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WESTERN WATER BULLETIN 1981

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

1981

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FOREWORD

This bulletin is the twenty-second 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 1981.

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 1981.

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)

GENERAL HYDROLOGIC CONDITIONS FOR 1981

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 1981. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 1981 measured at 5 index stations was 1.97 inches, compared to an average of 2.76 inches during the last 23 years (1959 to 1981).

The flow of the Colorado River reaching Imperial Dam was 6,270,400 acre-feet, about 79% of the 47-year average (1935-1981) of 7,911,453 acre-feet. At the northerly international boundary, the total flow of the river during 1981 was 1,925,734 acre-feet, about 55% of the 1935-1981 average of 3,498,498 acre-feet. At the southerly international boundary, the flow during 1981 was 237,538 acre-feet, or about 9.4% of the 1935-1981 average of 2,531,022 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 303,807 acre-feet in 1981, about 30% of the 1951-1981 average of 1,005,950 acre-feet.

The total of all flows of the Colorado River entering Mexico in 1981 amounted to 2,190,898 acre-feet, 54% of the 1935-1981 average of 4,061,669 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, 6) in the Wellton-Mohawk Bypass Drain at southerly land boundary near San Luis, Arizona, and 7) the 242 Well Field near San Luis, Arizona.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1981. A maximum instantaneous flow of 10,100 second-feet occurred in the Colorado River at the northerly boundary station on January 13, 1981.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 24,787,700 acre-feet, 87% of the usable capacity of 28,588,400 acre-feet. The greater part (22,668,000 acre-feet) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River water for irrigation during 1981 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1981 was 1,205,746 acres; 691,040 acres in the United States and 514,706 acres in Mexico. An estimated 32% of acreage in Mexico is served by pumping from ground water.

The suspended sediment load passing the northerly boundary station in 1981 was 48.0 acre-feet, about 21% of the 1956-1981 average of 228.7 acre-feet.

Tijuana River Basin

During 1981, the temperatures at Barrett Dam, California (elevation 1,750 feet) in the upper portion of the basin in the United States averaged 64.1 degrees, 2.8 degrees above the 51-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 66 degrees, 4 degrees above the normal for many years.

At Barrett Dam in the upper portion of the basin in the United States, the 1981 recorded precipitation was 14.52 inches, 83% of normal; and at Chula Vista near the lower end of the basin, 8.19 inches, or 86% of normal. The recorded precipitation at San Juan de Dios in the upper portion of the basin in Mexico, was 14.37 inches, approximately 88% of the normal during the 26-year period; and at Rodriguez Dam in the lower portion of the basin in Mexico, 7.20 inches, 85% of the 44-year average.

Runoff in the basin during 1981 averaged 74% of normal. Above Morena Reservoir the runoff was 10,107 acre-feet, or about 127% of the 45-year 1937-1981 mean of 7,933 acre-feet. At Rodriguez Reservoir, the runoff was 11,429 acre-feet, or about 54% of the 44-year mean of 21,099 acre-feet.

The flow of the Tijuana River at the international boundary was 10,603 acre-feet during 1981.

Whitewater Draw

During 1981, the average annual temperature over the watershed was 2.1 degrees above normal, while the annual precipitation was above normal. Runoff for the year at the gaging station near Douglas, Arizona, of 2,045 acre-feet, was about 32% of average.

GENERAL HYDROLOGIC CONDITIONS FOR 1981

San Pedro River

During 1981, the average annual temperature was 1.6 degrees above normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 101% of the 1961-1981 mean of 19.53 inches. The stream flow at the international boundary was 9,321 acre-feet, 41% of the 1951-1981 normal.

Santa Cruz River

During 1981, the average annual temperature over the watershed was somewhat above normal, and the annual precipitation was about 107% of the 43-year 1939-1981 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 10,228 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 1,253 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 8,975 acre-feet from the loop of the river lying in Mexico, or approximately 88% of the flow reaching the Nogales station.

Alamo and New Rivers

During 1981, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, was 73.5 degrees, 1.3 degrees above normal; and over the drainage area of the New River, as recorded at Mexicali, Baja California, it was 75 degrees, 4 degrees above the 56-year average.

At El Centro, the precipitation was 3.86 inches, about 149% of the 51-year average; and in Mexicali, the annual precipitation was 1.77 inches, 58% of the 56-year average. The total flow of the New River at the international boundary in 1981 was 155,443 acre-feet, which was about 180% of the 1943-1981 normal.

Salton Sea

During 1981, the average annual temperature around the Salton Sea was about 102% of the long-term average, while the annual precipitation recorded at Brawley, California was approximately 104% of the long-term mean of 2.60 inches. The water surface of the Salton Sea remained more or less the same during the year. The maximum stage, 227.1 feet below mean sea level, was recorded on April 23 to May 14; June 1-5, and June 8, 9, inclusive. The minimum stage, 228.3 feet below mean sea level, was recorded on October 13, 16-25, 28, 29; and November 1 to December 4, inclusive.

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-Foot 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0
Current Year 1981								Period 1973-1981				
Month	Extreme Gage Feet		* ♂ Extreme Second-Foot			Average Second-Foot	Total Acre-Foot	Acre-Foot				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.				0		0	0	527	902	0		
Feb.				0		0	0	529	813	0		
Mar.				0		0	0	560	849	0		
Apr.				0		0	0	545	857	0		
May				0		0	0	574	887	0		
June				0		0	0	576	986	0		
July				0		0	0	583	1,021	0		
Aug.				0		0	0	555	918	0		
Sept.				0		0	0	457	904	0		
Oct.				0		0	0	477	905	0		
Nov.				0		0	0	449	902	0		
Dec.				0		0	0	449	993	0		
Yearly				0		0	0	6,281	10,258	0		
	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
				0		0	0	7,748	12,653	0		

* Includes 12% losses

♂ Mean daily

RESERVATION MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

DESCRIPTION: Water-stage recorder (digital) located 500 feet (152 m) upstream from railroad culvert and one mile (1.6 km) northwest of Yuma, Arizona. Discharge measurements are made from a footbridge immediately below the gage. The drainage canal discharges into the outfall channel of the Yuma Main Canal Wasteway 200 feet (61.0 m) downstream from the spillway structure, and thence into the Colorado River on the right bank, 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 boundary. Prior to October 1955, published as "California Drainage Canal near Yuma, Arizona."

RECORDS: Based on current meter measurements and a continuous record of gage heights. Records are computed and furnished by the U. S. Geological Survey. Records available: Monthly discharge, January 1913 to April 1920, October 1921 to March 1925, and January 1934 to September 1947; daily and monthly discharge, October 1947 through 1981.

REMARKS: Reservation Main Drain No. 4 collects drainage and wastewater from the area east of the Yuma Main Canal on the Reservation Division of the Yuma Project, located in California. Since 1939, collection of seepage from the All-American Canal has caused large increases in drainage flows. Average annual flow prior to 1937 was 12,800 acre-feet (15,789,000 m³). Monthly and annual averages since 1937 are shown in the table below.

EXTREMES: Prior to 1937: Maximum annual flow 20,190 acre-feet (24,904,000 m³), 1916; minimum annual flow 8,920 acre-feet (11,003,000 m³), 1913.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	62	62	73	59	77	84	78	73	80	64	67	73
2	61	62	85	61	81	68	75	81	79	65	59	78
3	62	66	65	73	87	70	74	72	79	75	61	69
4	59	62	67	74	70	69	77	70	78	72	64	68
5	59	64	77	67	68	73	77	69	75	63	59	61
6	61	61	85	64	69	72	73	68	82	63	60	61
7	59	57	72	61	69	72	70	69	73	62	64	60
8	60	59	71	69	73	71	69	72	72	68	63	71
9	61	59	78	68	72	71	70	71	71	67	63	61
10	60	62	71	65	69	71	70	71	80	61	62	62
11	61	58	82	65	71	72	68	72	72	60	64	62
12	60	62	72	64	79	72	68	76	73	61	63	62
13	59	58	69	65	69	77	73	73	78	63	60	62
14	60	56	72	64	68	76	69	75	75	63	60	61
15	62	59	67	65	71	74	74	85	79	65	60	61
16	59	59	65	74	67	74	69	74	74	60	58	71
17	58	56	65	69	67	74	69	83	75	59	62	66
18	55	58	68	73	68	74	75	76	70	60	59	63
19	53	61	72	73	68	75	71	83	69	60	63	63
20	53	58	66	73	66	79	69	80	71	61	58	62
21	55	59	66	70	67	75	72	83	72	61	58	71
22	55	61	71	74	70	76	73	83	71	60	57	56
23	56	61	64	69	68	79	72	81	68	60	58	62
24	56	61	67	69	70	75	72	82	66	65	60	56
25	58	59	66	70	68	75	77	8	69	63	60	56
26	61	59	62	70	68	72	79	83	65	65	61	58
27	58	64	61	71	68	75	74	78	64	64	58	63
28	59	69	59	70	69	80	75	79	63	64	59	59
29	60	60	60	73	68	77	72	79	63	65	62	55
30	67	62	60	73	69	74	70	80	71	62	63	56
31	64		59		72		71	80		64		59
Sum	1,833	1,692	2,137	2,055	2,186	2,226	2,245	2,382	2,177	1,965	1,825	1,948
Current Year 1981								Period 1937-1981				
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	67	119	53	59.1	3,636	3,150	4,780	877	
Feb.			28	69	114	56	60.4	3,356	2,978	4,320	563	
Mar.			1 2	85	128	59	68.9	4,239	3,662	5,240	1,240	
Apr.			1 4	74	1	59	68.5	4,076	3,684	5,250	1,160	
May			3	87	20	66	70.5	4,336	3,826	5,590	992	
June			1	84	2	68	74.2	4,415	3,714	5,580	885	
July			26	79	111	68	72.4	4,453	3,988	6,550	816	
Aug.			15	85	6	68	76.8	4,725	3,965	6,810	861	
Sept.			6	82	128	63	72.6	4,318	3,733	6,220	889	
Oct.			3	75	17	59	63.4	3,898	3,738	5,740	1,040	
Nov.			1	67	22	57	60.8	3,620	3,492	5,490	994	
Dec.			2	78	29	55	62.8	3,864	3,381	4,960	966	
Yearly				87		53	67.6	48,936	43,311	63,700	12,840	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				2.46		1.50	1.91	60,362	53,424	78,573	15,838	

Ø 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 1981.

REMARKS: The wasteway discharges to the river the flow in excess of irrigation water in the Yuma Main Canal. 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, 2,020 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10	8.0	5.7	5.4	5.3	5.6	6.4	7.7	6.3	118	94	495
2	12	47	6.0	5.0	5.3	5.6	6.2	7.7	6.4	134	5.4	377
3	10	350	6.2	4.6	5.4	5.6	6.2	7.8	6.3	150	5.8	476
4	11	528	6.5	4.6	5.4	5.5	6.2	7.6	6.3	138	15	466
5	11	537	6.8	4.6	5.4	5.5	23	13	11	135	106	556
6	9.7	575	7.1	4.7	5.3	5.6	13	7.0	9.2	160	233	442
7	9.5	723	7.2	4.8	5.1	5.6	7.1	6.8	8.9	88	261	457
8	9.4	746	7.5	5.1	4.7	5.6	7.6	6.6	8.4	55	255	363
9	9.4	697	7.6	5.8	4.7	5.5	7.1	6.7	8.4	34	284	431
10	9.4	6.2	7.4	5.3	5.8	5.4	7.0	6.8	8.3	90	266	434
11	10	6.2	7.3	9.7	5.5	6.1	7.2	6.8	113	25	197	519
12	9.3	410	7.2	6.6	5.4	6.1	9.6	6.7	791	119	118	506
13	9.3	778	7.0	6.4	5.3	5.7	7.9	6.2	587	115	100	483
14	16	765	6.1	6.3	5.3	5.6	7.7	6.2	618	124	174	491
15	10	757	5.8	6.2	5.3	4.5	18	14	641	114	156	498
16	10	840	5.5	6.2	5.3	4.0	8.0	8.6	680	127	171	582
17	9.9	829	5.4	5.8	5.3	4.2	7.3	6.0	589	124	209	567
18	11	771	5.2	5.8	5.3	4.2	7.0	6.2	629	138	207	759
19	11	730	4.9	5.5	4.4	4.2	6.9	6.2	636	190	155	875
20	11	703	4.8	5.4	5.4	4.4	7.0	6.1	679	208	167	866
21	11	733	4.6	5.4	5.7	8.1	6.9	6.2	674	200	95	707
22	11	660	4.6	5.3	5.7	8.8	7.0	6.1	656	171	194	6.0
23	11	690	5.4	5.0	5.5	7.2	6.9	6.1	678	206	301	4.9
24	11	696	5.4	4.9	5.4	6.1	6.8	6.0	699	128	281	5.4
25	11	769	5.2	4.8	5.4	6.2	6.9	5.9	687	115	250	5.4
26	9.5	865	5.0	4.9	5.4	6.2	9.5	5.6	605	236	167	7.2
27	8.5	675	4.5	4.9	5.4	6.2	8.1	6.9	594	238	193	8.0
28	8.5	5.5	4.5	4.8	7.7	6.2	8.0	10	657	230	272	6.6
29	8.5		4.5	5.2	5.8	6.0	8.0	6.3	664	201	268	7.2
30	8.5		4.5	5.2	5.5	6.8	7.8	6.3	503	224	352	8.0
31	8.2		4.5		5.6		7.7	6.3		164		12
Sum	315.6	15,899.9	179.9	164.2	168.0	172.3	260.0	222.4	12,459.5	4,519	5,552.2	11,420.7
Current Year 1981									Period 1935-1981			
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.			14	16	31	8.2	10.2	626	51,241	110,700	626	
Feb.			26	865	28	5.5	568	31,537	45,116	89,140	1,099	
Mar.			9	7.6	128	4.5	5.80	357	44,613	90,190	357	
Apr.			11	9.7	13	4.6	5.47	326	45,132	86,580	326	
May			28	7.7	19	4.4	5.42	333	53,544	88,280	333	
June			22	8.8	16	4.0	5.74	342	46,848	86,660	342	
July			5	23	12	6.2	8.39	516	44,142	91,220	452	
Aug.			15	14	26	5.6	7.17	441	44,642	89,890	441	
Sept.			12	791	1	6.3	415	24,713	48,314	83,660	736	
Oct.			27	238	11	25	146	8,963	45,162	90,050	567	
Nov.			30	352	2	5.4	185	11,013	45,214	101,500	841	
Dec.			19	875	23	4.9	368	22,653	49,726	108,800	598	
Yearly				875		4.0	141	101,820	563,694	1,042,850	11,945	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				24.8		0.11	3.99	125,594	695,311	1,286,345	14,734	

0 Mean daily

1 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 1981. 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,960	706	791	699	769	681	707	732	616	711	581	1,010
2	2,980	693	1,060	714	761	681	680	745	602	719	479	995
3	2,980	1,070	1,460	729	761	685	693	723	617	721	497	1,090
4	2,980	1,280	1,400	847	736	713	975	708	636	722	502	1,090
5	2,950	1,260	1,220	929	739	903	747	678	659	712	656	1,220
6	2,970	1,290	1,070	832	737	823	689	668	688	746	701	1,180
7	2,980	1,320	1,470	718	734	720	674	660	687	690	729	1,200
8	2,990	1,330	1,630	731	937	697	683	768	632	651	726	1,190
9	3,000	1,350	1,000	712	943	665	678	641	607	627	731	1,240
10	2,980	1,130	981	734	814	657	849	618	572	629	719	1,200
11	2,980	835	897	817	742	676	751	620	617	723	714	1,300
12	2,980	1,040	887	776	751	662	701	590	1,440	627	682	1,290
13	2,950	1,430	937	775	729	675	664	645	1,370	635	665	1,300
14	2,990	1,420	898	760	723	676	727	585	1,220	619	657	1,370
15	3,050	1,390	820	750	726	657	704	843	1,210	615	665	1,370
16	2,910	1,490	839	781	724	686	681	1,420	1,270	622	672	1,470
17	2,150	1,490	894	771	716	674	662	1,980	1,210	643	684	1,430
18	2,070	1,540	860	786	713	662	703	1,600	1,190	653	680	1,410
19	2,120	1,510	817	915	712	653	697	853	1,190	679	662	1,450
20	2,150	1,530	791	1,260	728	666	692	697	1,220	719	662	1,420
21	2,090	1,520	787	817	709	757	687	703	1,230	692	660	1,330
22	1,740	1,440	778	1,080	701	713	697	776	1,210	677	690	689
23	1,530	1,490	788	816	699	817	698	716	1,270	676	734	657
24	1,250	1,500	816	736	886	666	685	659	1,280	711	731	657
25	1,120	1,560	769	862	746	646	826	591	1,250	691	768	604
26	995	1,670	754	790	706	676	883	558	1,240	719	754	535
27	925	1,500	676	717	703	714	799	522	1,190	728	774	541
28	860	812	640	714	716	717	754	544	1,210	714	731	535
29	790	709	749	749	712	761	700	517	1,230	711	749	532
30	751	715	792	684	726	680	680	513	1,090	715	766	530
31	729	706	706	670	670	679	679	528	668	668	529	529
Sum	68,900	36,596	28,860	24,109	23,127	21,165	22,445	23,401	30,453	21,165	20,421	32,364
Current Year 1981								Period 1951-1981				
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.	14.20	10.58	15	3,090	31	720	2,220	136,661	190,556	979,890	29,857	
Feb.	12.22	10.51	27	1,740	2	688	1,310	72,587	142,057	826,600	33,790	
Mar.	12.26	10.26	8	1,760	28	629	931	57,243	158,740	1,073,270	34,604	
Apr.	11.90	10.29	20	1,580	1	693	804	47,820	153,330	843,010	33,687	
May	10.85	10.20	8	980	31	661	746	45,872	153,490	863,860	45,872	
June	10.89	10.10	21	1,000	24	624	706	41,980	141,170	833,970	33,856	
July	10.86	10.06	4	1,020	17	643	724	44,519	146,830	649,820	34,413	
Aug.	12.92	10.09	17	2,140	30	504	755	46,415	154,504	670,050	33,610	
Sept.	12.08	9.98	12	1,680	11	544	1,020	60,403	139,509	775,930	43,182	
Oct.	10.45	9.80	11	795	31	500	683	41,980	116,205	802,210	34,965	
Nov.	10.63	9.74	25	885	2	474	681	40,504	128,448	911,370	34,832	
Dec.	11.63	9.83	19	1,520	129	526	1,040	64,193	156,710	1,114,550	33,023	
Totals	14.20	9.74		3,090		474	967	700,177	1,781,549	10,220,870	513,755	
Totals	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
	4.33	2.97		87.5		13.4	27.4	863,661	2,197,523	12,607,341	633,712	

1 And other days

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

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.90	10.55	10.56	10.41	10.43	10.24	10.21	10.26	10.29	10.27	9.98	10.79
2	13.93	10.52	11.08	10.44	10.41	10.24	10.15	10.29	10.22	10.28	9.75	10.75
3	13.94	11.25	11.76	10.47	10.41	10.25	10.18	10.24	10.24	10.29	9.79	10.91
4	13.94	11.63	11.67	10.70	10.36	10.31	10.76	10.22	10.27	10.30	9.80	10.89
5	13.90	11.59	11.37	10.86	10.36	10.71	10.30	10.18	10.31	10.27	10.15	11.08
6	13.94	11.62	11.13	10.66	10.36	10.54	10.17	10.17	10.36	10.35	10.25	11.00
7	13.98	11.66	11.79	10.42	10.35	10.33	10.14	10.17	10.35	10.22	10.31	11.02
8	14.00	11.68	12.06	10.45	10.76	10.27	10.16	10.43	10.21	10.14	10.30	11.00
9	14.01	11.71	10.98	10.39	10.78	10.20	10.15	10.17	10.14	10.09	10.32	11.09
10	14.00	11.32	10.96	10.43	10.52	10.18	10.51	10.14	10.05	10.09	10.29	11.02
11	14.00	10.75	10.80	10.60	10.37	10.22	10.31	10.15	10.13	10.30	10.28	11.19
12	14.01	11.14	10.77	10.51	10.39	10.19	10.20	10.10	11.68	10.08	10.21	11.18
13	13.98	11.81	10.87	10.50	10.34	10.22	10.12	10.24	11.54	10.10	10.17	11.19
14	14.03	11.78	10.80	10.47	10.33	10.22	10.26	10.13	11.28	10.07	10.15	11.31
15	14.13	11.73	10.65	10.44	10.34	10.18	10.20	10.70	11.26	10.06	10.17	11.30
16	13.92	11.88	10.69	10.49	10.34	10.25	10.14	11.75	11.35	10.07	10.18	11.48
17	12.77	11.87	10.80	10.47	10.32	10.22	10.10	12.67	11.22	10.12	10.21	11.41
18	12.64	11.95	10.73	10.49	10.32	10.19	10.19	12.08	11.19	10.14	10.20	11.37
19	12.72	11.90	10.64	10.74	10.31	10.17	10.18	10.80	11.18	10.20	10.16	11.43
20	12.78	11.92	10.60	11.36	10.35	10.19	10.17	10.49	11.23	10.29	10.16	11.40
21	12.69	11.89	10.59	10.53	10.30	10.39	10.16	10.51	11.25	10.23	10.16	11.10
22	12.15	11.75	10.58	11.05	10.29	10.29	10.18	10.69	11.22	10.20	10.22	10.12
23	11.82	11.83	10.60	10.52	10.28	10.51	10.18	10.58	11.32	10.19	10.32	10.05
24	11.38	11.84	10.65	10.36	10.67	10.19	10.15	10.47	11.34	10.27	10.31	10.05
25	11.20	11.93	10.57	10.62	10.39	10.15	10.45	10.35	11.29	10.23	10.39	10.00
26	11.00	12.11	10.54	10.47	10.30	10.18	10.57	10.28	11.28	10.29	10.37	9.88
27	10.90	11.82	10.36	10.31	10.29	10.23	10.40	10.22	11.19	10.31	10.41	9.97
28	10.80	10.60	10.28	10.31	10.32	10.36	10.30	10.29	11.23	10.28	10.32	9.96
29	10.70		10.44	10.38	10.31	10.33	10.19	10.23	11.27	10.27	10.35	9.95
30	10.65		10.45	10.47	10.25	10.25	10.14	10.22	11.03	10.28	10.39	9.95
31	10.60		10.43		10.22		10.14	10.26		10.18		9.95
Avg.	12.85	11.57	10.85	10.54	10.38	10.27	10.24	10.50	10.90	10.21	10.20	10.77

YUMA MESA OUTLET DRAIN TO COLORADO RIVER NEAR YUMA, ARIZONA

DESCRIPTION: Venturi meter with recorder 0.3 mile (0.5 km) from outlet to Colorado River, 0.5 mile (0.8 km) west of Joe Henry Memorial Park in Yuma, Arizona. Outlet is 1.7 miles (2.7 km) downstream from the mouth of Yuma Main Canal wasteway.

RECORDS: Records are furnished by U. S. Geological Survey. Monthly discharge July 1970 through 1981. Prior to July 21, 1972, records furnished by U. S. Bureau of Reclamation.

REMARKS: Records show water pumped from wells on the Yuma Mesa and conveyed by underground conduit to Colorado River.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	32	32	48	46	41	43	36	42	39	42	42	41
2	32	31	33	45	41	43	36	42	42	42	44	46
3	32	31	16	45	41	43	36	42	42	42	46	45
4	16	32	22	45	43	43	36	42	42	42	46	45
5	0	32	41	45	44	43	35	42	42	42	46	45
6	9.5	32	26	45	44	43	35	42	42	43	42	45
7	24	32	13	45	44	43	35	42	42	43	46	45
8	28	32	13	45	44	43	35	42	27	42	46	50
9	29	32	13	45	44	43	35	42	0	42	46	53
10	32	30	13	45	44	43	35	42	0	42	46	53
11	33	27	27	45	44	43	35	42	13	24	46	53
12	33	27	41	45	44	43	35	37	33	33	46	50
13	33	28	42	45	44	43	35	32	42	43	46	48
14	33	27	42	45	44	43	35	42	42	43	46	51
15	33	27	42	45	44	43	35	12	43	42	46	53
16	33	27	41	45	44	43	35	0	43	42	45	53
17	33	27	45	45	44	42	30	0	43	42	45	48
18	33	27	53	45	44	43	20	0	42	42	45	50
19	33	27	53	45	44	43	32	0	42	42	45	53
20	33	27	53	44	44	43	36	29	42	42	45	51
21	32	27	53	45	44	43	36	35	42	42	45	47
22	32	27	53	45	40	43	35	43	42	42	45	50
23	32	34	52	45	38	43	35	40	42	41	45	52
24	32	41	53	45	38	42	35	39	42	42	30	52
25	32	44	53	45	38	42	35	43	42	42	0	49
26	32	44	53	45	38	42	35	43	42	42	0	49
27	32	46	50	45	38	43	35	43	42	42	0	50
28	32	47	52	45	38	11	35	43	42	42	16	51
29	32	48	47	45	44	0	35	39	42	42	46	52
30	32	47	47	45	44	22	39	35	42	42	46	52
31	32	47	47	43	44	35	42	35	42	42	37	52
31	32	47	47	44	44	35	42	35	42	42	37	52
Sum	916.5	901	1,231	1,348	1,320	1,183	1,086	1,044	1,123	1,278	1,215	1,537
Current Year 1981								Period 1971-1981				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
												Day
Jan.			111	33	5	0	29.6	1,818	2,710	5,840	0	
Feb.			28	48	111	27	32.2	1,787	2,508	4,830	0	
Mar.			118	53	17	13	39.7	2,442	2,971	5,430	4	
Apr.			1	46	30	43	44.9	2,674	2,781	5,120	242	
May			15	44	123	38	42.6	2,618	2,664	4,933	0	
June			11	43	28	0	39.4	2,346	2,771	4,828	0	
July			130	42	18	20	35.0	2,154	3,119	5,510	692	
Aug.			122	43	116	0	33.7	2,071	3,239	6,000	180	
Sept.			115	43	19	0	37.4	2,227	3,170	5,880	0	
Oct.			16	43	11	24	41.2	2,535	3,181	5,360	157	
Nov.			13	46	125	0	40.5	2,410	3,257	5,290	313	
Dec.			19	53	1	41	49.6	3,049	3,478	5,970	0	
Yearly				53		0		28,131	35,849	58,680	1,753	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				1.50		0	1.10	34,699	44,219	72,381	2,162	

§ Mean daily

! And other days

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 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.5	5.4	5.5	5.0	6.0	6.0	7.0	7.0	7.5	7.0	6.5	4.5
2	5.5	5.4	5.5	5.0	6.0	6.0	7.0	7.0	7.5	7.0	6.5	4.5
3	5.5	5.4	5.4	5.0	6.0	6.0	7.0	7.0	7.5	7.0	6.5	4.5
4	5.5	5.4	5.4	5.0	6.0	6.0	7.0	7.0	7.5	7.0	6.5	4.5
5	5.5	5.4	5.4	5.0	6.0	6.0	7.0	7.0	7.5	7.0	6.0	4.5
6	5.5	5.4	5.4	5.1	6.0	6.0	7.0	7.0	7.5	7.0	6.0	4.5
7	5.5	5.4	5.3	5.1	6.0	6.0	7.0	7.0	7.5	7.0	6.0	4.5
8	5.5	5.4	5.3	5.1	6.0	6.0	7.0	7.0	7.5	7.0	6.0	4.5
9	5.5	5.4	5.3	5.1	6.0	6.0	7.0	7.0	7.5	7.0	6.0	4.5
10	5.5	5.4	5.3	5.1	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
11	5.5	5.4	5.2	5.2	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
12	5.5	5.4	5.2	5.2	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
13	5.5	5.4	5.2	5.3	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
14	5.5	5.4	5.2	5.3	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
15	5.5	5.4	5.1	5.3	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
16	5.5	5.4	5.1	5.4	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
17	5.5	5.4	5.1	5.4	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
18	5.5	5.4	5.1	5.4	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
19	5.5	5.4	5.0	5.4	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
20	5.5	5.4	5.0	5.5	6.0	6.0	7.0	7.0	7.0	7.0	6.0	4.5
21	5.5	5.5	5.0	5.5	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
22	5.5	5.5	5.0	5.5	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
23	5.4	5.5	5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
24	5.4	5.5	5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
25	5.4	5.5	5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
26	5.4	5.5	5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
27	5.4	5.5	5.0	5.7	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
28	5.4	5.5	5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
29	5.4		5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
30	5.4		5.0	5.6	6.0	6.0	7.0	7.5	7.0	7.0	6.0	4.5
31	5.4		5.0		6.0		7.0	7.5		7.0		4.5
Sum	169.6	152.0	160.0	159.8	186.0	180.0	217.0	222.5	214.5	217.0	182.0	139.5
Current Year 1981									Period 1948-1981			
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	5.5	123	5.4	5.47	336	306	899	39.3	
Feb.			121	5.5	1 1	5.4	5.43	301	265	746	40.5	
Mar.			1 1	5.5	119	5.0	5.16	317	323	853	62.7	
Apr.			27	5.7	1 1	5.0	5.33	317	341	1,000	66.8	
May			1 1	6.0	1 1	6.0	6.00	369	348	966	58.3	
June			1 1	6.0	1 1	6.0	6.00	357	364	1,030	67.4	
July			1 1	7.0	1 1	7.0	7.00	430	416	1,260	72.8	
Aug.			121	7.5	1 1	7.0	7.18	441	463	1,350	73.8	
Sept.			1 1	7.5	110	7.0	7.15	425	445	1,370	53.6	
Oct.			1 1	7.0	1 1	7.0	7.00	430	453	1,220	55.3	
Nov.			1 1	6.5	1 5	6.0	6.07	361	409	1,240	57.7	
Dec.			1 1	4.5	1 1	4.5	4.50	277	365	1,050	42.2	
Yearly				7.5		4.5	6.02	4,361	4,498	12,429	774	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				0.21		0.13	0.17	5,379	5,548	15,331	955	

