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WESTERN WATER BULLETIN 2003

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

2003

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FOREWORD

This bulletin is the forty-fourth 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 Bulletin contains information for the year 2003.

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 16 kilometers to the mouth of the Gila River, thence westward 18 kilometers to Pilot Knob Mountain, and south 1.6 kilometers 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 35 kilometers 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 145 kilometers 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 28,200 square kilometers 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 1,857 square kilometers below Alamo Dam and Lake, completed in 1963; and from the Gila River, draining about 18,900 square kilometers 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 scheduled deliveries of waters of the Colorado River, which in 2003 amounted to 1,850,234 thousand cubic meters, in accordance with Article 10 of the 1944 Water Treaty. No diversions were made to a substitute canal in 2003.

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, 1.8 kilometers 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 Colorado River waters diverted by Mexico (except emergency deliveries to Tijuana from August 1972 to August 1980 and November-December 2003) have been diverted to the Alamo Canal at Morelos Dam.

TIJUANA RIVER BASIN

The total drainage area of the Tijuana River basin is 4,483 square kilometers, 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 34 kilometers from the Pacific Ocean to join the Rio de Las Palmas in Mexico. From the confluence of these tributaries, the Tijuana River flows northwesterly 8 kilometers to cross the land boundary into the United States near San Ysidro, California and Tijuana, Baja California, and then flows westerly 10 kilometers to discharge into the Pacific Ocean 3 kilometers 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 2,650 square kilometers. 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 1,919 square kilometers, of which 1,681 square kilometers 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 1,380 square kilometers. Of this amount, 901 square kilometers 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 National Water Commission 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

This Bulletin is published in System International (SI) units which are based on the metric system. The following conversion constants may be used to convert to the English system of measurement. Data collected by the Mexican Section are computed and published in a Spanish version of the water bulletin in metric units.

METRIC TO ENGLISH CONVERSION CONSTANTS

	METRIC UNITS				ENGLISH UNITS
	LENGTH				
	Millimeters	x	0.03937	=	Inches
	Meters	x	3.28084	=	Feet
	Kilometers	x	0.62137	=	Miles
	AREA				
	Square Meters	x	10.76391	=	Square Feet
	Hectares	x	2.47105	=	Acres
	Square Kilometers	x	0.38610	=	Square Miles
	VOLUME				
	Cubic Meters	x	35.31467	=	Cubic Feet
1,000	Cubic Meters	x	0.81071	=	Acre-Feet
	WEIGHT				
	Kilograms	x	2.20462	=	Pounds
	Megagrams	x	1.10231	=	Tons (2,000 lbs.)
	TEMPERATURE				
	Degrees Celsius	x	1.8 + 32	=	Degrees Fahrenheit

GENERAL HYDROLOGIC CONDITIONS FOR 2003

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 2003. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 2003 measured at 3 index stations was 39 millimeters, compared to an average of 50 millimeters during the last 45 years (1959 to 2003).

The flow of the Colorado River reaching Imperial Dam was 7,123,470 thousand cubic meters, about 73% of the 69-year average (1935-2003) of 9,820,786 thousand cubic meters. At the Northerly International Boundary, the total flow of the river during 2003 was 1,748,703 thousand cubic meters, about 38% of the 1935-2003 average of 4,579,033 thousand cubic meters. At the Southerly International Boundary, the flow during 2003 was 30,542 thousand cubic meters, about 1% of the 1935-2003 average of 3,058,032 thousand cubic meters.

The total of all flows of the Colorado River entering Mexico in 2003 amounted to 2,067,200 thousand cubic meters, 40% of the 1935-2003 average of 5,147,612 thousand cubic meters, 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) in the Wellton-Mohawk Bypass Drain at the southerly land boundary near San Luis, Arizona, and 6) from the 242 Well Field near San Luis, Arizona.

During 2003, other waters arrived at the Mexican points of diversion and amounted to 75,443 thousand cubic meters. These waters consisted mainly of excess waters released from reservoirs on the Colorado River. A maximum instantaneous flow of 158 cubic meters per second occurred in the Colorado River at the Northerly International Boundary station on March 18, 2003.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 21,471.0 million cubic meters, 61% of the usable capacity of 35,263.2 million cubic meters. The greater part (18,872.2 million cubic meters) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River water for irrigation during 2003 due to drought or accident to the irrigation system.

The total reported area irrigated from waters of the Colorado River below Imperial Dam in 2003 was 439,241 hectares; 303,160 hectares in the United States and 136,081 hectares in Mexico. An estimated 33% of the total area irrigated in Mexico is served by pumping from ground water.

TIJUANA RIVER BASIN

During 2003, the temperatures at Barrett Dam, California (elevation 533.40 meters) in the upper portion of the basin in the United States averaged 17.7 degrees Celsius, 1.1 degree Celsius above the 73-year mean. In the extreme upper portion of the basin in Mexico at El Pinal, Baja California (elevation 1394.96 meters), the recorded temperatures during the year could not be determined due to incomplete records. At Rodriguez Dam, Baja California (elevation 139.90 meters), the recorded temperatures averaged 21 degrees Celsius, equal to the normal for many years.

At Barrett Dam, in the upper portion of the basin in the United States, the recorded precipitation was 346 millimeters, 78% of normal; and at Lower Otay Dam near the lower end of the basin, 231 millimeters, or 82% of normal. The recorded precipitation at El Pinal in the upper portion of the basin in Mexico could not be determined due to incomplete records. At Rodriguez Dam, in the lower portion of the basin in Mexico, the recorded precipitation was 220 millimeters, 95% of the 65-year average.

Runoff above Barrett and Rodriguez Reservoirs during 2003 was about 2% of normal. Above Morena Reservoir, the runoff was 226 thousand cubic meters, or about 2% of the 67-year 1937-2003 mean of 12,581 thousand cubic meters. Above Barrett Reservoir, the runoff was 954 thousand cubic meters, or about 6% of the 67-year 1937-2003 mean of 16,780 thousand cubic meters. At Rodriguez Reservoir, there was no measurable runoff during the year.

The flow of the Tijuana River at the international boundary was 12,170 thousand cubic meters during 2003.

WHITEWATER DRAW

During 2003, the average annual temperature over the watershed was 2.5 degrees Celsius above normal, while the annual precipitation was 72% of normal. Runoff for the year at the gaging station near Douglas, Arizona, was 426 thousand cubic meters, or about 7% of average.

SAN PEDRO RIVER

During 2003, the average annual temperature was 0.6 degree Celsius above normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 91% of the 1961–2003 mean of 523 millimeters. The stream flow at the international boundary was 6,125 thousand cubic meters, 24% of the 1951–2003 average.

SANTA CRUZ

During 2003, the average annual temperature over the watershed averaged 17.3 degrees Celsius, 1.0 degree Celsius above the long term average. The annual precipitation was about 96% of the 65–year 1939–2003 mean. Runoff measured at the Nogales gaging station, where the stream re–enters the United States, was 1,184 thousand cubic meters. The total runoff for the year measured at the gaging station near Lochiel, Arizona, where the stream enters Mexico from the United States, was 159 thousand cubic meters. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 1,025 thousand cubic meters from the loop of the river lying in Mexico, or approximately 86% of the flow reaching the Nogales Station.

ALAMO AND NEW RIVERS

During 2003, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, was 23.9 degrees Celsius, 1.3 degree Celsius above normal; and over the drainage area of the New River as recorded at Mexicali, Baja California, it was 25 degrees Celsius, 3 degrees Celsius above the 78–year average.

At El Centro, the precipitation was 78 millimeters, about 118% of the 73–year average; and in Mexicali, the annual precipitation record was 34 millimeters, 43% of the 78–year average. The total flow of the New River at the international boundary in 2003 was 130,954 thousand cubic meters, which was about 90% of the 1943–2003 average.

SALTON SEA

During 2003, the average annual temperature around the Salton Sea was 0.7 degree Celsius above the long–term average, while the annual precipitation recorded at Brawley, California was approximately 73% of the long–term mean of 67 millimeters. The water surface of the Salton Sea dropped slightly during the year. The maximum stage, 69.495 meters below mean sea level, was recorded on March 30 and 31, April 1 and 2, April 9 through April 17, and May 25 through June 3, inclusive. The minimum stage, 69.800 meters below mean sea level, was recorded on November 4 through November 22 and November 26 through December 25, inclusive.

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

DESCRIPTION: Water deliveries are measured at a metering station located near the international boundary near Tijuana and approximately 4.0 kilometers east of International Boundary Monument #253. The metering station consists of an in-line flowmeter with four backflow preventers. Deliveries are made utilizing a 61-centimeter diameter steel pipeline.

RECORDS: Based on totalizer readings read at approximately noon each day. Records are furnished by the Otay Municipal Water District. Records available from August 13, 1972 to December 1983; November and December 2003. (No deliveries were made from 1984 through October 2003). The records reflect a 12% loss through 1983 and a 7.2% loss thereafter 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. Pursuant to Minute No. 310, emergency deliveries resumed in November 2003. The deliveries are conveyed approximately 520 kilometers 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. The facilities were developed to circumvent serious water shortages in Tijuana.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0.12
2	0	0	0	0	0	0	0	0	0	0	0	.25
3	0	0	0	0	0	0	0	0	0	0	0	.25
4	0	0	0	0	0	0	0	0	0	0	0	.25
5	0	0	0	0	0	0	0	0	0	0	0	.25
6	0	0	0	0	0	0	0	0	0	0	0	.25
7	0	0	0	0	0	0	0	0	0	0	0	.26
8	0	0	0	0	0	0	0	0	0	0	0	.25
9	0	0	0	0	0	0	0	0	0	0	0	.25
10	0	0	0	0	0	0	0	0	0	0	.04	.26
11	0	0	0	0	0	0	0	0	0	0	.19	.22
12	0	0	0	0	0	0	0	0	0	0	.22	.13
13	0	0	0	0	0	0	0	0	0	0	.23	.24
14	0	0	0	0	0	0	0	0	0	0	.23	.23
15	0	0	0	0	0	0	0	0	0	0	0	.24
16	0	0	0	0	0	0	0	0	0	0	0	.24
17	0	0	0	0	0	0	0	0	0	0	0	.24
18	0	0	0	0	0	0	0	0	0	0	0	.25
19	0	0	0	0	0	0	0	0	0	0	.04	.25
20	0	0	0	0	0	0	0	0	0	0	.22	.25
21	0	0	0	0	0	0	0	0	0	0	.22	.33
22	0	0	0	0	0	0	0	0	0	0	.29	0
23	0	0	0	0	0	0	0	0	0	0	.28	0
24	0	0	0	0	0	0	0	0	0	0	.27	0
25	0	0	0	0	0	0	0	0	0	0	.34	0
26	0	0	0	0	0	0	0	0	0	0	.57	0
27	0	0	0	0	0	0	0	0	0	0	.41	0
28	0	0	0	0	0	0	0	0	0	0	.39	0
29	0		0	0	0	0	0	0	0	0	.38	0
30	0		0	0	0	0	0	0	0	0	.53	0
31	0		0		0		0	0		0		0
Sum	0	0	0	0	0	0	0	0	0	0	4.85	5.01

Current Year 2003 — Period 1973–2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	487	1,113	0
Feb.			! 1	0	! 1	0	0	0	490	1,003	0
Mar.			! 1	0	! 1	0	0	0	519	1,047	0
April			! 1	0	! 1	0	0	0	504	1,057	0
May			! 1	0	! 1	0	0	0	531	1,094	0
June			! 1	0	! 1	0	0	0	533	1,216	0
July			! 1	0	! 1	0	0	0	539	1,259	0
Aug.			! 1	0	! 1	0	0	0	514	1,132	0
Sept.			! 1	0	! 1	0	0	0	423	1,115	0
Oct.			! 1	0	! 1	0	0	0	441	1,116	0
Nov.			26	.57	! 1	0	.16	419	450	1,113	0
Dec.			21	.33	!22	0	.16	433	451	1,225	0
Yearly				0.57		0	0.03	852	5,882	12,653	0

ϕ Mean daily ! And other days

09-5300.00 RESERVATION MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

DESCRIPTION: Water-stage recorder (digital) located 152 meters upstream from railroad culvert and 1.6 kilometers 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 61.0 meters downstream from the spillway structure, and thence into the Colorado River on the right bank, 305 meters upstream from Colorado River below Yuma Main Canal Wasteway, and 10.5 kilometers 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 2003.

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 15,789 TCM. Monthly and annual averages since 1937 are shown in the table below.

