-1965) and for Wisteria Wasteway, bulletins 1 to 16 (1960-1975). For data on wastes from Potable Water Plant, see page 57 of this bulletin.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1956-1978		
		Average	Maximum	Minimum
January	153	1,237	8,758	15.4
February	127	829	7,281	19.6
March	123	546	2,610	21.7
April	134	429	2,843	16.1
May	123	330	1,141	9.1
June	136	261	1,477	0
July	137	237	528	0
August	117	380	1,413	0
September	126	422	2,081	21.0
October	141	645	3,474	8.4
November	109	715	3,784	0
December	116	1,140	8,691	0
Yearly	1,544	7,171	27,430	399
	Thousands of Cubic Meters			
	1,904	8,845	33,835	492

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 (24.9 km) northwest of Westmoreland, Imperial County, California. The Salton Sea is the sink of a closed basin which has a drainage area of 8,360 square miles (21,652 km²). Zero of the gage is 250.00 feet (76.2 m) below mean sea level, U. S. C. & G. S. datum.

RECORDS: Records of water surface elevations available from November 1904 through 1978. From January 1925 to October 22, 1951, once monthly records of elevations were collected by Imperial Irrigation District from a bench mark at Figtree John's Spring, about 22 miles (35.4 km) 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 (0.30 m) higher than that of the present station. All records reported below and the area and capacity table are adjusted to the datum of the present station.

REMARKS: Runoff from the basin, irrigation drainage and waste water from Imperial and Coachella Valleys in the United States, and drainage and waste water from part of the Mexicali Valley in Mexico discharge into the Salton Sea. Water from Mexico enters the United States in the Alamo and New River channels. The bottom of the sea is 277.7 feet (84.6 m) below mean sea level, U. S. C. & G. S. datum.

EXTREMES: Maximum elevation during year, 228.2 feet (69.6 m) below mean sea level. Minimum elevation during year, 229.4 feet (69.9 m) below mean sea level. Extremes for period of record, maximum elevation 195.9 feet (59.7 m) below mean sea level, February 10 to March 29, 1907; minimum elevation since 1906, 251.6 feet (76.7 m) below mean sea level in November 1924.

Mean Daily Water Surface Elevation in Feet below Mean Sea Level - 1978

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 229.0	228.9	228.6	228.4	228.3	228.3	228.5	228.7	229.0	229.3	229.4	229.4
2	* 229.0	* 228.8	228.6	228.4	228.3	228.3	228.5	228.7	229.0	229.3	229.4	229.4
3	* 229.0	228.8	228.6	228.4	228.3	228.3	228.5	228.7	229.0	229.3	229.4	229.4
4	* 229.0	228.8	228.6	228.4	228.3	228.3	228.5	228.7	229.0	* 229.3	229.4	229.4
5	* 229.0	228.8	228.6	* 228.4	228.2	228.3	228.6	228.7	* 229.0	229.3	229.4	229.4
6	* 229.0	228.8	228.6	228.4	228.2	228.3	228.6	228.7	229.0	229.3	229.4	229.4
7	* 229.0	228.8	228.6	228.3	228.2	228.3	228.6	228.7	229.1	229.3	229.4	* 229.3
8	* 229.0	228.8	228.6	228.3	228.2	228.3	228.6	228.7	229.1	229.3	229.4	229.3
9	* 229.0	228.8	228.6	228.3	228.2	228.3	228.6	228.7	229.1	229.3	229.4	229.3
10	* 228.9	228.8	* 228.6	228.3	* 228.2	228.3	228.6	228.7	229.1	229.4	229.4	229.3
11	* 228.9	228.8	228.6	228.3	228.2	228.3	228.6	228.7	229.1	229.4	229.4	229.3
12	* 228.9	228.8	228.6	228.3	228.2	228.3	228.6	228.7	229.1	229.4	229.4	229.3
13	* 228.9	228.8	228.6	228.3	228.2	228.3	* 228.6	228.7	229.1	229.4	229.4	229.3
14	* 228.9	228.8	228.6	228.3	228.2	228.3	228.6	228.8	229.1	229.4	229.4	229.3
15	* 228.9	228.7	228.5	228.3	228.2	* 228.4	228.6	228.8	229.1	229.4	* 229.4	229.3
16	* 228.9	228.7	* 228.5	228.3	228.3	228.4	228.6	* 228.8	229.1	229.4	229.4	229.3
17	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.8	229.1	229.4	229.4	229.2
18	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.8	229.2	229.4	229.4	229.2
19	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.9	229.2	229.4	229.4	229.2
20	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.9	229.2	229.4	229.4	229.2
21	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.9	229.2	229.4	229.4	229.2
22	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.9	229.2	229.4	229.4	229.2
23	* 228.9	228.7	228.5	228.3	228.3	228.4	228.6	228.9	229.2	229.4	229.4	229.2
24	* 228.9	228.7	228.5	228.3	228.3	228.4	228.7	228.9	229.2	229.4	229.4	229.2
25	* 228.9	228.7	228.5	228.3	228.3	228.4	228.7	228.9	229.2	229.4	229.4	229.2
26	* 228.9	228.7	228.4	228.3	228.3	228.4	228.7	229.0	229.2	229.4	229.4	229.2
27	* 228.9	228.7	228.4	228.3	228.3	228.5	228.7	229.0	229.2	229.4	229.4	229.2
28	* 228.9	228.6	228.4	228.3	228.3	228.5	228.7	229.0	229.2	229.4	229.4	229.1
29	* 228.9		228.4	228.3	228.3	228.5	228.7	229.0	229.3	229.4	229.4	229.1
30	* 228.9		228.4	228.3	228.3	228.5	228.7	229.0	229.3	229.4	229.4	229.1
31	* 228.9		228.4		228.3		228.7	229.0		229.4		229.1
Avg.	228.9	228.8	228.5	228.3	228.3	228.4	228.6	228.8	229.1	229.4	229.4	229.3

Month	Current Year 1978		Period 1935-1978		
	Extreme Elevation Feet		Elevation Feet		
	High	Low	# Average	Maximum	! Minimum
Jan.	228.9	229.0	237.40	228.9	249.3
Feb.	228.6	228.9	237.08	228.6	248.8
Mar.	228.4	228.6	236.82	228.4	248.6
Apr.	228.3	228.4	236.63	228.3	248.7
May	228.2	228.3	236.62	228.2	248.5
June	228.3	228.5	236.77	228.3	248.8
July	228.5	228.7	236.93	228.5	249.1
Aug.	228.7	229.0	237.12	228.4	249.4
Sept.	229.0	229.3	237.31	228.6	249.4
Oct.	229.3	229.4	237.37	229.2	249.8
Nov.	229.4	229.4	237.38	229.2	250.0
Dec.	229.1	229.4	237.25	229.0	249.6
Yearly	228.2	229.4	237.06	# 228.3	250.0

Area and Capacity Table		
Elevation	Area	Capacity
Feet Below M.S.L.	Acres	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

* Estimated

Ø Mean daily

Mean monthly

! Reading near first day of month

CHEMICAL ANALYSES OF WATER SAMPLES 1978

The tables below are based on quarterly samples from the Alamo River taken and analyzed by the State of California Department of Water Resources. Beginning December 1971, not all constituents analyzed. New River samples are collected monthly and analyzed by the U. S. Geological Survey.

Samples from the Alamo River are taken north of the international boundary at upstream end of box culvert under the All-American Canal. Flow at this point includes drainage flows across international boundary and flows from drain intercepts along toe of south bank of All-American Canal. Samples from New River are taken from the right bank at road bridge 450 feet north of international boundary. Records of sampling extend from April 1951 through 1978.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na 22.99; (CO₃ plus HCO₃) expressed as CO₃, 30.00; SO₄, 48.03; Cl, 35.45; NO₃, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as EC x 10⁶ at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		EC x 10 ⁶ @ 25° C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO ₃ + HCO ₃	SO ₄	Cl	NO ₃

Alamo River

Jan.	1	5.40	653	6,110		8.1							22.27	35.25	
Feb.															
Mar.	1	5.22	673	5,560		8.4							22.48	33.84	
Apr.															
May															
June	1	4.34	434	4,740		8.1							20.17	26.11	
July															
Aug.															
Sept.	1	4.13	413	4,330		8.1							18.83	23.58	
Oct.															
Nov.															
Dec.	1	4.55	491	4,970		8.4							20.90	27.86	

New River

Jan.	2	5.96	56,600	7,160		7.8	65	69	13.67	11.55	47.52	5.21	17.28	51.13	
Feb.	1	5.41	43,300	7,320		7.6	67	73	11.88	9.70	43.93	4.36	14.05	48.66	
Mar.	1	6.51	64,400	7,780		7.1	69	72	13.17	11.02	53.50	5.21	17.49	57.83	
Apr.	2	6.78	72,600	7,820		7.8	63	70	16.32	14.47	53.28	5.51	19.99	58.17	
May	2	6.75	57,100	7,840		7.8	67	70	14.57	13.24	55.68	5.18	19.47	58.53	
June	2	6.78	41,500	8,020		7.2	68	71	14.27	12.83	56.33	5.05	18.99	59.58	
July	2	7.08	46,400	8,440		7.8	71	76	13.72	11.68	61.64	5.08	16.34	67.98	
Aug.	2	7.58	57,300	8,580		7.4	73	76	14.27	10.61	65.99	5.18	17.01	72.16	
Sept.	1	6.10	42,800	6,860		7.4	70	72	11.28	9.46	48.85	4.98	15.93	52.67	
Oct.	5	6.06	47,800	6,560		7.4	71	74	11.63	8.80	51.07	4.85	14.93	55.57	
Nov.	2	7.56	56,000	8,430		7.5	74	77	13.22	10.03	66.99	5.11	15.93	71.23	
Dec.	3	6.90	64,200	8,280		7.5	72	76	12.92	9.79	59.81	5.05	15.72	64.40	

** Percent of total cations

*** Percent of total anions

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES 1978

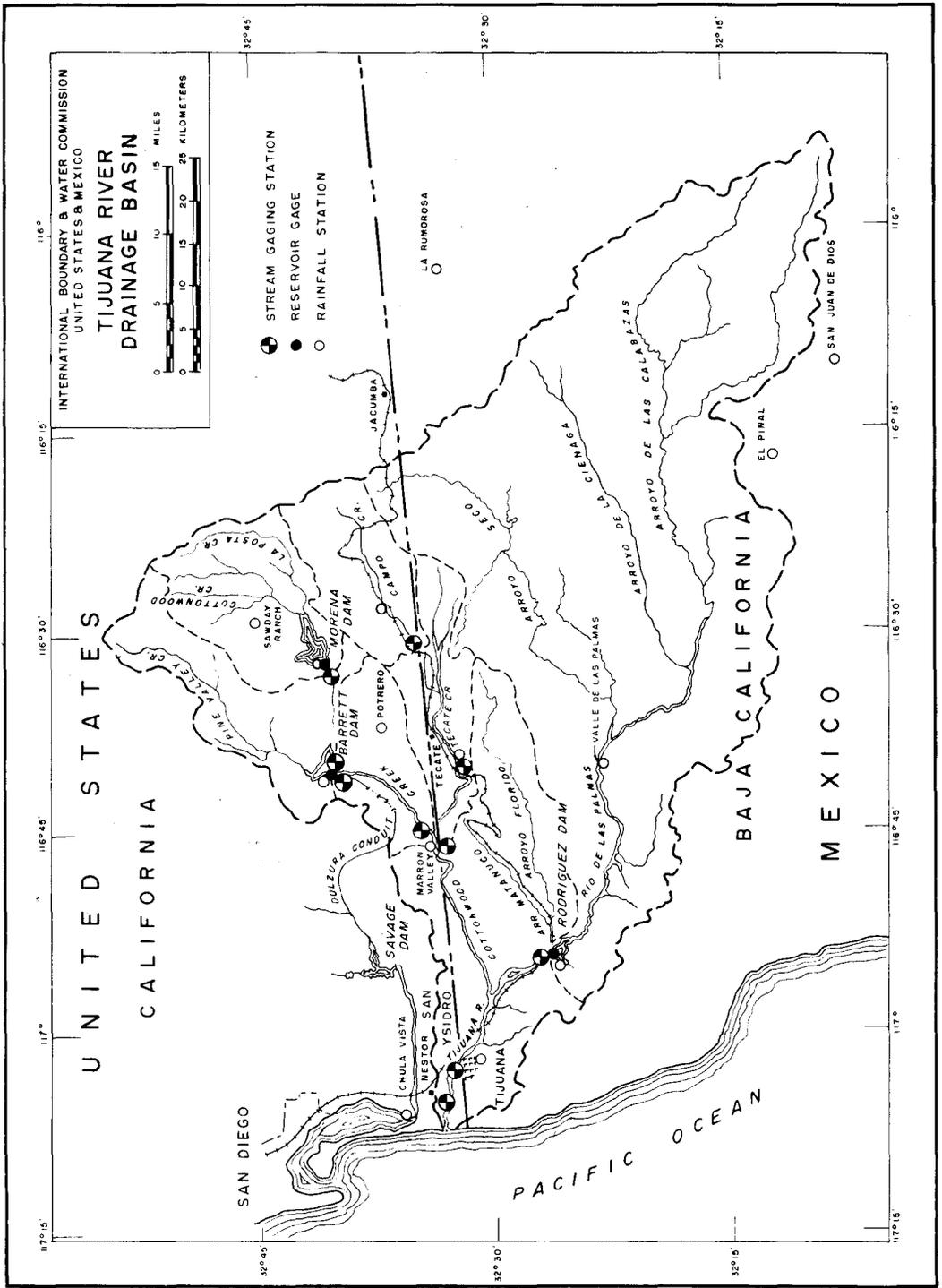
The following table shows electrical conductivity, expressed in mhos per centimeter $\times 10^6$ at 25°C , of individual water samples from the New River in Mexico at the international boundary. Samples were taken by the Mexican Section of the Commission, who also made the determinations.