β Mean daily

! 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 1981. 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,370	1,060	1,210	3,310	2,620	1,420	2,670	2,980	1,490	0	93	0
2	4,570	1,060	3,180	3,200	2,420	1,470	2,520	2,940	1,390	0	200	0
3	3,930	66	4,100	3,130	2,400	1,480	2,530	2,840	1,390	0	218	0
4	3,790	0	1,220	3,010	2,190	1,420	2,210	2,850	1,330	0	236	0
5	4,600	0	1,010	2,910	2,080	1,100	2,440	2,890	1,320	0	82	0
6	4,760	0	1,480	3,050	1,700	1,200	2,580	2,890	1,290	0	0	0
7	5,380	0	2,470	3,200	1,480	1,350	2,620	2,840	1,310	0	0	0
8	5,530	0	2,680	3,120	1,350	1,480	2,560	2,780	1,360	0	0	0
9	5,930	0	1,880	3,160	1,410	1,520	2,690	2,920	1,470	0	0	0
10	5,890	1,120	1,790	3,110	1,530	1,640	2,470	2,880	1,330	0	0	0
11	5,340	1,270	2,050	3,080	1,490	1,610	2,620	2,950	1,090	0	0	0
12	5,480	455	2,030	3,160	1,470	1,620	2,740	3,010	0	0	0	0
13	6,360	0	2,070	3,220	1,350	1,660	2,800	2,960	0	0	0	0
14	5,880	0	2,370	3,170	1,220	1,700	2,690	3,010	0	0	0	0
15	5,470	0	2,470	3,180	1,260	1,960	2,690	2,980	0	0	0	0
16	2,290	0	2,530	3,170	1,210	1,880	2,700	2,970	0	0	0	0
17	1,990	0	2,480	3,240	1,210	2,080	2,780	2,960	0	0	0	0
18	1,830	0	2,750	3,230	1,240	2,120	2,770	2,960	0	0	0	0
19	2,040	0	2,690	3,200	1,320	2,180	2,740	3,100	0	0	0	0
20	1,870	0	2,750	2,780	1,350	2,310	2,770	3,180	0	0	0	0
21	1,330	0	2,820	3,000	1,330	2,300	2,830	3,140	0	0	0	0
22	2,000	0	2,850	3,100	1,350	2,610	2,840	3,020	0	0	0	1,010
23	1,700	0	3,020	2,910	1,370	2,470	2,840	3,210	0	0	0	1,010
24	1,300	0	3,090	2,840	1,080	2,810	2,860	3,120	0	0	0	1,060
25	1,300	0	3,150	2,710	1,200	3,090	2,670	3,100	0	0	0	1,010
26	951	0	3,260	2,800	1,270	3,030	2,560	3,130	0	0	0	1,060
27	976	45	3,340	2,990	1,260	3,010	2,670	2,910	0	0	0	1,120
28	1,510	1,050	3,410	2,870	1,420	2,920	2,740	2,530	0	0	0	1,230
29	1,380	0	3,360	2,880	1,620	2,980	2,740	2,240	0	0	0	1,280
30	1,070	0	3,290	2,750	1,660	3,030	2,710	2,100	0	0	0	1,380
31	1,060	0	3,350	1,700	1,700	2,770	1,740	1,740	0	82	0	1,370
Sum	102,877	6,126	80,150	91,480	47,560	61,450	82,820	89,130	14,770	82	829	11,530

Month	Current Year 1981							Period 1944-1981			
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum
							High	Low			
Jan.			13	6,360	26	951	3,320	204,054	43,207	400,200	0
Feb.			11	1,270	14	0	219	12,151	25,514	149,500	0
Mar.			3	4,100	5	1,010	2,590	158,975	88,220	394,116	0
Apr.			1	3,310	25	2,710	3,050	181,448	112,484	362,400	0
May			1	2,620	24	1,080	1,530	94,338	31,833	353,038	0
June			25	3,090	5	1,100	2,050	121,884	72,471	365,732	0
July			24	2,860	4	2,210	2,670	164,271	125,493	385,131	0
Aug.			23	3,210	31	1,740	2,880	176,787	126,080	334,036	0
Sept.			1	1,490	112	0	492	29,296	56,391	319,121	0
Oct.			1	82	1	0	2.6	163	21,819	381,640	0
Nov.			31	236	16	0	27.6	1,644	24,622	383,028	0
Dec.			30	1,380	1	0	372	22,869	51,003	336,397	0
Yearly				6,360		0	1,610	1,167,876	779,137	3,850,009	0
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
				180		0	45.6	1,440,563	961,058	4,748,948	0

Ø Mean daily 1 And other days

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	107.85	103.80	103.52	105.36	104.66	103.57	104.80	104.80	103.25	102.00	101.99	102.20
2	107.37	103.82	104.43	105.26	104.45	103.57	104.63	104.83	103.14	101.98	101.86	102.22
3	106.84	103.24	105.42	105.12	104.41	103.55	104.54	104.80	103.21	102.07	101.90	102.30
4	106.64	103.77	104.32	105.10	104.14	103.60	104.47	104.78	103.10	101.94	101.93	102.31
5	107.13	103.67	103.98	105.07	104.01	103.60	104.36	104.73	103.10	101.95	101.93	102.38
6	107.34	103.60	104.20	105.06	103.54	103.40	104.37	104.74	103.09	102.00	101.90	102.37
7	107.92	103.38	104.82	105.10	103.26	103.24	104.35	104.76	103.19	102.15	101.92	102.35
8	108.04	103.35	104.93	105.02	103.24	103.36	104.32	104.76	103.32	101.94	101.93	102.36
9	108.36	103.33	104.50	105.00	103.36	103.36	104.42	104.77	103.41	101.91	101.95	102.41
10	108.34	103.70	104.38	104.97	103.44	103.45	104.41	104.72	103.36	101.90	101.94	102.39
11	107.99	103.80	104.54	105.00	103.35	103.39	104.56	104.72	103.36	102.06	101.95	102.46
12	108.02	103.28	104.52	105.02	103.34	103.42	104.64	104.72	102.91	101.88	101.90	102.46
13	108.86	103.09	104.57	105.10	103.24	103.51	104.67	104.82	103.05	101.92	101.89	102.46
14	108.66	103.09	104.78	105.02	103.20	103.50	104.67	104.83	102.67	101.87	101.88	102.51
15	108.49	103.01	104.78	105.04	103.27	103.74	104.67	104.92	102.58	101.88	101.90	102.51
16	106.06	103.12	104.87	105.03	103.20	103.76	104.67	105.23	102.63	101.87	101.89	102.61
17	104.90	103.08	104.91	105.13	103.20	103.87	104.62	105.30	102.79	101.89	101.94	102.65
18	104.61	103.06	105.13	105.16	103.21	103.87	104.63	105.15	102.62	101.89	101.94	102.66
19	104.84	103.10	105.09	105.28	103.26	103.98	104.63	104.95	102.56	101.91	101.92	102.77
20	104.77	103.08	105.11	105.39	103.35	104.08	104.63	104.87	102.61	101.97	101.92	102.80
21	104.37	103.00	105.11	105.06	103.28	104.24	104.65	104.83	102.54	101.95	101.89	102.73
22	104.47	102.99	105.15	105.47	103.28	104.51	104.67	104.84	102.52	102.01	101.92	102.80
23	104.33	102.96	105.33	105.04	103.30	104.55	104.65	104.92	102.53	101.94	101.96	102.76
24	104.22	102.99	105.41	104.90	103.34	104.67	104.66	104.86	102.61	101.94	101.96	102.77
25	104.29	103.07	105.43	104.90	103.23	104.87	104.62	104.93	102.71	101.92	101.95	102.69
26	*103.98	103.24	105.49	104.90	103.22	104.92	104.59	104.94	102.56	101.93	101.94	102.72
27	*103.82	103.23	105.54	104.98	103.19	104.92	104.55	104.83	102.58	101.94	101.95	102.76
28	104.20	103.26	105.58	104.87	103.44	104.92	104.56	104.62	102.56	102.00	101.96	102.79
29	104.10		105.57	104.92	103.74	104.90	104.58	104.37	102.61	101.97	101.99	102.85
30	103.90		105.45	104.83	103.75	105.03	104.59	104.18	102.51	101.93	102.01	103.02
31	103.87		105.45		103.83		104.52	103.66		101.98		103.18
Avg.	106.08	103.29	104.91	105.07	103.51	103.98	104.57	104.78	102.85	101.95	101.93	102.59

* 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 1981 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.2	0.5	4.2	0.7	0	0.2	1.4	0.2	1.0	1.8	0.1	0
2	.2	.1	.2	1.8	1.0	.2	6.5	2.7	3.8	.1	.2	0
3	.2	0	0	.1	6.6	.5	1.3	4.0	.1	.6	0	.1
4	.2	0	0	0	.4	1.4	0	1.3	0	1.3	0	7.3
5	1.3	0	0	8.3	.1	7.1	0	1.1	0	.7	0	3.0
6	3.8	0	0	.2	0	1.3	0	0	1.7	.1	0	1.7
7	.2	5.4	5.3	0	0	5.3	0	3.4	5.2	0	1.8	0
8	1.4	2.7	.3	0	1.0	.1	0	1.9	.1	6.6	5.1	0
9	2.0	.1	0	0	9.4	0	0	.2	.1	.8	1.7	0
10	.5	.4	.7	0	.2	0	0	0	0	0	.3	0
11	2.4	2.2	0	2.9	.1	0	1.5	0	0	0	0	.1
12	1.8	.9	0	3.2	.1	0	.1	0	0	5.4	0	6.7
13	.2	1.8	0	0	0	2.4	0	0	0	4.7	0	3.0
14	.8	.2	0	0	0	.2	0	0	0	.1	0	.3
15	3.2	.1	0	.9	0	0	0	0	.1	1.7	0	.3
16	.1	0	0	2.0	0	0	0	.2	0	.6	0	7.0
17	2.0	2.3	1.4	.6	2.9	.1	0	.1	0	.3	1.2	.4
18	1.4	* .1	.6	1.5	.7	0	0	.9	2.3	.7	15.8	2.7
19	1.0	* 2.7	1.4	.2	.1	0	0	.1	2.1	* 1.7	3.1	.2
20	.2	3.8	.7	0	.6	0	0	0	.2	* .5	.1	.1
21	.1	0	.1	0	10.9	2.2	0	0	.1	.2	0	.7
22	.3	0	0	0	0	.3	.1	0	.1	.1	0	2.0
23	.1	1.2	0	.9	0	.1	.1	0	.1	.1	1.6	4.3
24	.1	1.6	0	2.9	0	.2	.1	0	.1	.1	.1	1.8
25	3.6	.1	0	.1	0	1.3	.1	0	.1	.9	1.7	1.1
26	0	0	0	0	2.5	.2	3.6	0	.1	1.5	1.4	.1
27	0	.3	0	0	4.7	0	.5	6.2	.1	3.4	1.5	.1
28	0	2.4	.4	0	4.9	0	.4	.1	.1	5.6	8.9	0
29	2.0	0	.4	0	.3	0	.1	0	.6	2.1	.3	0
30	.1	0	.9	0	.1	0	2.0	0	1.4	.1	0	0
31	5.9	0	.7	0	2.2	0	.8	.1	.9	.9	0	5.5
Sum	35.3	28.9	17.3	26.3	48.8	23.1	18.6	21.5	19.5	42.7	44.9	48.5
Current Year 1981								Period 1935-1981				
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.	2.02	0	31	35.8	126	0	1.1	70.0	162	914	0	
Feb.	2.10	0	7	37.6	12	0	1.0	57.3	143	400	6.0	
Mar.	1.86	0	7	32.3	13	0	.6	34.3	153	517	0	
Apr.	2.15	0	5	38.8	13	0	.9	52.2	162	425	27.8	
May	2.12	0	29	38.1	11	0	1.6	96.8	160	440	40.3	
June	1.91	0	7	33.4	14	0	.8	45.8	147	595	40.9	
July	1.80	0	1	31.0	11	0	.6	36.9	137	516	0	
Aug.	1.95	0	18	34.3	110	0	.7	42.6	105	617	0	
Sept.	1.80	0	2	31.0	13	0	.6	38.7	105	462	0	
Oct.	2.10	0	8	37.6	17	0	1.4	84.7	132	490	0	
Nov.	1.49	0	18	24.3	13	0	1.5	89.1	154	462	9.0	
Dec.	2.17	0	31	39.2	11	0	1.6	96.2	174	592	13.7	
Yearly	2.17	0		39.2		0	1.0	745	1,734	4,500	638	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.66	0		1.11		0	0.03	919	2,139	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 1981.

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 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	107.19	103.58	103.25	104.95	104.27	103.22	104.46	104.43	102.95	101.74	101.71	101.97
2	106.76	103.58	103.94	104.86	104.07	103.22	104.27	104.46	102.82	101.77	101.71	102.00
3	106.23	103.12	104.76	104.72	104.04	103.18	104.20	104.43	102.92	101.87	101.74	102.03
4	106.04	103.61	103.94	104.69	103.77	103.25	104.13	104.40	102.82	101.71	101.77	102.07
5	106.46	103.51	103.67	104.66	103.64	103.28	103.97	104.36	102.79	101.71	101.77	102.13
6	106.73	103.44	103.87	104.66	103.18	103.08	104.00	104.36	102.79	101.77	101.74	102.13
7	107.28	103.18	104.40	104.66	102.92	102.92	103.97	104.40	102.92	101.94	101.77	102.10
8	107.38	103.15	104.43	104.59	102.89	103.02	103.94	104.36	103.05	101.74	101.77	102.10
9	107.71	103.12	104.17	104.56	103.02	103.05	104.00	104.40	103.12	101.71	101.77	102.13
10	107.68	103.41	104.04	104.53	103.08	103.12	104.04	104.33	103.12	101.71	101.77	102.13
11	107.38	103.51	104.13	104.56	102.99	103.05	104.17	104.30	103.15	101.87	101.77	102.17
12	107.41	103.08	104.20	104.59	102.99	103.08	104.27	104.33	102.72	101.67	101.74	102.20
13	108.23	102.92	104.23	104.66	102.89	103.15	104.30	104.43	102.76	101.71	101.74	102.20
14	108.10	102.89	104.43	104.56	102.85	103.15	104.30	104.46	102.43	101.67	101.74	102.23
15	107.91	102.82	104.43	104.59	102.89	103.38	104.33	104.53	102.33	101.64	101.74	102.23
16	105.61	102.89	104.49	104.59	102.85	103.38	104.23	104.79	102.36	101.64	101.74	102.30
17	104.43	102.85	104.53	104.66	102.85	103.48	104.20	104.76	102.56	101.67	101.77	102.36
18	104.13	102.82	104.76	104.72	102.85	103.48	104.23	104.63	102.33	101.67	101.77	102.36
19	104.33	102.85	104.72	104.86	102.89	103.58	104.27	104.53	102.30	101.71	101.74	102.46
20	104.27	102.85	104.76	104.92	102.99	103.67	104.20	104.43	102.33	101.77	101.71	102.49
21	103.90	102.76	104.79	104.66	102.92	103.84	104.23	104.40	102.26	101.74	101.71	102.43
22	103.97	102.76	104.79	105.05	102.92	104.10	104.27	104.40	102.23	101.80	101.74	102.49
23	103.90	102.72	104.95	104.66	102.92	104.17	104.27	104.49	102.30	101.74	101.77	102.46
24	103.94	102.76	105.02	104.53	102.99	104.27	104.27	104.46	102.36	101.74	101.77	102.46
25	104.04	102.82	105.05	104.49	102.85	104.46	104.20	104.56	102.46	101.71	101.77	102.40
26	103.81	102.99	105.12	104.49	102.82	104.56	104.17	104.56	102.33	101.74	101.77	102.43
27	103.58	102.99	105.15	104.56	102.82	104.56	104.13	104.46	102.33	101.77	101.77	102.46
28	103.90	102.99	105.22	104.46	103.05	104.56	104.13	104.30	102.30	101.77	101.80	102.49
29	103.87		105.15	104.53	103.35	104.53	104.17	104.07	102.33	101.74	101.80	102.53
30	103.71		105.05	104.43	103.35	104.66	104.20	103.87	102.23	101.74	101.80	102.69
31	103.64		105.05		103.44		104.13	103.35		101.80		102.85
Avg.	105.61	103.08	104.53	104.66	103.15	103.61	104.17	104.40	102.59	101.74	101.77	102.30

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	104.17	103.44	103.12	104.82	104.13	103.15	104.30	104.27	102.69	101.54	101.48	101.25
2	104.20	103.44	103.31	104.69	103.94	103.15	104.13	104.30	102.56	101.61	101.21	101.28
3	104.17	102.92	103.84	104.56	103.87	103.12	104.04	104.27	102.69	101.77	101.28	101.44
4	104.20	103.51	103.77	104.56	103.61	103.18	103.97	104.23	102.59	101.41	101.44	101.61
5	104.20	103.44	103.54	104.53	103.48	103.18	103.84	104.17	102.49	101.28	101.48	101.74
6	104.13	103.35	103.74	104.49	103.02	102.95	103.81	104.20	102.53	101.41	101.31	101.67
7	104.07	103.08	104.27	104.49	102.72	102.76	103.77	104.20	102.69	101.87	101.28	101.48
8	104.07	103.05	104.33	104.40	102.69	102.85	103.74	104.20	102.92	101.57	101.51	101.48
9	104.07	103.02	104.00	104.40	102.82	102.89	103.84	104.23	102.99	101.54	101.38	101.57
10	104.07	103.31	103.94	104.36	102.92	102.95	103.87	104.17	103.02	101.51	101.38	101.41
11	104.07	103.41	104.04	104.40	102.82	102.89	104.04	104.13	103.05	101.74	101.31	101.38
12	103.97	102.95	104.10	104.40	102.82	102.89	104.10	104.17	102.66	101.38	101.18	101.38
13	103.81	102.76	104.10	104.49	102.76	102.99	104.17	104.27	102.69	101.41	101.28	101.38
14	103.74	102.76	104.30	104.43	102.72	102.99	104.17	104.30	102.33	101.05	100.95	101.48
15	103.71	102.69	104.33	104.43	102.79	103.25	104.17	104.36	102.17	101.05	101.25	101.48
16	103.71	102.79	104.40	104.43	102.72	103.25	104.07	104.59	102.23	101.05	101.38	101.71
17	103.74	102.76	104.43	104.49	102.72	103.35	104.04	104.59	102.49	101.12	101.48	102.17
18	103.74	102.72	104.63	104.56	102.72	103.35	104.07	104.46	102.20	101.15	101.54	102.20
19	103.77	102.72	104.59	104.69	102.76	103.44	104.10	104.36	102.13	101.21	101.51	102.33
20	103.71	102.69	104.63	104.79	102.85	103.54	104.07	104.27	102.20	101.54	101.31	102.40
21	103.71	102.59	104.66	104.49	102.79	103.71	104.10	104.23	102.07	101.54	101.12	102.26
22	103.77	102.59	104.66	104.92	102.79	103.97	104.13	104.23	102.03	101.67	101.02	102.23
23	103.74	102.59	104.82	104.49	102.79	104.04	104.13	104.27	102.10	101.57	101.12	102.20
24	103.81	102.66	104.89	104.36	102.89	104.13	104.13	104.23	102.23	101.38	100.95	102.03
25	103.87	102.72	104.92	104.40	102.76	104.33	104.07	104.33	102.36	101.48	100.75	101.84
26	103.64	102.82	104.99	104.40	102.72	104.43	104.04	104.33	102.17	101.38	101.02	101.77
27	103.41	102.85	104.99	104.43	102.69	104.40	104.00	104.27	102.17	101.35	101.05	101.84
28	103.77	102.85	105.05	104.33	102.95	104.43	104.00	104.10	102.17	101.57	100.89	102.00
29	103.74		105.02	104.36	103.28	104.36	104.04	103.90	102.20	101.51	100.98	101.97
30	103.58		104.92	104.30	103.31	104.53	104.07	103.67	102.10	101.35	101.12	102.46
31	103.54		104.89		103.38		104.00	103.15		101.57		102.76
Avg.	103.87	102.95	104.36	104.49	103.02	103.48	104.04	104.20	102.43	101.44	101.25	101.80

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 1981.

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 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	107.15	101.02	100.89	100.46	100.10	99.97	99.97	99.90	99.44	99.18	99.05	99.21
2	106.69	100.95	103.58	100.43	100.10	99.97	99.97	99.90	99.41	99.21	99.05	99.21
3	106.20	100.92	104.72	100.43	100.10	99.97	99.93	99.90	99.41	99.25	99.05	99.15
4	106.00	100.92	102.30	100.39	100.07	99.97	99.93	99.90	99.41	99.25	99.05	99.18
5	106.46	100.89	100.92	100.39	100.07	99.93	99.93	99.90	99.41	99.25	99.11	99.18
6	106.69	100.89	100.85	100.39	100.03	99.93	99.93	99.90	99.38	99.15	99.18	99.18
7	107.25	100.85	102.30	100.36	100.03	99.93	99.93	99.90	99.38	99.15	99.18	99.18
8	107.38	100.82	103.28	100.36	100.00	99.97	99.93	99.90	99.38	99.15	99.15	99.15
9	107.68	100.82	101.48	100.33	100.00	99.93	99.93	99.90	99.38	99.15	99.15	99.18
10	107.64	101.57	100.98	100.33	100.00	99.93	99.93	99.90	99.38	99.15	99.15	99.15
11	107.32	102.10	100.82	100.33	100.00	99.93	99.93	99.90	99.38	99.15	99.15	99.18
12	107.38	101.02	100.75	100.33	100.00	99.97	99.93	100.13	99.38	99.15	99.15	99.18
13	108.20	100.95	100.75	100.30	100.00	99.97	99.93	99.93	99.38	99.15	99.15	99.18
14	108.04	100.95	100.75	100.30	100.00	99.97	99.97	99.93	99.38	99.11	99.15	99.21
15	107.84	100.95	100.72	100.30	100.00	99.93	99.97	99.93	99.25	99.08	99.11	99.18
16	105.51	100.95	100.72	100.26	100.00	99.93	99.97	100.03	99.28	99.08	99.11	99.15
17	104.40	100.92	100.72	100.26	100.00	99.93	99.93	102.36	99.31	99.08	99.11	99.15
18	104.00	100.95	100.72	100.26	100.00	99.97	99.93	102.53	99.28	99.08	99.11	99.15
19	104.23	100.95	100.69	100.26	100.00	99.97	99.93	99.90	99.25	99.08	99.11	99.11
20	104.17	100.89	100.69	100.26	100.00	99.97	99.93	99.67	99.21	99.08	99.11	99.15
21	103.64	100.85	100.69	100.23	100.00	99.97	99.93	99.64	99.25	99.11	99.11	99.18
22	103.94	100.85	100.66	100.23	99.97	99.97	99.93	99.61	99.25	99.18	99.11	99.21
23	103.54	100.85	100.62	100.20	99.97	99.97	99.93	99.61	99.25	99.15	99.11	99.25
24	102.72	100.85	100.62	100.16	99.97	99.97	99.93	99.61	99.21	99.11	99.11	99.21
25	102.40	100.85	100.59	100.13	99.97	100.00	99.93	99.61	99.25	99.11	99.11	99.21
26	101.51	100.85	100.59	100.13	99.97	100.00	99.93	99.57	99.21	99.11	99.11	99.18
27	101.18	100.89	100.56	100.13	99.97	99.97	99.93	99.57	99.21	99.11	99.15	99.18
28	102.23	100.89	100.52	100.13	99.97	99.97	99.93	99.54	99.21	99.11	99.21	99.18
29	101.74		100.52	100.10	99.97	99.97	99.93	99.54	99.21	99.11	99.18	99.21
30	101.08		100.49	100.10	99.97	99.97	99.93	99.51	99.21	99.08	99.18	99.18
31	101.02		100.46		99.97		99.90	99.51		99.05		99.18
Avg.	105.02	100.98	101.12	100.26	100.00	99.97	99.93	99.97	99.31	99.15	99.11	99.18

**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 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0
Current Year 1981								Period 1966-1981				
Month	Extreme Gage Feet		Extreme Second-Foot			Average Second-Foot	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day			Average	Maximum	Minimum		
Jan.				0		0	0	12,132	18,718	0		
Feb.				0		0	0	9,442	16,992	0		
Mar.				0		0	0	6,591	18,506	0		
Apr.				0		0	0	5,488	18,061	0		
May				0		0	0	8,988	19,091	0		
June				0		0	0	6,977	18,756	0		
July				0		0	0	6,392	18,946	0		
Aug.				0		0	0	6,604	19,188	0		
Sept.				0		0	0	9,226	18,474	0		
Oct.				0		0	0	12,714	19,200	0		
Nov.				0		0	0	12,391	18,478	0		
Dec.				0		0	0	11,256	19,121	0		
Yearly				0		0	0	108,201	214,781	0		
	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
				0		0	0	133,465	264,930	0		

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 though 1981; continuous record of gage heights, July 20, 1952 through 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,700 #	20.2	13.3	17.0	11.4	10.2	13.5	10.3	9.6	9.6	6.8	5.8
2	5,200 #	19.9	1,820	17.1	10.3	11.2	13.5	10.3	9.6	8.8	7.1	5.8
3	4,640	19.4	2,960	18.1	9.6	11.3	12.7	11.8	9.9	8.1	6.1	6.5
4	4,460	19.8	731	16.8	11.1	10.0	11.9	11.8	10.3	8.0	5.4	6.5
5	4,930	20.8	15.9	14.7	11.8	10.4	11.1	12.6	10.3	7.4	6.7	7.2
6	5,150	20.8	11.0	15.4	12.5	8.8	11.5	12.6	8.8	6.9	8.0	4.4
7	5,970	19.9	657	16.4	10.7	8.8	11.1	13.1	7.8	6.6	8.3	10.4
8	6,100	19.6	1,270	15.8	10.8	10.0	10.5	11.1	10.2	6.6	8.3	7.8
9	6,520	19.0	235	15.6	9.0	10.3	11.6	10.3	11.0	5.9	7.6	7.2
10	6,500	331	21.7	15.2	8.1	10.7	# 10.8	12.3	11.1	5.9	7.2	8.7
11	6,100 #	579	17.4	15.2	9.9	10.9	# 9.6	# 11.6	11.2	5.9	7.2	8.7
12	6,140 #	15.6	15.6	15.2	11.3	12.1	# 10.3	# 45.2	11.1	5.9	7.2	7.8
13	7,350	12.1	15.5	16.4	11.1	10.3	* 11.9	* 25.2	10.3	6.4	6.5	8.0
14	7,110	11.1	14.3	16.7	11.6	8.8	14.2	14.3	10.9	6.2	6.5	8.0
15	6,860	10.2	13.5	16.1	12.1	7.7	13.3	11.7	11.2	6.1	6.5	8.5
16	3,840	10.5	13.7	15.4	10.3	9.8	13.0	20.7	9.9	6.2	6.5	6.9
17	2,450	11.7	15.1	16.2	9.6	10.1	12.7	523	10.8	5.9	6.5	6.5
18	2,060	12.2	18.1	13.5	10.7	10.7	11.1	619	10.8	5.7	6.5	8.5
19	2,310	12.5	18.6	13.5	10.8	11.6	10.3	58.2	8.8	5.2	6.5	8.7
20	2,240	11.8	18.7	14.0	10.4	10.3	* 11.6	13.0	8.8	5.9	5.8	8.2
21	1,700	10.5	18.7	14.8	10.7	9.6	12.6	12.6	9.6	6.8	5.8	9.2
22	1,860	10.5	17.3	15.4	11.0	11.2	12.8	11.1	11.1	6.8	5.8	7.5
23	1,580	12.0	18.4	15.3	8.8	15.4	13.8	11.1	10.3	8.7	5.6	7.2
24	729	12.6	18.2	14.4	8.5	12.6	14.5	11.9	10.3	8.4	4.5	8.2
25	420	11.7	17.8	12.0	9.3	12.8	12.7	13.7	11.1	8.8	4.3	8.0
26	112	11.7	16.9	11.5	9.4	12.7	11.9	14.4	9.6	8.6	4.7	8.0
27	23.6	12.9	17.8	13.3	8.5	11.9	12.6	14.7	9.6	9.4	5.0	8.0
28	385	12.5	16.8	13.0	8.7	11.1	12.7	14.6	10.3	9.8	5.0	7.3
29	237	16.8	11.4	8.8	8.8	11.1	11.9	12.5	10.3	9.9	5.8	7.8
30	20.7	16.5	10.7	9.6	11.6	11.9	11.9	11.1	9.9	7.4	5.8	6.5
31	20.0	16.7		9.6	9.6	11.1	11.1	11.1	5.2	5.2	6.8	6.8
Sum	108,717.3	1,291.5	8,087.3	446.1	316.0	324.0	374.7	1,596.9	304.5	225.0	189.5	234.6
Current Year 1981								Period 1954-1981				
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	108.12	99.08	13	7,780	31	19.2	3,510	215,638	129,328	969,540	949	
Feb.	101.83	98.25	110	1,140	121	10.2	46.1	2,562	64,840	414,310	977	
Mar.	104.49	98.08	3	3,180	1	8.0	261	16,041	53,537	630,230	659	
Apr.	97.98	97.60	1	30.5	30	9.6	14.9	885	45,867	532,320	745	
May	97.72	97.48	15	24.4	27	5.9	10.2	627	59,164	467,742	460	
June	98.01	97.45	23	54.5	15	5.2	10.8	643	28,600	417,461	507	
July	97.67	97.48	24	25.3	1	9.6	12.1	743	25,599	315,015	584	
Aug.	101.22	97.30	18	820	122	9.6	51.5	3,167	35,581	316,701	618	
Sept.	97.38	97.20	117	19.3	7	5.2	10.2	604	35,122	377,078	113	
Oct.	97.30	97.14	2	12.7	31	3.7	7.3	446	58,738	489,302	383	
Nov.	98.08	97.15	1	5	8.7	124	4.3	376	79,999	448,165	355	
Dec.	98.62	97.26	7	20.7	6	0	7.6	465	97,703	643,850	465	
Yearly	108.12	97.14		7,780		0	335	242,197	714,078	4,200,009	92,518	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	32.95	29.61		220		0	9.5	298,748	880,808	5,180,669	114,120	