EXTREMES: Prior to 1937: Maximum annual flow 24,904 TCM, 1916; minimum annual flow 11,003 TCM, 1913.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.64	1.56	1.64	1.67	1.87	2.12	1.87	1.73	1.78	1.50	1.95	1.73
2	1.64	1.67	1.53	1.67	1.87	2.12	1.81	1.76	1.81	1.67	1.93	1.73
3	1.56	1.56	1.76	1.76	1.87	2.12	1.95	1.78	1.84	1.61	1.93	1.76
4	1.64	1.67	1.81	1.73	1.90	2.12	1.93	1.76	1.81	1.67	2.01	1.78
5	1.59	1.64	1.67	1.76	1.98	2.10	1.90	1.70	1.81	1.67	1.95	1.84
6	1.64	1.67	1.50	1.73	2.07	2.10	1.93	1.76	1.78	1.73	1.98	1.84
7	1.56	1.64	1.64	1.90	2.10	2.10	1.87	1.73	1.76	1.76	1.98	1.81
8	1.53	1.61	1.64	1.81	2.07	2.10	1.84	1.95	1.73	1.76	2.04	1.76
9	1.56	1.59	1.44	1.76	2.15	2.04	1.81	2.04	1.73	1.76	2.07	1.78
10	1.64	1.64	1.56	1.64	2.12	2.04	1.73	2.04	1.73	1.78	2.04	1.84
11	1.67	1.56	1.50	1.39	2.15	1.98	1.73	1.93	1.73	1.78	2.07	1.78
12	1.87	1.56	1.53	1.50	2.10	1.98	1.78	1.95	1.67	1.81	2.07	1.76
13	1.73	1.76	1.56	1.44	2.12	1.90	1.78	1.95	1.70	1.78	2.12	1.78
14	1.59	1.90	1.61	1.42	2.15	1.95	1.73	1.95	1.67	1.73	2.10	1.81
15	1.61	1.98	1.73	1.53	2.15	1.95	1.81	1.95	1.64	1.76	2.01	1.78
16	1.61	2.07	1.73	1.70	2.15	1.90	1.70	1.95	1.47	1.76	1.95	1.76
17	1.59	1.87	2.10	1.67	2.15	1.87	1.73	1.93	1.50	1.78	2.01	1.76
18	1.67	2.04	2.41	1.90	2.18	1.93	1.70	1.93	1.50	1.76	2.01	1.70
19	1.84	1.95	1.98	1.98	2.15	1.93	1.67	1.90	1.59	1.81	2.01	1.64
20	1.93	2.01	1.76	1.87	2.15	1.93	1.76	1.84	1.64	1.73	2.01	1.67
21	1.90	1.87	1.67	1.81	2.15	1.98	1.73	1.84	1.61	1.81	2.01	1.67
22	1.70	1.61	1.67	1.67	2.15	1.98	1.76	1.87	1.61	1.67	1.95	1.64
23	1.67	1.56	1.70	1.93	2.18	1.90	1.76	1.84	1.84	1.73	1.98	1.64
24	1.61	1.56	1.67	1.76	2.18	1.87	1.78	1.87	1.27	1.87	1.93	1.73
25	1.64	1.56	1.70	1.90	2.15	1.90	1.76	1.81	1.16	1.78	1.67	1.81
26	1.64	1.95	1.67	1.87	2.15	1.87	1.78	1.81	1.19	1.78	1.78	1.81
27	1.56	2.04	1.70	1.90	2.15	1.84	1.84	1.78	1.39	1.84	1.78	1.76
28	1.59	1.84	1.67	1.84	2.15	1.84	1.76	1.81	1.44	1.76	1.64	1.76
29	1.53		1.70	1.90	2.15	1.90	1.78	1.78	1.42	1.78	1.67	1.73
30	1.56		1.67	1.87	2.10	1.90	1.78	1.78	1.30	1.81	1.76	1.73
31	1.61		1.67		2.15		1.81	1.78		1.87		1.76
Sum	51.12	48.94	52.59	52.28	65.11	59.26	55.57	57.50	48.12	54.31	58.41	54.35

Current Year 2003 | Period 1937–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			20	1.93	! 8	1.53	1.65	4,417	4,194	6,054	711
Feb.			16	2.07	! 1	1.56	1.75	4,228	3,874	5,493	456
Mar.			18	2.41	9	1.44	1.70	4,544	4,746	6,617	1,005
April			19	1.98	11	1.39	1.74	4,517	4,745	6,476	940
May			!18	2.18	! 1	1.87	2.10	5,626	4,963	6,895	804
June			! 1	2.12	!27	1.84	1.98	5,120	4,754	6,883	717
July			3	1.95	19	1.67	1.79	4,801	4,990	8,079	662
Aug.			! 9	2.04	5	1.70	1.85	4,968	5,007	8,400	698
Sept.			! 3	1.84	25	1.16	1.60	4,158	4,745	7,672	721
Oct.			!24	1.87	1	1.50	1.75	4,692	4,994	7,080	843
Nov.			13	2.12	28	1.64	1.95	5,047	4,744	7,367	806
Dec.			! 5	1.84	!19	1.64	1.75	4,696	4,529	6,241	783
Yearly				2.41		1.16	1.80	56,814	56,285	78,573	10,410

ϕ Mean daily ! And other days

09-5250.00 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, 501 meters upstream from the intake of the Colorado River siphon, and 5.1 kilometers downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side, 305 meters upstream from Colorado River below Yuma Main Canal Wasteway, and 10.5 kilometers 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 2003.
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, 367,333 TCM; maximum annual flow, 1,127,040 TCM, 1932; minimum annual flow, 141,728 TCM, 1917. Since 1935: Maximum mean daily discharge, 57.2 CMS, December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.62	0.76	4.28	4.50	1.64	17.8	2.15	0.40	14.5	7.99	6.97	0.28
2	2.41	2.29	3.94	4.53	1.25	19.7	2.27	.28	15.2	8.52	6.34	1.81
3	1.56	1.02	4.02	11.9	1.47	20.9	2.07	.28	14.1	6.00	3.29	.28
4	1.70	1.47	3.17	4.11	1.76	21.2	1.76	.28	14.1	5.04	1.10	.28
5	2.92	1.56	2.78	3.31	1.16	20.6	1.90	.28	14.9	4.22	3.31	.28
6	2.01	7.87	2.97	4.13	1.42	23.8	1.13	.74	14.4	8.16	11.1	.28
7	1.93	1.78	3.51	4.11	2.07	24.6	.57	2.29	13.5	4.59	14.6	.28
8	1.05	1.19	2.78	1.64	2.52	18.5	6.29	17.6	13.4	7.05	14.9	.88
9	.62	1.25	2.75	.37	8.13	.82	5.30	19.5	14.6	6.17	15.7	3.91
10	1.50	1.02	2.80	3.68	5.95	1.16	1.39	17.8	13.0	3.79	10.1	4.13
11	1.39	1.44	3.31	6.12	11.0	3.14	1.93	16.1	12.9	2.63	16.8	9.01
12	2.07	1.36	2.95	8.47	12.1	2.63	2.41	17.0	12.1	5.41	18.2	4.13
13	.93	2.46	3.99	10.3	11.6	2.63	1.30	15.7	12.2	11.8	16.2	.28
14	.48	5.01	4.42	4.73	11.8	2.01	1.19	14.7	11.8	8.52	9.18	4.53
15	.85	6.54	6.12	.91	10.5	2.86	1.36	15.0	17.9	5.41	.28	5.32
16	1.02	6.49	4.25	.28	10.1	2.83	1.13	14.9	16.5	6.32	1.10	2.83
17	1.78	4.16	4.30	.28	12.6	2.12	1.39	13.4	16.7	6.63	11.4	1.84
18	2.01	3.31	5.04	10.2	12.4	2.72	.88	14.1	16.5	3.96	12.4	.28
19	2.63	2.95	4.84	9.77	14.4	3.06	1.19	13.8	17.6	3.60	14.6	1.33
20	2.07	.93	3.71	8.47	12.4	2.32	2.63	8.92	18.9	7.90	15.5	.34
21	1.44	9.63	3.57	2.29	12.4	2.24	1.90	12.7	16.7	3.23	15.5	4.90
22	1.47	1.16	3.12	.28	13.8	2.83	1.33	8.89	16.8	6.23	15.7	1.95
23	1.67	.99	3.82	.28	15.8	2.10	1.59	14.2	15.9	5.95	16.3	6.97
24	1.39	1.13	4.73	3.54	16.9	1.93	1.08	15.2	1.81	2.32	10.8	14.4
25	1.50	2.49	4.93	6.17	17.3	1.70	1.13	14.6	1.76	.28	.28	26.8
26	2.04	2.18	4.39	5.52	19.4	1.76	1.42	15.2	1.90	5.58	.28	13.6
27	1.76	2.07	1.67	7.36	19.9	1.81	1.30	9.91	1.64	6.83	.28	13.6
28	3.00	3.17	1.93	4.62	21.3	2.38	.91	13.6	1.95	8.18	.28	18.6
29	2.15		2.29	3.65	16.5	2.97	1.27	14.2	1.02	7.62	.28	18.5
30	1.47		3.71	3.94	17.5	2.21	1.33	15.2	.48	5.78	.28	18.3
31	1.02		4.16		17.0		.91	15.5		5.55		19.0
Sum	54.46	77.68	114.25	139.46	334.07	217.33	54.41	352.27	354.76	181.26	263.05	198.92

Current Year 2003 | Period 1935-2003

Month	Extreme Gage Meters High	Extreme Gage Meters Low	Extreme-Cubic Meters per Second Day	ϕ High	Day	ϕ Low	Average	Volume-Thousand Cubic Meters Total	Average	Maximum	Minimum
Jan.			1	4.62	14	0.48	1.76	4,705	51,701	136,546	550
Feb.			21	9.63	1	.76	2.77	6,712	42,327	109,952	444
Mar.			15	6.12	27	1.67	3.69	9,871	42,253	111,248	440
April			3	11.9	!16	.28	4.65	12,049	41,627	106,795	402
May			28	21.3	5	1.16	10.8	28,864	49,715	108,892	411
June			7	24.6	9	.82	7.24	18,777	43,116	107,263	422
July			8	6.29	7	.57	1.76	4,701	40,231	112,518	455
Aug.			9	19.5	! 2	.28	11.4	30,436	44,461	110,878	455
Sept.			20	18.9	30	.48	11.8	30,651	48,957	103,193	440
Oct.			13	11.8	25	.28	5.85	15,661	43,452	111,075	699
Nov.			12	18.2	!15	.28	8.77	22,728	44,473	125,198	882
Dec.			25	26.8	! 1	.28	6.42	17,187	50,590	134,203	570
Yearly				26.8		0.28	6.42	202,342	542,903	1,286,335	8,226

ϕ Mean daily ! And other days

09-5211.00 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, 305 meters downstream from the mouth of the Yuma Main Canal Wasteway, 1.0 kilometers downstream from the abandoned gaging station on the Colorado River at Yuma, 8.4 kilometers downstream from the mouth of the Gila River, 31.5 kilometers downstream from Imperial Dam, and 10.3 kilometers upstream from the northerly international boundary. Zero of the gage is 31.09 meters 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 2003. 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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20.1	17.6	23.0	22.3	22.1	36.0	21.0	21.9	34.8	21.7	28.3	18.8
2	23.1	19.0	21.5	22.1	21.9	36.5	20.8	25.5	35.4	27.4	26.2	19.7
3	18.4	18.2	26.9	26.1	23.8	37.1	21.4	22.8	34.6	25.1	30.6	17.9
4	18.5	18.9	33.4	21.3	26.1	38.2	21.8	22.2	34.8	24.6	34.6	17.7
5	19.1	18.3	28.2	26.2	47.6	37.7	21.9	21.9	35.7	23.9	28.2	18.7
6	18.6	23.7	19.6	28.0	37.1	37.9	22.1	20.8	34.3	25.1	29.2	18.0
7	17.8	19.3	23.5	38.8	39.4	38.2	21.6	26.2	33.4	24.6	28.9	17.6
8	17.4	18.9	26.0	36.5	27.8	34.6	25.2	34.0	33.1	24.4	28.9	18.9
9	17.1	19.0	19.4	33.7	29.5	19.5	24.5	37.1	34.0	24.5	30.0	20.9
10	17.5	19.3	19.0	33.4	32.0	19.9	20.6	36.5	33.1	25.1	32.0	21.3
11	21.8	19.3	17.9	23.6	32.0	20.5	21.3	34.0	32.6	25.4	32.6	21.2
12	38.5	19.5	20.1	23.3	30.3	20.3	22.4	34.0	30.6	24.9	32.6	21.4
13	27.0	21.2	21.9	23.3	30.6	21.0	21.4	34.3	31.2	24.9	48.1	21.5
14	17.6	50.7	21.4	22.1	30.9	20.8	21.1	34.0	30.9	24.3	48.4	22.5
15	17.6	59.2	23.4	21.3	32.0	21.3	29.5	34.6	33.4	24.1	36.0	22.3
16	18.7	45.3	23.8	23.3	31.2	22.3	22.6	34.3	33.4	24.2	29.7	19.7
17	18.6	34.8	47.9	26.2	30.9	22.6	23.6	34.0	33.1	22.7	30.3	19.0
18	20.4	49.6	74.2	36.0	32.0	20.1	21.3	34.6	32.0	22.5	30.9	18.1
19	36.2	60.9	43.6	45.9	33.4	21.5	21.3	34.6	33.1	23.0	30.0	17.1
20	45.3	41.9	29.7	57.5	31.7	20.5	23.2	35.7	33.7	22.2	30.0	18.2
21	38.5	32.3	24.5	42.8	31.7	19.8	22.2	35.1	32.0	22.0	29.7	21.2
22	20.5	21.2	23.8	25.5	32.0	21.0	21.5	36.5	32.9	18.9	29.5	20.6
23	19.0	19.9	23.7	36.5	32.6	20.4	21.7	35.4	35.4	21.6	29.7	18.3
24	18.7	20.7	24.1	26.4	33.4	20.0	21.6	35.7	19.2	21.2	26.9	26.3
25	18.9	20.9	26.3	32.3	33.7	19.3	21.4	34.8	18.1	21.8	18.9	33.1
26	19.0	67.4	25.7	26.5	34.8	19.3	27.2	34.8	18.0	22.2	22.2	33.1
27	18.8	78.7	23.8	24.7	35.4	19.5	24.4	35.7	20.9	22.3	20.8	34.0
28	18.5	34.3	20.6	23.1	37.7	19.9	22.8	36.0	20.6	23.1	18.7	32.0
29	17.7		20.9	22.5	36.2	21.2	22.7	35.4	20.0	23.8	18.2	31.4
30	17.8		22.2	22.3	38.2	20.7	22.4	35.7	18.7	25.3	18.5	31.4
31	17.7		22.2		36.2		22.2	36.0		24.6		31.4
Sum	674.4	890.0	822.2	873.5	1,004.2	747.6	698.7	1,004.1	903.0	731.4	878.6	703.3