Electrical conductivity is a relative indication of the concentration of dissolved solids in the water samples.

Date	EC $\times 10^6$ @ 25°C												
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New River at International Boundary

January	February	April	May	July	August	October	November
3 6,800	14 6,670	4 6,990	23 6,890	3 6,920	15 7,590	3 6,850	21 7,920
10 6,000	21 6,350	11 7,070	30 7,100	11 8,600	22 8,010	10 8,470	28 6,960
17 6,090	28 6,700	18 7,010		18 8,520	29 7,830	17 7,920	December
24 6,300	March	25 7,250	6 7,200	25 8,300	September	24 7,010	5 7,600
31 6,610	7 6,950	May	13 7,030	August	4 6,990	31 7,200	12 7,210
February	14 7,050	2 7,090	20 6,990	1 8,150	12 7,010	November	19 7,050
1 6,500	21 6,830	8 7,040	27 6,890	8 7,800	19 7,450	7 7,630	26 7,400
7 6,200	28 7,200	16 6,700			26 6,870	14 7,020	



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 (2.9 km) upstream from the mouth of Hauser Creek, 8.5 miles (13.7 km) upstream from Barrett Dam, and about 20 miles (32.2 km) upstream from the international boundary. The zero of the gage is 2,882.4 feet (878.56 m) 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, California. Records April 1911 through 1978.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1978 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 the present crest of ungated spillway is 157.00 feet (47.85 m), gage datum. Reservoir capacity at spillway crest, 1948 survey, is 50,210 acre-feet (61,934,000 m³). 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 (45,886,000 m³), January 1916; minimum no flow during parts of many years.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1937-1978		
		Average	Maximum	Minimum
January	329	399	3,520	0
February	2,349	1,009	16,700	8.0
March	8,818	1,650	13,220	19.3
April	2,772	968	11,490	3.3
May	679	334	3,550	0
June	79.0	165	1,660	0
July	0	114	1,010	0
August	37.0	84.7	1,260	0
September	15.3	58.8	1,070	0
October	2.0	68.6	1,270	0
November	166	129	1,380	0
December	278	417	3,590	4.4
Yearly	15,524	5,397	39,439	121
	Thousands of Cubic Meters			
	19,149	6,657	48,648	149

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 (1.3 km) 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, California. Records available: January 1911 through 1978.

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 (26,397,000 m³), February 1916; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1937-1978		
		Average	Maximum	Minimum
January	0	104	1,700	0
February	0	290	4,260	0
March	4,113	334	4,113	0
April	0	719	12,950	0
May	0	196	3,040	0
June	0	270	7,360	0
July	0	154	2,340	0
August	264	134	1,550	0
September	0	251	5,880	0
October	0	75.4	529	0
November	0	101	1,260	0
December	0	278	5,350	0
Yearly	4,377	2,906	24,825	0
	Thousands of Cubic Meters			
	5,399	3,585	30,621	0

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 (13.7 km) downstream from Morena Dam, 1 mile (1.6 km) downstream from the mouth of Pine Valley Creek and about 12 miles (19.3 km) upstream from the international boundary. Zero of gage is 1,446.12 feet (440.78 m) 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 1978. 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, California. Capacity of reservoir at top of flash gates on spillway (gage height 168.88 feet (51.47 m)) is 44,755 acre-feet (55,205,000 m³). Capacity at spillway crest (gage height 160.88 feet (49.04 m)) is 37,950 acre-feet (46,811,000 m³). Dead storage, 719 acre-feet (887,000 m³) below lowest outlet (gage height 58.88 feet (17.95 m)) 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 (67,595,000 m³) February 1927; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1937-1978		
		Average	Maximum	Minimum
January	1,071	538	3,430	5.2
February	3,808	1,491	26,790	7.6
March	19,305	2,818	19,305	14.1
April	4,116	1,638	21,630	10.2
May	1,702	514	5,130	0
June	583	211	1,730	0
July	167	133	1,010	0
August	152	77.0	579	0
September	28.0	87.3	759	0
October	39.0	54.3	645	.1
November	478	126	1,200	0
December	1,093	444	3,380	1.7
Yearly	32,542	8,132	59,387	129
	Thousands of Cubic Meters			
	40,140	10,031	73,253	159

DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder 0.5 mile (0.8 km) downstream from Barrett Dam on right bank of Dulzura Conduit 50 feet (15.2 m) 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 city of San Diego, California. Records available: January 1909 through 1978.

REMARKS: Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 1.5 miles (2.4 km) 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 (12.9 km) 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 loss in the reach from the reservoir to the gaging station.

EXTREMES: Since 1937: Maximum mean daily discharge, 55 second-feet (1.56 m³/sec) on March 15, 1954; minimum discharge, no flow for long periods on many occasions.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	21.0	28.8	33.4	32.6	28.4	23.3	25.3
2	0	0	0	0	0	22.5	28.6	33.4	32.4	28.4	23.3	25.3
3	0	0	0	0	0	22.5	28.6	33.4	32.0	28.0	23.3	25.3
4	0	0	0	0	0	22.5	28.6	33.2	31.7	24.3	23.3	25.3
5	0	0	0	0	0	22.5	28.6	33.4	31.7	24.1	23.3	25.1
6	0	0	0	0	0	22.7	31.1	33.7	0	24.5	23.3	25.1
7	0	0	0	0	0	24.3	31.1	33.7	0	24.3	23.3	25.1
8	0	0	0	0	0	26.3	30.7	34.1	0	24.5	23.3	25.1
9	0	0	0	0	5.4	26.5	30.7	34.5	0	24.3	23.3	25.1
10	0	0	0	0	8.0	26.7	30.7	33.9	0	24.7	23.3	25.1
11	0	0	0	0	8.0	27.1	30.5	33.7	0	24.7	22.9	25.1
12	0	0	0	0	7.8	27.3	30.3	33.7	0	25.1	22.9	25.1
13	0	0	0	0	0	29.4	30.3	33.9	0	25.1	22.9	25.1
14	0	0	0	0	0	28.8	30.3	33.9	0	25.1	22.9	25.1
15	0	0	0	0	0	28.6	30.1	33.4	27.8	25.1	22.9	25.1
16	0	0	0	0	0	28.6	30.1	32.8	30.9	24.3	25.3	25.1
17	0	0	0	0	0	28.6	30.1	32.6	30.7	24.3	25.3	25.1
18	0	0	0	0	0	29.0	29.8	32.6	30.7	24.3	25.3	25.1
19	0	0	0	0	0	29.4	0	32.4	30.7	24.3	25.3	25.3
20	0	0	0	0	0	29.6	19.5	32.4	32.6	24.1	25.3	25.5
21	0	0	0	0	0	29.8	19.5	32.4	32.6	23.9	25.3	25.5
22	0	0	0	0	0	29.0	22.5	32.4	32.6	23.9	25.3	25.5
23	0	0	0	0	0	28.4	22.5	32.4	32.6	23.9	25.3	25.5
24	0	0	0	0	17.6	28.2	22.5	32.4	32.6	23.3	25.3	25.1
25	0	0	0	0	15.5	27.8	25.1	32.4	32.6	23.3	25.3	25.7
26	0	0	0	0	16.2	27.5	28.0	32.4	0	23.3	25.3	25.7
27	0	0	0	0	16.2	29.0	28.0	32.4	0	23.3	25.3	25.7
28	0	0	0	0	16.2	29.0	30.9	32.6	0	23.1	25.3	25.7
29	0	0	0	0	16.6	29.2	33.1	32.4	21.0	22.9	25.3	25.7
30	0	0	0	0	16.7	29.0	33.1	32.4	21.9	23.5	25.3	25.7
31	0	0	0	0	18.2		33.1	32.4		23.5		25.7
Sum	0	0	0	0	162.4	810.8	856.8	1,024.7	549.7	759.8	727.0	785.5
	0	0	0	0	162.4	810.8	856.8	1,024.7	549.7	759.8	727.0	785.5
	Current Year 1978							Period 1937-1978				
Month	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		0	0	0	338	2,350	0	
Feb.				0		0	0	0	346	2,130	0	
Mar.				0		0	0	0	508	2,330	0	
Apr.				0		0	0	0	795	2,860	0	
May			31	18.2	! 1	0	5.2	322	886	3,040	0	
June			21	29.8	1	21.0	27.0	1,608	929	2,920	0	
July			129	33.1	19	0	27.6	1,699	768	2,920	0	
Aug.			9	34.5	! 19	32.4	33.1	2,032	658	2,820	0	
Sept.			! 1	32.6	! 6	0	18.3	1,090	420	2,320	0	
Oct.			! 1	28.4	29	22.9	24.5	1,507	337	2,450	0	
Nov.			116	25.3	! 11	22.9	24.2	1,442	450	2,760	0	
Dec.			124	25.7	! 5	25.1	25.3	1,558	421	2,305	0	
Yearly				34.5		0	15.4	11,258	6,856	27,170	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				0.98		0	0.44	13,887	8,457	33,514	0	

0 Mean daily

! And other days

COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located about 2.5 miles (4.0 km) downstream from Barrett Dam and 0.5 mile (0.8 km) 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 (305 m) (from topographic map).

RECORDS: Data furnished by the city of San Diego, California. Prior to January 1953, the records were furnished by the city of San Diego and reviewed and revised by the United States Section of the 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 1978. 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 (47,366,000 m³) February 1927; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1937-1978		
		Average	Maximum	Minimum
January	0	14.3	590	0
February	0	24.4	990	0
March	0	659	13,390	0
April	0	968	33,400	0
May	0	219	7,520	0
June	0	30.9	890	0
July	0	1.7	21	0
August	0	1.5	21	0
September	0	1.2	21	0
October	0	1.1	21	0
November	0	.8	15	0
December	0	1.3	21	0
Yearly	0	1,923	50,364	0
	Thousands of Cubic Meters			
	0	2,372	61,123	0

COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located 1.6 miles (2.6 km) upstream from the international land boundary between the United States and Mexico, 0.8 mile (1.3 km) upstream from the confluence with Tecate Creek, and 5.1 miles (8.2 km) 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 (213 m) downstream from the gage. Zero of the gage is 569.40 feet (173.55 m) 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. Records available: October 1936 through 1978.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 (16.1 km) and 18 miles (29.0 km), respectively, upstream from this station. During 1978 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 (123 m³/sec) February 7, 1937 (gage height 9.65 feet) (2.94 m), from rating curve extended above 1,500 second-feet (42.5 m³/sec) by logarithmic plotting. Minimum discharge, no flow during part of each year.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	1.4	776	41	13	0.75	0	0	0	0	0	0.34
2	0	.80	600	33	19	.69	0	0	0	0	0	.48
3	0	.50	365	28	14	.55	0	0	0	0	0	.31
4	0	.30	244	24	10	.47	0	0	0	0	0	.27
5	0	.4	589	22	8.5	.46	0	0	0	0	0	.32
6	0	12	303	20	7.2	.48	0	0	0	0	0	.36
7	0	15	205	33	5.7	.47	0	0	0	0	0	.29
8	0	18	161	31	4.9	.42	0	0	0	0	0	.26
9	0	26	140	28	4.6	.33	0	0	0	0	0	.29
10	.36	98	145	23	4.1	.29	0	0	0	0	0	.32
11	1.9	80	138	19	3.8	.26	0	0	0	0	0	.30
12	.82	56	278	17	3.7	.21	0	0	0	0	0	.30
13	.42	158	192	15	3.5	.18	0	0	0	0	0	.30
14	1.6	195	146	14	3.3	.14	0	0	0	0	0	.30
15	150	108	119	14	3.3	.11	0	0	0	0	0	.33
16	26	64	99	18	3.4	.08	0	0	0	0	0	.33
17	138	43	85	17	2.9	.04	0	0	0	0	0	3.5
18	34	30	75	13	2.2	0	0	0	0	0	0	13
19	29	22	68	11	1.8	0	0	0	0	0	0	20
20	24	17	63	10	2.0	0	0	0	0	0	0	8.6
21	16	14	58	9.8	2.3	0	0	0	0	0	0	4.5
22	12	11	53	8.9	2.7	0	0	0	0	0	0	3.2
23	8.5	8.9	49	7.5	3.1	0	0	0	0	0	0	2.5
24	6.0	7.9	43	6.2	3.1	0	0	0	0	0	2.2	2.1
25	4.4	7.0	36	7.1	3.0	0	0	0	0	0	.88	1.9
26	3.4	6.6	32	7.4	2.7	0	0	0	0	0	.45	1.7
27	2.5	8.7	30	7.0	2.4	0	0	0	0	0	.34	1.6
28	1.5	50	27	6.7	2.0	0	0	0	0	0	.27	1.6
29	1.1	25	25	6.7	1.4	0	0	0	0	0	.24	1.5
30	2.3	25	25	6.8	.90	0	0	0	0	0	.24	1.4
31	3.0	42	42		.75	0	0	0	0	0		1.2
Sum	466.80	1,063.10	5,211	505.1	145.25	5.93	0	0	0	0	4.62	73.40
Current Year 1978								Period 1937-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total	Acre-Feet			
	High	Low	Day	High	Day	Low	Acre-Feet	Average	Maximum	Minimum		
Jan.			15	150	1	0	15.1	926	190	1,190	0	
Feb.			14	195	4	.30	38.0	2,109	592	9,940	0	
Mar.			1	776	129	25	168	10,336	1,695	20,880	0	
Apr.			1	41	124	6.2	16.8	1,002	1,373	40,240	0	
May			2	19	31	.75	4.59	288	319	10,040	0	
June			1	.75	118	0	.20	11.8	60.0	1,590	0	
July				0	0	0	0	0	6.6	206	0	
Aug.				0	0	0	0	0	.3	7.7	0	
Sept.				0	0	0	0	0	1.7	72	0	
Oct.				0	0	0	0	0	3.3	101	0	
Nov.			24	2.2	1	1	0	.15	19.0	440	0	
Dec.			19	20.0	8	.26	2.37	146	124	1,316	0	
Yearly				776		0	20.4	14,828	4,384	66,700	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				22.0		0	0.58	18,290	5,408	82,274	0	

0 Mean daily

1 And other days

COTTONWOOD CREEK NEAR INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and cableway, 0.6 mile (1.0 km) upstream from the international land boundary between the United States and Mexico, 0.5 mile (0.8 km) downstream from the confluence of Cottonwood Creek and Tecate Creek, and 5.5 miles (8.9 km) south of Dulzura, California. Low water discharge measurements are made by wading at the gage. The zero of the gage is 542.42 feet (165.33 m) 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. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1978.

REMARKS: Flow is partially controlled by Barrett and Morena Reservoirs, 11 (17.7 km) and 19 miles (30.6 km), respectively, upstream from this station. The flow at this station represents the amount of water passing the Harron Dam site.

EXTREMES: Maximum discharge, 4,700 second-feet (133 m³/sec), February 7, 1937 (gage height 8.50 feet) (2.59 m) from rating curve extended above 300 second-feet (8.50 m³/sec) on basis of velocity, mean depth and area computations. Minimum discharge, no flow for part of most years.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.18	1.5	1,750	78	21	0.80	0.20	0.20	0.18	0.19	0.19	4.0
2	.18	.88	1,300	52	27	.70	.20	.20	.16	.17	.16	5.3
3	.18	.59	900	41	19	.60	.20	.20	.14	.20	.16	3.7
4	.18	.40	600	34	14	.50	.20	.19	.13	.13	.13	3.4
5	.18	4.3	1,300	33	12	.50	.20	.20	.18	.17	.13	3.9
6	.18	18	800	30	10	.50	.20	.20	.19	.17	.10	4.0
7	.18	21	500	72	7.6	.50	.20	.20	.20	.16	.08	3.5
8	.18	32	350	58	6.3	.45	.20	.21	.18	.15	.05	3.1
9	.20	45	320	46	5.8	.35	.20	.20	.16	.15	.05	3.1
10	9.2	172	330	36	4.7	.30	.20	.19	.16	.16	.08	3.1
11	7.1	132	310	29	4.0	.30	.20	.19	.18	.16	.66	2.8
12	1.9	86	710	26	3.8	.25	.20	.19	.18	.17	5.4	2.7
13	1.1	299	450	23	3.6	.20	.20	.19	.20	.17	2.2	2.6
14	2.1	286	250	22	3.4	.20	.20	.18	.20	.17	6.1	2.7
15	349	146	170	22	3.4	.20	.20	.18	.21	.16	3.5	2.8
16	50	94	130	30	3.5	.20	.20	.17	.48	.15	2.5	2.9
17	274	74	120	25	3.0	.20	.20	.16	.30	.16	2.7	24
18	63	55	110	20	2.3	.20	.20	.13	.25	.18	2.8	41
19	58	44	95	18	1.9	.20	.20	.16	.25	.18	2.8	49
20	49	34	90	16	2.1	.20	.20	.16	.21	.21	2.2	19
21	33	28	80	16	2.4	.20	.20	.14	.25	.30	2.6	11
22	24	23	75	16	2.8	.20	.20	.12	.20	.30	4.2	8.8
23	16	19	70	14	3.2	.20	.20	.11	.24	.26	3.7	7.3
24	8.1	16	59	12	3.2	.20	.20	.13	.21	.22	17	6.2
25	5.2	14	48	13	3.1	.20	.20	.17	.19	.23	11	5.5
26	3.8	13	41	13	2.8	.20	.20	.15	.20	.21	6.0	4.8
27	2.5	17	38	13	2.5	.20	.20	.17	.20	.19	4.6	4.6
28	1.7	73	36	13	2.1	.20	.20	.18	.18	.19	4.1	4.6
29	1.2	34	13	13	1.5	.20	.20	.18	.18	.17	3.8	4.5
30	2.5	36	14	14	1.0	.20	.20	.20	.14	.22	3.7	4.3
31	3.6	97	93		.90		.20	.19		.20		4.1
Sum	967.64	1,748.67	11,195	848	183.90	9.35	6.20	5.44	6.13	5.85	92.69	252.3
Current Year 1978												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1937-1978			
	High	Low	Day	High	Low	Average			Maximum	Minimum		
Jan.			15	349	1	0.18	31.2	1,919	408	2,750	0	
Feb.			13	299	4	.40	62.5	3,468	1,059	13,680	0	
Mar.			1	1,750	29	34	36.1	22,205	2,850	27,140	0	
Apr.			1	78	24	12	28.3	1,682	1,889	51,060	0	
May			2	27	31	.90	5.93	365	476	14,110	0	
June			1	.80	113	.20	.31	18.5	98.3	2,630	0	
July			1	.20	1	.20	.20	12.3	17.0	312	0	
Aug.			8	.21	23	.11	.18	10.8	6.6	171	0	
Sept.			16	.48	4	.13	.20	12.2	9.4	152	0	
Oct.			121	.30	4	.13	.19	11.6	21.2	705	0	
Nov.			24	17	1	.05	3.09	184	55.7	839	0	
Dec.			19	49	13	2.6	8.14	500	316	3,330	0	
Yearly				1,750		0.05	42.0	30,388	7,206	97,900	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				49.6		0	1.19	37,483	8,889	120,759	0	

Ø Mean daily

! And other days

INFLOWS TO RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

DESCRIPTION: Rodriguez Dam is located in Mexico on Rio de las Palmas, the principal tributary to the Tijuana River, about 5.6 miles (9.0 km) upstream from its confluence with Cottonwood Creek, 10.6 miles (17.0 km) upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 9.9 miles (16.0 km) southeast of Tijuana, Baja California.

RECORDS: Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, rainfall and including Emergency Deliveries of Colorado River Water to Tijuana beginning in August 1972. The Emergency Deliveries of Colorado River Water to Tijuana are made pursuant to Minute 240 of this Commission. Records obtained by the Ministry of Agriculture and Hydraulic Resources through May 1961; from June 1961 through March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California, and from April 1966 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1978. 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 (115.85 m) above mean sea level; at top of spillway gates 410.10 feet (125.00 m) above mean sea level. Reservoir capacity at spillway crest 76,210 acre-feet (94,000,000 m³); at top of spillway gates 111,070 acre-feet (137,000,000 m³).
EXTREMES: Maximum monthly inflow, 77,790 acre-feet (95,953,000 m³); April 1941; minimum, no flow during part of most years.

Monthly Discharge in Acre-Feet

Month	Current Year 1978			Period 1938-1978		
	Natural Inflow	*Otay Aqueduct	Total	Average	Maximum	Minimum
January	5,849	48.5	5,898	879	6,569	0
February	12,234	13.5	12,248	2,334	41,295	5.8
March	64,654	.16	64,654	6,572	68,321	4.2
April	5,255	0	5,255	2,719	77,790	0
May	73.5	0	73.5	340	9,962	0
June	0	0	0	68.3	891	0
July	0	0	0	75.2	326	0
August	0	0	0	54.8	770	0
September	32.3	0	32.3	60.6	466	0
October	7.2	0	7.2	70.0	344	0
November	208	0	208	152	1,940	0
December	567	0	567	800	15,686	8.4
Yearly	88,881	62.2	88,944	14,127	177,668	254
	Thousands of Cubic Meters					
	109,634	76.7	109,711	17,425	219,151	313

* Inflow from the supply of water from Otay Aqueduct for the city of Tijuana

DIVERSIONS FROM RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

DESCRIPTION: Sparling flow meter located immediately below the dam in the pipeline which carries water from Rodriguez Reservoir to Gate No. 1 (Poblado Presa) and to Gate No. 2 (City Aqueduct). Formerly, water for irrigation was also diverted to the North and South Canals.

RECORDS: Direct recording by Sparling flow meter. Records through May 1961 were obtained by the Ministry of Agriculture and Hydraulic Resources; from June 1961 to March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano de Tijuana; and from April 1966 through 1978 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1978.

REMARKS: Beginning in January 1937, diversions for irrigation began from both sides for the Tijuana valley and for domestic use at the village by Rodriguez Dam and the city of Tijuana. Since February 1960, no water has been released for irrigation of farmlands.

EXTREMES: Maximum monthly diversion, 1,963 acre-feet (2,421,000 m³), July 1944; minimum, no flow March and April 1941, August 1960, and December 1962.

Monthly Discharge in Acre-Feet

Month	Current Year 1978	Period 1938-1978		
		Average	Maximum	Minimum
January	26.2	208	782	1.5
February	25.1	234	1,132	.8
March	171	285	1,223	0
April	302	398	1,602	0
May	324	538	1,676	1.8
June	469	627	1,857	1.9
July	590	668	1,963	1.9
August	538	581	1,859	0
September	748	479	1,420	1.9
October	532	409	1,187	1.9
November	521	318	1,037	1.9
December	509	279	981	0
Yearly	4,755	5,026	15,317	29.3
	Thousands of Cubic Meters			
	5,865	6,200	18,893	36.2

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on right bank about 550 feet (168 m) upstream from the international boundary and about 0.8 mile (1.3 km) west of the international gate at San Ysidro, California. The zero of the gage is at mean sea level, U. S. C. & G. S. datum. The water-stage recorder was removed in May due to construction of flood control channel. Recorder was installed December 1, 1978 about 1.5 miles (2.4 km) downstream at Dairy Mart road bridge. Zero of the gage at the new location has not been determined.

RECORDS: Based on 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 1978.