Estimated

* Partly estimated

! And other days

COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	106.62	99.08	98.28	97.83	97.61	97.54	97.55	97.48	97.30	97.25	97.20	97.66
2	106.20	99.05	102.45	97.82	97.59	97.54	97.55	97.48	97.29	97.25	97.22	97.63
3	105.67	99.01	104.22	97.83	97.57	97.54	97.54	97.50	97.29	97.24	97.16	97.61
4	105.47	99.01	100.26	97.81	97.58	97.52	97.53	97.50	97.29	97.24	97.16	97.60
5	105.95	99.01	98.47	97.78	97.58	97.53	97.52	97.51	97.28	97.23	97.17	97.60
6	106.16	98.98	98.39	97.78	97.59	97.51	97.52	97.51	97.25	97.22	97.19	97.84
7	106.83	98.95	100.44	97.78	97.56	97.51	97.52	97.51	97.24	97.22	97.19	97.94
8	106.93	98.94	101.93	97.77	97.56	97.53	97.51	97.49	97.26	97.22	97.19	97.49
9	107.25	98.92	99.25	97.77	97.54	97.52	97.52	97.48	97.26	97.21	97.18	97.41
10	107.23	99.83	98.34	97.75	97.53	97.52	97.52	97.49	97.26	97.21	97.18	97.39
11	106.93	100.55	98.29	97.75	97.54	97.53	97.50	97.49	97.26	97.21	97.18	97.39
12	106.95	98.52	98.27	97.74	97.56	97.54	97.50	97.74	97.26	97.21	97.18	97.36
13	107.82	98.44	98.25	97.75	97.56	97.52	97.52	97.71	97.25	97.21	97.17	97.35
14	107.66	98.42	98.24	97.76	97.57	97.50	97.55	97.58	97.26	97.20	97.17	97.34
15	107.49	98.39	98.22	97.75	97.57	97.48	97.54	97.55	97.26	97.20	97.17	97.34
16	105.11	98.38	98.21	97.74	97.55	97.51	97.53	97.61	97.24	97.20	97.17	97.30
17	103.80	98.39	98.21	97.75	97.53	97.52	97.53	100.28	97.26	97.20	97.17	97.29
18	103.33	98.38	98.22	97.72	97.54	97.52	97.51	100.60	97.26	97.20	97.17	97.32
19	103.64	98.37	98.20	97.72	97.55	97.54	97.50	97.92	97.23	97.19	97.17	97.32
20	103.55	98.32	98.19	97.73	97.54	97.52	97.52	97.44	97.23	97.19	97.16	97.31
21	102.86	98.26	98.18	97.73	97.54	97.51	97.53	97.42	97.24	97.20	97.16	97.34
22	103.08	98.26	98.17	97.73	97.55	97.53	97.53	97.38	97.26	97.23	97.16	97.30
23	102.70	98.28	98.17	97.73	97.52	97.58	97.54	97.36	97.25	97.23	97.24	97.31
24	101.40	98.28	98.17	97.71	97.52	97.55	97.54	97.37	97.25	97.22	97.80	97.32
25	100.79	98.26	98.15	97.67	97.53	97.55	97.52	97.38	97.26	97.22	98.06	97.32
26	99.94	98.26	98.14	97.66	97.53	97.55	97.51	97.39	97.25	97.22	97.98	97.32
27	99.53	98.28	98.14	97.67	97.51	97.54	97.52	97.38	97.25	97.22	97.88	97.32
28	100.61	98.27	98.13	97.66	97.52	97.53	97.51	97.38	97.27	97.22	97.82	97.31
29	100.06		98.12	97.63	97.52	97.53	97.50	97.35	97.25	97.22	97.75	97.33
30	99.15		98.11	97.61	97.53	97.54	97.50	97.33	97.25	97.19	97.71	97.32
31	99.10		98.10		97.53		97.49	97.32		97.16		97.32
Avg.	104.19	98.68	98.84	97.74	97.55	97.53	97.52	97.68	97.26	97.21	97.34	97.42

■ Estimated

* Partly estimated

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 1981, 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	0.6	32.9	48.4	0.2	0.4	0.4	0.2	0.1	0.2	0.4	56.1	0.3	
2	.2	18.2	25.3	.3	.5	.3	.2	.1	.2	2.1	39.8	.3	
3	.2	6.3	6.5	.2	.3	.4	.3	.1	.2	.4	8.4	.3	
4	.2	4.5	2.4	.2	.3	.4	.3	.2	.2	1.1	13.9	.3	
5	.4	.3	.4	55.5	.3	.4	.2	.3	.2	.5	.4	.3	
6	.2	.3	.6	12.0	.4	.4	.2	.4	.2	.2	.4	58.1	
7	.2	.3	.4	5.5	.4	43.4	.3	.3	.2	.2	.4	26.6	
8	.3	.3	.4	3.8	.4	31.0	.4	.3	.2	.2	.4	2.4	
9	.3	.2	.3	.4	.4	3.3	.4	40.9	.3	.2	.5	.5	
10	.5	.2	.2	.4	.7	1.9	.4	17.2	.3	.4	.2	.1	
11	.4	.4	.2	.4	.5	.2	.4	3.5	.3	.6	.3	3.1	
12	2.1	.4	.3	.4	.4	.3	.4	1.5	9.7	.9	.2	.4	
13	2.2	.4	.3	.4	.4	.3	.3	.4	.3	.3	.2	.3	
14	.4	.4	.3	.4	.4	.3	.2	.3	.3	.3	.2	.3	
15	.4	.3	.4	.4	.4	.3	.2	.3	.2	.4	.3	.3	
16	.4	.2	.4	.4	.4	.3	.3	.2	.2	.4	.2	.2	
17	.4	.3	.3	.3	.4	.4	.4	.1	.2	2.9	.2	.2	
18	.4	.4	.3	.3	.4	.4	.4	.3	.2	.3	.3	.5	
19	.5	.4	.2	.2	.3	.4	.4	.3	.2	.3	.3	.3	
20	.3	.4	.3	.3	.2	.4	.4	.2	.2	.2	.3	.2	
21	.4	.5	.4	.4	.2	.4	.4	.2	.3	.2	.3	1.7	
22	.4	.5	.4	.3	.3	.4	.4	.2	.3	.5	.3	.4	
23	.4	.4	.4	.4	.3	.3	.4	.2	4.7	.3	.3	.4	
24	.4	.3	.3	.4	.3	.2	.2	.1	.3	.2	.2	.4	
25	.4	.4	.3	.4	.2	.2	.1	.1	.3	.2	.2	.4	
26	.4	.4	.3	.5	.3	.3	.1	.1	.3	.3	.2	.4	
27	.6	.4	.3	.5	.4	.3	.1	.1	.3	.3	.4	.3	
28	.4	.4	.4	.4	.3	.3	.1	.1	.3	.3	.2	.3	
29	.4	.4	.4	.4	.4	.3	.1	.1	.2	.4	.3	.3	
30	.9	.3	.3	.4	.4	.2	.1	.1	.2	.4	.4	.4	
31	.4	.4	.3	.4	.3	.4	.1	.1	.4	.3	.4	.4	
Sum	15.7	70.4	91.7	86.1	11.3	88.1	8.4	68.4	21.2	15.7	125.8	100.4	
Current Year 1981													
Period 1935-1981													
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum		
												Day	Day
Jan.	112.25	111.75	12	12.3	1	2	0.2	0.5	31.1	2,852	9,570	0	
Feb.	115.41	111.75	1	231	1	6	.2	2.5	140	2,317	8,430	14.5	
Mar.	115.82	111.75	1	283	118	.2	3.0	182	2,186	6,230	59.1	0	
Apr.	115.68	111.74	5	262	4	.1	2.9	171	2,020	6,300	0	0	
May	111.88	111.74	10	1.7	19	.1	.4	22.4	2,392	9,320	8.3	0	
June	115.53	111.75	7	244	110	.2	2.9	175	2,292	7,440	71.2	0	
July	111.77	111.72	1	8	4	125	0	.3	16.7	2,294	8,320	12.7	0
Aug.	115.64	111.73	9	257	129	.1	2.2	136	1,981	9,740	87.5	0	
Sept.	115.60	111.73	12	252	1	.1	.7	42.0	1,432	6,140	6.0	0	
Oct.	112.82	111.73	17	59.4	20	.1	.5	31.1	1,952	5,680	11.9	0	
Nov.	115.96	111.74	1	304	17	.1	4.2	250	2,351	8,220	18.8	0	
Dec.	115.24	111.74	6	214	1	9	.1	3.2	199	3,098	9,430	61.9	0
Yearly	115.96	111.72		304		0	1.9	1,396	27,167	82,900	943		
		Meters		Cubic Meters per Second				Thousands of Cubic Meters					
		35.34	34.05		8.61		0	0.05	1,722	33,510	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 1981; 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 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.24	96.51	96.06	96.04	95.92	95.89	95.90	95.87	95.94	95.93	96.35	# 97.43
2	102.72	96.53	99.65	96.05	95.91	95.90	95.90	95.87	95.93	96.00	96.49	# 97.40
3	102.72	96.48	101.80	96.04	95.91	95.91	95.90	95.89	95.93	95.93	96.09	# 97.38
4	102.51	96.40	98.51	96.03	95.92	95.91	95.88	95.88	95.94	95.94	96.31	# 97.36
5	102.90	96.31	96.50	96.17	95.93	95.91	95.88	95.88	95.93	95.93	95.93	# 97.35
6	103.14	96.25	96.39	96.13	95.92	95.90	95.89	95.89	95.95	95.92	95.93	# 97.99
7	103.67	96.20	98.03	96.08	95.91	96.09	95.89	95.89	95.92	95.92	95.93	# 97.88
8	103.80	96.18	99.95	96.05	95.90	96.10	95.88	95.87	95.95	95.92	95.93	# 97.33
9	104.08	96.15	97.45	96.03	95.88	95.93	95.89	95.98	95.94	95.92	95.96	# 97.19
10	104.08	96.11	96.23	96.00	95.87	95.90	95.89	96.02	95.93	95.92	95.93	# 97.17
11	103.83	96.15	96.19	96.00	95.88	95.87	95.89	95.92	95.91	95.92	95.95	* 97.18
12	103.77	96.19	96.16	95.99	95.88	95.88	95.90	95.97	95.96	95.93	95.93	97.12
13	104.55	96.11	96.15	96.00	95.88	95.87	95.90	96.08	95.93	95.92	95.93	97.11
14	104.47	96.05	96.12	96.00	95.88	95.87	95.90	95.92	95.94	95.92	95.93	97.09
15	104.32	96.02	96.10	95.99	95.88	95.87	95.90	95.89	95.94	95.92	95.94	97.09
16	102.41	96.02	96.11	95.96	95.87	95.87	95.90	95.88	95.94	95.92	95.93	97.08
17	# 101.24	96.00	96.10	95.94	95.87	95.88	95.91	97.54	95.94	95.97	95.93	97.08
18	100.82	95.99	96.10	95.91	95.88	95.88	95.90	97.95	95.94	95.91	95.93	97.08
19	101.13	95.96	96.10	95.91	95.89	95.88	95.91	96.37	95.93	95.91	95.93	97.07
20	101.01	95.94	96.10	95.93	95.88	95.88	95.92	96.01	95.94	95.90	95.93	97.07
21	100.28	95.91	96.08	95.94	95.88	95.88	95.91	95.95	95.95	95.91	95.93	97.09
22	100.61	95.90	96.08	95.94	95.87	95.90	95.90	95.94	95.95	95.91	95.93	97.08
23	100.06	95.90	96.08	95.91	95.86	95.93	95.91	95.94	95.96	95.92	# 96.40	97.08
24	98.57	95.90	96.09	95.90	95.86	95.91	95.90	95.95	95.96	95.92	# 97.78	97.08
25	97.97	95.90	96.09	95.87	95.86	95.90	95.89	95.95	95.95	95.92	# 97.96	97.09
26	97.04	95.89	96.09	95.86	95.86	95.90	95.89	95.94	95.94	95.92	# 97.83	97.08
27	96.67	95.89	96.08	95.86	95.86	95.89	95.88	95.95	95.93	95.92	# 97.70	97.07
28	97.62	95.88	96.06	95.86	95.85	95.89	95.88	95.95	95.94	95.92	# 97.61	97.07
29	97.42		96.05	95.86	95.86	95.88	95.88	95.94	95.94	95.92	# 97.53	97.08
30	96.51		96.06	95.88	95.86	95.88	95.87	95.94	95.93	95.92	# 97.47	97.08
31	96.44		96.05		95.87		95.87	95.95		95.92		97.07
Avg.	101.28	96.10	96.73	95.97	95.88	95.90	95.89	96.06	95.94	95.92	96.41	97.20

From January 17 through November 22 stages based on weekly staff gage readings
 * Partly estimated # Estimated

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

DESCRIPTION: Water-stage recorder and control weir on wasteway from West Main Canal to Colorado River. Located on east side of levee at site used prior to May 1, 1971. The site used May 1, 1971 to September 20, 1977 was located 200 feet (61 m) downstream from present site on west side of levee. 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 1981, 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 1981 — 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	47.8	0
2	0	0	0	0	0	0	0	0	0	0	15.8	0
3	0	0	0	0	0	0	0	0	0	0	.6	0
4	0	0	0	0	0	0	0	0	0	0	.1	0
5	0	0	0	0	0	0	0	0	0	0	.1	0
6	0	0	0	0	0	0	0	0	0	0	.1	9.7
7	0	0	0	0	0	0	0	0	0	0	.1	17.9
8	0	0	0	0	0	0	0	0	0	0	0	1.6
9	0	0	0	0	0	0	0	0	0	0	0	.3
10	0	0	0	0	0	0	0	2.4	0	0	0	0
11	0	0	0	0	0	0	0	.4	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	.1	0	0	0	0
14	0	0	0	0	0	0	1.3	0	0	0	0	0
15	0	0	0	0	0	0	.6	0	0	0	0	0
16	0	0	0	0	0	0	10.0	0	0	0	0	0
17	0	0	0	0	0	0	3.8	0	0	0	0	0
18	0	0	0	0	0	0	.1	0	0	0	0	0
19	0	0	0	0	0	0	.1	0	0	0	0	0
20	0	0	0	0	0	0	.1	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	.9	0	0
Sum	0	0	0	0	0	0	16.0	2.9	0	0.9	64.6	29.5
Current Year 1981								Period 1939-1981				
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	701	2,860	0		
Feb.	0	0		0		0	0	604	2,510	0		
Mar.	0	0		0		0	0	556	1,660	0		
Apr.	0	0		0		0	0	599	1,940	0		
May	0	0		0		0	0	728	2,470	0		
June	0	0		0		0	0	636	2,350	0		
July	1.01	0	16	23.9	! 1	0	.5	31.7	550	1,950	0	
Aug.	1.07	0	10	25.5	! 1	0	.1	5.8	576	2,530	0	
Sept.	0	0		0		0	0	0	518	2,180	0	
Oct.	1.42	0	31	43.6	! 1	0	0	1.8	628	2,100	0	
Nov.	1.72	0	1	60.1	! 8	0	2.2	128	727	2,380	0	
Dec.	1.50	0	6	48.0	! 1	0	1.0	58.5	801	2,680	0	
Yearly	1.72	0		60.1		0	0.3	226	7,624	24,370	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.52	0		1.70		0	0.01	279	9,404	30,060	0	

1 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 1981. 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.1	1.1	2.7	6.2	3.5	1.9	0.5	2.6	11.7	15.2	14.7	2.2
2	4.0	5.8	1.5	4.5	4.8	.6	1.6	.6	13.0	3.6	10.8	2.5
3	3.8	5.3	2.3	13.0	12.6	4.1	.7	.6	12.1	8.5	7.2	9.3
4	1.0	8.7	.3	6.9	9.8	5.3	3.6	.3	10.5	2.0	1.1	4.6
5	14.7	3.3	.2	3.1	6.7	3.4	1.2	0	4.9	1.2	.4	3.4
6	7.1	2.0	5.8	4.5	5.6	1.8	.5	.7	.7	7.2	5.2	2.2
7	13.4	8.0	2.9	4.2	5.4	2.6	# .1	.7	.1	3.7	16.2	14.3
8	7.4	6.5	8.1	5.3	8.2	1.6	# .7	1.6	# 5.5	7.5	6.6	12.6
9	2.6	12.6	4.6	6.0	2.7	1.5	# 1.5	.4	# 5.2	12.8	3.6	14.2
10	.6	8.0	.5	4.7	1.5	.6	# 12.5	2.2	# 28.3	8.0	2.5	2.1
11	.3	4.1	.7	5.7	5.2	1.8	# 13.9	.4	# 17.4	3.0	.5	6.4
12	.7	9.0	2.2	2.0	1.9	11.1	# 17.0	.7	# 10.9	1.3	16.6	10.1
13	3.2	5.5	.9	.8	3.4	7.3	# .7	3.2	# 14.4	1.0	4.7	2.2
14	3.4	.7	.4	1.8	.8	6.7	# .4	.5	# 15.5	1.1	7.9	.3
15	.6	10.9	4.2	1.7	2.4	4.4	.4	.5	4.9	13.3	11.2	2.0
16	3.0	24.8	7.5	4.3	4.0	.9	2.7	4.1	1.8	7.0	5.9	3.8
17	1.9	3.9	2.9	3.0	5.0	3.5	4.5	9.5	1.8	16.5	3.7	.7
18	4.6	1.3	2.5	6.5	.6	.9	.7	8.2	3.0	6.9	3.6	9.8
19	5.3	.7	1.9	18.6	6.2	.7	.2	2.9	# 2.8	3.1	9.1	20.7
20	2.2	3.5	5.9	9.7	2.9	1.8	.2	1.9	# .5	3.3	4.1	19.5
21	9.0	.9	5.7	2.6	3.0	3.1	1.3	5.0	# 6.2	5.2	8.7	14.1
22	1.1	4.2	6.0	2.9	2.0	* 3.4	.6	1.0	# 1.7	10.8	13.0	2.4
23	.9	1.4	1.2	1.2	.9	* .1	.5	.2	# 2.7	7.3	2.5	1.5
24	4.4	2.3	.2	10.5	.4	1.6	.7	1.0	# 2.7	5.2	.5	1.5
25	1.8	11.6	.4	3.9	.9	* .9	3.8	2.0	# 2.2	16.0	19.2	.6
26	.7	12.4	1.0	3.5	2.0	0	.7	1.9	# 14.5	8.9	13.4	.3
27	.8	2.7	2.4	3.5	6.1	.5	3.4	1.3	# 8.8	10.1	3.8	.1
28	1.6	14.8	3.2	2.4	.6	# 2.3	4.9	5.4	# 1.8	6.9	4.8	0
29	1.3	3.8	9.8	4.1	4.1	* 3.3	1.8	3.9	# 6.4	6.4	1.9	3.6
30	3.5	1.8	4.1	2.5	2.5	3.3	3.3	4.4	# 6.0	21.8	3.7	4.0
31	2.1	.6	.6	5.6	5.6		1.1	12.5		18.4		3.6
Sum	110.1	176.0	84.3	156.9	121.3	81.0	85.7	80.2	218.0	243.2	207.1	174.6
Current Year 1981										Period 1935-1981		
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.	0.88	0.02	5	27.7	27	0.2	3.6	218	1,065	3,360	90.0	
Feb.	.99	.02	22	33.5	121	.2	6.3	349	896	3,170	133	
Mar.	.80	0	12	23.5	25	0	2.7	167	1,034	2,920	154	
Apr.	.95	.03	19	31.4	28	.3	5.2	311	1,006	3,170	175	
May	1.13	.02	19	41.1	128	.2	3.9	241	1,109	3,040	228	
June	.72	0	12	19.5	110	0	2.7	161	945	3,660	161	
July	1.02	0	25	35.1	17	0	2.8	170	1,020	3,590	170	
Aug.	.86	0	16	26.6	15	0	2.6	159	1,038	3,960	159	
Sept.	1.07	0	10	37.8	17	0	7.3	432	980	3,170	159	
Oct.	1.00	.03	30	34.0	14	.3	7.8	482	1,021	3,280	307	
Nov.	.84	0	14	25.6	6	0	6.9	411	1,106	3,570	241	
Dec.	.86	0	19	26.6	127	0	5.6	346	1,079	3,080	247	
Yearly	1.13	0		41.1		0	4.8	3,447	12,299	38,310	3,026	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.34	0		1.16		0	0.14	4,252	15,171	47,255	3,733	

* Partly estimated

Estimated

! And other days

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 1981.

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 limitrophe section of the river.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	106	109	137	129	* 141	131	130	150	123	131	136	103
2	111	112	147	131	* 138	136	119	165	128	112	120	103
3	111	113	137	124	* 141	138	126	155	131	103	117	102
4	110	117	116	138	* 127	134	117	136	118	91.3	110	100
5	110	109	128	148	133	133	124	141	131	92.2	113	101
6	116	117	134	158	129	128	125	135	122	112	115	102
7	117	125	124	143	139	134	117	134	128	123	110	102
8	114	117	118	129	138	144	117	135	126	120	112	96.6
9	116	129	123	125	139	125	112	134	121	127	111	101
10	111	114	122	138	154	123	133	134	121	114	118	96.2
11	99.3	116	125	143	149	119	125	130	126	113	116	95.9
12	88.4	116	122	147	140	134	125	125	122	115	107	103
13	108	117	118	137	146	134	123	153	104	110	109	91.8
14	116	130	124	152	146	140	124	134	103	110	105	84.2
15	119	130	134	145	145	130	122	134	124	130	100	113
16	117	138	135	146	139	123	117	140	134	119	109	106
17	111	123	132	150	132	123	119	143	123	123	105	110
18	110	122	135	149	135	130	123	124	123	122	96.6	107
19	108	119	132	146	144	123	99.2	128	131	130	117	113
20	112	124	147	129	135	124	97.3	124	122	124	120	122
21	113	115	127	124	146	119	128	125	122	120	115	105
22	107	109	121	132	158	124	135	124	131	121	111	98.7
23	125	119	124	131	138	139	138	124	120	120	105	100
24	108	139	119	127	133	132	138	131	130	128	114	80.3
25	103	136	133	139	139	139	138	123	125	120	119	86.9
26	110	124	132	145	139	121	134	124	123	127	110	89.2
27	118	133	124	137	140	121	128	125	113	130	106	91.3
28	124	142	127	133	148	105	109	126	122	136	103	95.0
29	119	124	138	130	95.0	120	128	120	126	93.4	100	100
30	116	126	139	134	114	119	131	111	139	101	100	100
31	117	124	124	131	131	139	133	133	125	125	105	105
Sum	3,470.7	3,414	3,971	4,152	4,326	3,815.0	3,820.5	4,148	3,678	3,713.5	3,324.0	3,104.1
Current Year 1981									Period 1935-1981			
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.			23	125	12	88.4	112	6,884	7,639	11,203	1,740	
Feb.			28	142	1	109	122	6,772	7,521	11,988	1,640	
Mar.			2	147	4	116	128	7,876	8,645	12,430	1,940	
Apr.			6	158	1	124	138	8,235	8,492	11,890	1,920	
May			22	158	4	* 127	140	8,580	8,710	13,140	1,950	
June			8	144	29	95.0	127	7,567	8,092	12,040	2,290	
July			31	139	20	97.3	123	7,578	7,999	11,830	2,530	
Aug.			2	165	25	123	134	8,227	7,963	11,960	2,560	
Sept.			16	134	14	103	123	7,295	7,915	11,568	2,280	
Oct.			30	139	4	91.3	120	7,366	8,795	12,385	2,940	
Nov.			1	136	29	93.4	111	6,593	8,394	12,010	2,800	
Dec.			20	122	24	80.3	100	6,157	8,067	11,480	2,450	
Yearly				165		80.3	123	89,130	98,232	139,380	27,040	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
			4.67		2.27	3.48	109,941	121,168	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 outlet 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-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12.5	14.7	4.2	2.5	3.6	0.3	2.2	3.0	2.5	3.1	3.7	3.8
2	3.6	23.6	27.5	5.5	3.4	6.6	13.5	8.5	.7	.7	11.9	1.8
3	.5	8.4	2.4	4.0	12.5	15.3	1.6	2.9	1.5	10.7	4.8	3.2
4	.8	1.7	.6	2.9	2.2	8.8	3.6	.3	11.3	17.0	1.0	2.1
5	1.0	.9	.4	10.4	.5	2.4	5.5	2.3	5.2	19.0	.8	1.5
6	.1	1.4	.4	19.9	2.0	3.2	5.1	4.8	.3	17.4	.8	4.2
7	0	3.5	.4	1.8	.7	.4	.4	8.2	7.0	6.7	.7	11.5
8	2.8	3.9	.7	.4	.3	3.0	.3	2.8	2.0	6.6	.6	1.8
9	5.2	5.1	5.0	1.4	2.8	3.9	.2	2.2	6.2	2.2	.5	.9
10	.6	3.0	1.8	2.9	20.5	.5	.3	9.2	15.7	.7	.4	.5
11	1.4	1.6	.3	2.6	17.1	1.0	.8	3.4	.2	2.9	1.3	3.1
12	.4	2.9	.8	2.3	4.7	3.3	1.5	1.3	4.6	8.6	3.0	5.0
13	.3	2.6	2.5	7.9	1.4	5.8	.1	1.5	.3	9.5	2.2	7.6
14	1.6	2.5	3.8	4.9	4.1	3.1	.7	.6	3.4	5.5	6.4	3.6
15	2.5	.4	5.0	2.0	4.2	5.2	.7	2.3	2.5	11.4	2.4	2.8
16	1.0	.4	5.2	3.7	3.0	3.4	1.0	.8	.2	6.7	2.7	1.1
17	.8	1.3	2.3	2.4	2.0	9.8	1.5	2.8	.2	9.2	1.2	4.1
18	1.1	.9	3.3	1.5	.9	.3	3.3	13.3	11.2	3.6	6.6	1.4
19	2.1	5.0	2.0	1.7	.4	.2	3.7	6.6	.7	2.2	1.7	.9
20	2.0	.6	3.8	6.6	4.3	6.2	1.1	.2	1.2	4.2	2.1	5.0
21	2.3	.5	8.1	2.7	9.5	5.9	2.6	.8	5.8	6.2	.4	9.5
22	5.0	4.0	4.7	3.8	14.8	.8	1.0	.2	6.8	5.4	.2	3.3
23	6.0	5.2	2.7	.6	.4	13.6	.2	3.7	8.0	3.9	1.0	2.2
24	3.9	2.0	.6	.6	1.8	6.2	.2	3.2	4.4	6.2	2.7	.2
25	1.0	3.5	0	1.8	.9	4.1	4.6	.9	1.7	6.4	2.8	7.7
26	.8	3.5	.3	.2	1.9	14.2	.9	10.4	6.8	3.0	2.1	9.4
27	.4	2.6	2.4	2.0	2.9	11.0	5.2	2.0	13.7	12.5	10.0	13.4
28	.2	4.7	1.9	2.7	4.0	.9	5.2	4.1	1.0	4.1	5.6	8.9
29	1.3	.3	5.3	4.3	4.6	.7	9.5	4.5	12.5	2.1	1.6	.4
30	.3	1.5	5.2	6.7	.2	1.7	11.8	7.6	2.5	.2	2.8	.5
31	1.3	4.3	4.1	4.1	4.1	.1	4.4	4.4	3.2	3.2	3.2	.5
Sum		110.4		111.2	142.2	140.3	78.3	123.0	145.2	203.4	81.4	124.2
	62.8		104.2									
Current Year 1981									Period 1971-1981			
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.	1.52	0	24	19.1	17	0	2.0	125	353	565	125	
Feb.	1.80	.02	1	26.7	25	.1	3.9	219	451	681	219	
Mar.	2.10	0	2	35.8	113	0	3.4	207	481	939	203	
Apr.	2.00	0	6	32.7	26	0	3.7	221	373	664	164	
May	1.83	0	3	36.0	116	0	4.6	282	288	434	148	
June	1.88	0	4	37.8	115	0	4.7	278	302	480	107	
July	1.97	0	2	41.0	11	0	2.5	155	282	556	93.2	
Aug.	1.85	.01	26	36.8	4	.1	4.0	244	303	536	98.0	
Sept.	1.97	0	18	41.0	17	0	4.8	288	390	768	190	
Oct.	1.70	.03	4	31.6	20	.2	6.6	403	378	728	133	
Nov.	1.47	.02	27	24.5	30	.1	2.7	161	378	541	161	
Dec.	1.45	0	1	23.8	120	0	4.0	246	371	610	188	
Yearly	2.10	0		41.0		0	3.9	2,829	4,350	6,229	2,829	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.64	0		1.16		0	0.11	3,490	5,366	7,683	3,490	

! And other days

242 WELL FIELD NEAR SAN LUIS, ARIZONA

DESCRIPTION: Water-stage recorder and 12-foot (3.7 m) Parshall flume located 100 feet (30.5 m) upstream from confluence of East Main Canal Wasteway, 110 feet (33.5 m) north of the southerly land boundary, and 1.4 miles (2.3 km) east of the Colorado River.

RECORDS: Based on current meter measurements and a continuous record of gage heights. The station is operated by the United States Section of the Commission. Records available: October 18, 1978 through 1981.

REMARKS: Records show the pumping of ground water from the 242 well field east of San Luis, Arizona.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	45.0	46.2	49.6	49.6	43.9	42.8	1.0	41.4
2	0	0	0	0	45.0	47.3	49.6	46.3	43.9	28.5	.4	48.3
3	0	0	0	0	45.0	47.3	49.6	46.3	43.9	32.3	0	46.9
4	0	0	0	0	45.0	46.7	49.6	49.6	43.9	34.5	0	48.4
5	0	0	0	0	45.0	47.3	49.6	49.2	43.9	37.6	0	48.4
6	0	0	0	0	45.0	46.2	49.6	49.6	43.9	43.9	0	48.4
7	0	0	0	0	43.1	47.3	49.6	48.4	43.9	43.2	0	45.5
8	0	0	0	0	35.7	46.2	49.6	48.4	31.8	43.2	0	49.6
9	0	0	0	0	43.9	45.4	49.6	48.4	1.1	39.5	0	49.6
10	0	0	0	0	43.9	43.9	49.6	48.4	.4	43.7	0	49.6
11	0	0	0	0	43.9	41.7	49.6	49.6	18.2	48.4	0	49.6
12	0	0	0	0	43.9	42.9	49.6	42.7	42.8	47.3	0	49.4
13	0	0	0	0	43.9	45.0	49.6	.8	42.8	47.8	0	49.6
14	0	0	0	0	43.9	45.0	49.6	.4	42.8	48.4	0	48.8
15	0	0	0	0	43.9	45.0	49.6	0	42.8	48.4	0	49.5
16	0	0	0	0	43.4	46.6	49.6	0	43.0	47.8	0	49.6
17	0	0	0	0	43.4	47.3	49.6	0	43.0	47.3	0	49.6
18	0	0	0	0	46.2	48.4	49.3	0	37.2	47.3	0	45.3
19	0	0	0	0	46.8	49.4	49.6	0	43.9	47.3	0	42.8
20	0	0	0	0	47.3	49.6	49.6	18.9	43.9	47.3	0	42.8
21	0	0	0	0	47.3	48.8	46.7	31.9	43.9	47.3	0	44.3
22	0	0	0	0	47.3	42.1	47.2	42.8	43.9	47.3	0	49.8
23	0	0	0	0	47.3	49.6	45.6	42.8	43.9	47.3	0	49.6
24	0	0	0	0	47.3	49.6	46.4	43.9	44.6	47.3	0	49.6
25	0	0	0	0	47.3	49.6	49.6	43.9	42.2	47.3	0	49.6
26	0	0	0	0	47.3	49.4	49.6	43.9	43.4	47.3	0	49.6
27	0	0	0	19.3	42.0	49.3	47.2	43.9	40.6	41.1	0	49.6
28	0	0	0	43.3	41.2	49.6	49.6	43.9	43.4	47.3	0	49.6
29	0	0	0	42.3	45.0	49.6	49.6	43.9	43.6	47.3	0	49.3
30	0	0	0	45.0	45.0	49.6	49.6	43.9	42.1	47.3	12.3	49.6
31	0	0	0	0	46.2	49.6	49.6	43.6	43.6	33.4	0	49.6
Sum	0	0	0	149.9	1,386.4	1,411.9	1,522.4	1,045.0	1,172.6	1,366.7	13.7	1,493.3
Current Year 1981								Period 1979-1981				
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.				0		0	0	4.2	12.7	0		
Feb.				0		0	0	6.6	19.8	0		
Mar.				0		0	0	1.6	4.8	0		
Apr.			28	93.0	1	0	5.0	102	297	0 ^a		
May			17	47.3	1	31.7	44.7	2,750	2,750	11.3		
June			9	52.0	22	6.4	47.1	2,800	1,263	21.4		
July			1	50.8	123	42.8	49.1	3,020	1,080	42.8		
Aug.			20	56.9	115	0	33.7	2,073	691	0		
Sept.			24	47.3	110	.4	39.1	2,326	776	0		
Oct.			16	50.8	31	2.2	44.1	2,711	920	0		
Nov.			30	40.6	1	3	0	27.2	9.0	0		
Dec.			22	56.9	1	19.0	48.2	2,962	987	0		
Yearly				93.0		0	26.2	18,966	6,983	18,966	163	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				2.63		0	0.74	23,394	8,613	23,394	201	

^a 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 Mejordada Canal near San Luis, Arizona.