Current Year 2003 | Period 1951–2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
			ϕ High		ϕ Low			Total	Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			20	45.3	9	17.1	21.8	58,268	254,303	1,317,479	36,828
Feb.			27	78.7	1	17.6	31.8	76,896	208,857	1,228,424	41,083
Mar.			18	74.2	11	17.9	26.5	71,038	231,009	1,610,496	42,683
April			20	57.5	! 4	21.3	29.1	75,470	206,329	1,119,312	41,552
May			5	47.6	2	21.9	32.4	86,763	205,819	1,065,554	43,373
June			! 4	38.2	!25	19.3	24.9	64,593	199,745	1,113,679	36,996
July			15	29.5	10	20.6	22.5	60,368	225,013	2,013,773	37,956
Aug.			9	37.1	6	20.8	32.4	86,754	231,333	2,073,958	41,457
Sept.			5	35.7	26	18.0	30.1	78,019	208,666	1,669,785	53,264
Oct.			2	27.4	22	18.9	23.6	63,193	179,760	1,789,911	43,129
Nov.			14	48.4	29	18.2	29.3	75,911	182,307	1,292,035	42,965
Dec.			27	34.0	19	17.1	22.7	60,765	211,721	1,374,775	40,733
Yearly				78.7		17.1	27.2	858,038	2,544,862	13,065,596	633,707

ϕ Mean daily ! And other days

09-5211.01 COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY
AT YUMA, ARIZONA – STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.085	3.000	3.135	3.120	3.110	3.415	3.085	3.105	3.365	3.070	3.215	3.030
2	3.160	3.040	3.100	3.115	3.110	3.430	3.080	3.190	3.375	3.210	3.165	3.055
3	3.050	3.015	3.225	3.200	3.155	3.440	3.095	3.130	3.360	3.160	3.260	3.010
4	3.055	3.035	3.370	3.090	3.205	3.465	3.105	3.115	3.360	3.150	3.340	3.005
5	3.070	3.015	3.250	3.210	3.625	3.450	3.110	3.105	3.375	3.135	3.205	3.035
6	3.065	3.145	3.050	3.245	3.440	3.455	3.115	3.080	3.350	3.165	3.230	3.010
7	3.045	3.040	3.150	3.470	3.485	3.465	3.100	3.205	3.330	3.150	3.230	3.000
8	3.035	3.025	3.205	3.430	3.245	3.385	3.185	3.375	3.320	3.145	3.225	3.035
9	3.025	3.025	3.040	3.370	3.275	3.045	3.170	3.435	3.340	3.145	3.250	3.090
10	3.040	3.030	3.035	3.360	3.340	3.055	3.075	3.425	3.320	3.160	3.300	3.095
11	3.150	3.030	3.000	3.150	3.340	3.070	3.095	3.370	3.315	3.165	3.305	3.090
12	3.500	3.035	3.060	3.140	3.300	3.065	3.120	3.370	3.275	3.150	3.315	3.095
13	3.255	3.075	3.105	3.140	3.305	3.085	3.095	3.370	3.285	3.155	3.610	3.100
14	3.035	3.660	3.095	3.110	3.315	3.080	3.090	3.370	3.280	3.135	3.615	3.120
15	3.030	3.820	3.140	3.090	3.340	3.095	3.280	3.375	3.330	3.130	3.385	3.115
16	3.055	3.585	3.155	3.140	3.320	3.120	3.125	3.370	3.335	3.135	3.260	3.050
17	3.055	3.375	3.625	3.210	3.310	3.125	3.150	3.365	3.325	3.095	3.275	3.025
18	3.100	3.660	4.075	3.415	3.335	3.060	3.095	3.375	3.305	3.090	3.290	3.000
19	3.445	3.855	3.550	3.605	3.365	3.095	3.095	3.375	3.325	3.105	3.275	2.975
20	3.620	3.525	3.285	3.805	3.330	3.070	3.140	3.390	3.345	3.080	3.275	3.000
21	3.485	3.325	3.170	3.535	3.330	3.055	3.115	3.385	3.305	3.075	3.270	3.080
22	3.095	3.080	3.155	3.190	3.335	3.085	3.100	3.410	3.325	2.995	3.265	3.065
23	3.055	3.050	3.150	3.425	3.350	3.070	3.105	3.385	3.375	3.065	3.275	3.000
24	3.045	3.070	3.160	3.215	3.360	3.060	3.100	3.390	3.010	3.055	3.205	3.190
25	3.050	3.075	3.215	3.340	3.370	3.040	3.095	3.370	2.980	3.065	3.020	3.340
26	3.050	3.955	3.195	3.215	3.390	3.040	3.230	3.375	2.980	3.075	3.110	3.345
27	3.040	4.140	3.150	3.175	3.405	3.045	3.165	3.385	3.055	3.080	3.075	3.360
28	3.035	3.370	3.075	3.135	3.450	3.055	3.130	3.390	3.050	3.095	3.025	3.320
29	3.010		3.080	3.125	3.425	3.090	3.125	3.380	3.035	3.110	3.010	3.305
30	3.010		3.115	3.120	3.460	3.080	3.120	3.385	3.000	3.145	3.020	3.305
31	3.005		3.115		3.420		3.115	3.390		3.130		3.305
Avg.	3.120	3.290	3.200	3.265	3.340	3.170	3.125	3.325	3.260	3.115	3.245	3.115

09-5302.00 YUMA MESA OUTLET DRAIN TO COLORADO RIVER NEAR YUMA, ARIZONA

DESCRIPTION: Venturi meter with recorder 0.5 kilometer from outlet to Colorado River, 0.8 kilometer west of Joe Henry Memorial Park in Yuma, Arizona. Outlet is 2.7 kilometers downstream from the mouth of Yuma Main Canal Wasteway.
RECORDS: Records are furnished by U. S. Geological Survey. Records available: July 1970 through 2003. 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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.12	2.80	2.78	2.89	2.89	2.69	2.58	2.89	2.27	2.29	2.29	2.29
2	2.12	2.80	2.78	2.89	2.89	2.69	2.35	2.89	2.27	2.29	2.29	2.29
3	2.12	2.80	2.78	2.89	2.89	2.69	2.35	2.89	2.27	2.29	2.29	2.29
4	2.12	2.80	2.78	2.89	2.89	2.63	2.35	2.89	2.27	2.29	2.29	2.29
5	2.12	2.80	2.78	2.89	2.89	2.55	2.35	2.89	2.15	2.29	2.29	2.29
6	2.24	2.80	2.78	2.89	2.89	2.55	2.35	2.72	2.15	2.29	2.29	2.29
7	2.38	2.80	2.78	2.89	2.89	2.55	2.35	2.63	2.15	2.29	2.29	2.29
8	2.38	2.80	2.78	2.89	2.89	2.55	2.35	2.63	2.15	2.21	2.29	2.15
9	2.38	2.80	2.78	2.89	2.89	2.55	2.35	2.63	2.15	2.15	2.29	2.01
10	2.55	2.80	2.78	2.89	2.89	2.55	2.35	2.63	2.15	2.15	2.29	1.95
11	2.72	2.80	2.78	2.89	2.89	2.55	2.35	2.44	2.12	2.07	2.21	1.78
12	2.72	2.80	2.80	2.89	2.89	2.55	2.35	2.29	2.27	2.15	2.29	1.87
13	2.72	2.80	2.83	2.89	2.89	2.55	2.35	2.24	2.21	2.15	2.29	1.87
14	2.63	2.72	2.83	2.89	2.89	2.55	2.44	2.21	2.18	2.24	2.29	1.87
15	2.66	2.75	2.83	2.89	2.89	2.55	2.44	2.21	2.18	2.27	2.27	1.84
16	2.72	2.80	2.83	2.89	2.89	2.55	2.44	2.21	2.18	2.24	2.24	1.81
17	2.72	2.80	2.83	2.89	2.89	2.55	2.58	2.21	2.18	2.29	2.29	1.87
18	2.72	2.80	2.83	2.89	2.89	2.55	2.69	2.12	2.18	2.29	2.29	1.87
19	2.72	2.80	2.83	2.89	2.89	2.55	2.69	2.07	2.18	2.29	2.29	1.87
20	2.72	2.80	2.83	2.89	2.89	2.55	2.69	2.07	2.18	2.29	2.29	1.87
21	2.72	2.80	2.83	2.89	2.89	2.55	2.69	2.07	2.18	2.29	2.29	1.87
22	2.72	2.80	2.83	2.89	2.89	2.55	2.69	2.07	2.18	2.29	2.29	1.87
23	2.72	2.80	2.83	2.89	2.83	2.52	2.69	2.07	2.18	2.29	2.29	1.87
24	2.72	2.80	2.83	2.89	2.69	2.41	2.69	2.07	2.18	2.29	2.29	1.87
25	2.72	2.80	2.83	2.89	2.69	2.49	2.69	2.07	2.18	2.29	2.29	1.87
26	2.72	2.80	2.83	2.89	2.69	2.55	2.69	2.07	2.18	2.29	2.29	1.87
27	2.72	2.80	2.83	2.89	2.69	2.55	2.69	2.12	2.18	2.29	2.29	1.87
28	2.69	2.69	2.83	2.89	2.69	2.55	2.69	2.27	2.27	2.29	2.29	1.87
29	2.69		2.83	2.89	2.69	2.55	2.69	2.27	2.27	2.29	2.29	1.87
30	2.63		2.83	2.89	2.69	2.55	2.69	2.27	2.27	2.29	2.29	1.87
31	2.72		2.83		2.69		2.69	2.27		2.29		1.87
Sum	79.35	78.16	87.15	86.70	87.93	76.77	78.34	73.38	65.91	70.01	68.55	61.23

Current Year 2003 | Period 1971-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			!11	2.72	! 1	2.12	2.56	6,856	3,158	7,204	0
Feb.			! 1	2.80	28	2.69	2.79	6,753	2,976	6,753	0
Mar.			!13	2.83	! 1	2.78	2.81	7,530	3,299	7,530	4.9
April			! 1	2.89	! 1	2.89	2.89	7,491	3,352	7,491	299
May			! 1	2.89	!24	2.69	2.84	7,597	3,390	7,617	0
June			! 1	2.69	24	2.41	2.56	6,633	3,132	7,206	0
July			!18	2.69	! 2	2.35	2.53	6,769	3,300	6,796	613
Aug.			! 1	2.89	!19	2.07	2.37	6,340	3,315	7,401	222
Sept.			! 1	2.27	11	2.12	2.20	5,695	3,226	7,253	0
Oct.			! 1	2.29	11	2.07	2.26	6,049	3,340	7,106	194
Nov.			! 1	2.29	11	2.21	2.29	5,923	3,360	7,103	386
Dec.			! 1	2.29	11	1.78	1.98	5,290	3,581	7,580	0
Yearly				2.89		1.78	2.50	78,926	39,429	78,926	2,162

ϕ Mean daily ! And other days

09-5305.00 DRAIN NO. 8-B (ARAZ DRAIN)

DESCRIPTION: This drain discharges into the Colorado River 6.4 kilometers downstream from Colorado River below Yuma Main Canal Wasteway, and 4.0 kilometers 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 2003.
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 975 meters upstream, is affected by backwater from the river during ordinary high stages.
EXTREMES: Mean daily discharge: Maximum, 1.08 CMS on May 31, 2000; minimum no flow several days in February 1966.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.28	0.27	0.28	0.28	0.34	0.34	0.31	0.27	0.37	0.40	0.40	0.37
2	.27	.27	.28	.28	.37	.31	.31	.28	.34	.40	.40	.37
3	.27	.28	.28	.28	.37	.31	.31	.28	.34	.40	.40	.37
4	.27	.28	.27	.28	.37	.27	.31	.28	.34	.42	.40	.37
5	.26	.28	.25	.28	.37	.27	.28	.28	.34	.42	.51	.37
6	.25	.28	.23	.28	.37	.27	.28	.31	.31	.42	.40	.37
7	.25	.27	.24	.28	.37	.27	.28	.31	.31	.42	.40	.37
8	.25	.26	.24	.28	.40	.27	.28	.31	.31	.40	.40	.37
9	.24	.25	.24	.28	.34	.27	.28	.31	.31	.40	.40	.37
10	.24	.25	.24	.28	.34	.28	.24	.28	.31	.40	.40	.37
11	.25	.24	.24	.31	.34	.28	.23	.28	.31	.40	.40	.37
12	.25	.24	.25	.31	.34	.28	.22	.28	.31	.40	.40	.37
13	.25	.25	.25	.31	.34	.28	.22	.28	.34	.40	.40	.34
14	.25	.25	.25	.31	.37	.28	.21	.28	.34	.40	.40	.34
15	.26	.25	.25	.31	.37	.28	.20	.28	.34	.40	.40	.34
16	.26	.25	.26	.31	.37	.28	.20	.31	.37	.40	.40	.34
17	.26	.26	.26	.31	.37	.28	.19	.31	.37	.40	.40	.34
18	.26	.26	.26	.34	.37	.28	.19	.31	.40	.40	.37	.34
19	.26	.26	.27	.34	.37	.28	.20	.31	.40	.40	.37	.34
20	.26	.26	.27	.34	.37	.28	.20	.34	.40	.40	.37	.34
21	.26	.27	.27	.34	.37	.28	.21	.34	.42	.40	.37	.34
22	.26	.27	.27	.34	.37	.28	.22	.34	.42	.40	.37	.34
23	.27	.27	.27	.34	.37	.31	.22	.37	.45	.40	.37	.34
24	.27	.27	.28	.34	.37	.31	.23	.37	.45	.40	.37	.34
25	.27	.28	.28	.34	.37	.31	.23	.37	.45	.40	.37	.34
26	.27	.28	.28	.34	.37	.31	.24	.37	.45	.40	.37	.34
27	.27	.28	.28	.34	.34	.31	.24	.40	.45	.40	.37	.34
28	.27	.28	.28	.34	.34	.31	.25	.37	.45	.40	.37	.34
29	.27		.28	.34	.34	.31	.25	.37	.45	.40	.37	.34
30	.27		.28	.34	.34	.31	.26	.37	.45	.40	.37	.34
31	.27		.28		.34		.26	.37		.40		.34
Sum	8.09	7.41	8.16	9.39	11.17	8.70	7.55	9.93	11.30	12.48	11.72	10.90