EXTREMES: Since May 1947: Maximum instantaneous discharge, 3,700 second-feet (105 m³/sec), March 1, 1978; minimum discharge, no flow during part or all of each year since 1951.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.3	* 3.2	3,270	243	18.0	0	0	0	* 2.5	* 0.5	* 1.9	2.2
2	0	* 5.2	2,920	118	20.9	0	0	0	* .7	* .5	* 1.9	1.2
3	1.5	* 12.9	1,790	69.6	20.9	0	0	0	* .7	* .5	* 2.0	.8
4	1.2	* 21.7	1,340	55.5	20.8	0	0	0	* 17.3	* .7	* 2.0	.8
5	2.4	* 29.2	1,450	49.8	20.8	0	0	0	* .6	* .7	* 2.2	.9
6	.4	* 33.8	902	* 47.9	19.3	0	0	0	* .6	* .8	* 2.4	.9
7	.1	* 82.6	607	47.9	17.8	0	0	0	* .5	* .8	* 2.6	.5
8	.1	130	* 455	47.9	16.2	0	0	0	* .5	* .8	* 2.8	.5
9	51.4	156	* 421	46.0	14.7	0	0	0	* .5	* .9	* 2.9	.5
10	102	479	434	46.0	12.2	0	0	0	* .5	* .9	* 3.0	.6
11	19.4	431	529	44.6	9.7	0	0	0	* .5	* .9	* 3.1	.5
12	1.8	300	1,020	41.8	7.2	0	0	0	* .5	* 1.0	* 3.1	.1
13	.6	659	712	39.0	6.7	0	0	0	* .5	* 1.2	* 3.1	.5
14	141	584	840	36.2	6.1	0	0	0	* .5	* 1.2	* 36.0	.3
15	958	262	596	33.4	5.6	0	0	0	* .5	* 1.5	* 7.5	.3
16	280	147	* 324	33.4	5.0	0	0	0	* .5	* 1.7	* 4.8	.4
17	1,590	134	* 186	30.8	4.5	0	0	0	* .5	* 1.7	* 3.4	140
18	440	110	* 172	29.6	4.0	0	0	0	* .5	* 1.7	* 3.2	117
19	316	* 51.0	166	28.4	3.5	0	0	0	* .5	* 1.7	* 3.1	144
20	309	* 19.9	464	26.0	3.0	0	0	0	* .2	* 1.7	* 2.7	51.0
21	* 128	* 19.0	518	24.1	2.5	0	0	0	* 0	* 1.7	* 2.5	22.1
22	* 92.2	* 14.5	518	12.3	2.0	0	0	0	* 0	* 1.8	* 17.0	13.4
23	* 63.5	* 8.1	431	6.0	1.5	0	0	0	* 0	* 1.8	* 8.2	7.9
24	* 31.6	* 4.6	469	4.3	1.0	0	0	* .5	* 0	* 1.8	* 86.0	5.7
26	* 22.6	* 3.2	292	* 5.0	.5	0	0	* .5	* 0	* 1.8	* 33.0	5.7
27	* 17.2	* 3.9	274	* 6.5	0	0	0	* .5	* .7	* 1.8	* 8.5	4.3
28	* 12.9	* 5.2	194	* 11.5	0	0	0	* .5	* .6	* 1.8	* 3.0	3.9
29	* 11.3	257	* 67.3	* 13.0	0	0	0	* .5	* .5	* 1.8	* .5	3.9
30	* 9.7	55.5	* 14.0	* 14.0	0	0	0	* .5	* .5	* 1.8	* .5	3.3
31	* 8.1	65.0	* 15.0	* 15.0	0	0	0	* .5	* .5	* 1.9	* .5	3.3
81	* 5.2	179			0	0	0	* .5		* 1.9		3.3
Sum	4,617.5	3,967.0	21,690.8	1,226.5	244.4	0	0	4.0	31.9	41.3	253.4	539.8

Month	Extreme Gage Feet		Current Year 1978				Average Second-Feet	Total Acre-Feet	Period 1947-1978		
	High	Low	Extreme Second-Feet		Low	Acre-Feet					
			Day	High		Day	Low	Average	Maximum	Minimum	
Jan.	51.30	46.70	17	2,510	2	0	149	9,159	642	9,159	0
Feb.	50.25	48.05	13	1,000	1	3.2	142	7,868	514	7,868	0
Mar.	51.65	45.92	1	3,700	29	49.8	700	43,023	2,077	43,023	0
Apr.	47.32	45.40	1	691	25	0	40.9	2,433	288	2,926	0
May			1	20.9	125	0	7.9	485	58.6	485	0
June			0	0	0	0	0	0	21.5	309	0
July			0	0	0	0	0	0	16.5	239	0
Aug.			124	* .5	1	1	0	* .1	* 7.9	23.1	272
Sept.			4	* 200	121	* 0	* 1.1	* 63.3	26.1	216	0
Oct.			130	* 1.9	1	1	* 0	* 1.3	37.9	305	0
Nov.			24	* 86.0	128	* 0	* .5	* 8.4	109	1,084	0
Dec.			18	332	12	0	17.4	1,071	283	2,725	0
Yearly				3,700	0	0	89.0	64,695	4,097	64,695	0
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
				105	0	0	2.53	79,801	5,054	79,801	0

* Partly estimated 0 Mean daily ! And other days # Estimated

TIJUANA RIVER NEAR NESTOR, CALIFORNIA

DESCRIPTION: Water-stage recorder on county road bridge 4.1 miles (6.6 km) downstream from the international land boundary between the United States and Mexico, 2.9 miles (4.7 km) upstream from mouth of the river, and 1.7 miles (2.7 km) south of Nestor, California. The zero of the gage is 15.14 feet (4.61 m) above mean sea level, U. S. C. & G. S. datum. From April 10, 1953 to August 5, 1958, station was located 2 miles (3.2 km) upstream at different datum.

RECORDS: Based on current meter measurements or observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1914 through September 1915, and October 1922 through 1978 (October 1922 through May 1936 are from city of San Diego, California.)

REMARKS: The flow at this station is partially controlled by Morena and Barrett Reservoirs on Cottonwood Creek in the United States and by Rodriguez Reservoir on Rio de las Palmas in Mexico. Some diversions for irrigation are normally made in Mexico whenever surface runoff occurs in the river or in its two principal tributaries.

EXTREMES: Since October 1, 1936: Maximum discharge, 17,700 second-feet (501 m³/sec), February 7, 1937 (gage height 8.20 feet (2.50 m)), obtained from rating curve extended above 2,000 second-feet (56.6 m³/sec) 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 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	3,800	215	15	0	0	0	0	0	0	1.2
2	0	0	2,990	127	13	0	0	0	0	0	0	4.3
3	0	0	2,260	83	14	0	0	0	0	0	0	2.0
4	0	0	1,430	62	15	0	0	0	0	0	0	1.0
5	0	0	2,650	52	13	0	0	0	0	0	0	.85
6	0	0	1,460	46	11	0	0	0	0	0	0	1.1
7	0	0	750	104	7.7	0	0	0	0	0	0	.51
8	0	0	500	101	7.1	0	0	0	0	0	0	.10
9	0	2.2	300	75	5.9	0	0	0	0	0	0	.10
10	7.6	226	220	61	4.3	0	0	0	0	0	0	.19
11	0	398	180	52	3.3	0	0	0	0	0	2.5	.19
12	0	326	1,710	45	3.3	0	0	0	0	0	11	.03
13	0	710	910	40	3.3	0	0	0	0	0	0	0
14	7.2	914	838	36	3.0	0	0	0	0	0	53	0
15	1,770	424	755	33	2.0	0	0	0	0	0	5.3	.02
16	401	166	480	36	1.3	0	0	0	0	0	1.3	.03
17	1,730	153	440	37	.28	0	0	0	0	0	.85	139
18	295	108	415	37	0	0	0	0	0	0	1.1	121
19	130	69	405	36	0	0	0	0	0	0	.19	10
20	146	50	400	34	0	0	0	0	0	0	0	6.0
21	104	26	600	31	0	0	0	0	0	0	22	3.0
22	54	5.5	435	33	0	0	0	0	0	0	20	1.0
23	29	4.8	360	30	0	0	0	0	0	0	7.1	.75
24	12	4.4	419	27	0	0	0	0	0	0	95	.70
25	2.3	4.4	324	23	0	0	0	0	0	0	37	.70
26	0	4.1	255	22	0	0	0	0	0	0	9.8	.68
27	0	4.8	216	21	0	0	0	0	0	0	3.3	.38
28	0	74	125	19	0	0	0	0	0	0	.12	.28
29	0	0	69	14	0	0	0	0	0	0	.04	.28
30	0	0	62	13	0	0	0	0	0	0	.23	.08
31	0	0	133	0	0	0	0	0	0	0	0	.03
Sum	4,688.1	3,674.2	25,891	1,545	122.48	0	0	0	0	0	269.83	295.50
Current Year 1978								Period 1937-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			15	1,770	1	1	151	9,299	839	9,299	0	
Feb.			14	914	1	1	131	7,288	3,568	66,920	0	
Mar.			1	3,800	30	62	835	51,354	7,129	107,000	0	
Apr.			1	215	30	13	51.5	3,064	5,122	181,900	0	
May			1	15	118	0	3.95	243	569	18,340	0	
June				0	0	0	0	0	95.2	3,060	0	
July				0	0	0	0	0	18.9	523	0	
Aug.				0	0	0	0	0	13.4	242	0	
Sept.				0	0	0	0	0	19.8	234	0	
Oct.				0	0	0	0	0	67.6	1,340	0	
Nov.			24	95	1	1	8.99	535	127	1,490	0	
Dec.			17	139	113	0	9.53	586	633	7,930	0	
Yearly				3,800		0	99.2	72,369	18,202	332,749	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				108		0	2.81	89,266	22,452	410,443	0	

§ Mean daily

! And other days

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, the U. S. Geological Survey, and the National Weather Service. Records for Rodriguez Reservoir obtained and furnished by the State of Baja California Commission of Public Services for Tijuana.

In Acre-Feet

Month	MORENA RESERVOIR, CALIFORNIA (Capacity 50,210)		BARRETT RESERVOIR, CALIFORNIA (Capacity 44,760)		RODRIGUEZ RESERVOIR, BAJA CALIFORNIA (Capacity 111,880)		TOTAL IN TIJUANA RIVER BASIN RESERVOIRS (Capacity 206,850)	
	1978	Average 1937-1978	1978	Average 1937-1978	1978	Average 1937-1978	1978	Average 1937-1978
Jan.	2,159	13,944	1,893	9,751	6,539	27,168	10,591	50,863
Feb.	4,504	14,580	5,671	11,084	18,646	28,124	28,821	53,788
Mar.	9,156	15,766	29,046	12,988	78,007	32,139	116,209	60,893
Apr.	11,790	15,829	33,038	13,493	82,370	32,227	127,198	61,549
May	12,240	15,699	34,103	12,885	81,065	32,340	127,408	60,924
June	11,990	15,267	32,603	12,154	79,424	31,349	124,017	58,770
July	11,692	14,853	30,770	11,401	77,708	30,324	120,170	56,578
Aug.	11,135	14,465	28,508	10,701	75,993	29,388	115,636	54,554
Sept.	10,978	14,007	27,168	10,430	74,375	28,596	112,521	53,033
Oct.	10,767	13,799	25,651	10,097	73,115	27,934	109,533	51,830
Nov.	10,978	13,707	24,451	9,772	72,263	27,482	107,692	50,961
Dec.	11,840	13,778	23,928	10,015	71,693	27,743	107,461	51,536
Average	9,936	14,641	24,736	11,231	65,933	29,568	100,605	55,440
Maximum	12,240	# 61,670	34,103	* 45,920	82,370	109,608	127,408	213,600
Minimum	2,159	10	1,893	106	6,539	0	10,591	1,264

March 31, 1941 - Prior to removal of spillway gates

* 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 the Commission. For location, elevation, period of record, and the observer, see alphabetical listing of these stations on page 77.