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 1981; West Main Canal Wasteway from February 23, 1971 through 1981; 242 Lateral from November 1978 through 1981.

REMARKS: Descriptions and flows of the individual stations, East Main Canal Wasteway, West Main Canal Wasteway, the Yuma Main Drain, and 242 Lateral are published separately in this bulletin on pages 29, 31, 30 and 32.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	122	125	144	138	193	179	182	205	181	192	155	150
2	119	141	176	141	191	190	184	220	186	145	143	156
3	115	127	142	141	211	205	178	205	188	154	129	161
4	112	127	117	148	184	195	174	186	184	145	112	155
5	126	113	129	162	185	186	180	192	185	150	114	154
6	123	120	140	182	182	179	180	190	167	180	121	157
7	130	136	127	149	188	184	167	191	179	177	127	173
8	124	127	127	135	182	195	168	188	165	177	119	161
9	124	147	133	132	188	176	163	185	134	182	115	166
10	112	125	124	146	220	168	195	194	165	166	121	148
11	101	122	126	151	215	164	189	183	162	167	118	155
12	89.5	128	125	151	190	191	193	150	180	172	127	168
13	112	125	121	146	195	192	173	158	162	168	116	151
14	121	133	128	159	195	195	175	136	165	165	119	137
15	122	141	143	149	196	185	173	137	174	203	114	167
16	121	163	148	154	189	174	170	145	179	180	118	160
17	114	128	137	155	182	184	175	155	168	196	110	164
18	116	124	141	157	183	180	176	146	174	180	107	164
19	115	125	136	166	197	173	153	138	178	183	128	177
20	116	128	157	145	190	182	148	145	168	179	126	189
21	124	116	141	129	206	177	179	163	178	179	124	173
22	113	117	132	139	222	170	184	168	183	184	124	154
23	132	126	128	133	187	202	184	171	175	178	108	153
24	116	143	120	138	182	189	185	179	182	187	117	132
25	106	151	133	145	188	194	196	170	171	190	141	145
26	112	140	133	149	190	185	185	180	188	186	126	148
27	119	138	129	162	191	182	184	172	176	194	120	154
28	126	162	132	181	194	158	169	179	168	194	113	154
29	122	133	133	194	184	149	181	180	182	182	96.9	153
30	120	129	129	193	188	167	174	191	167	211	117	156
31	120	129	129	187	187	187	190	194	180	180	117	159
Sum	3,644.5	3,698	4,160	4,570	5,975	5,450	5,507	5,396	5,214	5,526	3,625.9	4,894
Current Year 1981								Period 1935-1981				
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.			23	132	12	89.5	118	7,227	9,061	12,131	2,123	
Feb.			16	163	5	113	132	7,340	8,874	12,970	2,023	
Mar.			2	176	4	117	134	8,250	10,162	13,704	2,322	
Apr.			29	194	21	129	152	9,064	9,973	12,982	2,117	
May			22	222	1	6	182	193	11,853	13,900	2,473	
June			3	205	29	149	182	10,806	10,602	12,570	2,525	
July			25	196	20	148	178	10,923	10,381	12,420	2,927	
Aug.			2	220	14	136	174	10,703	9,995	12,657	2,989	
Sept.			1	188	9	134	174	10,341	10,061	12,450	2,602	
Oct.			30	211	1	2	145	178	11,114	13,898	3,444	
Nov.			1	155	29	96.9	121	7,192	9,887	12,712	3,407	
Dec.			20	189	24	132	158	9,711	10,504	12,050	2,888	
Yearly				222		89.5	158	114,372	121,864	149,010	31,840	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				6.29		2.53	4.47	141,077	150,318	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 1981; continuous record of gage heights, January 1947 through 1981. 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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,490	* 152	* 48.0	30.6	0	0	0	0	0	0	0	0
2	5,520	* 150	* 406	26.1	0	0	0	0	0	0	0	0
3	4,910	* 130	2,400 *	23.6	0	0	0	0	0	0	0	0
4	4,570	* 123	1,950 *	22.7	0	0	0	0	0	0	0	0
5	4,650	* 115	* 189	24.0	0	0	0	0	0	0	0	0
6	4,960	* 105	* 109	50.4	0	0	0	0	0	0	0	0
7	5,340	* 100	* 231	33.5	0	0	0	0	0	0	0	0
8	5,690	* 95.0	1,190 *	30.6	0	0	0	0	0	0	0	0
9	5,810	* 92.0	* 779	28.8	0	0	0	0	0	0	0	0
10	5,860	* 91.0	* 129	28.0	0	0	0	0	0	0	0	0
11	5,800	* 624	* 92.6	24.4	0	0	0	0	0	0	0	0
12	5,740	* 242	* 70.7	19.9	0	0	0	0	0	0	0	0
13	6,580	* 102	* 59.3	17.5	0	0	0	0	0	0	0	0
14	6,730	* 90.0	* 53.8	15.3	0	0	0	0	0	0	0	0
15	6,370	* 83.0	* 49.2	13.8	0	0	0	0	0	0	0	0
16	5,190	* 81.0	* 47.3	12.4	0	0	0	0	0	0	0	0
17	3,220	* 78.5	* 46.5	10.9	0	0	0	0	0	0	0	0
18	2,370	* 77.0	* 44.6	10.4	0	0	0	* 108	0	0	0	0
19	2,250	* 74.0	* 42.6	9.5	0	0	0	* 178	0	0	0	0
20	2,330	* 69.0	* 41.4	8.7	0	0	0	* 11.7	0	0	0	0
21	1,910	* 63.5	* 39.4	7.8	0	0	0	0	0	0	0	0
22	1,540	* 59.5	* 38.5	7.4	0	0	0	0	0	0	0	0
23	1,570	* 58.0	* 37.3	7.4	0	0	0	0	0	0	0	0
24	* 941	* 58.0	* 36.5	7.4	0	0	0	0	0	0	0	0
25	* 580	* 56.8	* 34.5	6.2	0	0	0	0	0	0	0	0
26	* 440	* 52.8	* 31.7	4.7	0	0	0	0	0	0	0	0
27	* 220	* 50.6	* 29.4	2.9	0	0	0	0	0	0	0	0
28	* 211	* 49.4	* 28.8	.9	0	0	0	0	0	0	0	0
29	* 350		* 29.4	0	0	0	0	0	0	0	0	0
30	* 209		* 30.6	0	0	0	0	0	0	0	0	0
31	* 155		* 31.7	0	0	0	0	0	0	0	0	0
Sum	107,506	3,122.1	8,346.8	485.8	0	0	0	297.7	0	0	0	0
Current Year 1981									Period 1935-1981			
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.	80.81	75.32	* 14	6,880	31	* 152	3,470	213,235	335,393	1,672,000	1,821	
Feb.	76.54	74.45	* 11	* 810	28	* 48.0	112	6,193	275,523	1,385,000	2,040	
Mar.	78.08	74.44	4	2,800	28	28.8	269	16,556	227,062	1,127,000	798	
Apr.	74.85	73.90	6	68.2	128	0	16.2	964	148,384	700,900	0	
May				0	0	0	0	0	204,295	1,460,000	0	
June				0	0	0	0	0	157,993	1,180,000	0	
July				0	0	0	0	0	116,588	772,800	0	
Aug.	75.89	73.90	18	297	1	1	9.6	590	131,129	795,000	0	
Sept.				0	0	0	0	0	157,510	1,033,000	0	
Oct.				0	0	0	0	0	200,659	1,192,000	0	
Nov.				0	0	0	0	0	257,605	1,428,000	0	
Dec.				0	0	0	0	0	318,881	1,839,000	0	
Yearly	80.81	73.90		6,880		0	328	237,538	2,531,022	10,688,800	61,569	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	24.63	22.52		195		0	9.29	293,001	3,121,990	13,184,528	75,945	

* Partly estimated

* Estimated

! And other days

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	80.24	* 75.31	* 74.45	74.49								
2	80.31	* 75.30	* 75.32	74.44								
3	79.95	* 75.22	* 77.80	74.41								
4	79.72	* 75.19	* 77.39	74.40								
5	79.80	* 75.15	* 75.46	74.41								
6	80.11	* 75.10	* 75.21	74.68								
7	80.35	* 75.07	* 75.43	74.52								
8	80.52	* 75.04	* 76.82	74.49								
9	80.53	* 75.02	* 76.30	74.47								
10	80.45	* 75.01	* 75.17	74.46								
11	80.31	* 76.24	* 74.99	74.42								
12	80.14	* 75.36	* 74.86	74.36								
13	80.56	* 74.81	* 74.77	74.32								
14	80.72	* 74.74	* 74.72	74.28								
15	80.53	* 74.70	* 74.68	74.25								
16	79.79	* 74.69	* 74.66	74.22								
17	78.52	* 74.67	* 74.65	74.19								
18	77.94	* 74.66	* 74.63	74.18				74.69				
19	77.91	* 74.64	* 74.61	74.16				75.47				
20	78.02	* 74.61	* 74.60	74.14				74.27				
21	77.72	* 74.57	* 74.58	74.12								
22	77.44	* 74.54	* 74.57	74.11								
23	77.46	* 74.53	* 74.56	74.11								
24	* 76.87	* 74.53	* 74.55	74.11								
25	* 76.43	* 74.52	* 74.53	74.08								
26	* 76.19	* 74.49	* 74.50	74.04								
27	* 75.60	* 74.47	* 74.48	73.99								
28	* 75.56	* 74.46	* 74.47	73.93								
29	* 76.02		* 74.48	73.90								
30	* 75.55		* 74.49	73.90								
31	* 75.33		* 74.50									
Avg.	78.60	* 74.88	* 75.04	74.25								

* Partly estimated

* Estimated

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 1981.

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-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102	268	254	240	238	193	202	187	198	178	193	198
2	102	268	254	244	234	198	194	185	198	193	191	193
3	102	268	246	246	241	197	198	187	198	196	193	183
4	101	262	246	238	246	193	196	187	204	198	198	202
5	54.8	232	248	238	249	187	194	196	208	198	198	202
6	3.5	232	244	238	246	187	196	193	208	200	193	200
7	3.0	234	240	230	252	187	198	194	206	204	191	198
8	7.6	236	244	228	244	187	198	194	206	206	189	198
9	2.4	231	248	234	242	190	200	194	212	206	191	202
10	1.6	226	250	238	240	196	200	194	208	204	192	210
11	1.6	224	248	240	240	200	194	193	198	200	196	200
12	1.2	222	250	238	241	198	202	202	198	202	200	200
13	1.0	222	246	234	244	198	193	196	195	200	196	202
14	4.1	224	246	236	240	196	195	191	184	198	194	200
15	2.8	226	242	238	244	194	181	194	196	196	194	198
16	65.4	234	244	246	244	187	144	176	200	194	194	200
17	266	234	224	244	246	194	77.9	165	204	196	195	200
18	272	240	220	244	244	201	128	163	204	194	196	201
19	274	240	238	244	240	204	178	181	206	196	193	204
20	273	240	250	244	238	203	178	181	208	198	196	206
21	276	240	244	244	230	203	171	183	206	196	202	204
22	280	242	236	238	204	201	171	181	206	198	202	205
23	283	240	230	238	200	202	172	180	210	198	200	201
24	281	238	234	246	196	202	183	183	214	200	202	200
25	272	240	238	250	202	202	196	189	212	196	206	200
26	277	236	240	248	201	202	193	194	212	194	208	202
27	277	232	230	244	196	202	191	191	210	193	208	201
28	268	242	220	242	190	200	194	193	210	193	204	200
29	268		218	242	188	202	193	196	210	196	208	204
30	268		216	242	193	210	191	194	202	194	202	204
31	268		224		194		193	194		191		202
Sum	4,659.0	6,673	7,412	7,216	7,047	5,916	5,694.9	5,831	6,131	6,106	5,925	6,220
Current Year 1981									Period 1977-1981			
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.	2.22	0.06	123	285	13	0.8	150	9,241	14,137	17,542	9,241	
Feb.	2.15	1.94	! 1	270	111	220	238	13,236	13,460	14,896	12,067	
Mar.	2.12	1.92	! 1	256	129	216	239	14,701	15,586	17,427	14,469	
Apr.	2.08	1.94	! 3	250	8	222	241	14,313	15,353	16,711	14,313	
May	2.23	1.73	7	281	28	183	227	13,978	15,811	16,808	13,978	
June	1.82	1.63	30	216	16	176	197	11,734	14,392	16,086	11,734	
July	1.83	.94	1	208	17	74.0	184	11,296	14,483	17,022	11,296	
Aug.	1.97	1.59	12	232	18	160	188	11,566	15,326	18,196	11,566	
Sept.	1.88	1.65	24	216	14	172	204	12,161	12,904	17,423	6,780	
Oct.	1.83	1.63	! 8	208	1	171	197	12,111	13,494	18,543	6,343	
Nov.	1.84	1.72	126	212	8	189	198	11,752	12,946	16,980	6,047	
Dec.	1.86	1.63	10	216	3	172	201	12,337	13,409	18,256	6,216	
Yearly	2.23	0.06		285		0.8	205	148,426	171,301	180,374	148,426	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.68	0.02		8.07		0.02	5.81	183,082	211,298	222,490	183,082	

! 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 1981.

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 Conexión was enlarged and lined, and is now known as the Central Feeder Canal.

Monthly Discharge in Acre-Feet

Month	Current Year 1981	Period 1956-1981		
		Average	Maximum	Minimum
January	33,845	7,904	69,527	0
February	3,139	2,433	14,698	0
March	9,527	5,756	35,492	0
April	3,996	11,613	68,714	0
May	7,401	9,181	58,365	0
June	1,330	9,705	50,025	0
July	0	12,108	46,139	0
August	2,327	13,589	55,497	0
September	42.2	10,963	68,053	0
October	168	8,079	110,417	0
November	0	9,518	69,415	0
December	0	7,121	70,213	0
Yearly	61,775	101,178	509,407	0
	Thousands of Cubic Meters			
	76,199	124,802	628,347	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 51 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 1981.

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, 54.04 feet (16.47 m) on May 3, 1980, minimum mean daily gage height 37.73 feet (11.50 m) on July 18 and 19, 1970; maximum mean daily discharge, 20,200 second-feet (571 m³/sec) on December 19, 1952; minimum mean daily discharge, no flow on various occasions.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	6,500	491	65.7	37.4	123	281	17.7	12.4	12.4	12.4	10.6	9.9	
2	6,890	463	84.0	38.8	124	220	17.7	12.4	13.4	12.4	10.6	9.9	
3	5,860	452	533	36.4	136	151	18.4	13.4	14.1	12.4	10.6	9.9	
4	5,050	349	1,330	34.3	120	77.0	18.4	13.4	15.5	12.4	10.6	9.9	
5	5,120	270	523	28.6	150	65.3	18.4	13.4	17.7	12.4	10.6	9.9	
6	5,510	275	367	27.2	139	48.0	18.4	13.4	19.8	13.4	10.6	9.9	
7	5,440	295	477	29.7	84.4	35.7	17.7	13.4	22.6	13.4	10.6	9.9	
8	6,180	299	982	31.4	60.7	29.0	17.7	14.1	22.6	13.4	10.6	9.9	
9	6,430	305	1,530	30.7	46.3	28.3	17.7	16.2	21.9	14.1	10.6	9.9	
10	6,570	271	1,600	30.7	44.8	27.5	16.2	18.4	20.5	14.1	10.6	9.9	
11	6,780	268	936	34.3	45.2	26.8	16.2	19.8	19.8	14.1	10.6	9.9	
12	6,460	523	516	37.4	61.1	24.4	15.5	20.5	18.4	13.4	10.6	9.9	
13	6,640	336	353	42.4	75.9	21.9	15.5	18.4	16.2	13.4	10.6	9.9	
14	7,520	170	292	37.1	97.5	20.8	15.5	16.2	13.4	13.4	10.6	9.9	
15	7,700	163	204	34.3	117	20.8	15.5	14.1	12.4	12.4	10.6	9.9	
16	7,060	166	220	35.0	140	19.8	15.5	11.3	12.4	12.4	10.6	9.9	
17	5,190	185	169	38.1	114	18.7	15.5	11.3	12.4	11.3	10.6	9.9	
18	3,250	160	118	43.1	48.4	18.0	15.5	19.8	11.3	11.3	9.9	9.9	
19	2,610	131	119	45.6	51.2	18.0	15.5	29.7	11.3	10.6	9.9	9.9	
20	1,880	122	115	49.4	57.6	17.3	15.5	40.3	11.3	10.6	9.9	9.9	
21	1,790	119	102	45.6	63.9	17.3	16.2	49.1	11.3	10.6	9.9	9.9	
22	1,620	113	86.5	74.5	57.9	17.3	16.2	36.7	11.3	10.6	9.9	11.3	
23	1,440	109	77.3	206	93.2	17.0	16.2	19.8	12.4	10.6	9.9	15.5	
24	1,300	107	84.4	207	92.5	16.2	15.5	11.3	12.4	10.6	9.9	20.5	
25	1,140	105	84.8	57.6	59.0	16.2	15.5	11.3	12.4	10.6	9.9	28.3	
26	1,010	99.9	78.4	46.3	64.6	15.2	15.5	12.4	12.4	10.6	9.9	32.5	
27	890	94.6	75.2	31.1	69.6	15.2	15.5	12.4	12.4	9.9	10.6	38.8	
28	809	91.1	67.8	53.3	75.6	14.8	14.1	12.4	12.4	9.9	11.3	45.2	
29	717		53.3	113	125	14.1	13.4	11.3	12.4	9.9	11.3	45.2	
30	636		79.8	118	192	14.1	13.4	11.3	12.4	9.9	11.3	46.6	
31	562		39.9		314		12.4	11.3		9.9		47.7	
Sum	126,525	6,533.2	11,367.1	1,673.9	3,044.8	1,327.1	498.3	541.0	440.7	366.2	313.6	539.3	
Current Year 1981												Period 1951-1981	
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.	51.64	43.44	14	7,730	31	558	4,100	250,959	175,230	1,047,732	426		
Feb.	43.14	41.60	12	562	28	84.0	233	12,958	106,758	696,461	317		
Mar.	45.37	40.75	10	1,600	31	32.1	367	22,546	83,834	807,342	0		
Apr.	42.65	40.42	23	283	27	26.8	55.8	3,320	60,492	588,983	0		
May	42.59	40.91	3	314	9	38.1	98.2	6,039	84,064	732,815	0		
June	42.49	40.16	1	292	129	14.1	44.5	2,632	44,119	555,460	0		
July	40.19	39.99	13	18.4	31	12.4	16.2	988	29,128	339,089	0		
Aug.	41.14	39.96	21	53.3	116	11.3	17.3	1,073	38,547	323,679	0		
Sept.	40.32	39.96	17	22.6	118	11.3	14.8	874	53,303	572,551	0		
Oct.	40.06	39.90	19	14.1	127	9.9	11.7	726	84,645	769,939	0		
Nov.	39.96	39.90	128	11.3	118	9.9	10.6	622	120,840	909,399	173		
Dec.	41.01	39.90	31	47.7	11	9.9	17.3	1,069	150,863	1,060,767	502		
Yearly	51.64	39.90		7,730		9.9	417	303,807	1,005,950	7,923,600	25,036		
	Meters		Cubic Meters per Second			Thousands of Cubic Meters							
	15.74	12.16		219		0.28	11.8	374,742	1,240,826	9,773,655	30,882		

1 And other days

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	50.26	43.11	41.50	40.75	41.90	42.45	40.16	39.99	39.99	39.99	39.93	39.90
2	50.62	43.01	41.70	40.81	41.90	42.29	40.16	39.99	40.03	39.99	39.93	39.90
3	49.90	42.98	43.37	40.78	41.96	42.03	40.19	40.03	40.06	39.99	39.93	39.90
4	49.25	42.85	45.14	40.75	41.86	41.50	40.19	40.03	40.09	39.99	39.93	39.90
5	49.38	42.68	43.24	40.58	42.03	41.37	40.19	40.03	40.16	39.99	39.93	39.90
6	49.77	42.68	42.78	40.55	41.96	41.08	40.19	40.03	40.22	40.03	39.93	39.90
7	50.00	42.72	42.88	40.62	41.21	40.81	40.16	40.03	40.32	40.03	39.93	39.90
8	50.39	42.72	44.16	40.65	41.24	40.68	40.16	40.06	40.32	40.03	39.93	39.90
9	50.59	42.72	44.95	40.58	40.94	40.65	40.16	40.12	40.29	40.06	39.93	39.90
10	50.69	42.65	44.91	40.55	40.91	40.62	40.12	40.19	40.26	40.06	39.93	39.90
11	50.85	42.65	43.73	40.65	40.91	40.58	40.12	40.22	40.22	40.06	39.93	39.90
12	50.66	43.08	42.85	40.72	41.21	40.49	40.09	40.26	40.19	40.03	39.93	39.90
13	50.75	42.81	42.65	40.81	41.44	40.42	40.09	40.19	40.12	40.03	39.93	39.90
14	51.38	42.29	42.55	40.68	41.63	40.39	40.09	40.12	40.03	40.03	39.93	39.90
15	51.48	42.26	42.32	40.58	41.77	40.39	40.09	40.06	39.99	39.99	39.93	39.90
16	50.98	42.29	42.45	40.62	41.90	40.35	40.09	39.96	39.99	39.99	39.93	39.90
17	49.44	42.39	42.22	40.72	41.73	40.32	40.09	39.96	39.99	39.96	39.93	39.90
18	47.57	42.26	41.93	40.85	40.91	40.29	40.09	40.22	39.96	39.96	39.90	39.90
19	46.88	42.06	41.93	40.91	40.98	40.29	40.09	40.49	39.96	39.93	39.90	39.90
20	45.93	41.99	41.90	41.01	41.11	40.26	40.09	40.81	39.96	39.93	39.90	39.90
21	45.80	41.96	41.80	40.91	41.24	40.26	40.12	41.04	39.96	39.93	39.90	39.90
22	45.54	41.90	41.67	41.50	41.14	40.26	40.12	40.72	39.96	39.93	39.90	39.96
23	45.28	41.86	41.57	42.36	41.17	40.26	40.12	40.22	39.99	39.93	39.90	40.09
24	45.05	41.83	41.63	42.36	41.24	40.22	40.09	39.96	39.99	39.93	39.90	40.26
25	44.78	41.80	41.63	41.17	41.21	40.22	40.09	39.96	39.99	39.93	39.90	40.45
26	44.52	41.73	41.57	40.91	41.31	40.19	40.09	39.99	39.99	39.93	39.90	40.58
27	44.29	41.67	41.54	40.49	41.37	40.19	40.09	39.99	39.99	39.90	39.93	40.78
28	44.09	41.60	41.44	41.08	41.44	40.19	40.06	39.99	39.99	39.90	39.96	40.94
29	43.86		41.17	41.86	41.83	40.16	40.03	39.96	39.99	39.90	39.96	40.94
30	43.67		41.57	41.90	42.16	40.16	40.03	39.96	39.99	39.90	39.96	40.98
31	43.44		40.88		42.55		39.99	39.96		39.90		41.01
Avg.	47.97	42.39	42.45	40.94	41.50	40.65	40.12	40.16	40.06	39.96	39.93	40.12

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 1981.

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 1981	Period 1964-1981		
		Average	Maximum	Minimum
January	8,546	1,111	8,546	0
February	617	588	7,653	0
March	525	381	4,809	0
April	26.8	115	1,992	0
May	130	218	1,973	0
June	139	203	2,411	0
July	0	169	1,768	0
August	112	211	2,383	0
September	576	525	6,375	0
October	1,736	1,800	23,242	0
November	531	976	14,510	0
December	0	1,070	10,559	0
Yearly	12,937	7,367	69,574	0
	Thousands of Cubic Meters			
	15,958	9,087	85,819	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 1981.

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. At the beginning of the year, the release of surplus flow at Morelos Dam noticeably increased the height of the river above the normal river bed.

EXTREMES: January 1960 through 1968: Maximum daily discharge, 4,380 second-feet ($124 \text{ m}^3/\text{sec}$), January 21 and December 7 and 8, 1960; minimum discharge, no flow on various occasions. Maximum monthly discharge, 225,224 acre-feet ($277,811,000 \text{ m}^3$) January 1960; minimum monthly discharge, zero during various months of several years. Annual maximum discharge, 503,260 acre-feet ($620,765,000 \text{ m}^3$) during 1960; minimum 59,335 acre-feet ($73,189,000 \text{ m}^3$) in 1968. January 1960 through 1981: Maximum gage height, 19.69 feet (6.00 m) April 30 to May 4, May 24-27, August 1-3, and August 16 to December 4, 1980; minimum gage height, 12.47 feet (3.80 m) on August 31 and September 1, 1960.