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
			Current Year 2003					Period 1948-2003			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			1	0.28	! 9	0.24	0.26	699	518	1,337	48.5
Feb.			! 3	.28	!11	.24	.26	640	435	920	50.0
Mar.			! 1	.28	6	.23	.26	705	507	1,052	77.3
April			!18	.34	! 1	.28	.31	811	516	1,233	82.4
May			8	.40	! 1	.34	.36	965	553	1,551	71.9
June			1	.34	! 4	.27	.29	752	530	1,270	83.1
July			! 1	.31	!17	.19	.24	652	592	1,554	89.8
Aug.			27	.40	1	.27	.32	858	656	1,665	91.0
Sept.			23	.45	! 6	.31	.38	976	670	1,690	66.1
Oct.			! 4	.42	! 1	.40	.40	1,078	753	1,505	68.2
Nov.			5	.51	!18	.37	.39	1,013	696	1,530	71.2
Dec.			! 1	.37	!13	.34	.35	942	602	1,947	52.1
Yearly				0.51		0.19	0.32	10,091	7,028	15,331	955

ϕ Mean daily ! And other days

09-5270.00 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, 33.5 kilometers downstream from the intake at Imperial Dam, 9.7 kilometers west of Yuma, about 1.6 kilometers 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 1.6 kilometers upstream from the northerly international boundary. Water-stage recorder is located in forebay on right bank of the All-American Canal, 168 meters upstream from wasteway gates and 549 meters from the entrance to the power plant. Datum of gage is 45.72 meters above mean sea level. Tailrace gage is on left bank, 207 meters 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 45.07 meters, 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 2003. 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, 281 CMS on October 6, 1985; minimum daily discharge, no flow during long periods.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21.4	51.5	54.1	65.4	40.2	0	31.2	27.4	0	20.0	0	28.2
2	20.4	52.7	55.2	66.6	30.3	0	31.4	24.2	0	0	0	28.9
3	20.4	54.4	54.9	64.3	29.7	0	30.9	24.9	0	0	0	29.2
4	20.3	52.1	49.6	68.5	21.6	0	29.2	21.7	0	0	0	30.0
5	20.3	53.5	50.4	62.0	22.7	0	28.9	23.6	0	0	0	29.7
6	28.6	45.9	60.9	64.6	22.7	0	28.3	23.6	0	0	0	30.3
7	28.1	52.7	59.2	61.7	22.7	0	28.3	19.1	0	0	0	30.3
8	28.9	52.1	56.1	62.0	22.8	0	24.9	5.64	0	0	0	30.3
9	28.6	52.4	64.3	62.0	15.6	27.2	21.4	0	0	0	0	28.6
10	29.7	51.5	67.7	58.3	0	25.2	28.1	0	0	0	0	28.9
11	27.6	51.8	72.8	68.3	0	25.2	27.7	0	0	0	0	30.6
12	28.3	52.1	76.2	69.7	0	26.1	25.7	0	0	0	0	31.7
13	26.7	50.7	70.2	67.7	0	25.5	26.7	0	0	0	0	32.6
14	32.9	52.7	64.0	68.3	0	24.8	26.8	0	0	0	0	33.4
15	32.6	52.7	60.3	70.2	0	24.1	25.7	0	0	0	0	32.3
16	29.5	52.7	58.1	67.1	0	24.6	26.5	0	0	0	0	31.7
17	31.4	53.0	68.5	62.9	0	21.6	23.1	0	0	0	0	29.5
18	30.6	52.7	68.3	63.7	0	26.4	24.6	0	0	0	0	36.5
19	28.2	52.7	62.0	64.6	0	26.9	27.0	0	0	0	0	30.0
20	28.3	52.7	64.3	65.1	0	27.4	24.8	0	0	0	0	28.0
21	28.3	45.6	62.6	58.6	0	27.8	26.2	0	0	0	0	25.1
22	36.5	53.5	63.4	53.8	0	27.0	34.0	0	0	0	0	22.9
23	40.2	53.8	61.7	53.0	0	29.2	41.1	0	0	0	0	27.7
24	40.2	53.5	62.9	51.3	0	33.1	35.4	0	26.6	0	3.54	18.6
25	40.2	54.7	59.5	42.5	0	33.7	33.1	0	26.1	0	26.8	0
26	39.6	56.1	59.8	49.8	0	35.1	27.5	0	27.0	0	20.6	0
27	42.8	57.2	60.9	51.5	0	38.8	30.0	0	26.3	0	24.0	0
28	43.0	53.0	66.0	48.7	0	38.2	31.2	0	27.1	0	27.1	0
29	46.2		64.3	48.4	0	39.9	28.8	0	25.2	0	28.6	0
30	48.1		64.0	48.4	0	42.2	26.3	0	28.3	0	27.6	0
31	51.3		63.7		0		28.9	0		0		0
Sum	999.2	1,470.0	1,925.9	1,809.0	228.3	650.0	883.7	170.14	186.6	20.0	158.24	705.0

Current Year 2003 | Period 1944–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			31	51.3	! 4	20.3	32.2	86,331	114,937	643,620	0
Feb.			27	57.2	21	45.6	52.5	127,008	95,537	579,127	0
Mar.			12	76.2	4	49.6	62.1	166,398	147,033	501,939	0
April			15	70.2	25	42.5	60.3	156,298	152,799	447,013	0
May			1	40.2	!10	0	7.36	19,725	73,987	454,461	0
June			30	42.2	! 1	0	21.7	56,160	113,228	501,523	0
July			23	41.1	9	21.4	28.5	76,352	159,895	512,385	0
Aug.			1	27.4	! 9	0	5.49	14,700	153,326	498,782	0
Sept.			30	28.3	! 1	0	6.22	16,122	97,477	591,679	0
Oct.			1	20.0	! 2	0	.65	1,728	69,369	617,269	0
Nov.			29	28.6	! 1	0	5.27	13,672	69,363	609,196	0
Dec.			18	36.5	!25	0	22.7	60,912	107,642	700,894	0
Yearly				76.2		0	25.2	795,406	1,354,593	6,000,505	0

ϕ Mean daily ! And other days

09-5220.00 COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank and cableway at the point where the northerly international land boundary (California-Baja California) intersects the Colorado River, about 10.3 kilometers downstream from Colorado River below Yuma Main Canal Wasteway, 8.0 kilometers west of Yuma, Arizona, 1.8 kilometers upstream from Morelos Diversion Structure, and about 1.6 kilometers downstream from Rockwood Gate. Zero of the gage is at mean sea level, U. S. C. & G. S. datum. On May 1, 1988, the gage was relocated 52 meters upstream of the old gage on the left bank. Zero of the new gage is at mean sea level, U. S. C. & G. S. datum. Elevation of the new gage is equal to that of the old gage. Station is operated by the United States Section of the Commission.

RECORDS: Based on 185 current meter measurements during the year, 121 by the United States Section, 62 by the Mexican Section of the Commission, 2 by the U. S. Geological Survey, and a continuous record of gage heights. Discharges are computed on the basis of a water-stage recorder 512 meters upstream from the northerly international boundary where the remains of an old weir serve as a partial controlling section. A continuous gage height record is available November 15, 1948 through 2003; daily discharge records available January 1, 1950 through 2003.

REMARKS: Reservoirs on the Colorado River, including Lake Mead above Hoover Dam, where storage began in 1935, reservoirs on the Gila River, and many irrigation diversions and return flows regulate the river flow at this station except for infrequent flood flows. During 2003 the flow at this point represented the total amount of the Colorado River water which crossed the northerly international boundary.

EXTREMES: Prior to January 1935: Maximum instantaneous discharge estimated about 7,080 CMS, January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 16,581,806 TCM; maximum annual flow 31,429,325 TCM, 1907; minimum annual flow 1,448,117 TCM, 1934. Since January 1935: Maximum instantaneous discharge 1,150 CMS on August 20, 1983, minimum discharge, no flow during April 1935.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	45.9	70.0	71.6	91.3	68.1	40.4	52.0	49.3	37.3	39.7	35.0	47.9
2	50.0	71.4	71.3	91.1	55.8	40.8	52.0	49.9	36.5	31.5	32.4	52.5
3	44.6	75.9	79.8	94.0	55.3	42.0	53.4	48.4	37.3	27.1	37.5	52.1
4	44.2	72.6	85.8	92.3	49.7	44.1	52.0	46.1	36.4	27.0	43.7	52.4
5	45.3	68.2	82.1	90.9	75.2	43.7	50.9	47.3	37.0	25.3	34.8	52.5
6	49.9	70.7	81.4	93.2	65.6	43.1	52.1	45.4	36.5	27.9	37.4	52.2
7	48.8	68.5	81.9	103	71.2	44.8	51.0	48.4	36.0	25.5	36.7	52.2
8	49.8	68.9	81.7	100	57.5	42.4	50.8	46.7	36.2	25.1	36.0	54.3
9	48.8	69.8	83.9	97.7	51.2	46.5	47.6	44.1	38.3	25.2	35.5	51.5
10	51.2	68.0	86.9	94.8	40.4	45.0	45.5	44.8	37.0	27.9	39.6	51.5
11	54.4	68.0	90.6	91.3	40.2	45.8	47.1	42.0	38.2	28.9	37.9	51.9
12	69.6	70.6	97.5	92.1	37.9	46.8	46.9	39.7	36.5	27.2	39.3	52.2
13	64.6	67.5	97.8	91.5	38.7	47.7	46.9	40.6	36.5	27.4	54.8	51.3
14	54.6	101	87.5	91.3	38.0	46.8	46.3	39.9	35.6	26.4	58.1	66.6
15	55.3	121	82.3	91.1	41.3	46.6	53.4	40.1	34.4	25.1	50.0	66.5
16	54.0	110	80.3	90.4	38.8	48.2	49.8	39.7	38.3	26.5	41.2	58.1
17	55.3	98.2	121	90.4	38.5	45.5	47.4	40.0	37.6	27.8	40.6	53.9
18	55.9	109	152	103	39.5	42.7	44.6	38.3	36.8	25.0	42.4	59.8
19	64.9	119	110	110	41.9	46.9	46.4	37.0	34.8	26.2	40.8	49.3
20	76.4	107	97.8	123	38.9	48.0	47.2	38.4	37.4	26.1	41.0	44.1
21	77.1	86.5	86.5	108	38.0	47.0	46.8	36.9	35.9	28.1	37.7	45.4
22	58.9	77.8	87.2	79.9	38.1	47.5	53.4	39.5	35.4	21.9	35.0	45.3
23	59.8	79.9	88.3	94.6	38.7	51.1	66.4	37.6	38.7	25.5	34.9	45.8
24	59.9	80.9	90.1	80.3	40.1	58.4	59.2	37.9	43.2	26.6	36.0	46.6
25	59.6	83.4	89.3	79.1	39.6	57.4	55.3	37.4	42.1	25.4	42.2	41.8
26	60.3	120	89.7	79.1	40.7	55.2	55.9	37.5	42.4	25.7	45.2	42.1
27	61.9	139	85.4	79.1	40.8	55.5	56.1	38.7	45.0	22.3	44.8	44.1
28	63.0	98.4	87.6	73.1	44.7	57.5	54.8	36.9	46.5	23.2	45.3	41.7
29	61.4		86.9	68.4	43.1	58.3	50.7	37.4	45.7	25.7	45.6	40.1
30	63.0		90.0	68.3	44.1	59.5	46.4	38.0	43.1	29.2	45.5	40.5
31	63.9		89.5		44.3		50.6	39.8		28.2		40.1
Sum	1,772.3	2,441.2	2,793.7	2,732.3	1,435.9	1,445.2	1,578.9	1,283.7	1,152.6	830.6	1,226.9	1,546.3

	Current Year 2003							Period 1935-2003			
	Extreme Gage Meters		Extreme-Cubic Meters per Second					Volume-Thousand Cubic Meters			
Month	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	32.320	31.780	21	93.1	! 3	43.7	57.2	153,127	478,636	2,027,841	39,348
Feb.	32.455	32.045	27	150	6	62.5	87.2	210,920	413,028	1,705,506	74,502
Mar.	32.335	31.825	18	158	2	67.2	90.1	241,376	443,852	1,642,378	23,930
April	32.115	31.740	!20	132	29	63.3	91.1	236,071	366,466	1,322,616	0
May	31.930	31.320	5	91.4	12	33.1	46.3	124,062	344,323	1,419,735	88,077
June	32.120	31.555	30	63.0	8	22.0	48.2	124,865	343,525	1,629,906	10,485
July	32.200	31.900	23	77.4	10	43.8	50.9	136,417	365,230	2,303,937	30,097
Aug.	31.980	31.720	8	52.8	21	32.2	41.4	110,912	372,134	2,485,718	54,026
Sept.	32.015	31.745	29	48.6	15	27.9	38.4	99,585	331,691	2,286,076	66,424
Oct.	31.835	31.485	1	44.6	22	19.9	26.8	71,764	319,895	2,417,702	52,985
Nov.	32.190	31.685	14	62.2	! 1	29.9	40.9	106,004	354,373	1,889,976	51,070
Dec.	32.215	31.480	15	72.7	17	21.6	49.9	133,600	445,880	2,259,735	51,806
Yearly	32.455	31.320		158		19.9	55.5	1,748,703	4,579,033	19,033,104	890,696