In the United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California		Sawday Ranch, California	
	1978	Average 1906-1978	1978	Average 1907-1978	1978	Average 1951-1978	1978	Average 1914-1978	1978	Average 1950-1978
Jan.	8.74	3.70	8.95	3.30	8.50	2.61	8.37	3.32	9.54	3.01
Feb.	5.66	3.68	6.58	3.33	5.70	2.05	6.52	3.60	7.25	2.45
Mar.	7.55	3.36	8.65	2.97	6.80	2.43	8.79	3.02	7.84	2.88
Apr.	1.93	1.74	1.92	1.58	1.30	1.38	1.92	1.79	1.64	1.67
May	.40	.61	.73	.57	.20	.41	.33	.63	.50	.45
June	0	.14	0	.07	0	.07	0	.10	0	.06
July	0	.35	0	.11	0	.02	0	.19	1.00	.43
Aug.	0	.51	0	.21	0	.15	0	.20	T	.68
Sept.	.39	.39	.38	.26	.90	.28	.18	.29	.11	.43
Oct.	.05	.88	0	.70	.10	.41	.04	.74	0	.52
Nov.	4.28	1.59	4.19	1.40	3.90	1.55	4.44	1.53	4.24	1.77
Dec.	5.95	3.23	4.53	2.86	2.40	2.24	4.52	3.11	5.23	2.45
Yearly	34.95	20.18	35.93	17.36	29.80	13.60	35.11	18.52	37.35	16.80

Month	Campo, California		Chula Vista, California		Lower Otay Dam, California		Brown Field, California			
	1978	Average 1900-1978	1978	Average 1930-1978	1978	Average 1906-1978	1978	Average 1964-1978		
Jan.	7.79	2.96	4.30	1.75	5.38	2.02	5.16	1.55		
Feb.	5.38	3.22	2.55	1.69	3.53	1.47	2.54	1.30		
Mar.	5.45	2.72	4.35	1.52	5.70	1.92	5.68	1.77		
Apr.	1.48	1.44	.96	.83	1.67	1.10	1.66	1.08		
May	.53	.52	.05	.25	.11	.32	.05	.24		
June	0	.07	0	.05	0	.07	0	.07		
July	T	.51	0	.02	0	.04	0	.06		
Aug.	.01	.50	0	.10	0	.12	0	.17		
Sept.	.16	.34	.14	.18	.15	.23	.65	.20		
Oct.	.06	.63	.08	.41	.12	.34	.20	.32		
Nov.	3.05	1.37	2.88	1.06	3.00	1.35	2.63	1.60		
Dec.	4.45	2.54	1.95	1.67	2.70	1.52	2.37	1.87		
Yearly	28.36	16.82	17.26	9.53	22.36	10.50	20.94	10.23		

In Mexico

Month	La Rumorosa, Baja California		Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de Las Palmas, Baja California	
	1978	Average 1945-1978	1978	Average 1946-1959 1961-1978	1978	Average 1948-1959 1961-1978	1978	Average 1938-1978	1978	Average 1948-1978
Jan.	3.50	0.79	7.56	2.44	#	1.65	4.37	1.50	4.17	1.46
Feb.	2.24	.51	7.64	1.57	# 4.53	1.46	4.37	1.38	5.12	1.18
Mar.	1.77	.55	5.31	2.05	4.96	1.38	3.94	1.46	3.90	1.22
Apr.	.24	.31	1.50	1.10	.79	.67	.91	.79	1.14	.63
May	0	.08	0	.31	#	.20	0	.16	0	.12
June	0	.04	0	.12	0	.04	0	.04	0	.04
July	T	.31	0	.12	0	.04	0	T	0	.04
Aug.	0	.67	0	.20	0	.04	0	.12	0	.12
Sept.	.08	.31	.24	.12	.16	.16	.16	.24	.59	.24
Oct.	.39	.43	T	.35	.08	.31	.08	.35	0	.20
Nov.	2.48	.55	3.74	1.30	2.60	1.10	2.20	.91	1.89	.79
Dec.	1.77	.75	3.74	2.17	2.48	1.38	1.97	1.57	2.64	1.06
Yearly	12.48	5.24	29.72	12.56		8.46	17.99	8.43	19.45	7.24

* Incomplete month

No data available

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

In Mexico

Month	El Pinal, Baja California		San Juan de Dios, Baja California						
	1978	Average 1964-1978	1978	Average 1956-1978					
Jan.	9.13	2.28	7.99	2.13					
Feb.	10.12	2.95	7.95	2.24					
Mar.	9.92	3.03	7.32	2.01					
Apr.	2.32	1.81	1.42	1.14					
May	T	.47	.04	.28					
June	0	.04	0	.12					
July	0	.67	.24	1.06					
Aug.	.16	.71	.79	.91					
Sept.	.67	.87	.31	.55					
Oct.	.83	.39	.31	.63					
Nov.	5.24	1.97	3.82	1.38					
Dec.	5.28	3.35	3.39	2.05					
Yearly	43.66	18.35	33.58	15.71					

T Trace

LOCATION OF RAINFALL STATIONS ON THE TIJUANA RIVER WATERSHED

In the United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	§ ELEV. (FT.)	RECORD BEGAN	OBSERVER
Barrett Dam, California	32° 41'	116° 40'	1,623	1907	City of San Diego
Brown Field, California	32° 34'	116° 59'	515	1964	City of San Diego
Campo, California	32° 38'	116° 28'	2,630	1877	Aarchie C. Leach
Chula Vista, California	32° 36'	117° 06'	9	1930	Western Salt Company
Lower Otay Dam, California	32° 37'	116° 56'	540	1906	City of San Diego
Marron Valley, California	32° 34'	116° 46'	550	1951	County of San Diego
Morena Dam, California	32° 41'	116° 31'	3,075	1906	City of San Diego
Potrero, California	32° 37'	116° 36'	2,400	1914	County of San Diego
Sawday Ranch, California	32° 45'	116° 29'	3,200	1950	William Tulloch

In Mexico

NAME OF STATION	LATI- TUDE	LONGI- TUDE	§ ELEV. (FT.)	RECORD BEGAN	OBSERVER
El Pinal, Baja California	32° 11'	116° 17'	4,429	1964	S. A. R. H.
La Rumorosa, Baja California	32° 31'	116° 04'	3,937	1945	S. A. R. H.
Rodriguez Dam, Baja California	32° 26'	116° 55'	459	1938	S. A. R. H.
San Juan de Dios, Baja California	31° 59'	116° 00'	3,280	1956	S. A. R. H.
Tecate, Baja California	32° 33'	116° 39'	1,690	1946	S. A. R. H.
Tijuana, Baja California	32° 31'	117° 02'	180	1948	S. A. R. H.
Valle de Las Palmas, Baja California	32° 23'	116° 40'	148	1948	S. A. R. H.

§ Elevation above mean sea level

¶ Estimated from topographic maps

* Ministry of Agriculture and 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 the Commission; those in Baja California are observed by the Ministry of Agriculture and Hydraulic Resources of Mexico. For specific location of these stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 77 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 1978, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.
2. Chula Vista: September 1918 through 1978, National Weather Service 4-foot diameter pan, 10 inches deep, set on 2 by 4-inch-timber grill.
3. 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 1978, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.
4. Lower Otay Dam: January 1950 through 1978, 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		Chula Vista, California		Lower Otay Dam, California	
	1978	Average 1916-1978	1978	Average 1921-1978	1978	Average 1919-1978	1978	Average 1950-1978
Jan.	0.34	2.18	2.48	1.87	1.98	2.84	1.38	1.97
Feb.	.16	2.22	1.93	2.21	3.34	3.36	1.62	2.36
Mar.	1.37	3.45	.94	3.47	4.62	5.00	2.43	3.44
Apr.	3.00	4.75	3.48	4.76	6.41	5.97	3.99	4.67
May	4.84	6.66	6.19	6.79	7.79	6.84	6.13	6.26
June	7.07	8.62	8.48	8.33	8.00	6.95	7.48	6.93
July	6.31	9.92	7.39	9.90	7.80	7.59	8.39	8.44
Aug.	6.62	9.22	8.33	9.31	7.59	7.33	6.67	7.98
Sept.	4.17	7.37	6.22	7.58	6.95	6.10	5.48	6.47
Oct.	2.72	5.19	4.70	5.34	4.79	4.91	4.68	4.75
Nov.	.81	3.40	2.01	3.36	3.18	3.63	2.01	2.84
Dec.	1.46	2.41	1.38	2.06	2.47	2.76	2.01	2.14
Yearly	38.87	65.39	53.53	64.98	64.92	63.28	52.27	58.25

In Mexico

Month	Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de las Palmas, Baja California		San Juan de Dios, Baja California	
	1978	Average 1961-1973	1978	Average 1952-1959 1961-1976	1978	Average 1939-1942 1946-1978	1978	Average 1952-1978	1978	Average 1956-1978
Jan.	*	3.27	*	3.07	1.42	4.61	1.73	3.58	Ø	2.72
Feb.	*	3.31	*	3.50	2.20	3.74	2.80	3.54	Ø	2.76
Mar.	*	4.29	*	3.94	3.39	4.80	3.43	5.04	Ø	4.13
Apr.	*	5.20	*	4.84	4.57	5.71	5.00	6.42	#5.43	4.96
May	*	6.14	*	5.75	7.68	7.13	8.31	7.60	#8.39	6.81
June	*	6.38	*	5.83	8.58	7.80	9.84	9.25	10.55	7.99
July	*	8.62	*	6.69	8.62	8.78	10.51	10.79	11.14	9.02
Aug.	*	8.27	*	6.97	7.80	8.11	9.17	10.00	9.92	8.19
Sept.	*	6.81	*	5.83	7.56	6.85	6.26	8.46	#7.76	7.76
Oct.	*	6.38	*	4.76	4.45	5.71	5.12	6.22	6.42	5.35
Nov.	*	3.86	*	3.50	2.36	4.76	2.80	4.41	Ø	3.66
Dec.	*	3.54	*	3.03	2.20	3.66	2.80	3.82	Ø	3.19
Yearly		67.87		57.13	60.83	70.98	67.76	78.90		60.71

* Missing record

Ø Frozen tank

Partly estimated

TEMPERATURE IN THE TIJUANA RIVER BASIN IN DEGREES FAHRENHEIT

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 maximum and minimum 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 77 in this bulletin.

In the United States

Month	Barrett Dam, California				Campo, California				Chula Vista, California			
	1978			Average 1931- 1978	1978			Average 1951 1978	1978			Average 1931- 1978
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	51.0	74	30	48.6	48.2	74	24	46.9	57.3	71	39	52.7
Feb.	51.6	77	32	50.4	49.1	74	28	48.0	56.8	78	43	53.9
Mar.	56.5	84	38	53.1	53.2	83	31	49.3	60.5	91	46	55.3
Apr.	56.1	78	38	57.5	51.7	86	28		59.2	71	45	57.8
May	63.6	96	44	62.6	58.2	96	29	58.2	62.9	80	50	60.6
June	73.2	101	47	68.3	66.8	99	32	64.9	65.8	80	56	63.0
July	78.0	107	50	76.1	73.5	104	35	73.2	66.8	78	58	
Aug.	75.7	103	49	76.1	71.3	100	30	73.1	67.9	75	55	
Sept.	72.3	100	47	72.1	67.3	99	33	68.7	69.4	96	53	
Oct.	69.8	99	45	64.0	64.7	96	32	60.7	66.4	88	54	63.0
Nov.	54.1	89	30	55.8	49.5	83	24	52.6	57.6	73	42	
Dec.	47.8	73	22	50.3	44.0	68	14		51.5	69	30	54.2
Yearly	62.5	107	22	61.2	58.1	104	14		61.8	96	30	

Month	Potrero, California											
	1978			Average 1975- 1978								
	Mean	Max.	Min.									
Jan.	50.4	76	29	52.2								
Feb.	50.6	77	30	51.2								
Mar.	55.6	85	33	51.0								
Apr.	54.2	85	30	53.6								
May	62.7	99	36	60.6								
June	72.6	102	42	70.2								
July	77.3	103	45	76.1								
Aug.	75.4	102	44	74.7								
Sept.	71.2	106	42	71.2								
Oct.	69.6	103	41	65.7								
Nov.	53.4	88	32	57.4								
Dec.	47.5	81	22	51.6								
Yearly	61.7	106	22	61.3								

In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1978		1946-1978		1978		1946-1978		1978		1948-1978	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	64	30	81	5	86	32	100	16	*	*	93	27
Feb.	64	32	82	10	75	34	100	18	75	43	102	32
Mar.	73	32	88	16	82	36	97	23	91	46	93	34
Apr.	73	32	91	23	77	36	100	28	86	46	97	34
May	93	37	97	28	100	41	100	36	*	*	97	43
June	97	52	113	34	99	50	104	32	90	55	100	41
July	99	54	104	39	104	55	115	36	82	50	120	46
Aug.	97	59	102	46	95	54	113	34	82	55	106	52
Sept.	88	43	104	34	106	50	115	36	100	52	120	46
Oct.	90	41	93	25	95	46	106	27	82	48	117	41
Nov.	73	30	88	14	90	34	97	27	86	39	108	34
Dec.	61	21	81	10	73	25	97	23	77	34	99	25
Yearly	99	21	113	5	106	25	115	16	100	34	120	25

* No record

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

1978

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 Agriculture and Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana River basin in 1978 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 above Barrett Dam	133	0	133	(a) 75	0	(a) 75
below Barrett Dam and above Tecate Creek	247	0	247	(a) 145	0	(a) 145
above Tecate Creek	65	0	65	(a) 220	0	(a) 220
Campo Creek above International Boundary	312	0	312	(a) 320	0	(a) 320
Tecate Creek above International Boundary (not including Campo Creek)	82	4	86	0	0	0
Cottonwood Creek above International Boundary Station	19	64	83	(a) 540	0	(a) 540
Rio de las Palmas above Rodriguez Dam	413	68	481	0	(b) 0	0
Tijuana River above Nestor Gaging Station	7	981	988	2,700	(c) 0	2,700
above the Mouth	458	1,266	1,724			
	462	1,269	1,731			

(a) Estimated. 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 1978 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir.



WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

DESCRIPTION: Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 450 feet (137 m) upstream from the Southern Pacific Railroad bridge, 1.5 miles (2.4 km) upstream from the international boundary, and 2 miles (3.2 km) west of Douglas, Arizona. Zero of gage is 3,909.14 feet (1,191.51 m) above mean sea level, U. S. C. & G. S. datum of 1929. Location April 26, 1972 to April 10, 1974 was 200 feet (61.0 m) upstream from bridge. Datum 4.40 feet (1.34 m) higher.

RECORDS: Based on 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 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 1978 (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 (97.7 m³/sec) August 10, 1931 (gage height 12.15 feet (3.70 m)); maximum estimated discharge, 4,050 second-feet (115 m³/sec) July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 5,060 second-feet (143 m³/sec) August 7, 1955; maximum gage height 16.55 feet (5.04 m) July 29, 1966; minimum daily discharge, no flow at times during most years.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.12	0.07	0.06	0.03	0	0	0	0	0.10	0	0	0
2	.13	.06	.06	.03	0	0	0	10	.10	0	0	0
3	.13	.06	.06	.03	0	0	0	299	.10	0	0	0
4	.13	.06	.05	.03	0	0	0	177	.10	0	0	0
5	.12	.06	.05	.02	0	0	0	14	.10	0	0	0
6	.12	.06	.06	.01	0	0	0	.10	.10	0	0	0
7	.12	.08	.05	0	0	0	0	.10	0	0	0	0
8	.11	.07	.05	0	0	0	0	0	0	0	0	0
9	.10	.06	.05	0	0	0	0	0	0	0	0	0
10	.09	.06	.06	0	0	0	0	0	0	0	0	0
11	.11	.08	.06	0	0	0	0	0	0	0	0	0
12	.09	.16	.06	0	0	0	0	96	0	0	0	0
13	.08	.07	.06	0	0	0	0	20	0	0	0	0
14	.08	.06	.07	0	0	0	.90	.50	0	0	0	0
15	.09	.06	.07	0	0	0	16	.30	0	0	0	0
16	.22	.06	.05	0	0	0	0	.20	0	0	0	0
17	.11	.06	.05	0	0	0	0	1.4	0	0	0	0
18	.09	.05	.05	0	0	0	0	15	0	0	0	0
19	.08	.05	.05	0	0	0	0	18	0	0	0	22
20	.08	.05	.05	0	0	0	0	.50	0	0	0	10
21	.08	.05	.05	0	0	0	0	.40	0	7.2	0	0
22	.08	.04	.05	0	0	0	0	.30	0	28	0	0
23	.08	.04	.04	0	0	0	0	27	0	39	0	0
24	.07	.05	.04	0	0	0	0	9.4	0	74	0	0
25	.07	.05	.04	0	0	0	0	.40	0	4.8	.15	0
26	.07	.05	.04	0	0	0	7.5	.20	0	0	5.6	0
27	.06	.05	.04	0	0	0	9.9	.20	0	0	0	0
28	.06	.06	.04	0	0	0	.90	.20	0	0	0	0
29	.06	.06	.04	0	0	0	0	.10	0	0	0	0
30	.06	.06	.04	0	0	0	0	.10	0	0	0	0
31	.07	.06	.04	0	0	0	0	.10	0	0	0	0
Sum	2.96	1.73	1.58	0.15	0	0	35.20	690.50	0.60	153.00	5.75	32.00

Current Year 1978							Period 1936-1978				
Month	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low			Average	Maximum	Minimum	
Jan.	2.67	2.47	16	0.25	27	0.06	0.095	5.9	37.6	451	0
Feb.	2.65	2.46	12	.18	21	.04	.062	3.4	20.0	132	0
Mar.	2.57	2.44	15	.10	31	.04	.051	3.1	29.1	295	0
Apr.	2.44		1	.04	17	0	.005	.3	19.9	173	0
May				0	0	0	0	0	14.4	138	0
June				0	0	0	0	0	126	1,590	0
July	4.58		15	38	11	0	1.14	69.8	2,084 #	8,110	39
Aug.	7.43		3	506	18	0	22.3	1,370	3,168 #	14,480	0
Sept.	2.18		1	.10	17	0	.020	1.2	740 #	3,170	0
Oct.	5.98		24	130	11	0	4.94	303	313	6,103	0
Nov.	4.46		26	16	11	0	.19	11.4	37.7	352	0
Dec.	5.51		19	71	11	0	1.03	63.5	122	2,363	0
Yearly	7.43			506		0	2.49	1,832	6,712	22,321	900
	Meters		Cubic Meters per Second			Thousands of Cubic Meters					
	2.26			14.3		0	0.07	2,260	8,279	27,533	1,110

1 And other days # 1947 records not included

**SEWAGE INFLUENT, DOUGLAS, ARIZONA
INTERNATIONAL TREATMENT PLANT**

DESCRIPTION: Parshall flume in influent line to the international treatment plant, equipped with Simplex digital meter for measuring combined sewage flows from Douglas, Arizona and Agua Prieta, Sonora; and Parshall flume with recorder for measuring the sewage from Douglas. Flows from Agua Prieta are deduced from total flows and the city of Douglas flows; however, since April 8, 1968, all sewage flows from Agua Prieta have been diverted to new oxidation ponds located in Mexico, 1.6 miles (2.6 km) south of the international boundary.

RECORDS: Continuous monthly records since March 1948; daily records from March 18, 1948 through 1950 and from January 1952 through 1978.

REMARKS: The 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. The plant is located in the United States adjacent to the international boundary about one mile (1.6 km) west of the Douglas-Agua Prieta Port of Entry. Prior to December 1970, the treatment of sewage was complemented by the use of old oxidation ponds in Mexico adjacent to the international boundary. Since December 1970, sewage effluent from the plant flows into Mexico and then across to the right bank of the Agua Prieta Arroyo, by means of a canal bridge, to be used for irrigation.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1978			Period 1952-1978		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	30.191	0	30.191	1.030	0.900	0.974	1.618	0.619	1.056
Feb.	27.530	0	27.530	1.100	.900	.983	1.784	.584	1.066
Mar.	31.420	0	31.420	1.230	.940	1.014	1.598	.590	1.065
Apr.	29.250	0	29.250	1.160	.760	.975	1.536	.619	1.062
May	34.410	0	34.410	1.450	1.000	1.110	1.595	.619	1.074
June	36.620	0	36.620	1.430	1.070	1.221	1.784	.626	1.127
July	39.370	0	39.370	1.430	1.120	1.270	3.209	.619	1.178
Aug.	40.440	0	40.440	1.520	1.210	1.305	1.985	.619	1.198
Sept.	37.260	0	37.260	1.380	1.010	1.242	1.884	.626	1.167
Oct.	38.007	0	38.007	1.390	1.010	1.226	1.667	.626	1.113
Nov.	36.310	0	36.310	1.400	1.000	1.210	1.586	.619	1.084
Dec.	30.730	0	30.730	1.220	.500	.991	1.760	.500	1.075
Yearly	411.538	0	411.538	1.520	0.500	1.127	3.209	0.500	1.105

**SEWAGE INFLUENT, AGUA PRIETA, SONORA
INTERNATIONAL OXIDATION PONDS**

DESCRIPTION: Parshall flume equipped with staff gage in influent line to oxidation ponds. Since April 8, 1968, all sewage from Agua Prieta, Sonora has been diverted to oxidation ponds, which are located in Mexico; if necessary, sewage from Douglas, Arizona may be included, but this has never been done.

RECORDS: Discharged are computed from daily 11:00 a.m. readings of the staff gage by applying an index for that hour, determined from 7 days of hourly measurements from which the relationship between mean daily readings and 11:00 a.m. readings was developed. Records available: Mean daily flows from April 8, 1968 through 1978.

REMARKS: The construction of the international oxidation ponds in Agua Prieta, Sonora was completed in April 1968 by the government of Mexico, fulfilling an international agreement to solve the problem of insufficient capacity at the international treatment plant in Douglas, where the combined flows from Douglas and Agua Prieta were treated. If necessary, sewage from Agua Prieta may be treated in this plant, but since the completion of the oxidation ponds, this has never been done. The ponds are located 1.6 miles (2.6 km) south of international monument 85a.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1978			Period 1968-1978		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	0	17.204	17.204	0.630	0.436	0.555	0.640	0.394	0.494
Feb.	0	15.190	15.190	.630	.394	.543	.726	.394	.507
Mar.	0	17.460	17.460	.630	.436	.563	.666	.394	.487
Apr.	0	16.759	16.759	.630	.436	.558	.666	.394	.492
May	0	18.012	18.012	.630	.436	.581	.666	.394	.513
June	0	17.015	17.015	.630	.436	.567	.630	.394	.509
July	0	17.512	17.512	.630	.436	.565	.691	.259	.506
Aug.	0	17.522	17.522	.630	.436	.565	.967	0	.457
Sept.	0	16.953	16.953	.630	.436	.565	.630	0	.473
Oct.	0	17.205	17.205	.630	.436	.555	.630	0	.479
Nov.	0	16.707	16.707	.630	.436	.557	.717	.394	.513
Dec.	0	17.030	17.030	.630	.436	.549	.709	.394	.490
Yearly	0	204.569	204.569	0.630	0.394	0.560	0.967	0	0.493

SAN PEDRO RIVER AT PALOMINAS, ARIZONA

DESCRIPTION: Water-stage recorder located near left bank on downstream side of the bridge pier at Highway 92, 0.7 mile (1.1 km) east of Palominas, 2.5 miles (4.0 km) upstream from Green Brush Draw, 4.5 miles (7.2 km) downstream from international boundary, and 12 miles (19 km) southwest of Bisbee, Arizona. Zero of gage is 4,187.62 feet (1,276.39 m) above mean sea level (State Highway bench mark).

RECORDS: Based on current meter measurements or observations of no flow during the year. Records available: May 1930 to October 1933, May 1935 to July 1941, and July 1950 through 1978. Records obtained and furnished by U. S. Geological Survey.

REMARKS: There are some small diversions for irrigation of a few hundred acres above this station, mostly in Mexico. Record shows approximate flow of river at international boundary.

EXTREMES: Maximum daily discharge, 22,000 second-feet (623 m³/sec) on August 14, 1940 (gage height 16.16 feet (4.93 m) present datum), from rating curve extended above 5,600 second-feet (159 m³/sec) on basis of slope-area measurement of peak flow; no flow at times in most summers. Greatest flood known occurred on September 28, 1926 (gage height, about 23.9 feet (7.28 m) present datum, from flood marks; discharge not determined).