Mean Daily Gage Height in Feet 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	19.42	19.03	16.17	15.72	15.35	14.99	14.57	14.37	14.44	14.44	14.44	14.30
2	19.42	19.00	16.14	15.72	15.35	14.96	14.57	14.37	14.44	14.44	14.44	14.34
3	19.39	18.96	16.08	15.68	15.32	14.96	14.53	14.37	14.44	14.44	14.44	14.34
4	19.39	18.96	16.08	15.68	15.32	14.96	14.50	14.37	14.44	14.44	14.44	14.37
5	19.36	18.93	16.08	15.68	15.29	14.93	14.53	14.37	14.44	14.44	14.44	14.37
6	19.36	18.90	16.04	15.65	15.22	14.93	14.50	14.37	14.44	14.44	14.44	14.37
7	19.32	18.86	16.01	15.62	15.22	14.90	14.50	14.30	14.44	14.44	14.40	14.40
8	19.32	18.83	16.01	15.62	15.22	14.90	14.47	14.30	14.44	14.44	14.40	14.44
9	19.32	18.83	15.98	15.62	15.22	14.83	14.50	14.27	14.40	14.44	14.40	14.44
10	19.29	18.77	15.94	15.62	15.19	14.83	14.53	14.27	14.40	14.44	14.40	14.50
11	19.29	18.77	15.94	15.62	15.19	14.83	14.57	14.27	14.40	14.44	14.37	14.50
12	19.29	18.73	15.91	15.62	15.16	14.80	14.60	14.27	14.40	14.44	14.37	14.53
13	19.29	18.70	15.88	15.58	15.16	14.80	14.57	14.30	14.37	14.44	14.37	14.53
14	19.26	18.67	15.88	15.58	15.16	14.76	14.53	14.30	14.37	14.44	14.37	14.57
15	19.26	18.64	15.88	15.58	15.16	14.76	14.57	14.30	14.37	14.44	14.37	14.57
16	19.26	18.60	15.85	15.55	15.12	14.76	14.57	14.30	14.37	14.44	14.37	14.57
17	19.26	18.57	15.85	15.55	15.09	14.73	14.57	14.34	14.37	14.44	14.34	14.60
18	19.26	18.50	15.81	15.55	15.09	14.70	14.53	14.34	14.37	14.44	14.34	14.60
19	19.26	18.44	15.81	15.52	15.06	14.70	14.50	14.34	14.37	14.44	14.34	14.63
20	19.23	18.37	15.81	15.52	15.06	14.67	14.50	14.37	14.40	14.44	14.34	14.63
21	19.23	18.34	15.78	15.49	15.06	14.67	14.47	14.37	14.40	14.44	14.30	14.63
22	19.19	18.31	15.75	15.49	15.03	14.63	14.47	14.37	14.40	14.44	14.30	14.67
23	19.19	18.27	15.75	15.49	15.03	14.63	14.44	14.37	14.40	14.44	14.30	14.70
24	19.19	18.24	15.75	15.45	15.03	14.63	14.44	14.40	14.37	14.44	14.30	14.70
25	19.16	18.18	15.75	15.45	14.99	14.63	14.47	14.40	14.37	14.44	14.30	14.73
26	19.16	18.11	15.75	15.45	14.99	14.63	14.44	14.44	14.40	14.44	14.30	14.76
27	19.13	18.04	15.72	15.45	14.99	14.60	14.44	14.44	14.44	14.44	14.30	14.76
28	19.09	17.98	15.72	15.45	14.96	14.60	14.40	14.44	14.44	14.44	14.27	14.76
29	19.06		15.72	15.42	14.96	14.60	14.37	14.44	14.44	14.44	14.27	14.80
30	19.06		15.72	15.39	14.99	14.57	14.37	14.44	14.44	14.44	14.27	14.83
31	19.03		15.72		14.99		14.37	14.47		14.44		14.83
Avg.	19.26	18.60	15.88	15.55	15.12	14.76	14.50	14.37	14.40	14.44	14.37	14.57

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)	
	1981	Average 1935-1981	1981	Average 1951-1981	1981	Average 1939-1981	1981	Estimated Average
Jan.	23,439	17,416	1,699	1,655	557.3	553.9	25,695.3	19,624.9
Feb.	23,547	17,204	1,706	1,675	553.7	555.9	25,806.7	19,434.9
Mar.	23,229	16,933	1,705	1,670	575.2	571.4	25,509.2	19,174.4
Apr.	22,691	17,019	1,724	1,671	611.4	601.6	25,026.4	19,291.6
May	22,373	17,845	1,768	1,735	615.8	603.3	24,756.8	20,183.3
June	22,015	19,031	1,636	1,621	616.6	604.3	24,267.6	21,256.3
July	21,900	19,203	1,473	1,490	580.8	591.3	23,953.8	21,284.3
Aug.	21,886	19,000	1,434	1,434	575.2	574.6	23,895.2	21,008.6
Sept.	21,870	18,748	1,464	1,419	572.8	570.6	23,906.8	20,737.6
Oct.	22,073	18,518	1,452	1,440	556.5	571.4	24,081.5	20,529.4
Nov.	22,259	18,327	1,525	1,516	563.7	561.0	24,347.7	20,404.0
Dec.	22,668	18,114	1,577	1,604	542.7	556.2	24,787.7	20,274.2
Avg.	22,496	18,113	1,597	1,578	576.8	576.3	24,669.6	20,267.3
Max.	23,547	27,780	1,768	1,808	616.6	688.7	25,806.7	28,235.0
Min.	21,870	* 10,727	1,434	1,186	542.7	76.9	23,895.2	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	1981						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Foot at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

Colorado River at Northerly International Boundary

Period 1956-1981

Jan.	475,897,338	18,900	4	0.0040	0.0058	0.0023	10.2	24.7	336	1.4
Feb.	122,161,869	3,900	4	.0032	.0043	.0024	2.1	13.6	116	1.6
Mar.	299,609,217	11,700	4	.0039	.0044	.0027	6.3	41.3	499	6.3
Apr.	317,534,427	13,500	5	.0043	.0045	.0033	7.3	37.1	434	7.3
May	195,372,558	5,800	4	.0030	.0037	.0023	3.2	14.3	201	2.3
June	228,042,918	7,800	4	.0034	.0041	.0027	4.2	15.2	92.6	2.8
July	285,296,229	9,000	5	.0032	.0035	.0028	4.9	20.1	89.3	3.4
Aug.	310,229,802	8,900	4	.0029	.0035	.0025	4.8	19.7	103	3.8
Sept.	129,331,953	4,300	5	.0033	.0038	.0028	2.3	8.9	43.6	1.6
Oct.	62,992,368	1,200	4	.0019	.0028	.0015	.7	5.2	36.7	.5
Nov.	64,048,311	1,300	4	.0020	.0032	.0013	.7	10.1	89.9	.5
Dec.	126,555,516	2,400	5	.0019	.0030	.0012	1.3	18.5	174	.6
Yearly	2,617,072,506	88,700	52	0.0034	0.0058	0.0012	48.0	228.7	2,198	48.0

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

Intake Canal at Morelos Diversion Structure

Period 1952-1981

Jan.	183,041,000	23,167	4	0.0127	0.0138	0.0110	12.5	6.0	22.3	0.2
Feb.	118,821,000	10,324	4	.0087	.0124	.0071	5.6	6.8	45.2	.9
Mar.	277,957,000	37,674	5	.0136	.0171	.0080	20.3	40.7	154	5.3
Apr.	316,577,000	23,455	4	.0074	.0102	.0057	12.6	36.3	121	7.5
May	194,784,000	16,871	4	.0087	.0105	.0066	9.1	10.1	51.2	1.5
June	227,423,000	17,693	5	.0078	.0100	.0068	9.6	26.1	109	3.1
July	284,490,000	18,112	4	.0064	.0089	.0041	9.8	37.0	156	4.1
Aug.	306,148,000	14,838	4	.0048	.0061	.0037	8.0	34.5	135	3.8
Sept.	128,640,000	4,187	5	.0033	.0058	.0020	2.3	14.8	64.7	1.9
Oct.	62,554,000	1,153	4	.0018	.0034	.0007	.6	4.5	26.7	.3
Nov.	63,696,000	1,405	4	.0022	.0045	.0004	.7	2.6	13.9	.2
Dec.	126,135,000	5,262	5	.0042	.0073	.0017	2.8	5.9	18.6	1.1
Yearly	2,290,266,000	174,142	52	0.0068	0.0171	0.0004	94.0	225	696	51.4

Samples and analyses by Mexican Section, Method B

Colorado River at Southerly International Boundary

Period 1946-1981

Jan.	289,786,365	135,800	1	0.0468	0.0537	0.0434	73.5			
Feb.	8,416,287	4,700	0	.0558	.0616	.0523	2.5			
Mar.	22,499,604	13,200	1	.0586	.0626	.0318	7.1			
Apr.	1,310,076	300	0	.0229	.0308	0	.2			
May	0	0	0	0.	0	0	0			
June	0	0	0	0	0	0	0			
July	0	0	0	0	0	0	0			
Aug.	801,810	300	0	.0373	.0500	0	.2			
Sept.	0	0	0	0	0	0	0			
Oct.	0	0	0	0	0	0	0			
Nov.	0	0	0	0	0	0	0			
Dec.	0	0	0	0	0	0	0			
Yearly	322,814,142	154,300	2	0.0477	0.0626	0	83.5			

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

Estimated

SUSPENDED SILT

Month	1981						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 Miguel C. Rodriguez Gaging Station

Period 1960-1981

Jan.	341,225,000	123,970	4	0.0363	0.0430	0.0212	67.0	16.8	251	0
Feb.	17,619,000	4,137	4	.0235	.0281	.0171	2.3	3.6	34.5	0
Mar.	30,655,000	13,976	6	.0456	.0566	.0081	7.5	5.4	100	0
Apr.	4,514,000	464	4	.0103	.0121	.0081	.2	8.4	172	0
May	8,211,000	1,555	3	.0364	.0182	.0122	.8	6.6	132	0
June	3,103,000	1,269	5	.0409	.0525	.0078	.6	6.2	127	0
July	1,344,000	90.5	4	.0067	.0091	.0040	.1	4.5	83.9	0
Aug.	1,459,000	119	5	.0082	.0148	.0052	.1	7.4	126	0
Sept.	1,188,000	84.8	4	.0071	.0137	.0021	.1	7.4	146	0
Oct.	988,000	29.5	4	.0030	.0040	.0020	0	11.6	206	0
Nov.	847,000	48.6	5	.0057	.0144	.0030	0	11.6	192	0
Dec.	1,454,000	136	4	.0093	.0144	.0030	.1	9.2	140	0
Yearly	412,607,000	145,880	52	0.0180	0.0566	0.0020	78.8	98.3	1,476	1.6

Samples and analyses by Mexican Section, Method C

CHEMICAL ANALYSES OF WATER SAMPLES

1981

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.	4	1.25	438,000	1,491		7.9	46	35	4.80	3.06	7.15	3.22	6.88	4.96	
Feb.	4	1.45	130,000	1,740		7.9	49	36	5.60	3.34	8.54	3.70	7.42	6.37	
Mar.	5	1.20	265,000	1,429		7.9	47	29	4.79	2.92	6.79	3.24	6.99	4.14	
Apr.	4	1.16	271,000	1,368		8.0	47	28	4.71	2.74	6.48	3.05	6.88	3.90	
May	4	1.28	184,000	1,543		8.0	48	32	5.02	2.99	7.43	3.41	7.09	5.03	
June	6	1.22	205,000	1,443		8.1	46	30	4.91	2.96	6.71	3.27	6.95	4.46	
July	5	1.16	244,000	1,365		8.0	45	29	4.70	2.90	6.11	3.03	6.85	3.98	
Aug.	6	1.17	267,000	1,355		8.0	47	28	4.50	2.88	6.52	2.97	7.15	3.93	
Sept.	5	1.43	136,000	1,633		8.0	53	32	5.23	2.99	9.34	3.44	8.11	5.40	
Oct.	5	1.55	71,800	1,753		8.0	52	34	5.79	3.21	9.58	3.92	8.34	6.23	
Nov.	5	1.52	71,600	1,780		7.9	50	34	5.58	3.31	9.02	3.79	8.24	6.21	
Dec.	5	1.47	137,000	1,725		7.9	52	35	5.39	3.16	9.20	3.60	7.88	6.08	
Mean	0.858	1.32	82,420,400	1,550		8.0	48	32	5.08	3.04	7.73	3.38	7.40	5.05	
Period Avg.		1.51	2,556,980	1,810		8.0			5.60	3.35	9.29	3.29	7.91	7.09	
Tons of Constituents									1981						
									267,000	96,800	465,000	540,000	931,000	469,000	
Avg. Tons									Period 1962-1981						
									263,000	95,200	494,000	252,000	879,000	578,000	

** Percent of total cations

*** Percent of total anions

0 Weighted mean

0 Total

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1981

The following tables show electrical conductivity, expressed in mhos per centimeter $\times 10^6$ 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	ECx10 ⁶ @25°C										
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Colorado River at Northerly International Boundary

January	February	April	May	July	August	October	November
1 * 1,410	15 1,800	1 1,350	16 1,590	1 1,340	16 1,340	1 1,740	16 1,840
2 1,430	16 1,790	2 1,360	17 1,610	2 1,380	17 1,320	2 1,710	17 1,820
3 1,460	17 1,760	3 1,370	18 1,590	3 1,420	18 1,340	3 1,720	18 1,790
4 1,450	18 1,740	4 1,400	19 1,560	4 1,440	19 1,360	4 1,710	19 1,790
5 1,390	19 1,730	5 1,420	20 1,540	5 1,480	20 1,370	5 1,750	20 1,820
6 1,440	20 1,770	6 1,370	21 1,550	6 1,400	21 1,390	6 1,740	21 1,810
7 1,410	21 1,720	7 1,350	22 1,590	7 1,380	22 1,420	7 1,690	22 1,830
8 1,390	22 1,710	8 1,360	23 1,580	8 1,380	23 1,390	8 1,740	23 1,840
9 1,410	23 1,760	9 1,370	24 1,600	9 1,370	24 1,330	9 1,770	24 1,850
10 1,440	24 1,770	10 1,370	25 1,630	10 1,360	25 1,340	10 1,770	25 1,680
11 1,480	25 1,760	11 1,430	26 1,570	11 1,380	26 1,340	11 1,800	26 1,610
12 1,460	26 1,700	12 1,420	27 1,570	12 1,400	27 1,360	12 1,720	27 1,640
13 1,450	27 1,640	13 1,390	28 1,570	13 1,360	28 1,380	13 1,810	28 1,750
14 1,460	28 1,690	14 1,390	29 1,560	14 1,390	29 1,440	14 1,790	29 1,860
15 1,460	March	15 1,370	30 1,530	15 1,350	30 1,480	15 1,770	30 1,740
16 1,580	1 1,640	16 1,390	31 1,540	16 1,340	31 1,460	16 1,760	December
17 1,550	2 1,490	17 1,400	June	17 1,330	September	17 1,750	1 1,780
18 1,600	3 1,350	18 1,390	1 1,590	18 1,360	1 1,510	18 1,750	2 1,810
19 1,570	4 1,440	19 1,450	2 1,580	19 1,380	2 1,520	19 1,760	3 1,870
20 1,500	5 1,530	20 1,380	3 1,560	20 1,360	3 1,510	20 1,760	4 1,880
21 1,510	6 1,620	21 1,330	4 1,530	21 1,360	4 1,530	21 1,700	5 1,800
22 1,530	7 1,520	22 1,350	5 1,560	22 1,350	5 1,540	22 1,720	6 1,730
23 1,530	8 1,390	23 1,330	6 1,590	23 1,370	6 1,550	23 1,730	7 1,730
24 1,630	9 1,470	24 1,380	7 1,570	24 1,350	7 1,570	24 1,730	8 1,720
25 1,700	10 1,570	25 1,410	8 1,590	25 1,370	8 1,560	25 1,720	9 1,700
26 1,760	11 1,560	26 1,440	9 1,510	26 1,410	9 1,420	26 1,750	10 1,710
27 1,830	12 1,520	27 1,340	10 1,500	27 1,350	10 1,450	27 1,790	11 1,670
28 1,760	13 1,530	28 1,370	11 1,540	28 1,350	11 1,480	28 1,730	12 1,690
29 1,660	14 1,530	29 1,350	12 1,560	29 1,350	12 1,620	29 1,710	13 1,690
30 1,710	15 1,510	30 1,360	13 1,500	30 1,350	13 1,620	30 1,730	14 1,710
31 1,710	16 1,450	May	14 * 1,520	31 1,340	14 1,720	31 1,700	15 1,740
February	17 1,470	1 1,350	15 1,430	August	15 1,750	November	16 1,650
1 1,740	18 1,450	2 1,420	16 1,440	1 1,390	16 1,640	1 1,760	17 1,640
2 1,780	19 1,430	3 1,460	17 1,440	2 1,390	17 1,650	2 1,730	18 1,630
3 1,970	20 1,430	4 1,430	18 1,460	3 1,350	18 1,660	3 1,770	19 1,690
4 1,820	21 1,410	5 1,470	19 1,460	4 1,350	19 1,670	4 1,750	20 1,710
5 1,820	22 1,430	6 1,460	20 1,460	5 1,350	20 1,680	5 1,780	21 1,740
6 1,850	23 1,410	7 1,510	21 1,490	6 1,360	21 1,700	6 1,760	22 1,690
7 1,800	24 1,380	8 1,570	22 1,400	7 1,350	22 1,650	7 1,740	23 1,650
8 1,760	25 1,380	9 1,610	23 1,390	8 1,370	23 1,610	8 1,720	24 1,670
9 1,750	26 1,350	10 1,640	24 1,380	9 1,370	24 1,630	9 1,720	25 * 1,700
10 1,680	27 1,340	11 1,600	25 1,360	10 1,360	25 1,630	10 1,750	26 1,710
11 1,520	28 1,340	12 1,540	26 1,370	11 1,350	26 1,640	11 1,780	27 1,790
12 1,630	29 1,370	13 1,560	27 1,380	12 1,330	27 1,640	12 1,780	28 1,720
13 1,740	30 1,330	14 1,580	28 1,360	13 1,360	28 1,720	13 1,780	29 1,580
14 1,770	31 1,350	15 1,590	29 1,340	14 1,330	29 1,670	14 1,800	30 1,540
			30 1,340	15 1,360	30 1,650	15 1,790	31 1,530

* Estimated

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1981

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

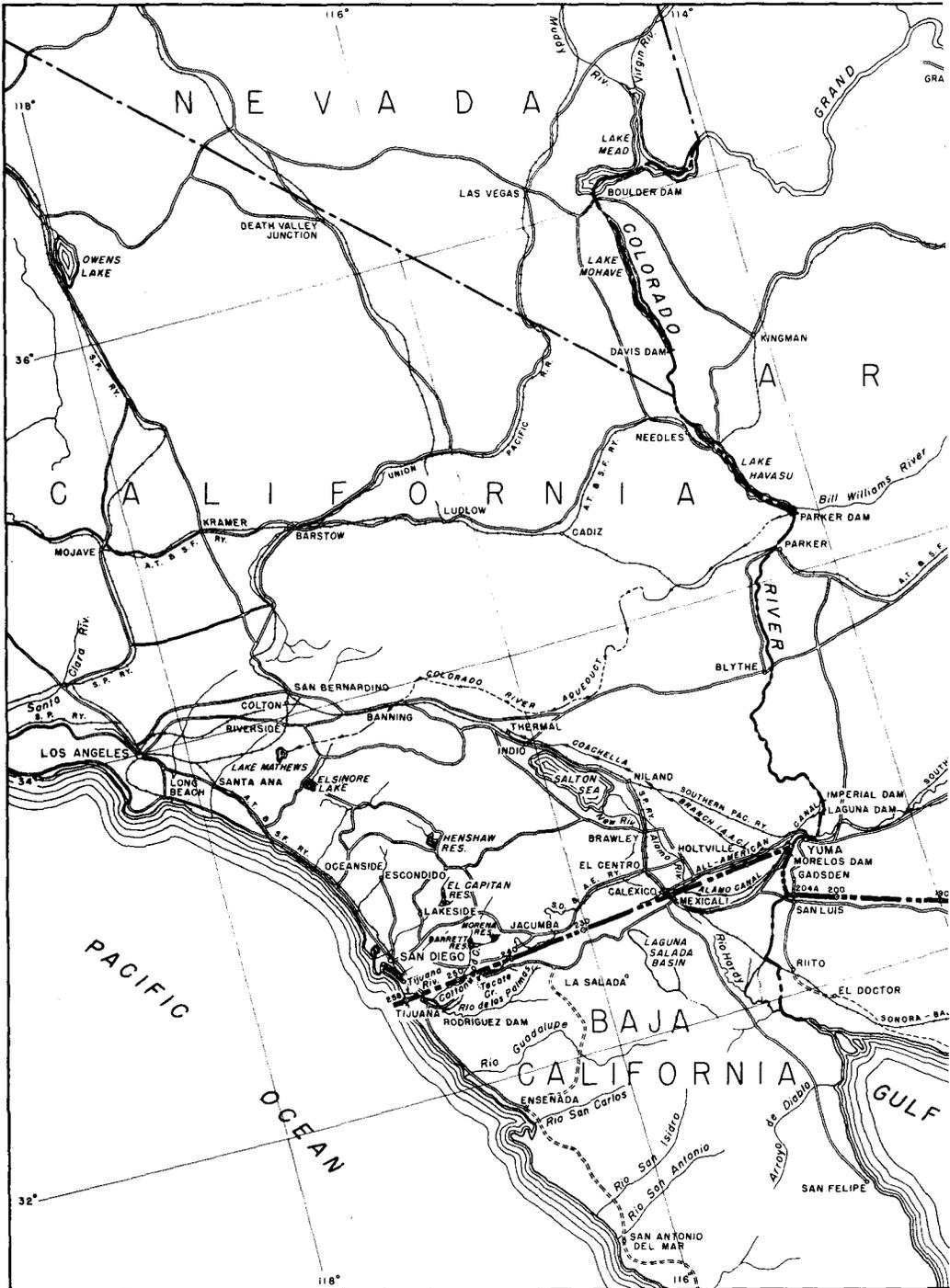
January		February		April		May		July		August		October		November	
1	1,440	15	1,800	1	1,370	16	1,610	1	1,350	16	1,430	1	1,760	16	1,860
2	1,440	16	1,820	2	1,370	17	1,590	2	1,380	17	1,360	2	1,750	17	1,830
3	1,460	17	1,790	3	1,370	18	1,590	3	1,450	18	1,390	3	1,760	18	1,800
4	1,460	18	1,720	4	1,420	19	1,560	4	1,450	19	1,400	4	1,740	19	1,800
5	1,420	19	1,740	5	1,420	20	1,550	5	1,480	20	1,400	5	1,750	20	1,840
6	1,470	20	1,790	6	1,370	21	1,540	6	1,430	21	1,450	6	1,720	21	1,850
7	1,430	21	1,720	7	1,370	22	1,610	7	1,390	22	1,470	7	1,710	22	1,840
8	1,420	22	1,730	8	1,370	23	1,600	8	1,380	23	1,470	8	1,780	23	1,850
9	1,420	23	1,780	9	1,380	24	1,600	9	1,380	24	1,390	9	1,790	24	1,860
10	1,440	24	1,770	10	1,390	25	1,540	10	1,380	25	1,380	10	1,780	25	1,750
11	1,500	25	1,780	11	1,440	26	1,590	11	1,400	26	1,390	11	1,780	26	1,630
12	1,480	26	1,720	12	1,430	27	1,590	12	1,400	27	1,430	12	1,720	27	1,620
13	1,470	27	1,660	13	1,410	28	1,590	13	1,370	28	1,440	13	1,810	28	1,750
14	1,460	28	1,720	14	1,420	29	1,560	14	1,400	29	1,500	14	1,830	29	1,850
15	1,470			15	1,380	30	1,530	15	1,360	30	1,510	15	1,820	30	1,800
16	1,570	1	March 1,650	16	1,390	31	1,570	16	1,360	31	1,520	16	1,810		
17	1,570	2	1,490	17	1,420			17	1,340			17	1,790	1	1,800
18	1,620	3	1,350	18	1,420		June 1,590	18	1,360		September 1,570	18	1,800	2	1,820
19	1,590	4	1,450	19	1,470	2	1,600	19	1,390	2	1,570	19	1,800	3	1,840
20	1,530	5	1,560	20	1,380	3	1,570	20	1,380	3	1,580	20	1,790	4	1,890
21	1,510	6	1,630	21	1,350	4	1,540	21	1,350	4	1,580	21	1,730	5	1,890
22	1,520	7	1,530	22	1,370	5	1,580	22	1,370	5	1,590	22	1,760	6	1,790
23	1,550	8	1,410	23	1,340	6	1,620	23	1,370	6	1,590	23	1,770	7	1,750
24	1,630	9	1,480	24	1,400	7	1,580	24	1,350	7	1,580	24	1,770	8	1,750
25	1,690	10	1,580	25	1,410	8	1,590	25	1,400	8	1,610	25	1,730	9	1,730
26	1,770	11	1,570	26	1,440	9	1,530	26	1,430	9	1,530	26	1,790	10	1,720
27	1,840	12	1,530	27	1,340	10	1,520	27	1,360	10	1,500	27	1,790	11	1,700
28	1,770	13	1,560	28	1,390	11	1,550	28	1,350	11	1,520	28	1,760	12	1,720
29	1,670	14	1,560	29	1,370	12	1,580	29	1,370	12	1,660	29	1,730	13	1,710
30	1,710	15	1,520	30	1,360	13	1,520	30	1,390	13	1,640	30	1,750	14	1,720
31	1,720	16	1,470		May 14	1,520	31	1,400	14	1,720	31	1,740	15	1,740	
		17	1,470	1	1,370	15	1,440		August 15	1,690		November 16	1,670		
		18	1,460	2	1,430	16	1,460	1	1,440	16	1,690	1	1,790	17	1,660
		19	1,760	3	1,490	17	1,450	2	1,430	17	1,680	2	1,850	18	1,660
		20	1,980	4	1,440	18	1,450	3	1,400	18	1,690	3	1,810	19	1,710
		21	1,830	5	1,440	19	1,470	4	1,370	19	1,690	4	1,790	20	1,730
		22	1,840	6	1,460	20	1,480	5	1,370	20	1,710	5	1,810	21	1,760
		23	1,860	7	1,530	21	1,510	6	1,390	21	1,700	6	1,770	22	1,720
		24	1,810	8	1,400	22	1,410	7	1,380	22	1,660	7	1,760	23	1,670
		25	1,780	9	1,630	23	1,420	8	1,430	23	1,650	8	1,720	24	1,680
		26	1,770	10	1,660	24	1,390	9	1,430	24	1,630	9	1,760	25	-
		27	1,690	11	1,600	25	1,370	10	1,400	25	1,630	10	1,780	26	1,730
		28	1,540	12	1,560	26	1,370	11	1,410	26	1,660	11	1,790	27	1,800
		29	1,610	13	1,570	27	1,400	12	1,370	27	1,660	12	1,780	28	1,740
		30	1,760	14	1,600	28	1,380	13	1,390	28	1,750	13	1,790	29	1,590
		31	1,770	15	1,620	29	1,350	14	1,400	29	1,700	14	1,810	30	1,630
						30	1,370	15	1,450	30	1,660	15	1,840	31	1,630

Colorado River at Southerly International Boundary

January	March					
6 1,460	3 1,380					

Colorado River at Miguel C. Rodriguez Gaging Station

January	February	March	May	July	August	October	November
5 1,400	16 1,730	30 1,510	18 1,600	6 1,640	24 2,470	5 2,970	23 3,330
12 1,380	23 1,750	April	25 1,590	13 1,530	31 3,230	14 2,820	30 3,460
19 1,420	March 6 1,460		8 1,510	20 1,630	September	19 3,310	December
26 1,890	2 1,710	13 1,390	1 1,420	27 1,690	7 3,550	26 3,430	7 3,560
February 6 1,340	20 1,420		8 1,510	August 14 3,100		November 14 3,590	
2 1,700	9 1,310	27 1,400	15 1,590	3 1,580	21 2,740	4 3,450	21 3,570
9 1,790	16 1,490	May 22 1,590	22 1,590	10 3,180	28 3,130	9 3,480	28 3,540
	23 1,430	11 1,620	29 1,610	17 2,920		16 3,340	



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 51 in this bulletin.

In the United States

Month	Brawley, California		El Centro, California		Blythe, California		Yuma Citrus Station, Arizona		Bullhead City, Arizona	
	1981	Average 1931-1981	1981	Average 1931-1981	1981	Average 1931-1981	1981	Average 1931-1981	1981	Average 1978-1981
Jan.	0.95	0.37	1.26	0.39	0.09	0.46	0.27	0.42	0.34	1.77
Feb.	.45	.33	.40	.34	.13	.44	.11	.35	.25	1.31
Mar.	.77	.23	.57	.20	.91	.71	.26	.26	1.45	1.72
Apr.	0	.10	0	.10	* 0	.14	.05	.11	.02	.19
May	.04	.02	.21	.01	* .04	.03	.06	.02	.40	.31
June	0	.01	0	.01	* .04	.04	T	.02	.06	.02
July	0	.05	0	.09	* T	.17	T	.15	.05	.48
Aug.	.17	.36	1.15	.36	0	.78	1.27	.53	.38	.38
Sept.	0	.33	0	.26	0	.35	0	.34	1.21	.39
Oct.	T	.24	0	.24	# .04	.29	.03	.41	.42	.29
Nov.	.32	.17	.27	.19	0	.24	.10	.18	.87	.56
Dec.	0	.39	0	.40	0	.48	0	.38	0	.50
Yearly	2.70	2.60	3.86	2.59	1.32	3.82	2.60	3.17	5.45	7.92

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1981	Average 1948-1981	1981	Average 1926-1981	1981	Average 1948-1981	1981	Average 1949-1981	1981	Average 1948-1981
Jan.	0.71	0.43	0.79	0.39	0.47	0.39	0.31	0.35	0.63	0.39
Feb.	.16	.24	.08	.31	.12	.20	.08	.28	.04	.20
Mar.	.71	.16	.51	.20	.55	.12	.98	.20	.47	.16
Apr.	0	.08	T	.08	0	.08	T	.08	0	.08
May	.04	T	.20	T	0	T	0	.04	0	.04
June	0	T	0	T	0	.04	0	.04	0	T
July	0	.08	0	.16	0	.04	0	.20	0	.04
Aug.	.31	.43	T	.35	.79	.16	.47	.43	.12	.20
Sept.	0	.20	T	.39	T	.12	0	.24	1.22	.24
Oct.	0	.31	0	.31	0	.28	0	.39	0	.31
Nov.	T	.16	.20	.16	.16	.16	T	.47	.12	.16
Dec.	0	.28	0	.71	T	.20	0	.47	T	.28
Yearly	1.93	2.36	1.77	3.07	2.09	1.73	1.85	2.76	2.60	2.05

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		Santa Clara, Sonora		San Felipe, Baja California		El Centinela, Baja California	
	1981	Average 1952-1981	1981	Average 1974-1981	1981	Average 1959-1981	1981	Average 1971-1981	1981	Average 1969-1981	1981	Average 1978-1981
Jan.	0.71	0.55	0	0.55	0.83	0.35	0.43	0.35	0.08	0.39	0	0.63
Feb.	.04	.28	0	0	T	.20	.04	.16	.16	.16	0	.16
Mar.	.59	.28	0	0	.39	.20	.08	.12	0	.12	0	.12
Apr.	0	.12	0	.16	0	.04	.12	.08	.08	.08	0	.08
May	0	.04	0	.04	0	T	.08	.04	.28	.04	0	.04
June	0	T	0	0	0	.04	0	T	0	.04	0	.04
July	0	.16	0	.16	0	.08	0	0	0	.12	0	.12
Aug.	.08	.31	1.69	.75	.24	.24	0	.12	0	.28	0	.28
Sept.	0	.28	0	1.10	.51	.51	.08	.31	.20	.35	T	.35
Oct.	0	.47	0	.24	0	.43	.12	.67	0	.24	0	.12
Nov.	.08	.28	.16	.16	0	.24	.35	.08	0	.16	0	.16
Dec.	0	.31	0	.35	0	.31	0	.24	0	.35	0	.35
Yearly	1.50	2.44		3.78	1.97	2.76	1.30	2.17	0.79	2.40		

* Blythe FAA Airport

Estimated from adjacent station

T Trace

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 1981.

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
Bullhead City, Arizona	35° 07'	114° 36'	580	1980	Bullhead City Fire Department
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° 34'	115° 00'	** 66	1948	# S. A. R. H.
Colonia Juarez, Baja California	32° 18'	115° 05'	49	1952	S. A. R. H.
Delta, Baja California	32° 21'	115° 11'	** 39	1948	S. A. R. H.
El Centinela, Baja California	32° 35'	115° 45'	164	1978	S. A. R. H.
Laguna Salada, Baja California	32° 12'	115° 44'	7	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° 08'	114° 54'	43	1959	S. A. R. H.
San Felipe, Baja California	31° 01'	114° 51'	72	1969	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 Centro 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 51 in this bulletin.