! And other days

09–5220.01 COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY – STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.830	32.140	32.245	31.925	31.740	31.620	31.925	31.915	31.785	31.745	31.780	32.055
2	31.920	32.145	32.245	31.920	31.560	31.615	31.915	31.920	31.765	31.610	31.750	32.135
3	31.800	32.165	32.285	31.950	31.550	31.635	31.935	31.885	31.770	31.540	31.815	32.125
4	31.785	32.145	32.305	31.935	31.520	31.670	31.930	31.860	31.765	31.560	31.925	32.135
5	31.815	32.105	32.295	31.920	31.790	31.675	31.920	31.885	31.765	31.520	31.780	32.140
6	31.910	32.145	32.290	31.935	31.685	31.660	31.945	31.855	31.780	31.560	31.815	32.135
7	31.890	32.130	32.285	32.035	31.740	31.685	31.940	31.900	31.785	31.535	31.820	32.135
8	31.920	32.135	32.285	31.995	31.615	31.675	31.955	31.870	31.785	31.520	31.820	32.175
9	31.895	32.140	32.295	31.955	31.575	31.690	31.945	31.815	31.805	31.540	31.815	32.115
10	31.925	32.130	32.305	31.955	31.385	31.695	31.940	31.850	31.800	31.570	31.895	32.110
11	31.985	32.130	32.260	31.895	31.355	31.705	31.990	31.805	31.815	31.595	31.865	32.115
12	32.160	32.145	32.170	31.925	31.360	31.720	31.990	31.755	31.805	31.555	31.900	32.110
13	32.090	32.130	32.065	31.920	31.415	31.730	31.995	31.765	31.800	31.560	32.070	32.080
14	31.935	32.295	31.915	31.915	31.415	31.725	31.985	31.765	31.800	31.570	32.130	32.080
15	31.960	32.370	31.865	31.915	31.470	31.720	32.145	31.765	31.790	31.575	32.005	32.040
16	31.930	32.370	31.840	31.915	31.465	31.755	32.100	31.760	31.885	31.600	31.875	31.880
17	31.965	32.305	32.145	31.895	31.480	31.765	32.070	31.760	31.845	31.625	31.855	31.795
18	31.985	32.345	32.240	32.030	31.480	31.720	32.025	31.765	31.850	31.605	31.880	31.900
19	32.100	32.360	32.060	32.060	31.505	31.770	32.055	31.755	31.865	31.615	31.860	31.685
20	32.190	32.345	32.005	32.085	31.485	31.800	32.055	31.765	31.905	31.615	31.860	31.610
21	32.215	32.225	31.880	31.985	31.475	31.795	32.050	31.750	31.865	31.610	31.835	31.635
22	32.030	32.170	31.890	31.800	31.475	31.795	32.105	31.775	31.875	31.515	31.800	31.640
23	32.050	32.195	31.910	31.920	31.495	31.835	32.140	31.760	31.915	31.545	31.815	31.645
24	32.055	32.205	31.925	31.815	31.535	31.920	32.085	31.760	31.975	31.580	31.850	31.675
25	32.045	32.225	31.915	31.800	31.545	31.920	32.035	31.760	31.960	31.545	31.965	31.620
26	32.065	32.325	31.910	31.795	31.575	31.930	32.050	31.760	31.955	31.545	32.045	31.635
27	32.100	32.375	31.865	31.815	31.570	31.975	32.050	31.765	31.965	31.570	32.035	31.670
28	32.120	32.290	31.880	31.805	31.620	32.020	32.055	31.740	31.970	31.585	32.050	31.620
29	32.075		31.885	31.760	31.620	32.030	31.965	31.755	31.935	31.630	32.055	31.610
30	32.110		31.905	31.760	31.620	32.055	31.915	31.765	31.835	31.690	32.055	31.625
31	32.125		31.905		31.645		31.970	31.790		31.685		31.620
Avg.	32.000	32.220	32.075	31.910	31.540	31.775	32.005	31.800	31.845	31.585	31.900	31.890

09-5318.50 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 0.8 kilometer downstream from the northerly international boundary and 1.0 kilometer upstream from Morelos Diversion Dam. Prior to July 14, 1971, the wasteway was located 0.6 kilometer 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 35.86 meters 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 2003 obtained by the United States Section; monthly discharge, January 1934 through 1950 by the Bureau of Reclamation.

EXTREMES: Prior to March 1950, maximum monthly discharge 1,127 TCM in January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 2.25 CMS on June 19, 1965, at a maximum gage height of 34.785 meters (old datum); minimum instantaneous discharge, zero during parts of most months.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.15	0.05	0	0	0.09	0.01	0	0	0.10	0.07	0.13
2	.08	.17	.20	0	0	.03	.08	0	0	.20	.08	.01
3	.09	.11	.09	0	0	.01	.04	0	.03	.02	0	.01
4	.01	.11	.01	0	0	0	.14	0	.09	.01	0	.01
5	.01	.11	.01	0	0	0	.01	0	.01	.01	0	.01
6	.03	.17	.01	0	0	0	0	0	0	0	0	0
7	.04	.16	.01	0	0	0	0	0	0	.08	0	0
8	.04	.14	.01	0	0	0	0	0	0	.17	0	0
9	.03	.10	.01	0	0	0	.02	0	0	.06	0	0
10	.02	.12	0	0	0	0	.01	0	0	.01	0	.06
11	.01	.15	0	0	0	0	.01	0	0	.03	0	.04
12	.02	.06	0	0	0	0	.01	0	0	0	0	.07
13	.01	.18	0	.01	0	0	.01	0	0	0	0	.01
14	.02	.19	0	.05	0	0	.01	0	0	.02	.06	.01
15	.04	.17	.08	0	0	0	.01	0	.09	.01	.14	0
16	.04	.10	.05	0	0	0	0	0	.01	0	.10	0
17	.06	.10	0	0	0	.01	0	.05	.01	0	.06	0
18	.06	.25	0	0	0	.01	0	.01	.01	0	.19	.05
19	.01	.19	.04	0	0	.04	0	0	.01	.09	.01	.04
20	.01	.20	0	0	0	.02	0	0	.01	.06	.05	.01
21	.06	.21	0	0	.10	.03	0	0	.01	0	.06	.01
22	.22	.14	0	0	0	.01	0	0	0	0	.06	.01
23	.04	.13	0	0	0	.01	0	0	0	0	.07	.46
24	0	.11	0	0	0	.01	0	0	0	0	.04	.08
25	0	.03	.01	0	0	0	0	0	0	0	.07	.01
26	.12	.02	0	0	0	0	0	0	0	0	.04	.07
27	.05	.02	0	0	0	.10	0	0	0	0	.04	.07
28	.16	.02	0	0	0	.23	0	0	0	0	.01	.04
29	.15		0	0	0	.18	0	0	0	0	.06	.01
30	.18		0	0	0	.01	0	0	.02	0	.04	.01
31	.12		0		0		0	0		0		.01
Sum	1.74	3.61	0.58	0.06	0.10	0.79	0.36	0.06	0.30	0.87	1.25	1.24

Current Year 2003 | Period 1935-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
				High		Low					
	High	Low	Day		Day			Total	Average	Maximum	Minimum
Jan.	0.675	0.005	22	1.33	! 4	0	0.06	150	183	1,127	0
Feb.	.560	0	24	1.01	! 7	0	.13	312	162	493	7.4
Mar.	.360	0	! 3	.52	! 6	0	.02	50.1	166	638	0
April	.145	0	14	.13	! 1	0	0	5.2	161	524	5.2
May	.415	0	21	.64	! 1	0	0	8.6	162	543	8.6
June	.280	0	27	.35	! 1	0	.03	68.3	145	734	19.0
July	.480	0	2	.80	! 5	0	.01	31.1	135	636	0
Aug.	.230	0	17	.26	! 1	0	0	5.2	113	761	0
Sept.	.470	0	15	.78	! 1	0	.01	25.9	125	570	0
Oct.	.310	0	1	.41	! 5	0	.03	75.2	174	604	0
Nov.	.470	0	21	.77	! 1	0	.04	108	181	570	11.1
Dec.	.685	0	1	1.36	! 1	0	.04	107	197	730	16.9
Yearly	0.685	0		1.36		0	0.03	947	1,904	5,551	787

! And other days

09-5220.21 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, 1.8 kilometers downstream from the northerly international boundary, and about 12.1 kilometers 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 0.05 meter 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 2003.

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, 35.91 meters on February 15, 1998; minimum mean daily elevation above mean sea level, 30.94 meters on February 17, 1957.

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.860	32.130	32.240	31.880	31.720	31.620	31.940	31.920	31.800	31.750	31.800	32.070
2	31.940	32.140	32.240	31.870	31.550	31.620	31.930	31.940	31.780	31.620	31.770	32.140
3	31.820	32.160	32.270	31.900	31.530	31.640	31.950	31.910	31.800	31.550	31.820	32.140
4	31.810	32.140	32.290	31.890	31.510	31.670	31.940	31.880	31.800	31.610	31.920	32.140
5	31.840	32.110	32.280	31.880	31.760	31.680	31.930	31.890	31.790	31.540	31.790	32.150
6	31.930	32.130	32.280	31.900	31.660	31.670	31.950	31.870	31.800	31.570	31.830	32.140
7	31.910	32.110	32.280	31.990	31.720	31.690	31.930	31.900	31.810	31.550	31.840	32.140
8	31.940	32.120	32.280	31.950	31.600	31.680	31.950	31.900	31.810	31.530	31.840	32.170
9	31.910	32.130	32.290	31.920	31.570	31.680	31.950	31.840	31.820	31.540	31.830	32.120
10	31.930	32.130	32.300	31.920	31.400	31.700	31.950	31.860	31.820	31.570	31.910	32.120
11	32.000	32.120	32.250	31.860	31.360	31.700	31.990	31.820	31.830	31.600	31.870	32.110
12	32.130	32.130	32.150	31.870	31.360	31.720	32.000	31.780	31.820	31.590	31.890	32.110
13	32.090	32.120	32.040	31.880	31.410	31.730	31.990	31.800	31.810	31.570	32.060	32.070
14	31.940	32.270	31.880	31.880	31.410	31.720	31.990	31.790	31.820	31.580	32.120	32.070
15	31.970	32.330	31.820	31.880	31.470	31.720	32.140	31.780	31.810	31.570	32.020	32.040
16	31.950	32.320	31.800	31.880	31.470	31.750	32.100	31.780	31.850	31.590	31.880	31.870
17	31.980	32.270	32.080	31.870	31.480	31.750	32.070	31.790	31.860	31.620	31.860	31.800
18	31.990	32.300	32.180	31.970	31.480	31.720	32.020	31.780	31.860	31.610	31.900	31.900
19	32.090	32.310	32.010	32.010	31.500	31.770	32.040	31.760	31.890	31.620	31.870	31.680
20	32.180	32.300	31.960	32.030	31.490	31.800	32.030	31.770	31.930	31.620	31.870	31.640
21	32.190	32.200	31.830	31.950	31.480	31.780	32.060	31.760	31.910	31.610	31.850	31.620
22	32.030	32.140	31.840	31.770	31.470	31.790	32.060	31.780	31.890	31.530	31.820	31.640
23	32.050	32.170	31.860	31.880	31.500	31.830	32.060	31.770	31.930	31.550	31.820	31.640
24	32.050	32.190	31.880	31.790	31.550	31.910	32.020	31.770	31.990	31.590	31.850	31.670
25	32.050	32.210	31.870	31.760	31.550	31.910	32.020	31.770	31.970	31.560	31.970	31.620
26	32.060	32.290	31.870	31.760	31.580	31.930	32.040	31.770	31.970	31.570	32.050	31.630
27	32.090	32.340	31.810	31.780	31.580	31.970	32.030	31.790	31.980	31.590	32.040	31.670
28	32.120	32.270	31.830	31.770	31.620	32.020	32.020	31.770	31.970	31.600	32.050	31.630
29	32.060		31.830	31.740	31.630	32.030	31.970	31.770	31.940	31.650	32.060	31.630
30	32.100		31.850	31.740	31.630	32.060	31.930	31.780	31.850	31.700	32.060	31.620
31	32.120		31.860		31.650		31.980	31.800		31.710		31.610
Avg.	32.005	32.200	32.040	31.870	31.540	31.775	32.000	31.815	31.865	31.595	31.910	31.890

09-5220.30 INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

DESCRIPTION: Water-stage recorder and staff gage on left bank of Intake Canal, 61 meters downstream from the intake at Morelos Dam, 410 meters upstream from the point where it joins the old Alamo Canal, 3.5 kilometers upstream from Matamoros Check, and about 1.6 kilometers south of the northerly international boundary. The zero of the gage is 0.05 meter below mean sea level, U. S. C. & G. S. datum.

RECORDS: The records are deduced from the flows arriving in the limitrophe section of the Colorado River at the northerly international boundary, the flows that pass downstream from the structure, and leakage through the structure. Records available: November 8, 1950 through 2003. Records obtained and furnished by the Mexican Section of the Commission.

REMARKS: The canal is operated with a minimum hydraulic slope to permit the maximum retention of silt above Matamoros Check, and the lower velocities in the canal do not permit measuring the flow with a current meter. Records for this station show the amounts of Colorado River water diverted at Morelos Diversion Dam to the Intake Canal and thence to the Alamo Canal for use in Mexico. Under conditions set forth in the 1944 Water Treaty, water for use in Mexico may be diverted to the Alamo Canal in the United States directly from the river at Rockwood Heading or by means of Imperial Dam, the All-American Canal, and certain facilities of the Imperial Irrigation District. No diversions of this nature have been made during the years 1951 through 2003, and consequently the records reported below show the total water diverted from the Colorado River to the Alamo Canal during those years. Mexico occasionally pumps water from the Colorado River at other points below Morelos Dam when water is available in the channel.