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.0	24.0	33.0	16.0	3.3	0.45	0	41.0	12.0	0	3.0	7.4
2	14.0	23.0	275	14.0	4.4	.45	0	74.0	16.0	0	3.0	6.2
3	13.0	21.0	241	12.0	3.6	.30	0	205	9.7	0	3.0	5.5
4	12.0	20.0	165	11.0	4.3	.60	0	49.0	10.0	0	2.5	5.1
5	11.0	20.0	90.0	10.0	3.9	.60	0	25.0	65.0	0	2.5	4.7
6	11.0	25.0	72.0	9.0	4.5	.45	0	15.0	41.0	0	2.0	5.1
7	10.0	25.0	102	7.4	3.2	.15	0	9.0	16.0	0	2.0	6.2
8	9.5	26.0	78.0	7.4	3.3	0	0	5.0	5.0	0	2.0	6.8
9	9.5	26.0	63.0	7.0	4.2	0	0	5.0	.50	0	2.0	6.8
10	9.7	24.0	57.0	7.0	4.3	0	0	4.0	0	0	2.0	6.8
11	13.0	27.0	47.0	7.0	2.3	0	0	7.0	0	0	2.0	6.8
12	14.0	35.0	47.0	7.0	1.2	0	0	34.0	0	0	1.5	5.5
13	12.0	33.0	88.0	7.0	1.3	0	0	7.0	0	0	1.5	5.1
14	10.0	34.0	179	7.0	1.3	0	0	3.0	0	0	1.5	5.0
15	12.0	38.0	163	7.0	1.2	0	33.0	2.0	0	0	1.5	4.9
16	42.0	39.0	110	7.0	1.2	0	22.0	2.0	0	0	1.4	4.7
17	26.0	39.0	74.0	7.0	1.0	0	15.0	2.0	0	0	1.2	6.0
18	25.0	35.0	58.0	7.0	1.0	0	9.5	1.9	0	0	1.0	1,060
19	24.0	30.0	51.0	7.0	1.0	0	5.6	1.9	0	0	1.2	7,440
20	24.0	26.0	45.0	7.0	1.4	0	2.5	1.5	0	0	1.9	1,470
21	39.0	24.0	41.0	7.0	1.0	0	1.4	1.9	0	75.0	1.5	497
22	34.0	22.0	36.0	7.0	1.0	0	27.0	1.9	0	56.0	3.1	340
23	30.0	21.0	34.0	7.0	.75	0	42.0	95.0	1.2	84.0	5.1	250
24	28.0	21.0	32.0	6.8	.75	0	18.0	167	0	128	75.0	200
25	25.0	21.0	30.0	5.5	.90	0	19.0	30.0	0	30.0	1,010	180
26	26.0	21.0	28.0	4.0	1.2	0	57.0	11.0	0	6.0	90.0	160
27	25.0	20.0	26.6	4.2	.60	0	66.0	11.0	0	4.2	35.0	150
28	24.0	21.0	24.0	3.4	.60	0	23.0	11.0	0	3.8	14.0	140
29	23.0	22.0	22.0	3.1	.60	0	14.0	38.0	0	3.5	11.0	130
30	22.0	20.0	20.0	3.1	.60	0	21.0	21.0	0	3.5	8.8	130
31	23.0	18.0	18.0		.45		109	15.0		3.0		600

Sum	615.7	741.0	2,349.0	221.9	60.35	3.00	485.0	897.1	176.40	397.0	1,292.2	12,845.6
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Month	Current Year 1978						Period 1951-1978				
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum
Jan.	4.14	3.37	16	90	7	9.4	19.9	1,221	597	7,813	2.6
Feb.	3.87	3.58	17	43	4	19	26.5	1,470	452	2,767	3.0
Mar.	4.97		2	374	31	18	75.8	4,659	490	4,659	13.3
Apr.	3.65	3.16	1	25	29	1.2	7.40	440	100	440	0
May	3.27	3.15	4	5.5	31	.45	1.95	120	35.9	183	0
June	3.18		5	.60	18	0	.10	6.0	167	1,391	0
July	4.72		31	286	1	0	15.6	962	6,268	17,238	184
Aug.	6.50	3.20	3	1,140	21	1.3	28.9	1,779	9,234	36,369	165
Sept.	4.53		4	229	110	0	5.88	350	1,788	16,344	11.3
Oct.	4.80		23	318	1	0	12.8	787	1,950	47,322	0
Nov.	8.79	3.17	25	3,110	19	.90	43.1	2,563	256	2,563	0
Dec.	13.66	3.39	19	9,740	7	.75	414	25,479	1,629	25,479	6.2
Yearly	13.66			9,740		0	54.3	39,836	22,967	62,788	4,400
	Meters		Cubic Meters per Second			Thousands of Cubic Meters					
	4.16			276		0	1.54	49,137	28,330	77,448	5,427

! And other days

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 (4.0 km) northeast of Lochiel, Arizona, and 1.7 miles (2.7 km) upstream from the international land 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 (1,408 m).

RECORDS: Based on current meter measurements or observations of no flow during the year. Records obtained and furnished by the U. S. Geological Survey. Records available: January 1949 through 1978.

REMARKS: There are small diversions by ground water pumping for irrigating about 200 acres (80.9 ha) above this station.

EXTREMES: Maximum discharge, 12,300 second-feet (348 m³/sec) on October 9, 1977 (gage height 10.21 feet) (3.11 m); minimum discharge, no flow for several days of each year.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	1.2	3.9	2.3	1.2	0.20	0	0.76	1.2	0.77	0.64	1.2
2	1.8	1.2	3.9	2.4	1.2	.19	0	26	1.2	.77	.64	1.2
3	1.8	1.1	2.5	2.3	1.2	.19	0	83	1.2	.76	.63	1.1
4	1.6	1.1	2.0	2.2	.99	.19	0	25	1.2	.77	.63	1.1
5	1.6	1.1	1.8	2.2	.65	.21	0	1.4	1.2	.76	.64	1.1
6	1.6	1.2	2.2	2.2	.56	.20	0	1.1	1.2	.75	.63	1.2
7	1.4	1.2	1.9	1.9	.74	.19	0	1.0	1.1	.75	.63	1.1
8	1.1	1.2	1.7	2.0	.75	.25	0	1.0	1.1	.72	.64	1.1
9	1.3	1.1	1.8	2.3	.42	.20	0	.99	1.1	.72	.65	1.0
10	1.4	1.2	1.9	2.3	.57	.12	2.00	.97	1.0	.72	.65	1.0
11	2.7	3.3	1.9	2.1	.58	0	.16	1.0	1.0	.71	.70	.94
12	1.7	4.4	2.3	2.0	.51	.17	0	1.8	1.0	.71	.68	.90
13	1.4	1.8	2.9	1.9	.46	.24	0	1.5	.99	.71	.64	.89
14	1.5	25	2.5	1.8	.54	.27	0	1.4	.98	.70	.65	.85
15	4.6	22	2.3	1.8	.50	.28	0	1.4	.97	.70	.65	.86
16	3.1	3.9	2.1	1.8	.34	.17	0	1.4	.97	.69	.64	.89
17	1.9	2.6	2.2	1.8	.28	.22	0	1.5	.96	.69	.64	.98
18	1.7	2.2	2.3	1.8	.32	.25	0	1.5	.93	.64	.64	276
19	1.6	2.1	2.4	1.6	.26	.28	0	1.5	.92	.67	.64	126
20	2.0	1.8	2.4	1.5	.21	.28	0	1.5	.92	.83	.64	7.9
21	2.0	1.7	2.3	1.5	.22	.30	.14	1.5	16	1.8	.64	3.9
22	1.8	1.7	2.3	1.5	.26	.33	104	1.5	6.6	.82	.64	2.8
23	1.4	1.7	2.3	1.5	.22	.30	1.8	7.3	.94	.75	.74	2.7
24	1.6	1.7	2.3	1.5	.24	.30	.82	1.7	.82	.74	5.9	2.7
25	1.5	1.7	2.2	1.4	.24	.28	1.7	1.4	.83	.69	5.8	3.1
26	1.5	1.7	2.3	1.3	.22	.28	18	1.3	.81	.68	1.4	3.2
27	1.2	2.1	2.3	1.3	.22	.30	30	1.3	.80	.66	1.4	3.6
28	1.2	2.6	2.3	1.3	.23	.33	.86	1.2	.80	.64	1.3	3.8
29	1.2	2.3	2.3	1.2	.23	.35	.70	1.2	.79	.64	1.2	3.9
30	1.2	2.2	2.2	1.2	.22	.18	2.4	1.2	.77	.65	1.1	5.2
31	1.5		2.3		.23		1.7	1.1		.64		89
Sum	53.7	95.6	72.0	53.9	14.81	7.05	164.28	176.42	50.30	23.25	33.02	551.21
Current Year 1978									Period 1949-1978			
Month	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.	2.13	1.81	15	8.8	8	1.1	1.73	107	45.9	226	1.3	
Feb.	2.69	1.81	14	63	1	1.1	3.41	190	42.4	261	1.8	
Mar.	2.02	1.84	1	5.4	8	1.7	2.32	143	36.8	250	.7	
Apr.	1.97	1.89	1	2.6	129	1.2	1.80	107	22.4	148	0	
May	1.90	1.66	1	1.2	20	.19	.48	29.3	9.6	49.5	0	
June	1.82		21	.41	11	0	.24	14.0	8.9	169	0	
July	4.87		22	700	1	0	5.30	326	569	4,270	1.6	
Aug.	5.42	2.01	3	1,010	1	.56	5.69	350	934	10,120	.08	
Sept.	3.48	2.05	21	200	29	.73	1.68	99.8	293	2,634	0	
Oct.	2.47	2.03	21	5.4	18	.64	.75	46.1	235	4,732	0	
Nov.	2.98	2.02	24	28	2	.60	1.10	65.5	49.3	273	0	
Dec.	4.93	2.02	18	730	14	.83	17.8	1,093	102	1,093	0	
Yearly	5.42			1,010		0	3.52	2,571	2,348	12,633	126	
Yearly	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
	1.65			28.6		0	0.10	3,171	2,896	15,583	155	

1 And other days

SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 5.5 miles (8.9 km) east of Nogales, Arizona, 0.8 mile (1.3 km) downstream from the international boundary and 6 miles (9.7 km) upstream from the Santa Cruz bridge on State Highway No. 82. Zero of gage is 3,702.54 feet (1,128.53 m) above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

RECORDS: Based on current meter measurements or observation of no flow during the year. Records obtained and furnished by the U. S. Geological Survey. 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; and July 1935 through 1978.

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 1978.

EXTREMES: Maximum discharge, 33,500 second-feet (949 m³/sec) on October 9, 1977 (gage height 15.5 feet) (4.72 m); minimum discharge, no flow for several days of many years.

Mean Daily Discharge in Second-Feet 1978 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15	15	600	31	15	0.30	0	466	2.2	0.70	3.7	57
2	15	14	740	25	15	.30	0	535	3.5	.70	4.1	49
3	16	14	346	25	12	.30	0	414	2.5	.60	4.4	40
4	17	13	196	28	9.0	.20	0	199	3.9	.60	4.4	38
5	17	13	165	34	8.0	.20	0	98	102	.50	4.6	38
6	17	16	210	31	7.7	.20	0	52	33	.50	4.6	38
7	18	16	245	32	8.0	.20	0	37	5.1	.50	4.6	44
8	18	14	158	30	7.4	.10	0	33	3.7	.40	4.1	40
9	18	14	127	34	7.0	.10	0	27	6.7	.40	4.1	42
10	19	15	112	33	6.4	.10	2.0	25	5.1	.40	4.4	42
11	19	90	96	30	6.1	.10	.10	36	3.7	.40	5.4	44
12	20	98	112	29	6.1	.10	0	170	2.5	.40	6.4	49
13	20	72	240	27	5.1	0	0	110	1.6	.40	6.4	49
14	21	295	220	25	4.6	0	0	33	1.1	.40	6.4	49
15	21	196	134	24	4.1	0	0	20	.90	.40	6.4	49
16	21	134	101	24	4.4	0	0	16	.90	.40	6.7	44
17	20	107	81	25	3.5	0	0	14	1.0	.40	6.7	54
18	20	93	74	23	3.0	0	0	12	.90	.50	6.7	6,010
19	18	70	66	21	2.5	0	2.4	11	1.0	.50	6.4	5,340
20	20	61	59	21	2.3	0	0	16	1.0	.80	5.8	876
21	19	52	55	21	2.1	0	0	30	32	78	5.8	433
22	21	44	54	19	2.1	0	2.4	14	2.0	27	5.8	384
23	19	43	50	20	1.7	0	7.6	12	2.5	7.7	12	328
24	19	39	49	20	1.4	0	.40	12	1.3	10	1,710	286
25	19	38	49	19	1.2	0	0	11	1.1	6.4	1,340	240
26	18	38	44	18	1.0	0	1.7	7.0	1.1	5.1	180	235
27	18	43	41	18	.80	0	9.2	4.4	.80	5.1	130	200
28	18	93	39	18	.70	0	.20	2.8	.80	5.1	98.0	200
29	18		40	17	.50	0	0	3.0	.80	5.1	76.0	200
30	18		39	15	.40	0	0	2.3	.80	4.8	59.0	256
31	18		38		.30		131	2.2		4.4		1,170
Sum	575	1,750	4,580	737	149.40	2.20	157.00	2,424.7	225.50	168.60	3,722.9	16,924
Current Year 1978								Period 1936-1978				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Day	Average	Average	Maximum	Minimum		
Jan.	3.64	3.51	19	24	1	14	18.5	1,140	1,073	16,710	0	
Feb.	4.70	3.49	14	364	5	12	62.5	3,471	958	11,129	0	
Mar.	5.36	4.17	2	896	31	34	148	9,084	1,044	12,454	0	
Apr.	4.22	4.00	9	38	22	14	24.6	1,462	254	1,462	0	
May	4.11	3.84	2	16	31	.1	4.82	296	69.5	338	0	
June	3.91		1	.4	1	9	0	.07	4.4	58.9	1,020	0
July	6.50		31	1,570	1	1	0	5.06	311	2,831	15,610	45
Aug.	7.55	3.59	1	4,480	31	2.0	78.2	4,809	5,875	45,790	49	91
Sept.	5.85	3.41	5	1,070	127	.8	7.52	447	1,370	7,507	0	0
Oct.	5.10		21	512	1	8	.4	5.44	334	1,722	59,025	0
Nov.	8.06	3.73	24	6,240	1	3.5	124	7,384	475	7,384	0	0
Dec.	10.50	4.18	18	12,700	6	36	546	33,568	2,408	33,568	0	0
Yearly	10.50			12,700		0	85.4	62,310	18,138	66,030	3,499	
Meters		Cubic Meters per Second				Thousands of Cubic Meters						
3.20		360				0 2.42 76,859 22,373 81,447 4,316						

1 And other days

SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Three 24-inch (61.0 cm) Parshall flumes, each with a recording flow meter and continuous totalizer, one located at the international boundary for measuring effluent from Nogales, Sonora, one located in the influent line to the treatment plant, and one on the plant effluent line. Nogales International Treatment Plant is located approximately 6 miles (9.7 km) north of the international boundary.