In the United States

Month	Yuma Citrus Station, Arizona	
	1981	Average 1931-1981
Jan.	3.41	3.85
Feb.	4.82	4.80
Mar.	6.16	7.46
Apr.	9.57	10.10
May	11.99	13.04
June	15.58	14.36
July	15.73	15.44
Aug.	13.12	13.65
Sept.	10.34	10.77
Oct.	6.61	7.59
Nov.	4.55	4.97
Dec.	3.66	3.69
Yearly	105.54	109.72

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1981	Average 1949-1955 1961-1981	1981	Average 1926-1981	1981	Average 1963-1981	1981	Average 1953-1981	1981	Average 1948-1981
Jan.	5.31	4.33	1.81	2.60	3.78	3.70	2.95	3.27	3.23	3.23
Feb.	6.14	5.24	2.87	3.50	5.04	4.72	4.33	4.06	4.25	4.33
Mar.	8.03	7.52	5.20	5.91	6.14	6.89	6.46	6.30	5.87	6.26
Apr.	11.18	10.24	8.19	7.99		8.54	8.39	8.43	8.94	8.23
May	12.76	12.87	10.08	10.55		11.22	11.73	11.06	9.76	10.31
June	15.04	14.06	12.20	11.73	14.92	12.87	10.91	12.72	13.03	11.57
July	15.39	13.86	12.99	11.85	14.80	12.68	10.98	13.82		12.01
Aug.	12.99	12.52	11.89	10.24	12.09	10.91	10.43	12.40	12.48	10.94
Sept.	11.69	10.35	8.58	8.15	10.94	9.13	8.90	9.57	9.06	8.58
Oct.	9.57	8.15	5.59	5.79	7.24	6.46	7.01	6.38	5.83	6.26
Nov.	5.98	5.35	3.07	3.43	5.08	4.76	4.17	4.25	4.41	4.33
Dec.	4.80	4.33	1.93	2.44	3.62	3.54	3.50	3.19	3.39	3.31
Yearly	118.90	110.20	84.41	84.17		96.14	89.76	96.14		83.03

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		Santa Clara, Sonora		San Felipe, Baja California	
	1981	Average 1970-1981	1981	Average 1974-1981	1981	Average 1963-1981	1981	Average 1971-1981	1981	Average 1952-1981
Jan.	3.94	3.35		4.06	2.99	3.03	4.21	5.08	4.13	4.88
Feb.	4.76	4.29		4.49	3.74	4.06	5.04	4.80	5.35	5.63
Mar.	6.54	6.30	7.83	7.24	6.30	5.98	6.38	6.30	5.63	6.89
Apr.	9.69	7.91		8.31	8.19	7.68	8.11	7.68	7.64	8.27
May	11.46	10.08		10.98	12.52	10.31	7.28	8.66	7.91	10.16
June	16.26	12.09		13.94	12.36	11.69	9.33	11.10	9.29	10.79
July	14.76	11.97	14.53	13.46	14.96	12.40		11.02	10.04	11.46
Aug.	13.78	10.79		12.28	13.66	10.43	8.86	10.35	8.94	11.22
Sept.	11.22	9.06	10.59	7.60	10.39	8.35	9.06	9.17	7.87	9.65
Oct.	7.95	6.81	6.18	6.61	7.09	5.79	6.65	7.40	6.61	8.23
Nov.	5.47	4.84	5.83	5.00	4.17	3.70	4.49	5.71	5.28	6.10
Dec.	3.74	3.58	5.67	3.82	4.21	2.95	4.29	5.16	4.09	4.76
Yearly	109.57	94.37		98.94	100.59	88.43		93.50	82.80	99.21

! Adjusted to full month

**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 51 in this bulletin.

In the United States

Month	Blythe, California				Yuma Citrus Station, Arizona				Brawley, California			
	1981			Average 1931-81	1981			Average 1931-81	1981			Average 1931-81
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	57.9	80	32	52.6	58.0	79	34	53.1	59.8	82	35	53.8
Feb.	58.3	89	32	57.3	58.4	89	31	57.0	59.6	90	33	58.0
Mar.	62.4	92	40	62.9	61.8	92	39	62.0	62.3	89	41	63.1
Apr.	* 76.7	*104	* 48	70.0	71.1	98	41	68.6	70.7	97	43	69.8
May	77.5	103	52	77.4	75.7	102	48	75.7	76.2	104	52	77.2
June	* 95.0	*118	* 69	85.4	88.7	115	60	83.7	88.9	115	62	85.1
July	* 98.0	*118	* 73	92.4	92.2	112	67	91.1	92.4	114	66	91.9
Aug.	92.3	115	66	91.0	92.4	116	64	90.3	93.0	117	62	91.3
Sept.	85.5	107	61	85.0	86.5	107	60	85.0	87.3	107	60	86.2
Oct.	# 73.0	# 97	# 49	73.2	69.7	96	43	73.5	72.4	96	48	75.0
Nov.	61.5	89	33	60.2	63.0	89	36	61.4	65.9	92	40	62.5
Dec.	55.3	78	31	53.3	56.6	79	32	54.6	58.2	83	30	55.1
Yearly	74.4	* 118	31	71.7	72.8	116	31	71.3	73.9	117	30	72.4

Month	El Centro, California				Bullhead City, Arizona							
	1981			Average 1931-81	1981			Average 1978-81				
	Mean	Max.	Min.		Mean	Max.	Min.					
Jan.	58.7	85	34	53.8	56.1	77	34	52.6				
Feb.	60.2	91	36	58.0	57.7	88	33	56.6				
Mar.	62.7	91	40	62.9	63.0	90	44	62.0				
Apr.	71.3	97	40	69.5	75.2	105	46	70.4				
May	76.5	103	51	77.0	80.2	104	55	78.0				
June	89.0	115	58	85.1	93.7	119	69	90.3				
July	91.9	114	67	91.8	95.2	120	64	94.8				
Aug.	92.6	116	62	91.0	95.6	119	63	92.8				
Sept.	86.0	109	58	85.6	88.2	109	65	87.2				
Oct.	71.2	96	43	74.6	70.9	98	39	74.6				
Nov.	64.0	90	38	62.2	63.3	87	34	60.9				
Dec.	57.8	80	33	54.8	54.5	76	35	53.8				
Yearly	73.5	116	33	72.2	74.5	120	33	72.8				

In Mexico

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	1981		1948-1981		1981		1926-1981		1981		1948-1981	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	82	39	88	23	77	39	93	19	84	36	113	16
Feb.	84	34	95	28	86	39	93	23	91	32	99	21
Mar.	93	41	100	32	91	46	100	30	88	43	113	25
Apr.	97	45	109	37	97	46	106	34	95	45	118	16
May	108	50	117	43	102	54	117	43	100	52	124	34
June	111	64	126	52	118	66	120	48	111	59	135	43
July	117	68	118	61	115	70	118	55	115	70	133	45
Aug.	117	68	120	61	120	68	120	54	115	63	129	46
Sept.	104	61	122	54	109	66	122	48	108	54	135	39
Oct.	93	43	111	32	99	50	111	32	93	45	118	32
Nov.	95	36	100	27	90	43	104	28	90	39	115	32
Dec.	84	34	90	23	79	36	90	23	79	34	97	25
Yearly	117	34	126	23	120	36	122	19	115	32	135	16

* Blythe FAA Airport

Estimated from adjacent station

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

1981

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 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	45,757
Reservation Division	12,971
Yuma Mesa	18,615
Yuma Aux. Project Unit "B" (Yuma Mesa)	2,650
South Gila Valley	9,962
North Gila Valley	5,695
Wellton-Mohawk	60,348
Coachella Valley	58,203
Imperial Valley	464,199
Warren Act	80
Non-Project lands adjacent to Colorado River	12,560
Total in United States	691,040
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 514,706
Total in United States and Mexico	1,205,746

* An estimated 32% of total acreage is served by pumping from ground water in Mexicali Valley

ALAMO RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Staff gage located on the right bank of the river, about 7 miles (11.3 km) east of Calexico, California, immediately downstream from the international land boundary between the United States and Mexico and a few feet upstream from a 4-foot (1.22 m) Cipolletti weir in the throat of a twin-tube concrete culvert which carries the river flow under the All-American Canal.

RECORDS: Computed on the basis of head on the Cipolletti weir from daily staff gage readings, and weir ratings as determined by monthly current meter measurements. Records obtained and furnished by Imperial Irrigation District. Records available: June 1942 through 1981.

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

EXTREMES: Maximum mean daily discharge, 258 second-feet (7.31 m³/sec) (estimated), April 13, 1946; minimum discharge, no flow July 22-23, 29-30, 1949. Prior to the period of record, and since 1900, considerably higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a part of its flow passed through the Alamo River channel.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.34	3.24	3.65	6.87	2.86	2.96	3.52	2.75	2.75	2.75	2.75	2.54
2	2.13	3.24	4.62	4.90	4.21	2.65	4.62	2.75	3.10	2.75	2.75	2.96
3	2.13	3.10	3.93	5.58	4.21	2.65	3.24	2.65	3.10	2.96	2.75	2.96
4	2.13	3.38	3.65	3.79	2.75	2.13	3.24	2.65	2.75	2.54	2.54	3.52
5	2.13	3.38	3.93	4.62	2.54	2.13	3.38	3.65	6.06	2.54	2.54	3.52
6	2.13	3.38	3.65	4.07	2.54	2.44	2.44	3.65	3.79	2.54	2.54	3.24
7	2.13	3.52	3.79	3.79	2.54	2.44	2.44	3.79	4.90	2.75	2.96	3.24
8	2.13	3.52	3.79	3.79	2.75	2.23	2.54	4.07	3.52	2.75	2.96	2.96
9	2.44	3.79	3.93	3.24	3.38	2.44	2.54	3.24	2.96	2.54	2.65	2.96
10	2.44	3.52	3.65	3.24	3.38	2.44	2.54	2.96	2.96	2.75	2.86	2.96
11	2.65	4.07	3.52	2.75	2.96	2.44	2.54	2.54	2.96	2.75	2.86	2.96
12	2.65	3.79	3.52	2.75	2.96	2.54	2.54	3.24	5.17	2.44	2.96	2.96
13	3.38	3.52	3.79	3.24	2.75	2.23	1.92	2.75	3.65	2.44	2.96	2.75
14	2.96	3.52	3.79	3.93	2.75	2.34	1.92	2.75	3.65	2.44	2.96	2.75
15	2.96	3.24	4.07	3.93	2.44	2.34	2.34	2.75	2.96	2.65	2.75	4.35
16	2.54	4.07	4.07	3.38	2.44	2.13	4.62	2.96	2.96	2.44	2.54	4.76
17	2.44	3.52	3.79	3.93	2.96	2.13	5.45	2.75	2.75	2.34	2.75	4.07
18	2.44	3.52	4.07	2.96	2.96	2.96	5.72	2.75	2.75	2.34	3.24	4.07
19	2.54	3.52	4.07	3.52	2.75	4.49	4.90	2.96	2.96	2.34	3.52	3.24
20	2.54	3.52	4.07	3.52	2.54	6.06	4.07	2.96	2.96	2.13	2.54	3.24
21	2.75	2.96	4.07	3.24	2.54	4.49	4.07	2.75	2.65	2.13	2.96	3.24
22	2.54	2.96	4.07	2.96	2.75	3.79	2.65	2.75	2.54	2.44	3.10	2.96
23	2.75	2.96	3.79	2.96	2.96	2.65	2.44	2.54	2.54	2.54	2.96	3.65
24	2.75	2.96	5.45	2.75	2.96	3.52	3.24	2.54	2.75	2.54	2.96	3.24
25	2.96	3.24	5.17	3.24	2.75	3.24	4.35	2.34	2.75	2.54	2.96	3.24
26	2.75	4.07	3.79	2.96	3.38	3.10	4.35	2.75	2.96	2.34	2.65	3.79
27	7.36	3.52	3.79	2.96	3.38	2.75	2.75	2.75	2.96	2.54	2.65	3.24
28	4.35	3.24	3.79	2.96	3.65	2.65	2.54	2.75	2.96	2.54	2.75	3.24
29	3.52	3.79	3.79	2.96	2.96	2.34	2.54	2.44	2.65	2.75	2.96	4.62
30	2.96	4.07	2.75	2.86	2.96	2.34	2.54	2.75	2.65	2.75	2.75	4.07
31	2.96	3.79	3.79	2.96	2.96	2.96	2.54	2.75	2.34	2.34	2.75	4.07
Sum	86.88	96.27	122.92	107.65	91.71	85.04	100.53	89.68	96.07	78.63	85.08	105.37
Current Year 1981									Period 1943-1981			
Month	Extreme Gage Ø Feet		Ø Extreme Second-Feet				Average Second- Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	0.70	0.32	27	7.36	! 2	2.13	2.80	172	323	2,790	99	
Feb.	.48	.40	111	4.07	! 21	2.96	3.44	191	293	2,822	90.2	
Mar.	.58	.44	24	5.45	! 11	3.52	3.97	244	331	3,154	87.1	
Apr.	.67	.38	1	6.87	! 11	2.75	3.59	214	352	2,222	97	
May	.49	.35	! 2	4.21	! 15	2.44	2.96	182	274	1,799	73	
June	.62	.32	20	6.06	! 4	2.13	2.83	169	269	1,686	61	
July	.60	.30	18	5.72	! 13	1.92	3.24	199	248	1,712	59	
Aug.	.48	.34	8	4.07	25	2.34	2.89	178	296	1,672	65.7	
Sept.	.62	.36	5	6.06	122	2.54	3.20	191	280	1,406	83.5	
Oct.	.40	.32	3	2.96	120	2.13	2.54	156	297	1,845	61.6	
Nov.	.44	.36	19	3.52	! 4	2.54	2.84	169	305	2,080	62.4	
Dec.	.53	.36	16	4.76	! 1	2.54	3.40	209	287	1,686	80	
Yearly	0.70	0.30		7.36		1.92	3.14	2,274	3,555	22,146	1,071	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.21	0.09		0.21		0.05	0.09	2,805	4,385	27,317	1,321	

Ø Mean daily

! And other days

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 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	237	198	195	228	227	259	265	206	243	213	187	159
2	253	199	201	217	244	251	250	220	237	207	192	166
3	232	209	241	212	248	246	235	243	217	208	184	163
4	218	213	255	211	248	241	224	261	207	215	177	165
5	216	202	309	212	271	234	224	269	227	219	169	172
6	221	196	267	222	308	222	221	260	216	225	177	161
7	211	201	224	237	273	208	224	236	218	215	171	159
8	193	200	217	256	259	202	216	212	294	213	163	166
9	189	200	225	262	255	203	205	201	228	201	177	166
10	171	208	214	267	270	207	199	202	204	181	178	164
11	173	216	203	261	273	201	202	201	210	173	186	163
12	281	217	199	239	278	187	200	240	198	168	186	161
13	343	209	197	233	262	182	209	341	202	166	184	159
14	340	211	195	250	250	178	225	518	219	171	184	159
15	263	208	196	253	228	178	234	514	222	170	176	161
16	233	205	216	228	225	195	221	405	239	179	159	165
17	211	201	221	215	228	211	215	338	234	191	165	164
18	194	198	219	230	231	181	239	333	231	172	156	159
19	208	195	216	278	232	167	236	284	219	167	154	165
20	209	190	212	351	222	174	261	248	214	171	181	166
21	211	188	213	301	221	178	242	225	211	170	179	159
22	209	200	211	281	215	213	244	222	215	169	165	157
23	206	202	211	263	214	209	232	238	201	171	160	166
24	201	202	219	230	215	201	226	240	195	168	161	166
25	204	196	217	219	221	212	227	249	198	165	170	158
26	218	191	207	217	221	222	235	235	202	174	169	159
27	217	190	203	217	245	232	235	231	206	190	162	166
28	209	180	220	226	252	233	232	239	215	201	186	167
29	204	202	222	226	248	236	207	238	201	195	172	169
30	209	218	218	226	252	241	194	232	210	194	181	169
31	205		234		255		195	231		193		150
Sum	6,889	5,625	6,797	7,268	7,591	6,304	6,974	8,312	6,533	5,815	5,211	5,049
Current Year 1981								Period 1943-1981				
Month	Extreme Gage Feet **		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
							High	Day				Low
Jan.	39.16	41.22	13	343	10	171	222	13,664	8,015	20,160	1,751	
Feb.	40.94	41.33	12	217	28	180	201	11,157	6,802	17,845	1,258	
Mar.	39.95	41.14	5	309	1	195	219	13,482	7,622	13,482	1,008	
Apr.	39.17	41.00	20	351	4	211	242	14,416	7,906	14,489	1,390	
May	39.93	40.68	6	308	23	214	245	15,057	7,105	15,057	629	
June	40.39	41.41	1	259	19	167	210	12,504	6,158	17,026	1,087	
July	40.24	41.14	1	265	30	194	225	13,833	6,355	22,576	817	
Aug.	38.27	41.11	14	518	1	201	268	16,487	7,206	16,487	1,139	
Sept.	40.03	41.25	8	294	24	195	218	12,958	7,134	14,664	1,795	
Oct.	40.98	41.64	6	225	25	165	188	11,534	7,316	13,991	2,081	
Nov.	41.25	41.70	2	192	19	154	174	10,336	6,938	12,670	2,483	
Dec.	41.25	41.73	5	172	31	150	163	10,015	7,662	21,205	1,763	
Yearly	38.27	41.73		518		150	215	155,443	86,219	156,317	24,573	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	11.66	12.72		14.7		4.2	6.1	191,737	106,350	192,815	30,311	

Ø 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 1981 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 1981.

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, 1978, 1979, 1980, and 1981.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
2	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8	1.8
3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
4	1.8	1.8	1.8	1.8	1.8	0	1.8	1.8	1.8	1.8	1.8	1.8
5	1.8	1.8	1.8	1.8	1.8	.7	1.8	2.1	1.8	1.8	1.8	1.8
6	1.8	1.8	2.5	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
7	1.8	1.8	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0	1.8
8	1.8	1.8	1.8	1.8	1.8	0	1.8	1.8	1.8	1.8	2.1	2.1
9	1.8	1.8	1.8	1.8	1.8	1.4	1.8	1.8	.7	1.8	1.8	1.8
10	1.8	1.8	1.8	1.8	1.8	2.1	1.8	1.8	2.1	1.8	2.1	1.8
11	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
12	3.2	1.8	1.4	1.8	1.8	1.8	2.1	1.8	.7	1.8	1.8	1.8
13	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
14	2.1	1.8	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
15	1.8	1.8	1.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8	1.8	1.8
16	1.8	.7	1.8	1.8	1.8	1.8	0	1.8	1.8	1.8	1.8	1.8
17	1.8	1.8	1.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8	1.8	1.8
18	1.8	0	1.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8	1.8	1.8
19	1.8	2.5	0	1.8	1.8	.7	1.8	1.8	1.8	1.8	1.8	1.8
20	1.8	1.8	1.8	1.8	1.8	0	1.8	2.1	1.8	1.8	1.8	1.8
21	1.8	1.4	0	1.8	1.8	1.8	1.8	1.1	1.8	1.8	1.8	.4
22	1.8	1.8	0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
23	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
24	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	.4
25	1.8	1.8	1.8	2.1	1.8	1.8	2.1	1.8	1.8	1.8	1.8	1.4
26	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0	1.8	1.8	1.8	.7
27	1.8	1.8	1.8	1.8	1.8	2.5	2.1	1.8	1.8	1.8	1.8	.7
28	1.8	1.4	1.8	1.8	1.8	1.8	2.1	0	1.8	1.8	1.8	.7
29	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8	0
30	1.8	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
31	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
Sum	56.2	46.6	50.1	53.3	53.7	47.3	55.8	51.6	51.6	54.7	51.9	38.1
Current Year 1981								Period 1968-1981				
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	3.2	23	1.4	1.8	111	208	520	0	
Feb.			19	2.5	18	0	1.8	92.4	178	311	0	
Mar.			6	2.5	119	0	1.8	99.7	256	871	33.6	
Apr.			25	2.1	11	1.8	1.8	105	241	431	105	
May			11	1.8	5	.7	1.8	106	259	435	46.2	
June			27	2.5	14	0	1.4	94.0	227	409	21.0	
July			15	2.1	16	0	1.8	111	293	528	0	
Aug.			12	2.1	126	0	1.8	102	328	596	102	
Sept.			14	2.1	19	.7	1.8	102	306	549	102	
Oct.			11	1.8	11	1.1	1.8	109	281	507	109	
Nov.			18	2.1	7	0	1.8	103	243	504	103	
Dec.			8	2.1	16	0	1.1	75.6	238	597	75.6	
Yearly				3.2		0	1.8	1,211	3,064	5,359	974	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
			0.09		0	0.05	1,494	3,779	6,610	1,201		

0 Mean daily

1 And other days

WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

DESCRIPTION: During 1981 the only flow to the New River in Mexico was waste from the City of Mexicali Potable Water Plant, which discharges into Rivera Drain and then to New River, and drainage water coming from the Colorado River District system of canals that enter the New River below Laguna Xochimilco.

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 to April 30, 1964; Pueblo Nuevo Wasteway, January 1956 through 1965; and the Potable Water Plant, January 1968 through December 1981.

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 58 of this bulletin.

Monthly Discharge in Acre-Feet

Month	Current Year 1981	Period 1956-1981		
		Average	Maximum	Minimum
January	111	1,162	8,758	15.4
February	92.4	829	7,281	19.6
March	99.7	573	2,610	21.7
April	105	512	3,194	16.1
May	106	345	1,176	9.1
June	94.0	454	5,670	0
July	111	692	10,251	0
August	102	613	4,137	0
September	102	505	3,215	21.0
October	109	673	3,474	8.4
November	103	703	3,784	0
December	75.6	1,120	8,691	0
Yearly	1,211	8,182	27,430	399
	Thousands of Cubic Meters			
	1,494	10,093	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 1981. 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, 227.1 feet (69.2 m) below mean sea level. Minimum elevation during year, 228.3 feet (69.6 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 - 1981

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	228.0	227.8	227.5	227.3	227.1	227.1	227.3	227.5	227.7	228.0	228.3	228.3
2	228.0	227.8	227.5	227.3	227.1	227.1	227.3	227.6	227.7	228.0	228.3	228.3
3	228.0	227.8	227.5	227.3	227.1	227.1	227.3	227.6	227.7	228.1	228.3	228.3
4	228.0	227.8	227.5	227.3	227.1	227.1	227.3	227.6	227.7	228.1	228.3	228.3
5	228.0	227.8	227.5	227.2	227.1	227.4	227.3	227.6	227.7	228.1	228.3	228.2
6	228.0	227.8	227.4	227.3	227.1	227.2	227.4	227.6	227.7	228.1	228.3	228.2
7	228.0	227.8	227.4	227.3	227.1	227.2	227.4	227.6	227.8	228.1	228.3	228.2
8	228.0	227.7	227.4	227.2	227.1	227.1	227.4	227.6	227.8	228.1	228.3	228.2
9	228.0	227.7	227.4	227.2	227.1	227.1	227.4	227.6	227.8	228.1	228.3	228.2
10	228.0	227.7	227.4	227.2	227.1	227.2	227.4	227.6	227.8	228.1	228.3	228.2
11	227.9	227.7	227.4	227.2	227.1	227.2	227.4	227.6	227.8	228.2	228.3	228.2
12	227.9	227.7	227.4	227.2	227.1	227.2	227.4	227.6	227.8	228.2	228.3	228.2
13	227.9	227.7	227.4	227.2	227.1	227.2	227.4	227.6	227.9	228.3	228.3	228.2
14	227.9	227.6	227.4	227.2	227.1	227.2	227.4	227.7	227.9	228.2	228.3	228.2
15	227.9	227.6	227.4	227.2	227.2	227.2	227.4	227.6	227.9	228.2	228.3	228.2
16	227.8	227.6	227.4	227.2	227.2	227.2	227.4	227.6	227.9	228.3	228.3	228.2
17	227.8	227.6	227.4	227.2	227.2	227.2	227.4	227.6	227.9	228.3	228.3	228.2
18	227.8	227.6	227.4	227.2	227.2	227.2	227.4	227.6	227.9	228.3	228.3	228.2
19	227.8	227.6	227.4	227.2	227.2	227.2	227.4	227.7	227.9	228.3	228.3	228.2
20	227.8	227.6	227.4	227.2	227.3	227.2	227.4	227.7	227.9	228.3	228.3	228.2
21	227.8	227.6	227.3	227.2	227.2	227.3	227.4	227.7	227.9	228.3	228.3	228.2
22	227.8	227.6	227.3	227.2	227.2	227.2	227.5	227.7	227.9	228.3	228.3	228.2
23	227.8	227.6	227.3	227.2	227.2	227.2	227.5	227.7	227.9	228.3	228.3	228.2
24	227.8	227.6	227.3	227.1	227.2	227.3	227.5	227.7	227.9	228.3	228.3	228.2
25	227.8	227.6	227.3	227.1	227.2	227.3	227.5	227.7	227.9	228.3	228.3	228.2
26	227.8	227.6	227.4	227.1	227.2	227.2	227.5	227.7	227.9	228.3	228.3	228.2
27	227.8	227.6	227.3	227.1	227.2	227.2	227.5	227.7	228.0	228.2	228.3	228.2
28	227.8	227.6	227.3	227.1	227.2	227.3	227.5	227.7	228.0	228.3	228.3	228.2
29	227.8	227.6	227.3	227.1	227.2	227.3	227.5	227.7	228.0	228.3	228.3	228.2
30	227.8	227.6	227.3	227.1	227.2	227.3	227.5	227.7	228.0	228.2	228.3	228.2
31	227.8	227.6	227.3	227.1	227.2	227.2	227.5	227.7	228.0	228.2	228.3	228.2
Avg.	227.9	227.7	227.4	227.2	227.2	227.2	227.4	227.6	227.9	228.2	228.3	228.2

Month	Current Year 1981		Period 1935-1981			Area and Capacity Table		
	Ø Extreme Elevation Feet		Elevation Feet			Elevation	Area	Capacity
	High	Low	# Average	Maximum	! Minimum	Feet Below M.S.L.	Acres	Acre-Feet
Jan.	227.8	228.0	236.82	227.9	249.3	277.7	0	0
Feb.	227.6	227.8	236.51	227.7	248.8	274.0	20,600	25,700
Mar.	227.3	227.5	236.25	227.4	248.6	270.0	62,900	188,700
Apr.	227.1	227.3	236.05	227.2	248.7	266.0	94,600	510,600
May	227.1	227.3	236.03	227.2	248.5	260.0	122,600	1,170,000
June	227.1	227.3	236.18	227.2	248.8	256.0	134,700	1,684,000
July	227.3	227.5	236.34	227.4	249.1	252.0	148,800	2,250,000
Aug.	227.5	227.7	236.53	227.6	249.4	244.0	179,700	3,562,000
Sept.	227.7	228.0	236.72	227.9	249.4	240.0	196,900	4,315,000
Oct.	228.0	228.3	236.79	228.1	249.8	235.0	221,800	5,360,000
Nov.	228.3	228.3	236.81	228.2	250.0	230.0	235,800	6,504,000
Dec.	228.2	228.3	236.68	228.1	249.6	220.0	262,000	8,993,000
Yearly	227.1	228.3	236.48	227.2	250.0	210.0	288,500	11,740,000
						200.0	315,500	14,760,000

Ø Mean daily

Mean monthly

! Reading near first day of month

CHEMICAL ANALYSES OF WATER SAMPLES

1981

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 downstream 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 1981.

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; (CO₂ plus HCO₃) expressed as CO₂, 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

Alamo River

Jan.																	
Feb.	1					8.1											
Mar.	1	4.05	988	4,380		8.2	64		12.48	10.69	41.76			17.57	24.85		
Apr.	1			6,300													
May	1	4.99	843	5,300		8.2								21.65	31.03		
June																	
July																	
Aug.																	
Sept.	1	5.22	997	5,540		8.0	66		10.33	10.69	40.80			22.69	33.29		
Oct.																	
Nov.																	
Dec.	1	7.97	1,666	8,210		7.9								32.69	52.47		

New River

Jan.	1	5.56	76,000	6,780		7.8	65		11.48	11.51	43.50			16.66	47.95		
Feb.	1	5.51	61,500	6,400		7.7	64		12.48	10.69	41.32			16.24	47.95		
Mar.	1	5.71	77,000	6,350		7.8	67		12.48	10.69	47.85			17.49	47.95		
Apr.	2	6.54	94,300	7,240		7.8	67		12.97	10.69	47.85			17.70	59.24		
May	1	6.61	99,500	8,000		8.1	72		12.48	9.87	56.55			19.75	62.06		
June	1	6.17	77,100	7,030		7.8	70		11.98	9.87	52.20			17.07	53.60		
July	1	6.63	91,700	7,900		7.9	74		9.98	9.87	56.55			19.57	56.42		
Aug.	1	6.01	99,100	7,700		8.1	61		13.97	13.98	43.50			16.66	53.60		
Sept.	1	6.20	80,300	7,480		7.8	68		11.98	10.69	47.85			16.45	56.42		
Oct.																	
Nov.	1	5.36	55,400	6,660		7.6	69		10.98	8.22	43.50			13.74	47.95		
Dec.																	
	11																

** Percent of total cations *** Percent of total anions
 # Sample taken and analyzed by U. S. Geological Survey

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1981

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												
------	--	------	--	------	--	------	--	------	--	------	--	------	--

New River at International Boundary

January		February		April		May		July		August		September		November	
6	7,140	24	6,990	7	6,950	26	7,010	7	7,000	17	6,370	29	6,320	17	6,420
13	6,980	March		14	7,220	June		14	6,950	24	6,400	October		24	6,980
20	7,210	3	7,100	21	7,050	2	6,990	21	7,040	September		6	6,520	December	
27	6,990	10	7,090	28	6,980	9	7,050	28	6,990	2	6,930	13	6,590	1	7,340
February		17	6,990	May		16	6,960	August		8	7,190	20	7,240	8	6,930
3	7,200	24	7,030	4	6,900	23	7,030	4	7,560	15	6,570	November		15	8,900
10	6,900	31	7,010	12	7,060	30	6,900	11	7,800	22	6,150	3	7,650	22	7,740
17	7,010			19	6,950							10	7,500	29	7,140

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 1981.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1981 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: Maximum monthly inflow since 1937, 33,569 acre-feet (41,407,000 m³), February 1980. 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 1981	Period 1937-1981		
		Average	Maximum	Minimum
January	1,216	598	7,472	0
February	1,461	1,858	33,569	8.0
March	3,938	2,254	24,190	19.3
April	1,922	1,303	12,101	3.3
May	258	589	10,544	0
June	454	315	5,719	0
July	13.6	180	3,151	0
August	21.7	105	1,260	0
September	0	60.6	1,070	0
October	96.7	71.8	1,270	0
November	401	152	1,380	0
December	325	447	3,590	4.4
Yearly	10,107.0	7,933	100,006	121
	Thousands of Cubic Meters			
	12,467	9,785	123,356	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 1981.