EXTREMES: Maximum mean daily discharge, 187 CMS, July 12 and 14, 1983; maximum mean daily gage height, 32.96 meters October 30, 1993 and other days. Minimum daily discharge, no flow on various occasions.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	45.9	70.2	71.6	91.3	68.1	40.5	52.0	49.3	37.3	39.8	35.1	48.0
2	50.1	71.6	71.5	91.1	55.8	40.8	52.1	49.9	36.5	31.7	32.5	52.5
3	44.7	76.0	79.9	94.0	55.3	42.0	53.4	48.4	37.3	27.1	37.5	52.1
4	44.2	72.7	85.8	92.3	49.7	44.1	52.1	46.1	36.5	27.0	43.7	52.4
5	45.3	68.3	82.1	90.9	67.3	43.7	50.9	47.3	37.0	25.3	34.8	52.5
6	49.9	70.9	81.4	93.2	65.6	43.1	52.1	45.4	36.5	27.9	37.4	52.2
7	48.8	68.7	81.9	103	71.2	44.8	51.0	48.4	36.0	25.6	36.7	52.2
8	49.8	69.0	81.7	100	57.5	42.4	50.8	46.7	36.2	25.3	36.0	54.3
9	48.8	69.9	83.9	97.7	51.2	46.5	47.6	44.1	38.3	25.3	35.5	51.5
10	51.2	68.1	86.9	94.8	40.4	45.0	45.5	44.8	37.0	27.9	39.6	51.6
11	54.4	68.2	90.6	91.3	40.2	45.8	47.1	42.0	38.2	28.9	37.9	51.9
12	64.4	70.7	97.5	92.1	37.9	46.8	46.9	39.7	36.5	27.2	39.3	52.3
13	64.6	67.7	97.8	91.5	38.7	47.7	46.9	40.6	36.5	27.4	54.8	51.3
14	54.6	86.1	87.5	91.3	38.0	46.8	46.3	39.9	35.6	26.4	58.2	66.6
15	55.3	99.5	82.4	91.1	41.3	46.6	53.4	40.1	34.5	25.1	50.1	66.5
16	54.0	98.3	80.3	90.4	38.8	48.2	49.8	39.7	38.3	26.5	41.3	58.1
17	55.4	90.9	121	90.4	38.5	45.5	47.4	40.0	37.6	27.8	40.7	53.9
18	56.0	88.4	128	99.8	39.5	42.7	44.6	38.3	36.8	25.0	42.6	59.8
19	63.0	99.4	110	107	41.9	46.9	46.4	37.0	34.8	26.3	40.8	49.3
20	72.3	98.8	97.8	114	38.9	48.0	47.2	38.4	37.4	26.2	41.0	44.1
21	77.2	86.7	86.5	103	38.1	47.0	46.8	36.9	35.9	28.1	37.8	45.4
22	59.1	77.9	87.2	79.9	38.1	47.5	53.4	39.5	35.4	21.9	35.1	45.3
23	59.8	80.0	88.3	94.6	38.7	51.1	66.4	37.6	38.7	25.5	35.0	46.3
24	59.9	81.0	90.1	80.3	40.1	58.4	59.2	37.9	43.2	26.6	36.0	46.7
25	59.6	83.4	89.3	79.1	39.6	57.4	55.3	37.4	42.1	25.4	42.3	41.8
26	60.4	88.7	89.7	79.1	40.7	55.2	55.9	37.5	42.4	25.7	45.2	42.2
27	61.9	95.8	85.4	79.1	40.8	55.6	56.1	38.7	45.0	22.3	44.8	44.2
28	63.2	89.8	87.6	73.1	44.7	57.7	54.8	36.9	46.5	23.2	45.3	41.7
29	61.5		86.9	68.4	43.1	58.5	50.7	37.4	45.7	25.7	45.7	40.1
30	63.2		90.0	68.3	44.1	59.5	46.4	38.0	43.1	29.2	45.5	40.5
31	64.0		89.5		44.3		50.6	39.8		28.2		40.1
Sum	1,762.5	2,256.7	2,770.1	2,712.1	1,428.1	1,445.8	1,579.1	1,283.7	1,152.8	831.5	1,228.2	1,547.4

Current Year 2003 | Period 1950–2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			21	77.2	4	44.2	56.9	152,280	119,888	275,305	1,192
Feb.			15	99.5	13	67.7	80.6	194,979	129,378	292,464	11,387
Mar.			18	128	2	71.5	89.4	239,337	237,091	435,370	120,761
April			20	114	30	68.3	90.4	234,325	253,148	404,698	189,700
May			7	71.2	12	37.9	46.1	123,388	147,329	286,174	81,665
June			30	59.5	1	40.5	48.2	124,917	193,267	332,588	117,400
July			23	66.4	18	44.6	50.9	136,434	254,370	439,171	136,434
Aug.			2	49.9	!21	36.9	41.4	110,912	242,534	420,673	110,912
Sept.			28	46.5	15	34.5	38.4	99,602	153,808	336,960	66,156
Oct.			1	39.8	22	21.9	26.8	71,842	93,097	280,817	12,894
Nov.			14	58.2	2	32.5	40.9	106,116	87,828	258,388	9,271
Dec.			14	66.6	!29	40.1	49.9	133,695	118,314	247,899	10,886
Yearly				128		21.9	54.8	1,727,827	2,032,993	3,451,533	1,569,404

ϕ Mean daily ! And other days

09-5220.31 INTAKE CANAL AT MORELOS DIVERSION STRUCTURE – STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.840	32.100	32.240	31.850	31.690	31.590	31.910	31.890	31.770	31.720	31.830	32.040
2	31.910	32.100	32.240	31.840	31.520	31.590	31.900	31.910	31.750	31.590	31.790	32.110
3	31.800	32.130	32.240	31.870	31.500	31.610	31.920	31.880	31.770	31.510	31.790	32.110
4	31.800	32.110	32.260	31.860	31.480	31.640	31.910	31.850	31.770	31.530	31.890	32.110
5	31.810	32.080	32.250	31.850	31.730	31.650	31.900	31.860	31.770	31.510	31.760	32.120
6	31.900	32.100	32.250	31.870	31.630	31.640	31.920	31.840	31.770	31.540	31.800	32.110
7	31.880	32.080	32.250	31.960	31.690	31.660	31.900	31.870	31.780	31.520	31.810	32.110
8	31.910	32.090	32.250	31.920	31.570	31.650	31.920	31.870	31.790	31.500	31.810	32.140
9	31.880	32.100	32.260	31.890	31.540	31.660	31.920	31.810	31.790	31.510	31.800	32.090
10	31.900	32.100	32.270	31.900	31.370	31.670	31.920	31.820	31.790	31.540	31.880	32.090
11	31.970	32.090	32.220	31.830	31.330	31.670	31.960	31.790	31.800	31.570	31.840	32.080
12	32.100	32.100	32.120	31.850	31.330	31.690	31.970	31.750	31.790	31.560	31.860	32.080
13	32.060	32.090	32.010	31.860	31.380	31.700	31.960	31.770	31.790	31.540	32.030	32.040
14	31.910	32.240	31.850	31.850	31.380	31.690	31.960	31.760	31.790	31.550	32.090	32.040
15	31.940	32.300	31.790	31.850	31.440	31.690	32.110	31.750	31.780	31.540	31.990	32.010
16	31.920	32.290	31.770	31.850	31.440	31.720	32.070	31.750	31.820	31.560	31.850	31.840
17	31.950	32.240	32.050	31.840	31.450	31.720	32.040	31.760	31.830	31.590	31.830	31.770
18	31.960	32.270	32.140	31.940	31.450	31.690	31.990	31.750	31.830	31.580	31.870	31.870
19	32.060	32.280	31.980	31.980	31.470	31.740	32.010	31.730	31.860	31.580	31.840	31.650
20	32.150	32.270	31.930	32.000	31.460	31.770	32.000	31.740	31.900	31.590	31.840	31.610
21	32.160	32.170	31.800	31.930	31.450	31.750	32.030	31.730	31.880	31.580	31.820	31.600
22	31.990	32.110	31.810	31.740	31.440	31.760	32.030	31.750	31.860	31.500	31.790	31.610
23	32.020	32.140	31.830	31.860	31.470	31.800	32.030	31.740	31.900	31.520	31.790	31.610
24	32.020	32.160	31.850	31.760	31.520	31.880	31.990	31.740	31.960	31.560	31.830	31.640
25	32.020	32.180	31.850	31.740	31.520	31.880	31.990	31.740	31.940	31.530	31.940	31.590
26	32.030	32.260	31.840	31.730	31.550	31.900	32.020	31.740	31.940	31.540	32.020	31.600
27	32.060	32.310	31.830	31.750	31.550	31.940	32.000	31.760	31.950	31.560	32.010	31.640
28	32.090	32.240	31.800	31.740	31.590	31.990	31.990	31.740	31.940	31.570	32.030	31.600
29	32.040		31.810	31.710	31.600	32.000	31.940	31.740	31.910	31.620	32.030	31.600
30	32.070		31.830	31.710	31.600	32.030	31.900	31.750	31.820	31.670	32.030	31.590
31	32.090		31.830		31.620		31.950	31.770		31.680		31.580
Avg.	31.975	32.170	32.015	31.845	31.510	31.745	31.970	31.785	31.835	31.565	31.885	31.860

09-5220.41 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, 1.8 kilometers downstream from the northerly international boundary, and about 12.1 kilometers 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 0.05 meter 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 2003.
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, 35.87 meters on February 15, 1998; minimum mean gage height, 29.06 meters from October 3, 1996 to January 13, 1997.

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
2	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
3	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.350	30.500
4	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
5	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
6	30.500	30.500	30.500	30.500	30.520	30.500	30.500	30.500	30.500	30.500	30.500	30.500
7	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
8	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
9	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
10	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
11	30.540	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
12	30.540	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
13	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
14	30.500	30.570	30.500	30.500	30.500	30.530	30.500	30.500	30.500	30.500	30.500	30.500
15	30.500	30.670	30.500	30.500	30.500	30.560	30.500	30.500	30.500	30.500	30.500	30.500
16	30.500	30.600	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
17	30.500	30.530	30.520	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
18	30.500	30.560	30.670	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
19	30.530	30.660	30.550	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
20	30.590	30.590	30.500	30.600	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
21	30.510	30.510	30.500	30.600	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
22	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
23	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
24	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
25	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.550	30.500	30.500	30.500
26	30.500	30.720	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
27	30.500	30.870	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
28	30.500	30.610	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
29	30.500		30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
30	30.500		30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
31	30.500		30.500		30.500		30.500	30.500		30.500		30.500
Avg.	30.505	30.550	30.510	30.505	30.500	30.505	30.500	30.500	30.500	30.500	30.495	30.500

09-5319.00 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, 1.8 kilometers 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 2003.

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 19.3 kilometers, 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, 3.1 kilometers 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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

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

Current Year 2003 | Period 1966-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
				High		Low					
	High	Low	Day		Day			Total	Average	Maximum	Minimum
Jan.	0	0	! 1	0	! 1	0	0	0	6,380	23,088	0
Feb.	0	0	! 1	0	! 1	0	0	0	4,904	20,959	0
Mar.	0	0	! 1	0	! 1	0	0	0	3,460	22,827	0
April	0	0	! 1	0	! 1	0	0	0	3,100	22,944	0
May	0	0	! 1	0	! 1	0	0	0	4,672	23,548	0
June	0	0	! 1	0	! 1	0	0	0	3,678	23,135	0
July	0	0	! 1	0	! 1	0	0	0	3,377	23,370	0
Aug.	0	0	! 1	0	! 1	0	0	0	3,433	23,668	0
Sept.	0	0	! 1	0	! 1	0	0	0	4,825	22,787	0
Oct.	0	0	! 1	0	! 1	0	0	0	6,791	23,683	0
Nov.	0	0	! 1	0	! 1	0	0	0	6,438	22,792	0
Dec.	0	0	! 1	0	! 1	0	0	0	5,923	23,585	0
Yearly	0	0		0		0	0	0	56,981	264,928	0

! And other days

09-5325.00 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, 6.9 kilometers downstream from the northerly international boundary and 5.1 kilometers 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. Since June 1986, zero of the gage is 34.05 meters above mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 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, January 1951 through 2003, obtained by the United States Section; monthly discharge, January 1924 through 1950 by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 12,014 TCM in August 1940; minimum monthly discharge, zero in April 1941. Since January 1, 1951, maximum instantaneous discharge, 22.7 CMS on December 3, 1961, at a maximum gage height of 35.845 meters; minimum instantaneous discharge, zero during parts of most years.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.88	0.98	0.17	0.04	0.01	0.01	0.02	0.05	0.28	1.26	0.71	1.06
2	.39	.60	.02	.02	.01	.14	.11	.01	.34	.18	.67	.28
3	.16	.25	.13	.02	.06	.18	.43	.65	.05	.01	.25	.19
4	.26	.02	.15	.02	.33	.12	.11	.31	.23	.28	.02	.16
5	.49	.02	.09	.05	.14	.02	.42	.02	.82	1.26	.04	.02
6	.49	.02	.10	.02	.01	.07	.20	.01	.25	.65	.79	.27
7	.36	.10	.19	.18	.01	.32	.11	.01	.20	.24	.39	.33
8	.76	.16	.02	.03	.01	.27	.02	.01	.06	1.20	.50	.25
9	1.12	.80	.02	.02	.01	.13	.07	.02	.03	.51	.58	.13
10	.96	.60	.02	.02	.16	.11	.20	.13	.02	.13	.75	.02
11	1.30	.02	.02	.05	.03	.08	.17	.03	.04	.49	.53	.29
12	1.39	.10	.01	.11	.04	.06	.65	.14	.06	.57	1.09	.28
13	.80	.24	.01	.37	.01	.03	.02	.04	.05	.21	.01	.22
14	1.14	.39	.01	.38	.01	.07	.02	.13	.09	.12	.04	.47
15	.36	.28	.03	.02	.42	.76	.02	.02	.38	.42	.18	.02
16	1.10	.08	.70	.05	.42	.08	.24	.08	.71	.77	.12	.19
17	.36	.28	.50	.25	.13	.05	.39	.04	.30	.01	.04	.73
18	.02	.28	.05	.25	.07	.06	.77	.16	.14	.17	.29	.04
19	.47	.07	1.03	.01	.12	.31	.25	.20	.23	.32	.51	.55
20	.17	.09	.59	.02	.30	.01	.21	.14	.04	.62	.42	.48
21	.04	.02	.04	.14	.05	.05	.07	.39	.02	.86	.20	.23
22	.43	.02	.10	.01	.29	.12	.08	.25	.40	.60	.34	.06
23	.05	.04	.31	.03	.14	.20	.13	.37	.97	.06	.33	.02
24	.38	.08	.55	.01	.18	.02	.02	.02	.71	.02	.23	.47
25	.07	.16	.18	.01	.01	.02	.27	.07	.11	.34	.28	.09
26	.96	.44	.03	.06	.15	.01	.02	.01	.35	.40	.02	.15
27	.09	.11	.06	.08	.45	.01	.03	.23	1.12	.56	.44	.08
28	.02	.14	.11	.32	.03	.01	.01	.05	.77	.46	.64	.52
29	.04		.02	.19	.01	.01	.01	.06	.77	.85	.22	.30
30	.20		.18	.02	.29	.01	.02	.18	1.03	.29	1.04	.39
31	.18		.12		.52		.03	.54		.48		.98
Sum	15.44	6.39	5.56	2.80	4.42	3.34	5.12	4.37	10.57	14.34	11.67	9.27