RECORDS: Flows from the United States are deduced from total plant influent less the flows measured crossing the international boundary from Mexico. Records available: Continuous monthly record for plant influent since August 1951, daily records for plant influent, January 1952 through 1978.

REMARKS: Prior to December 18, 1971 the plant was located along the right bank of Nogales Wash, approximately two miles (3.2 km) north of the international boundary. Nogales International Treatment Plant treats combined sewage from Nogales, Arizona and Nogales, Sonora by means of aerated stabilization lagoons. 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			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1978			Period 1952-1978		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	67.175	92.016	159.191	5.735	4.667	5.135	5.735	0.650	2.685
Feb.	71.882	83.771	155.653	6.670	5.003	5.559	6.670	.650	2.743
Mar.	95.813	115.532	211.345	7.490	6.000	6.818	7.490	.750	2.730
Apr.	94.875	72.609	167.484	6.130	5.172	5.583	6.130	.700	2.644
May	85.668	64.386	150.054	5.186	4.408	4.840	5.186	.550	2.539
June	79.480	70.305	149.785	5.424	4.486	4.993	5.424	.700	2.411
July	82.504	77.917	160.421	6.149	4.600	5.175	6.149	.700	2.491
Aug.	88.700	76.597	165.297	5.691	4.883	5.332	5.691	.750	2.768
Sept.	84.849	76.112	160.961	5.738	5.015	5.365	5.738	.800	3.033
Oct.	81.592	83.719	165.311	5.654	4.753	5.333	9.807	.700	2.938
Nov.	86.831	96.106	182.937	10.235	5.464	6.098	10.235	.800	2.826
Dec.	114.202	82.964	197.166	11.478	4.990	6.360	11.478	.350	2.812
Yearly	1,033.571	992.034	2,025.605	11.478	4.408	5.549	11.478	0.350	2.718

**RAINFALL ON THE SANTA CRUZ RIVER WATERSHED
IN INCHES**

Tabulated below are the monthly records of rainfall with averages for their periods of record at stations located in Arizona and one in Sonora, Mexico. Four stations are operated and maintained by the United States Section of the Commission, three by the National Weather Service, and one by the Mexican Section of the Commission. For location, elevation, period of record, type of gage in use, and the observer, see alphabetical listing of stations on page 91.

In the United States

Month	San Rafael #1, Arizona		San Rafael #2, Arizona		Canelo, Arizona		Patagonia, Arizona		Nogales, Arizona	
	1978	Average 1952-1978	1978	Average 1973-1978	1978	Average 1930-1978	1978	Average 1930-1978	1978	Average 1914-1978
Jan.	2.57	0.90	0.30	1.09	3.37	1.13	2.87	1.19	2.08	1.03
Feb.	3.06	.62	2.42	1.18	2.93	1.06	3.35	1.05	2.51	.85
Mar.	1.34	.83	2.02	.93	1.58	.78	1.34	.86	1.68	.77
Apr.	.12	.23	.11	.41	.05	.36	.14	.34	.35	.30
May	.06	.08	.04	.04	.04	.13	.56	.16	0	.14
June	.25	.57	.38	.45	.76	.80	.83	.51	1.02	.46
July	8.05	4.95	7.37	6.35	1.17	4.26	4.01	4.53	6.09	4.33
Aug.	*		4.23	2.96	1.68	4.26	3.00	4.04	2.10	3.87
Sept.	*		.53		1.42	1.75	1.33	1.86	.95	1.64
Oct.	*		2.55		2.33	1.01	2.25	1.06	2.51	.91
Nov.	*		4.40		3.02	.78	2.59	.81	3.47	.73
Dec.	*		4.40		3.59	1.36	4.03	1.39	4.07	1.29
Yearly			28.75		21.94	17.68	26.30	17.80	26.83	16.32

Month	Nogales Sanitation Plant 6N, Arizona		Parker Canyon, Arizona						
	1978	Average 1953-1978	1978						
Jan.	1.87	0.98	4.40						
Feb.	2.80	.71	4.20						
Mar.	2.53	.81	2.45						
Apr.	.41	.19	.15						
May	0	.11	.05						
June	1.00	.41	.35						
July	3.75	4.87	5.88						
Aug.	1.52	3.70	3.27						
Sept.	1.22	1.61	1.30						
Oct.	2.89	1.31	2.45						
Nov.	3.20	.68	2.75						
Dec.	3.71	1.30	2.95						
Yearly	24.90	16.68	30.20						

In Mexico

Month	San Lazaro, Sonora							
	1978	Average 1961-1978						
Jan.	2.05	0.83						
Feb.	2.52	.75						
Mar.	1.81	.71						
Apr.	0	.35						
May	0	.12						
June	.31	.47						
July	5.20	4.57						
Aug.	4.49	3.19						
Sept.	1.26	1.65						
Oct.	2.60	1.26						
Nov.	2.83	.71						
Dec.	4.09	1.34						
Yearly	27.17	15.08						

* Missing record

LOCATION OF RAINFALL STATIONS ON THE SANTA CRUZ WATERSHED

The precipitation records of the stations listed alphabetically below begin on the data shown and extend through 1978.

In United States

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Canelo, Arizona	S	31° 33'	110° 32'	5,010	1930	R. E. Ewing
Nogales, Arizona	R	31° 21'	110° 55'	3,808	1914	Milford L. Noon
Nogales Sanitation Plant 6N, Arizona	S	31° 25'	110° 57'	3,560	June 1952	I. B. & W. C.
Parker Canyon, Arizona	S	31° 22'	110° 32'	4,960	1978	I. B. & W. C.
Patagonia, Arizona	S	31° 33'	110° 45'	4,190	1930	George R. Proctor
San Rafael #1, Arizona	S	31° 26'	110° 36'	4,836	Mar. 1952	I. B. & W. C.
San Rafael #2, Arizona	S	31° 22'	110° 38'	4,860	Jan. 1975	I. B. & W. C.

In Mexico

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
San Lazaro, Sonora	S	*	*	4,199	Mar. 1954	I. B. & W. C. Mexican Section

S Standard 8" rain gage

R Recording rain gage

* Unavailable

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

Tabulated below are monthly records of temperature, humidity, evaporation and wind at the station located at the Nogales Sanitation Plant in Arizona 6 miles (9.7 km) north of the international boundary. December 18, 1971 the station was moved to correspond with a new Nogales Sanitation Plant. Prior to this date, the station was located 2 miles (3.2 km) north of the international boundary at the old Nogales Sanitation Plant. This station is operated and maintained by the United States Section of the Commission. Also tabulated below are the monthly records of temperature and evaporation for a station at San Lazaro, Sonora, located approximately 6.5 miles (10.5 km) southwest of Santa Cruz, Sonora and approximately 22 miles (35 km) southeast of Nogales, Sonora. This station is operated and maintained by the Mexican Section of the Commission. The equipment at the Nogales Sanitation Plant - 6N consists of: Standard 8-inch (203 mm) rain gage, 48-inch (1,219 mm) evaporation pan with stillwell and hook gage, maximum and minimum thermometer, anemometer (registers miles), hygrothermograph, and psychrometer, hand turbine type. The equipment at the station at San Lazaro, Sonora consists of: Maximum and minimum thermometer, standard 8-inch (203 mm) rain gage and a 48-inch (1,219 mm) diameter evaporation pan.

For specific location of these two stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 91 of this bulletin.

In United States

Temperature - Degrees Fahrenheit

Month	Nogales Sanitation Plant - 6N		
	1978		
	Mean	Max.	Min.
Jan.	46.5	74	11
Feb.	47.7	75	20
Mar.	56.1	85	29
Apr.	56.3	89	27
May	64.6	100	34
June	76.2	107	41
July	79.4	106	54
Aug.	76.0	98	51
Sept.	71.6	95	43
Oct.	65.0	93	36
Nov.	51.4	83	21
Dec.	43.4	72	- 4
Yearly	61.2	107	- 4

Mean Relative Humidity-Percent

Month	Nogales Sanitation Plant - 6N	
	1978	
	Max.	Min.
Jan.	88	35
Feb.	92	39
Mar.	88	42
Apr.	81	17
May	100	30
June	90	33
July	86	43
Aug.	100	56
Sept.	100	33
Oct.	100	34
Nov.	94	51
Dec.	100	30
Yearly	100	17

Evaporation - Inches

Month	Nogales Sanitation Plant - 6N	
	1978	Average 1953-1978
	Jan.	4.48
Feb.	3.66	4.60
Mar.	6.67	7.33
Apr.	8.38	9.60
May	10.61	12.34
June	#13.96	13.87
July	#11.04	10.33
Aug.	# 9.64	8.33
Sept.	9.63	8.09
Oct.	6.72	6.94
Nov.	4.35	4.53
Dec.	# 3.66	3.38
Yearly	92.80	92.91

Mean Wind Speed - Miles per Hour

Month	Nogales Sanitation Plant - 6N	
	1978	Average 1953-1978
	Jan.	1.5
Feb.	2.0	2.3
Mar.	2.2	2.6
Apr.	2.2	2.6
May	2.1	2.5
June	1.7	2.4
July	1.7	1.6
Aug.	1.4	1.1
Sept.	1.9	1.2
Oct.	1.3	1.6
Nov.	1.9	1.6
Dec.	1.8	1.8
Yearly	1.8	1.9

In Mexico

Temperature - Degrees Fahrenheit

Month	San Lazaro, Sonora			
	1978		1961-1978	
	Max.	Min.	Max.	Min.
Jan.	73	25	93	10
Feb.	72	25	88	16
Mar.	82	30	99	19
Apr.	84	34	106	18
May	97	36	117	28
June	104	50	124	39
July	104	59	126	50
Aug.	93	55	117	52
Sept.	93	48	115	39
Oct.	91	39	111	32
Nov.	82	32	102	21
Dec.	81	- 4	95	- 4
Yearly	104	- 4	126	- 4

Evaporation - Inches

Month	San Lazaro, Sonora	
	1978	Average 1961-1978
	Jan.	2.68
Feb.	3.94	4.72
Mar.	6.02	7.09
Apr.	9.37	9.69
May	10.16	11.81
June	11.65	12.68
July	9.45	8.35
Aug.	8.98	7.48
Sept.	7.68	7.36
Oct.	5.47	6.77
Nov.	3.35	4.57
Dec.	2.09	3.50
Yearly	80.83	87.95

Ten-year average

**DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS ALONG
SANTA CRUZ RIVER, SAN PEDRO RIVER, AND WHITEWATER DRAW
1978**

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 Soil Conservation Service 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
Above El Cajon, Mexico Gaging Station	179	125	304	200	2,352	2,552
Above Nogales, Arizona Gaging Station	185	348	533	200	2,696	2,896
San Pedro River:						
Above Palominas, Arizona Gaging Station	92	649 *	741	1,026	3,459	4,485
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	30,000	0	30,000

* An additional 47 square miles in Mexico is tributary to the San Pedro River downstream from this station