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: Maximum monthly discharge since 1937, 24,097 acre-feet (29,723,000 m³) March 1980. 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 1981	Period 1937-1981		
		Average	Maximum	Minimum
January	350	106	1,700	0
February	410	634	15,926	0
March	3,678	929	24,097	0
April	1,455	962	12,950	0
May	636	428	10,398	0
June	339	371	7,360	0
July	350	199	2,340	0
August	350	150	1,550	0
September	339	250	5,880	0
October	350	85.5	529	0
November	339	109	1,260	0
December	350	275	5,350	0
Yearly	8,946	4,498	71,416	0
	Thousands of Cubic Meters			
	11,035	5,548	88,091	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 1981. 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: Maximum monthly discharge since 1937, 54,755 acre-feet (67,540,000 m³) February of 1980. 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 1981	Period 1937-1981		
		Average	Maximum	Minimum
January	725	644	3,721	5.2
February	1,388	2,756	54,755	7.6
March	2,159	3,657	36,010	14.1
April	1,373	1,861	21,630	10.2
May	282	719	5,461	0
June	524	290	2,568	0
July	482	188	1,687	0
August	464	107	596	0
September	357	111	759	0
October	328	84.0	645	.1
November	434	144	1,200	0
December	167	444	3,380	1.7
Yearly	8,683	11,005	114,330	129
	Thousands of Cubic Meters			
	10,710	13,575	141,025	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 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	30.7	29.8	30.3	24.7	0	30.3	33.0	32.0	32.2	30.5	30.1	31.1
2	30.7	29.8	30.5	24.7	0	30.3	33.0	32.0	32.0	30.5	30.5	31.1
3	30.7	29.8	30.7	24.7	0	30.3	33.0	32.0	32.0	30.5	30.5	31.1
4	30.5	29.8	30.7	24.7	0	30.3	33.0	32.0	32.0	30.5	30.5	31.1
5	30.5	29.8	.40	24.7	0	30.5	33.0	32.0	31.7	30.5	30.5	0
6	30.5	29.8	0	24.7	0	30.5	33.0	32.0	31.5	30.3	30.5	0
7	30.5	29.8	0	24.9	0	30.5	33.0	32.0	31.5	30.3	30.5	0
8	30.5	29.8	0	24.9	0	30.5	33.0	32.0	31.3	30.3	30.7	0
9	30.3	30.1	0	24.9	0	30.5	33.0	32.0	31.3	30.3	30.7	0
10	30.3	30.1	0	24.9	9.02	30.5	33.0	32.0	31.1	30.3	30.7	0
11	30.3	30.1	0	24.9	13.3	30.5	33.0	32.0	31.1	30.3	30.7	0
12	30.1	29.8	0	24.9	17.8	30.5	33.0	32.0	31.1	30.3	30.7	0
13	30.1	30.1	0	25.3	24.7	30.7	33.2	32.0	30.9	30.3	30.7	0
14	30.1	30.1	0	0	29.6	30.7	33.4	32.0	30.9	30.1	30.7	0
15	30.1	30.1	0	0	29.6	30.7	33.7	31.7	30.9	29.8	30.7	0
16	30.1	30.1	0	0	29.6	30.7	33.9	31.5	30.9	30.9	30.7	0
17	30.1	30.1	11.9	0	29.6	30.5	33.7	31.3	30.9	32.0	30.5	0
18	30.1	30.1	16.2	0	29.6	30.5	33.4	31.3	30.9	30.1	30.5	0
19	30.1	30.1	19.5	0	29.6	30.5	33.4	31.1	30.9	30.1	30.5	0
20	30.1	30.1	22.7	0	29.6	30.3	33.0	30.9	30.9	30.1	30.5	0
21	30.1	30.3	22.7	0	29.6	30.3	32.6	30.9	30.9	30.1	30.5	0
22	30.1	30.3	22.7	0	29.6	30.3	32.4	30.9	30.9	30.1	30.7	0
23	30.1	30.3	22.7	0	29.6	30.1	32.2	30.9	31.1	30.1	30.7	0
24	30.1	30.3	24.5	0	29.6	33.0	32.2	30.9	31.1	30.1	30.7	0
25	30.1	30.3	24.5	0	29.8	33.0	32.0	17.6	30.9	30.1	30.9	0
26	30.1	30.3	24.5	0	29.6	33.0	32.0	22.3	30.7	30.1	30.9	0
27	29.8	30.3	24.5	0	29.8	33.0	32.0	27.1	30.7	30.3	30.9	0
28	29.8	30.3	24.5	0	29.8	33.0	32.0	27.1	30.7	30.3	30.9	0
29	29.8		24.7	0	29.8	33.0	32.0	26.9	30.5	30.3	31.1	0
30	29.8		24.7	0	30.1	33.0	32.0	26.9	30.5	30.3	31.1	0
31	29.8		24.7		30.1		32.0	26.9		30.5		0
Sum	936.0	841.7	457.60	322.9	599.42	931.5	1,017.1	934.2	934.0	940.3	919.8	124.4
Current Year 1981								Period 1937-1981				
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	30.7	127	29.8	30.2	1,857	359	2,350	0	
Feb.			121	30.3	1 1	29.8	30.1	1,669	360	2,130	0	
Mar.			1 3	30.7	1 6	0	14.8	908	494	2,330	0	
Apr.			13	25.3	114	0	10.8	640	761	2,860	0	
May			130	30.1	1 1	0	19.3	1,189	888	3,040	0	
June			124	33.0	23	30.1	31.0	1,848	945	2,920	0	
July			16	33.9	125	32.0	32.8	2,017	800	2,920	0	
Aug.			1 1	32.0	25	17.6	30.1	1,853	719	2,820	0	
Sept.			1 1	32.2	129	30.5	31.1	1,853	509	2,320	0	
Oct.			17	32.0	15	29.8	30.3	1,865	421	2,450	0	
Nov.			129	31.1	1 1	30.1	30.7	1,824	506	2,760	0	
Dec.			1 1	31.1	1 5	0	4.0	247	442	2,305	0	
Yearly				33.9		0	24.5	17,770	7,204	27,170	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				0.96		0	0.69	21,919	8,886	33,514	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. Spillway discharges have occurred in May 1943, March, April 1979, and January to May of 1980. 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 1981. 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: Maximum monthly discharge since 1937, 70,318 acre-feet (86,737,000 m³) February 1980. 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 1981	Period 1937-1981		
		Average	Maximum	Minimum
January	0	15.3	590	0
February	0	1,586	70,318	0
March	1,983	2,016	60,278	0
April	1,211	1,425	33,400	0
May	0	465	11,702	0
June	0	201	7,738	0
July	0	97.2	4,306	0
August	0	35.5	1,535	0
September	0	7.7	298	0
October	0	3.7	123	0
November	0	1.1	19.8	0
December	0	1.2	21.0	0
Yearly	3,194	5,855	172,679	0
	Thousands of Cubic Meters			
	3,940	7,222	212,998	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. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1981.

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 1981 there were releases or spills to the natural channel of Cottonwood Creek at Barrett Dam, the lowermost dam in Cottonwood Creek Basin.

EXTREMES: Maximum discharge 11,700 second-feet (331 m³/sec) February 21, 1980 (gage height 11.15 feet) (3.40 m). Minimum discharge, no flow during part of each year.

FOR MEAN DAILY DISCHARGES, SEE STATION NO. 11012000 IN U. S. GEOLOGICAL SURVEY PUBLICATION

"WATER RESOURCES DATA FOR CALIFORNIA, VOLUME 1", WATER YEARS 1981 AND 1982.

CAMPO CREEK NEAR CAMPO, CALIFORNIA

DESCRIPTION: Water-stage recorder and broad-crested weir on left bank, 0.5 mile (0.8 km) upstream from the international land boundary between the United States and Mexico, just upstream from the bridge on California State Highway 94, 3.5 miles (5.6 km) southwest of Campo, California. Zero of gage is 2,178.92 feet (664.13 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements and observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1981.

REMARKS: Campo Creek originates in the United States and flows southwestward into Mexico where it joins Tecate Creek. The flow at this station was partially regulated by a small conservation reservoir, 1 mile (1.6 km) upstream, from August 1956 to February 20, 1980, when it was destroyed by a flood.

EXTREMES: Maximum discharge 880 second-feet (24.9 m³/sec), February 6, 1937 (gage height 4.80 feet (1.46 m) present datum), from rating curve extended above 110 second-feet (3.12 m³/sec) on basis of velocity-depth relation and cross-section area at the control. Minimum discharge, no flow during part of most years.

FOR MEAN DAILY DISCHARGES, SEE STATION NO. 11012500 IN U. S. GEOLOGICAL SURVEY PUBLICATION

"WATER RESOURCES DATA FOR CALIFORNIA, VOLUME 1", WATER YEARS 1981 AND 1982.

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. This station is published by the U. S. Geological Survey under the name "Tijuana River near Dulzura, California." 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 1981.

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 Marron Dam site.

EXTREMES: Maximum discharge, 12,200 second-feet ($346 \text{ m}^3/\text{sec}$) estimated, February 21, 1980 (gage height 10.66 feet) (3.25 m) from rating curve extended above 200 second-feet ($5.66 \text{ m}^3/\text{sec}$) on basis of hydrographic comparison with upstream station; maximum gage height, 11.19 feet (3.41 m) February 18, 1980; minimum discharge, no flow for part of most years.

FOR MEAN DAILY DISCHARGES, SEE STATION NO. 11013000 (TIJUANA RIVER NEAR
DULZURA, CA) IN U. S. GEOLOGICAL SURVEY PUBLICATION, "WATER RESOURCES
DATA FOR CALIFORNIA, VOLUME 1", WATER YEARS 1981 AND 1982.

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 de 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 1981. 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, 157,453 acre-feet (194,216,000 m³); February 1980; minimum, no flow during part of most years.

Monthly Discharge in Acre-Feet

Month	Current Year 1981			Period 1938-1981		
	Natural Inflow	*Otay Aqueduct	Total	Average	Maximum	Minimum
January	1,845	0	1,845	2,179	54,820	0
February	2,267	0	2,267	6,030	157,453	5.8
March	6,571	0	6,571	8,217	68,321	4.2
April	1,190	0	1,190	3,043	77,790	0
May	5.0	0	5.0	593	11,460	0
June	0	0	0	169	4,661	0
July	0	0	0	104	1,464	0
August	0	0	0	64.5	770	0
September	2.4	0	2.4	61.3	466	0
October	.6	0	.6	70.3	344	0
November	149	0	149	160	1,940	0
December	48.2	0	48.2	775	15,686	8.4
Yearly	12,078	0	12,078	21,469	309,298	254
	Thousands of Cubic Meters					
	14,898	0	14,898	26,482	381,515	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 1981 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 1981.

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 1981	Period 1938-1981		
		Average	Maximum	Minimum
January	750	237	782	1.5
February	727	253	1,132	.8
March	790	306	1,223	0
April	816	419	1,602	0
May	908	559	1,676	1.8
June	950	647	1,857	1.9
July	984	686	1,963	1.9
August	996	610	1,859	0
September	947	510	1,420	1.9
October	953	444	1,187	1.9
November	908	353	1,037	1.9
December	878	316	981	0
Yearly	10,607	5,341	15,317	29.3
	Thousands of Cubic Meters			
	13,084	6,588	18,893	36.2

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on top of north levee about 0.7 mile (1.1 km) downstream (north) from boundary, 1.1 miles (1.8 km) upstream from the new Dairy Mart Road bridge, and 1.4 miles (2.3 km) west of the international gate at San Ysidro, California. Zero of the gage is 38.04 feet (11.59 m) above mean sea level, U. S. C. & G. S. datum. The gage silted in on February 22, 1980. The U. S. Geological Survey installed a water-stage recorder on the upstream right wing wall of Dairy Mart Road bridge on June 17, 1980. The upper gage was used again on December 19, 1980.

RECORDS: Based on current meter measurements, staff gage readings and a partial record of gage heights. Records obtained and furnished by the United States Section of the Commission. Stages were furnished by the U.S. Geological Survey from June 17 to December 19, 1980. Records available: May 1947 through 1981.

EXTREMES: Since May 1947: Maximum instantaneous discharge, 33,100 second-feet (937 m³/sec), February 21, 1980; minimum discharge, no flow during many years since 1951.

Mean Daily Discharge in Second-Feet 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.2	34.3	201	50.3	9.6	1.6	2.3	0.5	1.0	0.6	0.6	2.4
2	11.5	36.5	226	55.8	7.0	2.1	3.0	.6	2.9	2.4	.6	2.5
3	9.2	29.0	116	59.2	6.5	2.4	2.9	.6	1.4	1.8	.6	2.2
4	10.0	24.4	76.6	49.4	4.5	2.7	.2	.6	.8	1.8	.5	2.2
5	10.5	24.4	222	39.5	4.5	2.4	.2	.1	1.4	2.4	.5	2.0
6	15.2	24.8	220	30.6	.8	2.4	.6	0	1.4	1.4	.3	1.9
7	14.8	24.8	124	24.5	.6	2.1	.6	.8	2.1	2.1	.3	1.9
8	17.0	30.4	87.1	23.8	1.1	1.6	.5	.7	1.8	2.0	1.2	1.9
9	15.6	53.6	68.5	21.7	1.4	2.6	1.4	1.4	.8	2.1	3.4	1.8
10	17.0	128	67.4	19.2	8.8	2.3	.6	1.1	.5	2.4	2.4	1.6
11	17.8	79.0	53.2	18.0	13.3	2.1	.3	.6	.5	3.6	1.1	1.5
12	19.8	51.5	41.3	17.4	8.8	2.4	.5	.6	.5	4.4	.8	1.6
13	22.8	47.2	39.6	17.4	4.3	4.0	1.1	.3	.5	2.7	1.1	1.6
14	19.2	36.7	58.8	15.0	3.0	5.5	1.2	.3	.8	5.1	.8	1.5
15	22.0	27.9	51.5	15.0	4.6	2.7	.9	1.8	.6	3.4	.8	1.5
16	20.8	21.6	35.9	15.6	3.7	2.7	.5	1.1	.2	3.7	.8	1.5
17	17.6	15.5	29.4	18.0	4.0	2.4	.5	1.0	.8	1.4	1.1	1.5
18	18.4	13.6	34.3	18.3	1.9	2.7	1.1	.8	.6	1.1	1.8	1.6
19	17.3	13.6	63.0	25.2	2.7	2.7	.8	.2	.6	.5	1.8	1.5
20	18.0	13.6	118	25.9	2.9	1.8	.5	0	.8	.5	1.8	1.3
21	18.0	11.4	111	21.1	4.0	2.4	.5	0	.6	.6	3.4	1.4
22	17.3	11.8	94.4	16.2	4.0	2.1	1.1	0	3.7	.5	3.7	1.1
23	17.0	11.8	78.4	15.0	2.4	2.4	1.1	0	1.1	.3	6.7	1.1
24	16.6	11.4	65.2	12.6	2.4	2.4	.5	1.8	.3	.3	3.1	1.0
25	17.0	26.7	50.4	9.6	2.1	1.1	.1	.8	.5	.6	2.0	1.0
26	17.6	27.8	43.1	7.5	2.4	.6	0	.8	.3	.6	1.5	1.0
27	16.9	27.8	58.1	8.0	3.4	1.1	0	.6	.8	.6	18.1	1.0
28	34.2	23.3	66.3	11.4	5.5	.8	.5	.6	1.8	.8	24.4	1.0
29	36.6		74.0	11.4	3.7	1.4	.1	1.1	.8	3.7	8.8	1.0
30	40.3		69.6	13.2	2.7	2.4	.7	.6	.3	1.8	2.5	8.7
31	34.8		59.0		3.0		.5	.8		1.1		3.0
Sum	592.0	882.4	2,703.1	685.8	129.6	67.9	24.8	20.2	30.2	56.3	96.5	56.8
Current Year 1981									Period 1947-1981			
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.	41.03	39.56	29	113	3	8.5	19.1	1,174	2,801	72,441	0	
Feb.	41.81	39.98	25	194	121	10.5	31.5	1,750	9,655	315,328	0	
Mar.	43.51	40.25	1	503	1	22.2	87.2	5,362	6,107	126,292	0	
Apr.	41.33	40.26	2	106	26	6.5	22.9	1,360	1,869	39,217	0	
May	40.57	40.10	11	22.4	6	0	4.2	257	865	27,027	0	
June	40.45	40.04	10	18.0	1	0	2.3	135	268	8,144	0	
July	40.35	40.16	30	4.5	4	0	.8	49.2	121	3,360	0	
Aug.	40.38	40.19	24	6.0	5	0	.7	40.1	81.1	1,720	0	
Sept.	40.44	40.23	2	6.0	110	0	1.0	59.9	48.8	561	0	
Oct.	40.55	40.28	14	9.6	119	0	1.8	112	54.9	320	0	
Nov.	41.88	40.31	27	170	5	.3	3.2	191	128	1,084	0	
Dec.	40.87	39.45	30	46.5	122	.9	1.8	113	293	2,725	0	
Yearly	43.51	39.45		503		0	14.6	10,603	22,292	595,739	0	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	13.26	12.02		14.2		0	0.41	13,079	27,497	734,838	0	

! And other days

TIJUANA RIVER NEAR NESTOR, CALIFORNIA

DESCRIPTION: Water-stage recorder on Hollister Street 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 1981 (October 1922 through May 1936 are from city of San Diego, California.) The International Boundary and Water Commission provided gage height record and 6 discharge measurements for the period January 1 through March 31, 1981.

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, 33,500 second-feet (949 m³/sec), February 21, 1980 (gage height 8.70 feet (2.65 m)), affected by channel outbreak; maximum gage height 11.50 feet (3.51 m) January 30, 1980, prior to channel outbreak and major river movement caused by February floods; minimum discharge, no flow during parts of most years.

FOR MEAN DAILY DISCHARGES, SEE STATION NO. 11013500 IN U. S. GEOLOGICAL SURVEY PUBLICATION

"WATER RESOURCES DATA FOR CALIFORNIA, VOLUME 1", WATER YEARS 1981 AND 1982.

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 Dams, 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 BASIN RESERVOIRS (Capacity 206,850)	
	1981	Average 1937-1981	1981	Average 1937-1981	1981	Average 1937-1981	1981	Average 1937-1981
Jan.	49,484	15,153	35,245	11,313	68,336	30,521	153,065	56,987
Feb.	50,282	16,291	35,245	12,676	68,896	31,485	154,423	60,452
Mar.	50,328	17,484	38,060	14,667	69,828	35,692	158,216	67,843
Apr.	50,282	17,620	38,796	15,204	75,021	35,825	164,099	68,649
May	49,288	17,497	38,224	14,781	74,681	35,675	162,193	67,953
June	48,367	17,079	36,741	14,032	72,978	34,661	158,086	65,772
July	46,659	16,642	35,043	13,236	71,059	33,599	152,761	63,477
Aug.	45,304	16,224	33,497	12,473	68,784	32,595	147,585	61,292
Sept.	43,863	15,731	31,947	12,117	66,657	31,728	142,467	59,576
Oct.	42,750	15,482	30,526	11,729	64,730	30,987	138,006	58,198
Nov.	42,407	15,391	29,311	11,369	62,911	30,466	134,629	57,226
Dec.	42,112	15,466	29,437	11,582	61,582	30,638	133,131	57,686
Average	46,760	16,338	34,339	12,932	68,789	32,822	149,888	62,092
Maximum	50,328	# 61,670	38,796	* 45,920	75,021	109,608	164,099	213,600
Minimum	42,112	10	29,311	106	61,582	0	133,131	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 78.

In United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California		Sawday Ranch, California	
	1981	Average 1906-1981	1981	Average 1907-1981	1981	Average 1951-1981	1981	Average 1914-1981	1981	Average 1950-1981
Jan.	1.45	3.82	1.51	3.44	1.60	2.95	1.14	3.45	1.11	3.40
Feb.	3.22	3.78	2.84	3.45	2.40	2.23	2.44	3.67	3.69	2.90
Mar.	5.92	3.44	5.79	3.08	5.30	2.67	4.76	3.12	5.50	3.15
Apr.	.94	1.72	.80	1.56	1.00	1.33	1.17	1.76	.88	1.60
May	.34	.63	.25	.56	.10	.41	.18	.63	.27	.46
June	0	.13	0	.07	0	.06	0	.10	0	.05
July	.11	.34	0	.11	0	.03	0	.19	.92	.46
Aug.	.18	.50	.42	.21	0	.13	.04	.20	.71	.66
Sept.	0	.37	0	.25	0	.28	.54	.28	.05	.40
Oct.	.84	.87	.40	.70	.30	.41	.50	.73	.28	.53
Nov.	2.04	1.56	1.72	1.37	1.50	1.46	1.78	1.49	2.07	1.68
Dec.	.94	3.14	.79	2.78	1.00	2.08	.77	3.00	.54	2.28
Yearly	15.98	20.30	14.52	17.58	13.20	14.04	13.32	18.62	16.02	17.57

Month	Campo, California		Chula Vista, California		Lower Otay Dam, California		Brown Field, California			
	1981	Average 1900-1981	1981	Average 1930-1981	1981	Average 1906-1981	1981	Average 1964-1981		
Jan.	0.91	3.05	1.03	1.85	1.21	2.20	0.68	1.85		
Feb.	2.64	3.27	.79	1.69	1.23	1.53	1.31	1.40		
Mar.	4.22	2.77	4.03	1.61	3.57	2.08	2.14	1.98		
Apr.	.80	1.42	.53	.82	.85	1.08	.45	1.01		
May	.10	.52	.09	.24	.15	.32	.08	.24		
June	0	.06	0	.05	0	.07	0	.06		
July	.05	.50	.01	.02	0	.03	.02	.05		
Aug.	.03	.48	0	.09	0	.11	0	.14		
Sept.	.31	.34	.02	.17	0	.21	0	.16		
Oct.	.19	.63	.20	.40	.39	.34	.30	.33		
Nov.	1.35	1.34	1.05	1.03	1.20	1.27	1.07	1.42		
Dec.	.03	2.46	.44	1.59	.58	1.42	.69	1.63		
Yearly	10.63	16.84	8.19	9.56	9.18	10.66	6.74	10.27		

In Mexico

Month	La Rumorosa, Baja California		Valle Redondo, Baja California		Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California	
	1981	Average 1945-1981	1981	Average 1971-1981	1981	Average 1946-1959 1961-1981	1981	Average 1948-1959 1961-1981	1981	Average 1938-1981
Jan.	*	0.94	1.65	2.91	0.71	2.72	0.83	1.81	0.71	1.65
Feb.	*	.51	1.97	2.56	2.64	1.81	1.97	1.50	1.81	1.42
Mar.	*	.51	4.72	2.52	3.98	2.28	2.48	1.54	2.83	1.54
Apr.	*	.31	.55	.94	1.22	1.10	.43	.67	.28	.75
May	*	.12	.12	.39	.16	.31	.04	.20	.04	.16
June	0	.04	0	.04	0	.12	0	.04	0	T
July	0	.31	0	.04	0	.12	0	.04	0	T
Aug.	0	.71	0	.16	0	.16	0	.04	0	.12
Sept.	.12	.31	0	.35	.08	.12	T	.16	.04	.24
Oct.	.31	.39	.24	.63	.35	.35	.12	.31	T	.31
Nov.	.67	.51	1.89	1.57	1.57	1.22	1.06	1.02	1.30	.87
Dec.	0	.71	1.06	1.42	.91	2.01	.31	1.26	.20	1.50
Yearly		5.31	12.20	13.23	11.61	13.07	7.24	8.62	7.20	8.50

* No record

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

In Mexico

Month	Valle de las Palmas, Baja California		P. B. Rosarito, Baja California		El Pinal, Baja California		San Juan de Dios, Baja California		El Hongo, Baja California		El Carrizo, Baja California	
	1981	Average 1948-1981	1981	Average 1967-1981	1981	Average 1964-1981	1981	Average 1956-1981	1981	Average 1980-1981	1981	Average 1980-1981
	Jan.	1.18	1.73	0.94	2.09	2.01	3.15	1.34	2.56	0.71		1.18
Feb.	1.50	1.30	1.81	1.93	3.23	3.50	2.17	2.68	2.60		1.81	
Mar.	2.80	1.38	2.83	1.69	4.92	3.43	3.54	2.24	3.50		3.43	
Apr.	.47	.59	.31	.71	1.46	1.73	.87	.94	.67	1.18	.39	0.87
May	.04	.12	.08	.35	.16	.47	.08	.28	.08	.47	.08	.28
June	0	.04	0	.04	0	.04	0	.12	T	T	0	
July	0	.04	0	0	T	.59	1.14	1.06	.04	.24	T	
Aug.	0	.12	0	.08	.04	.63	1.02	.87	.28	.39	T	T
Sept.	.08	.20	T	.16	.08	.71	1.26	.55	.12	.08	T	T
Oct.	.08	.20	.12	.35	.28	.39	.16	.59	.24	.24	.20	.16
Nov.	1.02	.75	1.46	.87	2.56	1.81	2.13	1.30	1.57	.79	.98	.47
Dec.	.16	1.02	.79	1.14	.83	2.87	.67	1.89	T	.16	1.18	.94
Yearly	7.32	7.64	8.35	9.06	15.55	19.33	14.37	16.38	9.80		9.25	

T Trace

LOCATION OF RAINFALL STATIONS ON THE TIJUANA RIVER WATERSHED

In United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	Ø 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	Archie 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	Ø ELEV. (FT.)	RECORD BEGAN	OBSERVER
El Carrizo, Baja California	32° 29'	116° 42'	1,624	1980	* S. A. R. H.
El Hongo, Baja California	32° 31'	116° 18'	3,150	1980	S. A. R. H.
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.
P. B. Rosarito, Baja California	32° 18'	117° 02'	72	1967	S. A. R. H.
Rodriguez Dam, Baja California	32° 26'	116° 54'	459	1938	S. A. R. H.
San Juan de Dios, Baja California	31° 59'	116° 00'	3,986	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'	459	1948	S. A. R. H.
Valle Redondo, Baja California	32° 31'	116° 45'	794	1971	S. A. R. H.

Ø Elevation above mean sea level

Estimated from topographic maps

T Trace

* 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 78 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 1981, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.
2. Chula Vista: September 1918 through 1981, 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 1981, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.
4. Lower Otay Dam: January 1950 through 1981, 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	
	1981	Average 1916-1981	1981	Average 1921-1981	1981	Average 1919-1981	1981	Average 1950-1981
Jan.	2.16	2.14	1.85	1.88	2.79	2.84	2.28	1.88
Feb.	1.75	2.17	2.46	2.22	4.02	3.37	2.65	2.32
Mar.	1.48	3.36	2.43	3.42	4.63	4.99	2.84	3.36
Apr.	3.56	4.71	4.37	4.74	6.06	5.98	4.20	4.62
May	4.34	6.54	5.54	6.71	6.72	6.83	5.18	6.08
June	7.38	8.52	8.74	8.31	8.12	6.97	8.43	6.88
July	7.84	9.80	8.90	9.85	8.32	7.61	8.86	8.37
Aug.	6.62	9.07	8.65	9.25	8.02	7.35	7.87	7.89
Sept.	4.76	7.25	6.64	7.55	6.58	6.12	6.49	6.49
Oct.	3.68	5.09	3.93	5.30	5.38	4.92	4.22	4.72
Nov.	3.20	3.36	2.77	3.33	3.42	3.63	3.22	2.86
Dec.	2.14	2.40	2.34	2.07	2.50	2.78	2.00	2.17
Yearly	48.91	64.41	58.62	64.63	66.56	63.39	58.24	57.64

In Mexico

Month	Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de las Palmas, Baja California		San Juan de Dios, Baja California		Valle Redondo, Baja California		El Carrizo, Baja California	
	1981	Average 1952-1959 1961-1981	1981	Average 1939-1942 1946-1981	1981	Average 1952-1981	1981	Average 1956-1981	1981	Average 1976-1981	1981	Average 1980-1981
Jan.	2.95	3.07	2.36	4.41	3.50	3.50	2.52	2.68	5.71	3.46	4.57	
Feb.	4.41	3.54	3.66	4.69	4.25	3.50	*	2.76	4.09	3.19	5.71	
Mar.	*	3.94	2.95	4.69	3.74	4.88	*	4.13	4.57	3.90	4.80	
Apr.	*	4.84	4.92	5.67	5.94	6.30	5.63	4.96	4.88	5.43	6.73	6.61
May	*	5.75	5.47	4.92	7.68	7.52	7.36	6.69	*	6.69	8.54	6.93
June	*	5.83	8.66	7.83	10.94	9.25	10.59	8.11	10.83	10.43	13.90	
July	*	6.77	8.35	8.78	10.16	10.71	9.41	9.02	11.34	10.39	12.09	
Aug.	*	7.17	7.80	8.07	9.69	9.84	9.33	8.23	10.79	9.72	10.63	10.63
Sept.	*	5.83	6.06	6.81	7.36	8.39	6.73	7.64	9.25	7.09	9.72	9.37
Oct.	*	4.80	4.92	5.67	5.35	6.14	4.72	5.31	5.31	4.65	8.11	10.51
Nov.	*	3.54	3.15	4.69	3.86	4.45	4.61	3.78	5.08	3.78	6.89	7.01
Dec.	*	3.03	2.32	3.66	2.76	3.86	3.31	3.23	3.11	2.80	4.80	5.75
Yearly		57.13	60.63	70.28	75.24	77.87		60.71		73.46	96.50	

* No record

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 78 in this bulletin.