Current Year 2003 | Period 1935–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second					Volume–Thousand Cubic Meters			
	High	Low	High Day	High	Low Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.640	0.015	11	2.75	! 3	0.01	0.50	1,334	2,523	11,804	0
Feb.	.600	.020	1	2.75	13	.01	.23	552	2,056	10,398	17.9
Mar.	.775	.015	7	3.73	! 7	.01	.18	480	1,932	7,685	51.8
April	.340	.010	14	1.79	! 1	.01	.09	242	1,763	7,771	0
May	.510	0	15	2.16	! 5	0	.14	382	2,088	11,496	10.2
June	.535	.010	19	2.21	! 1	.01	.11	289	1,986	9,177	13.0
July	.570	.010	12	2.30	! 1	.01	.17	442	2,017	10,263	11.2
Aug.	.500	.005	12	2.14	26	0	.14	378	1,744	12,014	18.1
Sept.	.785	.010	23	3.81	! 1	.01	.35	913	1,313	7,574	7.4
Oct.	.865	.010	16	4.46	! 2	.01	.46	1,239	1,812	7,006	14.7
Nov.	.630	.015	7	2.71	! 1	.01	.39	1,008	2,173	10,139	23.2
Dec.	.730	.015	1	3.39	! 1	.01	.30	801	2,770	11,632	51.8
Yearly	0.865	0		4.46		0	0.26	8,060	24,177	102,255	707

! And other days

09-5221.00 COLORADO RIVER AT ELEVEN MILE GAGE – STAGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, 6.9 kilometers downstream from northerly international boundary, 5.1 kilometers downstream from Morelos Dam, about 15 meters downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 17.7 kilometers downstream from Yuma, Arizona, along the river levee. The zero of the gage is at mean sea level, U. S. C. & G. S. datum. On April 1, 1988, the gage was relocated 399 meters downstream of the old gage on the left bank. Zero of the new gage is at mean sea level, U. S. C. & G. S. datum. Elevation of the new gage is 0.12 meter lower than the old gage. On August 1, 1993, the gage was relocated 81.0 meters upstream of the original 1947 gage. The datum is equal to the 1947 gage.

RECORDS: Mean daily gage heights based on continuous water-stage records. Records available: Continuous record of gage heights, November 1947 through 2003; 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, 33.840 meters on February 18, 1998; minimum mean daily gage height, 27.630 meters on April 7, 1999.

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	27.800	27.825	27.855	27.745	27.765	27.755	27.765	27.830	27.835	28.005	28.040	28.165
2	27.750	27.785	27.800	27.735	27.765	27.765	27.780	27.825	27.865	27.855	28.030	28.070
3	27.720	27.760	27.790	27.740	27.775	27.765	27.805	27.875	27.820	27.805	28.000	28.060
4	27.730	27.725	27.785	27.740	27.805	27.765	27.775	27.850	27.875	27.825	27.965	28.060
5	27.750	27.725	27.775	27.740	27.915	27.750	27.820	27.815	27.930	27.955	27.970	28.045
6	27.760	27.730	27.775	27.735	27.780	27.755	27.785	27.815	27.880	27.900	28.050	28.050
7	27.745	27.740	27.780	27.755	27.775	27.785	27.775	27.815	27.880	27.860	28.030	28.085
8	27.785	27.750	27.760	27.740	27.775	27.780	27.755	27.830	27.845	27.950	28.045	28.135
9	27.825	27.820	27.760	27.740	27.770	27.770	27.765	27.830	27.835	27.875	28.060	28.090
10	27.795	27.795	27.760	27.745	27.780	27.765	27.785	27.845	27.830	27.770	28.055	28.045
11	27.845	27.735	27.755	27.745	27.770	27.760	27.785	27.830	27.840	27.810	28.065	28.075
12	27.970	27.750	27.750	27.755	27.775	27.755	27.840	27.860	27.840	27.880	28.140	28.070
13	27.990	27.765	27.740	27.785	27.765	27.755	27.770	27.860	27.845	27.850	28.005	28.065
14	27.825	28.235	27.730	27.780	27.765	27.755	27.775	27.865	27.840	27.890	28.015	28.090
15	27.750	29.025	27.725	27.750	27.810	27.815	27.780	27.845	27.870	27.900	28.035	28.045
16	27.810	28.350	27.790	27.755	27.805	27.750	27.805	27.850	27.920	27.895	28.015	28.050
17	27.760	28.085	27.865	27.775	27.775	27.750	27.820	27.845	27.880	27.735	28.000	28.150
18	27.730	28.115	28.740	27.820	27.770	27.755	27.855	27.855	27.855	27.685	28.025	28.035
19	27.890	28.995	28.420	27.940	27.775	27.785	27.805	27.845	27.865	27.650	28.055	28.110
20	28.515	28.325	27.865	28.360	27.795	27.745	27.810	27.840	27.840	27.775	28.055	28.080
21	28.045	27.880	27.790	28.510	27.765	27.750	27.790	27.865	27.835	27.995	28.025	28.055
22	27.785	27.765	27.785	27.805	27.790	27.760	27.795	27.855	27.875	27.985	28.035	28.025
23	27.730	27.750	27.795	27.785	27.780	27.775	27.810	27.865	27.945	27.925	28.035	28.015
24	27.755	27.750	27.820	27.775	27.785	27.745	27.795	27.830	27.910	27.925	28.030	28.080
25	27.725	27.755	27.770	27.765	27.760	27.750	27.830	27.840	27.830	27.955	28.040	28.035
26	27.815	28.935	27.740	27.770	27.775	27.750	27.795	27.825	27.855	27.960	28.025	28.040
27	27.740	29.730	27.735	27.780	27.800	27.755	27.805	27.860	27.930	27.980	28.065	28.025
28	27.720	28.550	27.745	27.795	27.760	27.755	27.800	27.830	27.900	27.975	28.125	28.070
29	27.725		27.740	27.785	27.755	27.760	27.805	27.815	27.895	28.020	28.055	28.055
30	27.755		27.745	27.765	27.780	27.760	27.815	27.830	27.955	27.975	28.160	28.060
31	27.740		27.755		27.810		27.820	27.870		27.980		28.145
Avg.	27.815	28.075	27.825	27.815	27.785	27.760	27.795	27.840	27.870	27.890	28.040	28.070

09-5330.00 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 the east side of the levee at the site used prior to May 1, 1971. The site used May 1, 1971 to September 20, 1977 was located 61 meters downstream from present site on the west side of levee. This wasteway is located in Arizona, 29.8 kilometers downstream from the northerly international boundary, 28.0 kilometers downstream from Morelos Diversion Dam, and 3.5 kilometers 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 2003, 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 3,528 TCM in January 1946; minimum monthly discharge, 150 TCM in September 1950. Since January 1, 1951, maximum instantaneous discharge, 2.89 CMS on January 24, 1954, at a maximum gage height of 29.095 meters (old datum); minimum instantaneous discharge, zero during a part of most months.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.25	0	0.46	0	0.15	0	0	0.08	0.30	0.19	0	0.24
2	.20	0	.45	0	.55	0	0	.11	.69	0	.09	.01
3	.45	0	.34	0	.60	0	0	.47	.19	0	.18	.01
4	.39	0	.12	0	.37	0	0	.13	.25	.03	0	.01
5	.16	0	.06	0	.39	0	0	.12	.61	.02	0	0
6	.27	0	.04	.21	.32	0	0	.01	.20	.33	0	.28
7	.25	0	.02	.03	.12	0	0	.03	.22	.24	.14	.30
8	.47	0	0	.02	.32	0	0	0	.46	.03	.15	.32
9	.38	0	.07	0	.56	0	0	0	.10	.02	.11	.29
10	.31	0	.12	0	.40	0	0	0	.07	.13	.20	.28
11	.42	0	.22	0	.44	0	0	0	.15	.36	.20	.29
12	.66	0	.37	.44	.22	0	0	0	.28	.03	.35	.03
13	.39	.09	.06	.37	.01	0	0	0	.13	.08	.16	.16
14	.50	.69	0	0	.15	0	0	0	.05	.02	.04	.35
15	.21	.68	0	.03	.25	0	0	0	.22	.06	.25	.26
16	.39	.46	0	.16	.33	0	0	0	.01	0	.08	.11
17	.11	.39	0	.04	.56	0	0	0	.08	0	.07	.13
18	.16	.32	0	.38	.50	0	0	0	.07	0	.09	.17
19	0	.54	0	.18	.41	0	0	0	0	0	.19	.24
20	0	.37	.09	.37	.53	0	0	0	0	0	.02	.08
21	0	.53	.10	.11	.44	0	0	0	0	0	0	.28
22	0	.25	0	0	.38	0	0	0	0	0	0	.09
23	0	.81	0	0	.01	0	0	0	.13	0	0	0
24	0	.70	0	0	0	0	0	0	.22	0	0	.01
25	0	.07	0	0	0	0	0	0	.06	0	.24	0
26	0	.17	0	0	0	0	0	0	.23	0	.15	.03
27	0	.78	0	0	0	0	.09	0	.24	0	.20	0
28	0	.34	0	0	0	0	.49	0	.17	0	.21	.06
29	0		0	0	0	0	.58	0	.04	0	.30	.23
30	0		0	0	0	0	.52	0	.14	0	.14	.49
31	0		0		0		.24	.07		0		.55
Sum	5.97	7.19	2.52	2.34	8.01	0	1.92	1.02	5.31	1.54	3.56	5.30

Current Year 2003 | Period 1939-2003

Month	Extreme Gage Meters High	Extreme Gage Meters Low	Extreme-Cubic Meters per Second Day	Extreme-Cubic Meters per Second High	Extreme-Cubic Meters per Second Day	Extreme-Cubic Meters per Second Low	Average	Volume-Thousand Cubic Meters Total	Volume-Thousand Cubic Meters Average	Volume-Thousand Cubic Meters Maximum	Volume-Thousand Cubic Meters Minimum
Jan.	0.545	0	8	1.01	! 2	0	0.19	516	621	3,528	0
Feb.	.590	0	23	1.14	! 1	0	.26	621	529	3,096	0
Mar.	.470	0	1	.80	! 7	0	.08	218	482	2,048	0
April	.560	0	15	1.06	! 1	0	.08	202	514	2,393	0
May	.525	0	20	.96	! 1	0	.26	692	630	3,047	0
June	.005	0	! 1	0	! 1	0	0	0	543	2,899	0
July	.545	0	29	1.00	! 1	0	.06	166	472	2,405	0
Aug.	.495	0	3	.87	! 7	0	.03	88.1	490	3,121	0
Sept.	.550	0	5	1.03	!11	0	.18	459	444	2,689	0
Oct.	.560	0	11	1.06	! 1	0	.05	133	588	2,590	0
Nov.	.435	0	27	.72	! 1	0	.12	308	711	2,936	0
Dec.	.485	0	30	.85	! 1	0	.17	458	734	3,306	0
Yearly	0.590	0		1.14		0	0.12	3,861	6,758	30,060	0

! And other days

09-5345.00 EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir located about 91 meters north of the international boundary near San Luis, Arizona and 2.4 kilometers east of the Colorado River. From September 28, 1977 to April 6, 1978, recorder was moved west 31 meters to a temporary bypass channel. On April 7, 1978, recorder was moved back to its original site. On August 17, 1992, flow ceased through the wasteway due to construction upstream of the gage. The gage was relocated 20 meters west of the original site providing continuous record since December 21, 1992.
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 2003. 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 land boundary at San Luis.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.08	0.11	0.01	0.12	0.02	0	0.39	0.08	0.05	0.17	0.09	0.16
2	.12	0	.01	.04	.09	.01	.27	.04	.03	.14	0	.07
3	.03	.06	0	.29	.03	0	.11	.22	.04	.14	0	.03
4	.01	.01	0	.18	.06	.08	.13	.30	.04	.12	.06	.03
5	0	0	.11	.02	.19	.04	.12	.05	.09	.16	.10	.02
6	0	.22	.11	.08	.04	.08	.04	.03	.14	.18	0	.12
7	.07	.02	.12	.05	.13	.14	.09	.02	.03	.07	.11	.04
8	.27	.06	.14	.35	.59	.07	.10	.01	.03	.02	.10	.07
9	.04	.46	.20	0	.23	.01	.11	.33	.29	.12	.19	.02
10	.15	.35	.18	0	.06	.08	.25	.07	.04	.05	.02	.01
11	.05	.13	.01	0	.09	.01	.28	.24	.02	.08	.28	.17
12	0	.03	0	.20	.13	0	.24	.05	0	.05	.01	.27
13	0	.41	.03	.40	.03	.01	.32	.37	.15	.03	.04	.03
14	0	.16	.04	.03	.03	.16	.36	.24	.06	.03	.01	.14
15	0	.01	.02	.02	.04	.01	.24	.37	.15	.01	.05	.01
16	.01	0	.11	.03	.19	0	.07	.26	.01	.07	0	.01
17	.17	.24	0	.05	.06	0	.07	.03	.01	.11	.01	.04
18	.13	.30	0	.02	.11	.05	.06	.02	.08	.11	.39	.11
19	.11	.05	0	.08	.19	.06	.14	.02	.04	.04	.02	.02
20	.10	.22	0	.11	.31	.21	.05	.16	.20	.09	.27	.04
21	.05	.13	0	.07	.13	.22	.04	.14	.12	.03	.05	.04
22	.01	0	.12	.07	.07	.22	.24	.07	.04	.06	.36	.01
23	.03	.01	.39	.19	0	.13	.10	.04	.02	.05	.06	.03
24	.29	0	.06	.15	.08	.05	.03	.03	.01	0	.12	.18
25	.15	.01	.04	.10	.08	.16	.06	.07	.03	.02	.17	.01
26	.12	.03	.05	.15	.33	.19	.32	.20	.08	.10	.13	.01
27	.04	.05	.06	.37	.05	.08	.31	.11	.03	0	.09	.01
28	.07	.14	.01	.29	.04	.06	.07	.27	.03	0	.01	.01
29	.02		.02	.22	.27	.08	.20	.20	.01	.02	.06	.09
30	.26		.02	.04	.31	.09	.08	.09	.08	0	.13	.04
31	.01		.12		.07		.04	.05		.13		.07
Sum	2.39	3.21	1.98	3.72	4.05	2.30	4.93	4.18	1.95	2.20	2.93	1.91

	Current Year 2003							Period 1935-2003			
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	0.280	0	30	0.67	! 3	0	0.08	206	1,087	4,144	111
Feb.	.255	0	10	.59	! 2	0	.11	277	907	3,910	164
Mar.	.235	0	23	.53	! 1	0	.06	171	1,031	3,602	171
April	.275	0	28	.65	! 4	0	.12	321	1,000	3,910	165
May	.300	0	8	.74	! 1	0	.13	350	1,122	3,750	175
June	.255	0	26	.58	! 1	0	.08	199	938	4,515	157
July	.215	0	12	.46	6	0	.16	426	1,014	4,428	210
Aug.	.255	0	15	.59	19	0	.13	361	1,042	4,885	196
Sept.	.270	0	26	.63	!12	0	.07	168	975	3,910	0
Oct.	.280	0	31	.67	! 3	0	.07	190	1,031	4,046	0
Nov.	.315	0	18	.78	! 2	0	.10	253	1,116	4,404	0
Dec.	.205	0	29	.43	!22	0	.06	165	1,097	3,799	51.0
Yearly	0.315	0		0.78		0	0.10	3,087	12,360	47,255	3,087

! And other days

09-5340.00 YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder located in the afterbay, with flow meters in the four discharge pipes at the Boundary Pumping Plant on the Main Drain about 61 meters north of the international boundary near San Luis, Arizona, 2.1 kilometers east of the Colorado River.