In the United States

Month	Barrett Dam, California				Campo, California				Chula Vista, California			
	1981			Average 1931- 1981	1981			Average 1951- 1981	1981			Average 1931- 1981
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	54.7	77	33	48.8	50.8	79	23	47.0	56.8	73	40	52.8
Feb.	54.9	84	32	50.6	52.3	85	25	48.2	58.5	81	40	54.1
Mar.	53.3	78	38	53.1	50.8	80	31	49.4	56.9	68	45	55.4
Apr.	59.9	87	39	57.5	57.0	87	31	53.1	60.5	78	46	58.0
May	63.1	90	44	62.5	60.4	90	33	58.2	63.1	72	50	60.6
June	75.7	104	54	68.5	72.3	102	41	65.2	68.6	95	58	63.2
July	78.2	103	52	76.1	74.7	100	44	73.3	70.8	82	63	66.9
Aug.	79.7	107	52	76.1	76.4	106	38	73.1	71.0	85	64	68.4
Sept.	74.2	99	52	72.3	70.1	98	38	68.9	68.8	84	60	67.2
Oct.	61.7	88	38	64.1	57.9	88	26	60.7	62.5	79	48	63.0
Nov.	59.2	85	38	55.9	55.1	83	29	52.6	59.5	82	46	58.1
Dec.	54.8	83	30	50.6	51.5	81	21	48.0	56.2	73	41	54.4
Yearly	64.1	107	30	61.3	60.8	106	21	58.1	62.8	95	40	60.2

Month	Potrero, California				Average 1975- 1981							
	1981											
	Mean	Max.	Min.									
Jan.	53.7	86	27	51.3								
Feb.	55.0	87	28	51.9								
Mar.	53.2	80	32	51.2								
Apr.	59.5	90	38	55.7								
May	62.4	94	38	60.5								
June	76.4	104	48	71.1								
July	77.9	105	52	76.6								
Aug.	79.3	108	50	75.0								
Sept.	73.7	104	44	72.5								
Oct.	60.6	92	31	64.9								
Nov.	58.9	90	32	57.3								
Dec.	54.0	84	26	52.9								
Yearly	63.7	108	26	61.7								

In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1981		1946-1981		1981		1946-1981		1981		1948-1981	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.			81	5	79	30	100	16	82	36	93	27
Feb.			82	10	86	32	100	18	86	36	102	32
Mar.			88	16	84	37	97	23	75	39	93	34
Apr.			91	23	90	37	100	28	86	48	97	34
May			97	27	91	39	100	36	86	48	100	43
June	99	54	113	34	106	48	106	32	106	57	108	41
July	95	59	104	39	106	52	115	36	99	61	120	46
Aug.	95	55	102	46	108	46	113	34	99	63	106	52
Sept.	90	52	104	34	99	46	115	36	97	59	120	46
Oct.	75	34	95	25	90	32	106	27	90	46	117	41
Nov.	75	34	95	14	88	32	97	27	91	46	108	34
Dec.	68	34	84	10	86	27	97	23	82	41	99	25
Yearly			113	5	108	27	115	16	106	36	120	25

TEMPERATURE IN THE TIJUANA RIVER BASIN IN DEGREES FAHRENHEIT

In Mexico

Month	Rodriguez Dam, Baja California				Valle de las Palmas, Baja California				P. B. Rosarito, Baja California			
	1981		1938-1981		1981		1948-1981		1981		1967-1981	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	79	39	90	27	77	32	91	12	77	45	93	36
Feb.	90	41	93	32	90	30	99	23	81	45	90	36
Mar.	77	43	90	32	79	37	100	28	68	48	90	34
Apr.	86	45	93	36	91	39	104	32	88	50	88	43
May	88	48	100	37	95	43	108	36	84	54	104	43
June	104	55	108	46	108	50	118	39	102	61	104	43
July	99	59	104	46	109	46	120	45	81	61	90	50
Aug.	99	61	106	50	111	50	111	41	82	63	91	50
Sept.	99	57	109	48	104	50	117	43	79	59	108	48
Oct.	90	45	108	34	91	37	109	32	88	52	100	43
Nov.	93	43	99	30	90	37	100	19	91	50	97	32
Dec.	81	41	93	27	82	30	95	21	73	46	90	36
Yearly	104	39	109	27	111	30	120	12	102	45	108	32

Month	El Pinal, Baja California				San Juan de Dios, Baja California				Valle Redondo, Baja California			
	1981		1964-1981		1981		1956-1981		1981		1974-1981	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	77	25	77	3	72	19	88	3	90	34	90	21
Feb.	75	21	81	14	77	21	84	16	86	36	95	23
Mar.	77	27	82	19	72	25	84	14	73	36	90	27
Apr.	77	30	82	18	79	27	102	19	88	39	95	32
May	82	32	90	25	82	25	91	19	93	43	102	39
June	91	43	99	28	100	37	106	28	108	54	113	41
July	91	43	102	32	93	45	120	36	108	54	111	50
Aug.	97	32	104	32	99	39	106	32	109	55	111	48
Sept.	91	36	102	25	90	37	106	25	93	46	115	45
Oct.	77	23	95	23	81	21	100	18	86	46	115	39
Nov.	82	23	88	14	75	21	99	12	95	37	97	28
Dec.	72	25	79	10	77	21	88	12	84	32	91	30
Yearly	97	21	104	3	100	19	120	3	109	32	115	21

Month	El Hongo, Baja California				El Carrizo, Baja California							
	1981		1980-1981		1981		1980-1981					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.	70	32			79	37						
Feb.	75	25			88	39						
Mar.	73	30			73	43						
Apr.	86	34			90	43						
May	88	39			93	46						
June	100	48			106	54						
July	99	52			102	52						
Aug.	102	52			102	52						
Sept.	93	48			97	54						
Oct.	82	36			91	43						
Nov.	79	34	82	34	88	41						
Dec.	73	30	73	30	86	41						
Yearly	102	25			106	37						

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

1981

The total area within the 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 Tijuana River Valley Association 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 1981 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	0	0	0
Morena Dam to Barrett Dam	133	0	133	0	0	0
above Barrett Dam	247	0	247	0	0	0
below Barrett Dam and above Tecate Creek	65	0	65	0	0	0
above Tecate Creek	312	0	312	0	0	0
Campo Creek above International Boundary	82	4	86	0	0	0
Tecate Creek above International Boundary (not including Campo Creek)	19	64	83	0	0	0
Cottonwood Creek above International Boundary Station	413	68	481	100	0	100
Rio de las Palmas above Rodriguez Dam	7	981	988	0	(a) 0	0
Tijuana River above Nestor Gaging Station	458	1,266	1,724			
above the Mouth	462	1,269	1,731	500	(b) 0	500

(a) Areas in upper valleys may be irrigated by pumping from ground water.

(b) There was no irrigation in 1981 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 1981 (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-Foot 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	12	44	0.18	0	0	0
2	0	0	0	0	0	0	.05	12	0	0	0	0
3	0	0	.34	0	0	0	0	37	.52	5.9	0	0
4	0	0	1.4	0	0	0	0	71	.06	.23	0	0
5	0	0	0	0	0	0	0	49	0	1.0	0	0
6	0	0	0	0	0	0	0	27	0	1.4	0	0
7	0	0	0	0	0	0	0	17	0	0	0	0
8	0	0	0	0	0	0	0	13	0	0	0	0
9	0	0	0	0	0	0	0	11	0	0	0	0
10	0	0	0	0	0	0	12	15	0	0	0	0
11	0	0	0	0	0	0	3.3	35	0	0	0	0
12	0	0	0	0	0	0	0	6.4	0	0	0	0
13	0	0	0	0	0	0	.04	4.9	0	0	0	0
14	0	0	0	0	0	0	19	4.1	0	0	0	0
15	0	0	0	0	0	0	29	3.6	0	0	0	0
16	0	0	0	0	0	0	3.2	3.1	0	0	0	0
17	0	0	0	0	0	0	3.5	2.4	0	0	0	0
18	0	0	0	0	0	0	0	1.9	0	0	0	0
19	0	0	0	0	0	0	272	2.3	0	0	0	0
20	0	0	0	0	0	0	36	2.6	0	0	0	0
21	0	0	0	0	0	0	3.3	1.0	0	0.02	0	0
22	0	0	0	0	0	0	12	.13	0	0.02	0	0
23	0	0	0	0	0	0	0	.10	0	0	0	0
24	0	0	0	0	0	0	0	.05	30	0	0	0
25	0	0	0	0	0	0	0	0	10	0	0	0
26	0	0	0	0	0	0	13	0	5.0	0	0	0
27	0	0	0	0	0	0	3.0	0	1.0	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	28	0	0	0	0	0	0
31	0	0	0	0	0	0	16.1	0	0	0	0	0
Sum	0	0	1.74	0	0	28	582.39	363.58	46.76	8.57	0	0
Current Year 1981										Period 1936-1981		
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.				0		0	0	38.3	451	0		
Feb.				0		0	0	18.8	132	0		
Mar.	4.47		4	3.6	1	0	.06	3.5	27.3	295	0	
Apr.				0		0	0	0	18.7	173	0	
May				0		0	0	0	13.7	138	0	
June	5.69		30	77	1	0	.93	55.5	119	1,590	0	
July	8.87		19	753	3	0	18.8	1,155	2,014	8,110	0	
Aug.	6.75		1	204	125	0	11.7	721	3,002	14,480	0	
Sept.	5.84		24	40	2	0	1.56	92.7	693	3,170	0	
Oct.	5.64		3	25	1	0	.28	17.0	293	6,103	0	
Nov.				0		0	0	0	35.2	352	0	
Dec.				0		0	0	0	114	2,363	0	
Yearly	8.87			753		0	2.82	2,045	6,387.0	22,321	235	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	2.70			21.3		0	0.08	2,522	7,878	27,533	290	

! And other days

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

DESCRIPTION: Parshall flume in the influent line to the old plant and a Parshall flume in the new headworks, located about 200 feet (61 m) east of the old treatment plant. The plant is located about one mile (1.6 km) west of the Douglas-Agua Prieta Port of Entry.

RECORDS: Continuous monthly records since March 1948; daily records from March 18, 1948 through 1950 and from January 1952 through 1981.

REMARKS: The treatment plant was constructed in 1947 by the governments of the United States and Mexico to correct a serious international sanitation problem. Since April 8, 1968, all sewage flows from Agua Prieta have been diverted to oxidation ponds located in Mexico, 1.6 miles (2.6 km) south of the international boundary. Since December 1970, sewage effluent from the plant flows into Mexico and then crosses to the right bank of the Agua Prieta Arroyo, by means of a canal bridge, to be used for irrigation. On July 1, 1973, ownership and operation of the plant was transferred from the Commission to the City of Douglas. The plant was modified in 1980. The flow entering the plant is divided; about one-third treated at the old plant and two-thirds by the new plant. The old and new plant effluent is combined, disinfected and discharged to Mexico.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1981			Period 1952-1981		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	23.881	0	23.881	1.428	0.416	0.769	1.700	0.416	1.060
Feb.	19.164	0	19.164	.797	.543	.684	1.784	.543	1.065
Mar.	23.218	0	23.218	1.121	.663	.749	1.598	.590	1.060
Apr.	23.808	0	23.808	1.249	.380	.793	2.047	.380	1.062
May	23.371	0	23.371	1.043	.510	.754	1.850	.510	1.067
June	22.738	0	22.738	.978	.555	.758	2.060	.555	1.127
July	25.598	0	25.598	1.153	.483	.826	3.209	.483	1.182
Aug.	25.828	0	25.828	1.487	.365	.833	2.681	.365	1.209
Sept.	24.931	0	24.931	1.182	.470	.830	1.884	.470	1.158
Oct.	24.010	0	24.010	.966	.603	.774	1.770	.603	1.106
Nov.	25.010	0	25.010	1.463	.607	.834	1.586	.587	1.082
Dec.	34.260	0	34.260	3.330	.754	1.105	3.330	.500	1.079
Yearly	295.817	0	295.817	3.330	0.365	0.809	3.330	0.365	1.105

SEWAGE INFLUENT, AGUA PRIETA, SONORA INTERNATIONAL OXIDATION PONDS

DESCRIPTION: Marshall 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: Discharges 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 1981.

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 1981			Period 1968-1981		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	0	17.522	17.522	0.630	0.436	0.565	0.640	0.394	0.505
Feb.	0	16.552	16.552	.630	.436	.591	.726	.394	.513
Mar.	0	18.196	18.196	.630	.436	.587	.666	.394	.501
Apr.	0	17.689	17.689	.630	.436	.590	.666	.394	.508
May	0	18.247	18.247	.630	.436	.589	.666	.394	.526
June	0	17.750	17.750	.630	.436	.592	.630	.394	.532
July	0	18.319	18.319	.630	.436	.591	.691	.259	.528
Aug.	0	17.573	17.573	.630	.436	.567	.967	0	.514
Sept.	0	17.076	17.076	.630	.436	.569	.630	0	.536
Oct.	0	17.706	17.706	.630	.436	.571	.630	0	.503
Nov.	0	16.698	16.698	.630	.436	.557	.717	.394	.522
Dec.	0	17.706	17.706	.630	.436	.571	.709	.394	.522
Yearly	0	211.035	211.035	0.630	0.436	0.578	0.967	0	0.518

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 1981. Records obtained and furnished by U. S. Geological Survey to September 30, 1981; and from October 1 to December 31, 1981 by the United States Section of the Commission.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.84	0.93	0.06	0.62	0.30	0	0	425	0.20	4.3	0	3.7
2	.76	.97	.35	.36	0	0	0	164	1.9	5.8	0	2.2
3	.81	1.1	.88	.35	.24	0	0	70	145	2.2	0	1.7
4	.91	1.1	.15	.65	.53	0	0	61	65	.4	0	1.0
5	1.0	.94	.01	.70	.23	0	0	41	25	2.5	0	1.1
6	1.2	.46	.04	.77	0	0	41	30	43	4.2	0	1.2
7	.82	.20	.01	.83	0	0	32	38	6.6	2.5	0	1.3
8	.25	.33	0	.85	0	0	3.5	22	.80	.9	0	1.4
9	.15	.87	0	.89	0	0	1.0	12	.70	0	.3	1.4
10	.15	.63	0	.75	0	0	287	28	.60	0	1.7	1.4
11	.26	.82	0	0	0	0	99	31	.50	0	2.1	1.5
12	.45	.42	0	0	0	0	14	303	.40	0	2.3	1.9
13	.75	.54	0	0	0	.08	75	402	.30	0	.9	1.9
14	1.4	.50	0	0	0	.03	4.3	167	.20	0	.8	2.3
15	1.2	.50	0	0	0	.22	5.5	74	.20	0	.8	2.5
16	1.2	.50	0	0	.17	.26	140	41	13	0	.6	2.3
17	1.1	.45	0	0	0	.45	171	24	11	0	1.5	2.3
18	1.3	.45	0	0	0	0	5.5	15	.50	0	1.9	2.3
19	1.3	.45	0	0	.06	0	3.5	40	.30	0	2.3	2.3
20	1.3	.45	.18	0	0	0	94	11	.20	0	2.4	2.3
21	1.2	.45	.52	.24	.49	0	38	3.5	.20	0	1.2	2.3
22	1.2	.45	.74	.61	.33	0	46	1.2	.20	.9	1.9	2.3
23	1.2	.45	.88	.64	.02	0	107	1.2	.20	.4	1.7	2.3
24	1.2	.35	.91	.53	.28	0	113	.90	0	0	1.7	1.9
25	1.2	.45	.67	.23	0	0	4.5	.40	0	0	1.1	1.9
26	1.2	.14	0	0	0	0	91	.60	0	0	1.4	1.9
27	1.2	.12	0	.08	0	0	33	.60	0	0	2.1	1.9
28	1.1	0	.25	.25	0	0	63	.40	0	0	1.3	1.9
29	1.0	.59	.30	0	0	.55	103	.60	0	0	2.1	1.9
30	1.0	.71	.26	0	0	20	175	.60	.20	0	4.1	1.9
31	1.0	.74	0	0	0	0	417	.40	0	0	0	1.9
Sum	29.65	15.02	7.69	9.91	2.65	21.59	2,166.8	2,009.40	316.20	24.1	36.2	60.1
Current Year 1981								Period 1951-1981				
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.	4.68	4.49	14	1.9	9	0	0.96	58.8	1,441	27,763	2.6	
Feb.	4.67		9	1.9	28	0	.54	29.8	543	4,080	3.0	
Mar.	4.64		3	1.4	11	0	.25	15.3	510	4,659	13.3	
Apr.	4.61		8	1.2	111	0	.33	19.7	123	871	9	
May	4.61		21	1.2	12	0	.09	5.3	44.6	285	0	
June	5.45		30	132	1	0	.72	42.8	176	1,391	0	
July	9.04		10	3,360	1	0	69.9	4,298	5,855	17,238	184	
Aug.	9.00	3.71	1	3,320	27	.20	64.8	3,986	8,644	36,369	165	
Sept.	7.00		3	1,400	124	0	10.5	627	1,650	16,344	11.3	
Oct.	4.65	3.70	1	29.9	13	0	.78	47.8	1,763	47,322	0	
Nov.	4.03	3.70	30	4.7	1	0	1.2	71.8	235	2,563	0	
Dec.	4.03	3.82	1	4.7	14	1.0	1.9	119	1,478	25,479	6.2	
Yearly	9.04			3,360		0	12.9	9,321	22,463	62,788	4,400	
Meters			Cubic Meters per Second				Thousands of Cubic Meters					
2.76			95.2				11,497					

! 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 1981.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.35	0.47	0.39	0.27	0.12	0.06	0	17.0	12.0	5.9	0.32	0.38
2	.35	.46	.49	.26	.10	.01	0	20.0	.60	33	.34	.39
3	.35	.43	.62	.31	.04	0	0	2.3	70	8.6	.35	.39
4	.35	.43	.45	.28	0	0	0	.47	7.4	.26	.35	.37
5	.35	.42	.58	.26	0	0	0	.43	3.3	.22	.35	.38
6	.35	.41	.55	.25	0	0	0	.40	.83	.22	.36	.38
7	.44	.41	.45	.24	0	0	0	.41	.18	.22	.37	.38
8	.39	.41	.41	.21	.03	0	5.1	.37	.16	.22	.37	.37
9	.34	.52	.41	.21	.07	0	.41	.34	.31	.23	.36	.34
10	.35	.50	.40	.21	.08	0	34	.34	.24	.25	.34	.34
11	.40	.43	.39	.22	.09	0	.30	.42	.19	.29	.35	.35
12	.46	.43	.39	.20	.10	0	2.6	.39	.17	.31	.35	.35
13	.49	.44	.39	.19	.13	0	.08	16.0	.17	.29	.36	.35
14	.44	.43	.38	.17	.12	0	0	26.0	.16	.28	.36	.34
15	.39	.43	.38	.16	.12	0	52.0	.58	.14	.32	.37	.35
16	.38	.41	.39	.15	.13	0	1.4	.42	.08	.29	.37	.35
17	.38	.40	.40	.17	.15	0	21.0	.37	.08	.29	.37	.36
18	.40	.40	.41	.16	.16	0	1.7	.32	.09	.30	.37	.35
19	.42	.40	.41	.18	.16	0	.23	.31	.15	.30	.38	.33
20	.43	.42	.43	.19	.15	0	.18	.27	.14	.34	.35	.33
21	.43	.42	.43	.20	.18	0	.17	.26	.14	.42	.35	.33
22	.43	.41	.40	.15	.19	0	.18	1.9	.15	.34	.35	.33
23	.46	.42	.39	.11	.19	0	1.3	1.2	.19	.33	.35	.32
24	.46	.40	.39	.08	.19	0	1.5	.34	.16	.33	.35	.31
25	.46	.40	.37	.08	.19	0	12.0	.28	.13	.33	.35	.33
26	.46	.41	.37	.08	.19	0	.46	.27	.13	.30	.37	.33
27	.46	.42	.35	.08	.19	0	.21	.27	.07	.30	.38	.33
28	.45	.39	.36	.05	.18	0	.23	.19	.02	.31	.42	.33
29	.44	.44	.32	.02	.15	0	56.0	.15	0	.32	.44	.30
30	.44	.44	.27	.01	.15	0	10.0	.30	24.0	.33	.39	.32
31	.48	.44	.25	.09	.09	0	9.0	84.0		.33		.34
Sum	12.78	11.92	12.62	5.15	3.64	0.07	210.05	176.30	121.38	55.77	10.89	10.75
Current Year 1981									Period 1949-1981			
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.	2.63	2.55	13	0.60	6	0.33	0.41	25.3	131	2,895	1.3	
Feb.	2.62	2.52	9	.69	17	.38	.43	23.6	53.7	437	1.8	
Mar.	2.74	2.52	3	1.4	31	.22	.41	25.0	47.3	396	.7	
Apr.	2.57	2.44	4	.28	30	0	.17	10.2	29.6	262	0	
May	2.61		1	.21	14	0	.12	7.2	13.4	128	0	
June	2.45		1	.07	12	0	0	14.7		169	0	
July	5.57		15	1,110	11	0	6.78	417	533	4,270	1.6	
Aug.	5.07	2.52	31	805	29	.14	5.69	350	863	10,120	.08	
Sept.	5.04		3	789	29	0	4.05	241	275	2,634	0	
Oct.	3.84	2.65	2	177	1	.21	1.80	111	218	4,732	0	
Nov.	2.82	2.72	29	.49	1	.30	.36	21.6	47.2	273	0	
Dec.	2.79	2.77	1	.41	23	.30	.35	21.3	95.3	1,093	0	
Yearly	5.57			1,110		0	1.73	1,253	2,321	12,633	126	
	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
	1.70			31.4		0	0.05	1,546	2,863	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. 1981 records fair. 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 1981.

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 1980.

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 1981 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0.60	0.40	0	0	327	210	21.0	1.8	1.5
2	0	0	0	.70	.40	0	0	150	20.0	154	1.6	1.5
3	0	0	0	.80	.30	0	0	80.0	180	32.0	1.7	1.6
4	0	0	5.0	.70	.20	0	0	40.0	30.0	22.0	1.6	1.7
5	0	0	2.0	.60	.10	0	0	30.0	43.0	16.0	1.8	1.8
6	0	0	1.0	.60	0	0	0	20.0	122	11.0	2.1	1.9
7	0	0	1.0	.60	0	0	2.0	10.0	75.0	9.6	2.2	2.0
8	0	0	1.0	.60	0	0	5.0	105	25.0	9.6	2.1	1.8
9	0	0	.90	.50	0	0	2.0	44.0	10.0	8.2	1.8	1.6
10	0	0	.90	.50	0	0	10.0	121	10.0	7.3	1.6	1.6
11	0	0	.80	.50	0	0	15.0	122	9.0	8.2	1.3	1.5
12	0	0	.80	.50	0	0	10.0	88.0	8.0	8.8	1.3	1.5
13	0	0	.70	.50	0	0	2.0	130	7.0	8.5	1.3	1.4
14	0	0	.70	.40	0	0	2.2	128	6.0	7.2	1.3	1.2
15	0	0	.60	.40	0	0	13.0	50.0	5.0	6.4	1.3	1.2
16	0	0	.60	.40	0	0	26.0	20.0	5.0	5.9	1.2	1.2
17	0	0	.50	.50	0	0	13.0	10.0	4.9	5.6	1.1	1.1
18	0	0	.50	.40	0	0	26.0	8.0	17.0	5.6	1.0	1.1
19	0	0	.50	.40	0	0	11.0	7.0	17.0	5.1	.97	1.1
20	0	0	.50	.40	0	0	52.0	6.5	25.0	4.8	.73	1.1
21	0	0	.90	.20	0	0	21.0	6.5	17.0	5.7	.80	1.1
22	0	0	.90	.20	0	0	41.0	6.5	55.0	5.9	.85	1.1
23	0	0	.90	.20	0	0	165	6.1	3.4	5.4	.82	1.1
24	0	0	.90	.30	0	0	138	4.2	1.8	5.1	.74	1.0
25	0	0	.90	.30	0	0	32.0	2.4	1.5	4.4	.72	1.1
26	0	0	.80	.20	0	0	25.0	.90	.70	4.0	.78	1.1
27	0	0	.70	.20	0	0	204	.60	.50	3.0	.68	1.1
28	0	0	.70	.10	0	0	221	.40	.20	2.4	.79	1.0
29	0	0	.70	0	0	0	216	.10	0	2.1	1.3	.93
30	0	0	.70	0	0	0	453	29.0	28.0	2.0	1.6	.92
31	0	0	.70	0	0	0	360	81.0	2.0	2.0	1.0	1.0
Sum	0	0	26.80	12.30	1.40	0	2,065.2	1,635.20	937.00	398.8	39.08	40.85

Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Period 1936-1981 Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
	Jan.				0		0	0	1,667	30,282	0
Feb.				0		0	0	1,062	11,129	0	
Mar.			4	5.0	1	0	.86	53.2	1,057	12,454	0
Apr.	3.90		2	.9	130	0	.41	24.4	289	2,301	0
May	3.86		2	.4	6	0	.05	2.8	84.6	897	0
June				0		0	0	62.2	1,020	0	
July	7.50		29	3,220	1	1	66.6	4,096	2,746	15,610	45
Aug.	6.65		8	2,080	29	0	52.7	3,243	5,650	45,790	91
Sept.	7.50		3	3,220	29	0	31.2	1,859	1,327	7,507	0
Oct.	6.31	3.62	20	1,620	29	2.0	12.9	791	1,627	59,025	0
Nov.	3.64	3.58	6	2.2	20	.70	1.30	77.5	446	7,384	0
Dec.	3.65	3.59	6	2.0	23	.89	1.32	81.0	2,257	33,568	0
Yearly	7.50			3,220		0	14.1	10,228	18,275	66,030	2,234
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	2.29			91.2		0	0.40	12,616	22,542	81,447	2,756

Estimated

! 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 1981.

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 1981			Period 1952-1981		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	85.132	81.574	166.706	6.399	4.837	5.378	7.942	0.650	3.011
Feb.	81.002	76.091	157.093	6.370	5.271	5.610	7.031	.650	3.059
Mar.	91.241	107.695	198.936	7.300	5.352	6.417	7.922	.750	3.066
Apr.	87.371	92.412	179.783	6.369	5.535	5.993	6.369	.700	2.943
May	93.620	84.965	178.585	6.811	5.208	5.761	6.811	.550	2.828
June	84.206	80.343	164.549	5.804	5.165	5.485	5.804	.700	2.683
July	92.859	104.520	197.379	7.433	5.334	6.367	7.433	.700	2.790
Aug.	103.967	122.111	226.078	8.315	6.546	7.293	8.315	.750	3.095
Sept.	104.498	124.761	229.259	8.579	7.175	7.642	8.579	.800	3.347
Oct.	108.975	122.479	231.454	9.539	6.789	7.466	9.807	.700	3.265
Nov.	95.264	115.574	210.838	7.364	6.781	7.028	10.235	.800	3.159
Dec.	99.781	113.486	213.267	7.297	6.298	6.880	11.478	.350	3.125
Yearly	1,127.916	1,226.011	2,353.927	9.539	4.837	6.443	11.478	0.350	3.031

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. Two 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 92.

In the United States

Month	San Rafael #2, Arizona		Canelo, Arizona		Patagonia, Arizona		Nogales, Arizona		Nogales Sanitation Plant 6N, Arizona	
	1981	Average 1973-1981	1981	Average 1930-1981	1981	Average 1930-1981	1981	Average 1914-1981	1981	Average 1953-1981
Jan.	1.43	1.43	1.25	1.17	1.43	1.22	1.66	1.05	1.74	1.07
Feb.	1.35	1.31	.80	1.07	.90	1.06	.67	.87	.82	.73
Mar.	3.00	1.11	2.85	.84	2.81	.92	2.54	.81	2.22	.87
Apr.	.75	.37	.43	.35	.46	.33	.14	.29	.32	.18
May	.70	.13	.29	.13	1.05	.18	.91	.16	1.18	.20
June	.30	.40	.18	.80	.32	.51	.27	.46	.14	.39
July	7.26	5.54	5.32	4.21	5.09	4.43	7.53	4.29	6.66	4.72
Aug.	.72	2.47	1.08	4.16	1.21	3.90	2.01	3.84	3.07	3.80
Sept.	2.26	2.07	1.04	1.70	1.12	1.80	3.48	1.65	2.05	1.57
Oct.	1.26	1.50	.86	.97	1.26	1.03	1.41	.90	2.84	1.28
Nov.	.80	.83	.75	.76	.52	.78	.40	.71	.47	.64
Dec.	0	.83	0	1.29	0	1.32	T	1.24	0	1.19
Yearly	19.83	17.99	14.85	17.45	16.17	17.48	21.02	16.27	21.51	16.64

In Mexico

Month	San Lazaro, Sonora								
	1981	Average 1961-1981							
Jan.	0	0.91							
Feb.	.55	.79							
Mar.	1.61	.75							
Apr.	0	.31							
May	0	.08							
June	0	.43							
July	5.35	4.37							
Aug.	2.13	3.27							
Sept.	1.77	1.65							
Oct.	1.57	1.14							
Nov.	.24	.67							
Dec.	0	1.18							
Yearly	13.23	15.00							

T Trace

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 1981.

In the 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.
Patagonia, Arizona	S	31° 33'	110° 45'	4,190	1930	George R. Proctor
San Rafael #2, Arizona	S	31° 22'	110° 38'	4,860	Jan. 1973	I. B. & W. C.

In Mexico

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
San Lazaro, Sonora	S	31° 18'	110° 38'	4,199	Mar. 1954	I. B. & W. C. Mexican Section

S Standard 8" rain gage

R Recording rain gage

**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 92 of this bulletin.

In United States

Temperature - Degrees Fahrenheit

Month	Nogales Sanitation Plant - 6N		
	1981		
	Mean	Max.	Min.
Jan.	49.3	77	25
Feb.	48.8	84	18
Mar.	49.1	81	28
Apr.	60.5	90	28
May	64.2	89	38
June	79.6	# 101	45
July	80.2	104	62
Aug.	78.2	101	55
Sept.	73.3	96	46
Oct.	62.2	94	28
Nov.	55.6	85	23
Dec.	48.7	82	14
Yearly	62.5	104	14

Mean Relative Humidity - Percent

Month	Nogales Sanitation Plant - 6N	
	1981	
	Max.	Min.
Jan.	100	43
Feb.	100	52
Mar.	100	45
Apr.	100	49
May	100	40
June	100	68
July	100	62
Aug.	100	53
Sept.	100	42
Oct.	100	41
Nov.	88	63
Dec.	100	33
Yearly	100	33

Evaporation - Inches

Month	Nogales Sanitation Plant - 6N	
	1981	Average 1953-1981
	Jan.	3.56
Feb.	4.43	4.58
Mar.	* 5.54	7.17
Apr.	8.27	9.52
May	11.01	12.21
June	* 12.40	13.73
July	* 10.06	10.46
Aug.	* 9.74	8.41
Sept.	* 8.41	8.15
Oct.	* 6.36	7.02
Nov.	5.03	4.60
Dec.	3.89	3.46
Yearly	88.70	92.90

Mean Wind Speed - Miles Per Hour

Month	Nogales Sanitation Plant - 6N	
	1981	Average 1953-1981
	Jan.	1.5
Feb.	2.1	2.3
Mar.	1.3	2.5
Apr.	.4	2.5
May	.4	2.4
June	.2	2.3
July	.2	1.6
Aug.	.5	1.1
Sept.	.7	1.2
Oct.	.8	1.5
Nov.	.1	1.6
Dec.	* .5	1.7
Yearly	0.7	1.9

In Mexico

Temperature - Degrees Fahrenheit

Month	San Lazaro, Sonora			
	1981		1961-1981	
	Max.	Min.	Max.	Min.
Jan.	72	27	93	10
Feb.	79	21	88	16
Mar.	81	30	99	19
Apr.	86	34	106	18
May		45	117	28
June	102	54	124	39
July	102	61	126	50
Aug.	97	59	117	52
Sept.	93	50	115	39
Oct.	86	37	111	32
Nov.	84	28	102	21
Dec.	77	23	95	- 4
Yearly	102	21	126	- 4

Evaporation - Inches

Month	** San Lazaro, Sonora	
	1981	Average 1961-1981
	Jan.	
Feb.		
Mar.		
Apr.		
May		
June		
July		
Aug.		
Sept.		
Oct.		
Nov.		
Dec.		
Yearly		

Estimated

* One or more days missing

** No data available

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

1981

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 and estimated from aerial photographs.

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	100	0	100
Above El Cajon, Mexico Gaging Station	179	125	304	100	2,352	2,452
Above Nogales, Arizona Gaging Station	185	348	533	100	2,696	2,796
San Pedro River:						
Above Palominas, Arizona Gaging Station	92	649 *	741	1,000	3,459	4,459
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	26,700	0	26,700

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