RECORDS: Main Drain discharges are lifted 3.05 to 3.66 meters 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 2003.

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 land boundary at San Luis.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.63	3.73	3.72	4.39	4.65	4.05	4.08	2.97	4.22	5.29	6.72	5.58
2	3.53	3.34	3.18	3.80	4.80	4.13	3.94	2.79	2.98	5.30	5.62	4.90
3	3.54	3.23	3.60	4.15	5.07	4.30	3.98	2.25	2.36	5.27	5.80	4.60
4	3.70	2.70	3.48	4.56	4.91	4.15	4.01	2.42	3.19	4.82	6.18	4.88
5	4.01	2.89	3.46	4.56	4.83	4.11	4.32	2.40	4.21	5.14	6.03	4.60
6	3.04	3.89	3.44	4.19	4.53	4.16	4.43	2.09	4.15	5.96	6.49	4.93
7	2.81	4.30	3.21	4.39	4.36	3.97	3.99	2.13	4.35	5.70	6.33	5.24
8	3.88	4.34	3.37	4.20	4.76	4.10	3.70	2.13	4.13	5.62	6.82	5.05
9	3.85	4.30	3.83	4.21	4.78	3.99	4.23	2.08	3.87	4.73	6.15	4.66
10	4.10	4.42	4.21	4.23	4.59	4.09	3.41	2.83	4.49	5.89	5.66	4.34
11	3.25	4.19	4.01	4.15	5.55	4.17	3.85	3.10	4.00	5.35	5.87	4.10
12	3.05	3.30	4.07	4.59	4.96	3.87	4.13	3.27	3.92	6.08	6.23	4.04
13	2.82	3.99	4.23	4.75	4.80	3.78	3.56	3.48	3.92	6.07	5.57	5.14
14	2.77	3.89	4.12	4.95	4.36	3.92	3.99	3.78	4.26	5.81	6.18	6.02
15	3.42	3.14	3.62	4.77	4.26	4.05	3.84	3.79	3.98	5.72	6.06	5.46
16	3.17	3.13	4.20	4.48	5.04	3.54	3.68	3.86	4.18	5.88	5.55	4.84
17	3.02	3.16	4.31	4.30	4.50	3.82	3.25	4.35	4.07	5.55	5.01	5.25
18	2.92	3.27	3.79	5.36	4.35	3.48	2.87	3.98	4.59	5.61	5.93	5.07
19	3.20	3.28	3.88	4.97	4.30	4.19	3.10	3.74	4.81	6.57	7.24	4.80
20	2.62	3.46	3.82	4.66	4.47	3.71	3.07	4.19	4.03	6.10	6.22	4.85
21	2.89	3.23	3.66	5.02	4.33	3.72	2.64	3.75	4.63	6.31	5.54	5.42
22	3.16	3.69	3.74	4.63	4.87	3.96	2.55	4.75	5.11	5.66	5.71	4.90
23	2.76	3.85	4.14	5.05	5.00	3.48	2.73	4.40	4.92	6.03	5.15	4.69
24	3.35	4.03	4.04	4.30	4.93	3.41	3.12	4.38	5.09	6.54	5.59	5.52
25	3.99	3.88	3.70	4.59	4.70	3.37	3.29	3.63	4.70	5.78	5.38	4.86
26	3.67	4.99	3.33	4.57	4.68	3.82	2.85	3.50	4.59	5.75	5.32	4.09
27	3.67	3.53	3.36	4.88	5.03	3.51	2.77	3.89	5.27	5.52	5.86	4.34
28	3.18	3.59	3.42	4.67	5.04	3.79	2.76	3.99	4.70	6.00	5.43	4.53
29	2.96		3.69	4.95	4.07	4.16	2.52	3.46	5.60	6.09	5.08	4.75
30	2.90		3.96	4.32	3.56	4.09	2.88	3.52	5.36	5.69	5.27	4.72
31	3.09		4.25		4.89		2.74	4.12		5.50		5.10
Sum	102.95	102.74	116.84	136.64	144.97	116.89	106.28	105.02	129.68	177.33	175.99	151.27

Current Year 2003 | Period 1935–2003

Month	Extreme Gage Meters High	Extreme Gage Meters Low	Extreme–Cubic Meters per Second High Day	High	Low Day	Low	Average	Volume–Thousand Cubic Meters Total	Average	Maximum	Minimum
Jan.			1	6.58	! 6	0	3.32	8,895	9,407	13,819	2,146
Feb.			13	8.53	!11	0	3.67	8,877	9,036	14,787	2,023
Mar.			15	6.72	!15	0	3.77	10,095	10,289	15,332	2,393
April			25	6.53	15	.89	4.55	11,806	10,293	14,666	2,368
May			11	6.88	13	.25	4.68	12,525	10,629	16,208	2,405
June			4	6.28	23	.78	3.90	10,099	9,701	14,851	2,825
July			2	5.56	22	0	3.43	9,183	9,582	14,715	3,121
Aug.			31	6.87	1	0	3.39	9,074	9,529	14,752	3,158
Sept.			1	6.07	3	1.92	4.32	11,204	9,755	14,269	2,812
Oct.			6	7.62	19	.81	5.72	15,321	11,438	15,321	3,626
Nov.			14	7.83	12	0	5.87	15,206	11,007	15,206	3,454
Dec.			4	7.17	6	.86	4.88	13,070	10,275	14,160	3,022
Yearly				8.53		0	4.29	135,355	120,941	171,922	33,353

! And other days

09-5343.00 WEST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder located about 0.5 kilometer upstream from outlet to Yuma Main Drain, which is 53 meters upstream from East Main Canal Wasteway outlet and 0.6 kilometer west of San Luis, Arizona. Prior to August 1, 1975, the recorder was located about 46 meters 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. Records available: February 23, 1971 through 2003.
REMARKS: Wasteway discharges from West Main Canal Wasteway comprise regulatory waste from the West Main Canal and this water is considered as part of the volumes arriving at the land boundary at San Luis.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.70	0.11	0.01	0.27	0.53	0.11	0.03	0.01	0.10	0.31	0.33
2	.01	.32	.06	.29	0	.48	.21	.07	0	0	.64	.01
3	.01	.27	.12	.34	0	.05	.06	.15	0	.01	.29	.01
4	.03	.56	.01	.18	0	.41	.12	.45	0	.03	.44	.01
5	0	.06	0	.47	0	.57	.17	.26	0	.29	.42	.01
6	0	.07	0	.46	0	.10	.16	0	0	.12	.16	.16
7	0	.09	.06	.41	0	.37	.01	.03	.03	.13	.14	.15
8	0	.02	.07	.45	0	.16	.13	.03	.02	.08	.15	.18
9	0	.06	.02	.25	0	.13	.34	.40	.01	.07	.02	.10
10	0	.73	.01	.43	0	.26	.26	.47	.01	.16	.10	.13
11	.16	.43	0	.61	0	.05	.13	.47	0	.01	.11	.09
12	0	.39	.02	.80	0	.02	.36	.14	.02	.09	.27	.02
13	0	.35	.05	.38	0	.01	.64	.07	.02	.36	.17	.08
14	0	.01	.10	.25	0	.11	.64	.28	.03	.19	.06	.03
15	0	0	.42	.01	.01	.09	.05	.29	.01	.03	.18	.01
16	.02	0	.49	.55	0	.12	.20	.50	.01	.16	.03	.02
17	0	0	.15	.55	0	.05	.28	.35	.01	.08	.18	.01
18	.26	0	.80	.14	0	.35	.36	.44	.06	.12	.23	.01
19	.65	.01	.32	.21	0	.31	.25	.21	.05	.33	.16	.01
20	.06	.03	.08	.28	0	.19	.65	.37	.20	.13	.12	.09
21	.14	.02	.03	.09	0	.13	.47	.24	.27	.38	.18	.35
22	.22	.02	.43	.09	0	.19	.82	.53	.05	.22	.21	.06
23	.60	.02	.39	.21	.18	.40	.54	.35	.15	.41	.54	.01
24	.48	0	.86	.28	.34	.06	.41	.48	.10	.40	.58	.18
25	.21	.02	.36	.18	.15	.18	.48	.44	.02	.34	.36	.26
26	.49	.15	.24	.32	.27	.08	.34	.25	.20	.65	.05	.21
27	.25	.10	.32	.15	.20	.06	.60	.20	.33	.52	.09	0
28	.17	.04	.57	.51	.26	.09	.02	.29	.09	.58	.22	0
29	.04		.26	.94	.22	.20	0	.19	.09	.54	.19	.02
30	.46		.19	.39	.22	.24	0	.42	.15	.16	.43	.02
31	.37		.03		.45		0	.43		.09		.01
Sum	4.63	4.47	6.57	10.23	2.57	5.99	8.81	8.83	1.94	6.78	7.03	2.58

Current Year 2003 | Period 1971–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	0.780	0	19	1.20	! 1	0	0.15	400	585	1,376	44.9
Feb.	.795	.010	10	1.26	! 3	0	.16	386	541	1,117	42.3
Mar.	.790	0	24	1.24	! 4	0	.21	568	581	1,158	68.3
April	.765	.015	8	1.15	!18	0	.34	884	574	1,280	49.2
May	.700	0	1	.94	! 1	0	.08	222	493	1,445	38.9
June	.710	.020	5	.97	! 9	0	.20	518	466	1,067	25.1
July	.745	0	14	1.08	!15	0	.28	761	482	944	77.3
Aug.	.725	.015	30	1.02	! 2	0	.28	763	573	1,447	121
Sept.	.720	.005	!26	1.00	! 2	0	.06	168	542	1,128	168
Oct.	.775	.015	26	1.18	! 2	0	.22	586	515	1,135	15.6
Nov.	.760	.020	24	1.14	! 9	0	.23	607	429	845	13.0
Dec.	.725	0	1	1.02	!14	0	.08	223	501	1,204	19.0
Yearly	0.795	0		1.26		0	0.19	6,086	6,282	10,047	1,808

! And other days

09-5345.50 242 WELL FIELD NEAR SAN LUIS, ARIZONA

DESCRIPTION: Water-stage recorder and 3.7 meter Parshall flume located 31 meters upstream from confluence of East Main Canal Wasteway, 34 meters north of the southerly land boundary, and 2.3 kilometers 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 2003.
REMARKS: Records show the pumping of ground water from the 242 well field east of San Luis, Arizona. This water is considered as part of the volumes arriving at the land boundary at San Luis.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	1.25	0	1.28	0.72	0	0.66	1.72	0.93	0.16	0	0
2	0	1.25	0	1.28	.53	.24	.75	.94	.93	.16	0	0
3	0	1.26	0	1.28	.53	.51	1.02	.97	.93	.16	0	0
4	0	1.43	0	1.28	.53	.39	1.02	1.35	.92	.16	0	0
5	0	1.61	0	1.27	.53	.35	1.02	1.44	.92	.16	0	0
6	0	1.63	0	1.28	.52	.43	1.02	1.51	.92	.16	0	0
7	0	1.65	.45	1.25	.35	.53	1.01	1.60	.92	.16	0	0
8	0	1.66	.85	1.02	.20	.54	1.01	1.61	.92	.14	0	0
9	.05	1.69	.84	1.28	.15	.65	1.11	1.61	.91	.18	0	0
10	.18	1.67	.97	1.19	0	.70	1.18	1.62	.91	.18	0	0
11	.18	1.68	1.08	1.16	0	.77	1.17	1.63	.92	.19	0	0
12	.17	1.65	.87	1.13	0	.86	1.17	1.46	.91	.19	0	0
13	.17	.79	1.21	1.12	0	.76	1.16	1.44	.91	.19	0	0
14	.18	.03	1.22	1.22	0	.76	.88	1.59	.91	.19	0	0
15	.17	0	1.22	1.29	0	.77	1.16	1.56	.91	.19	0	0
16	.17	0	1.23	1.29	0	.77	1.15	1.56	.90	.15	0	0
17	.17	0	.90	1.30	0	.76	.99	1.57	.90	0	0	0
18	.17	0	.51	1.30	0	.78	.58	1.39	.90	0	0	0
19	.17	0	1.14	1.30	0	.75	.58	.68	.86	0	0	0
20	.17	0	1.24	1.30	0	.75	.58	.35	.69	0	0	0
21	.37	.27	1.24	1.31	0	.74	.58	.35	.68	0	0	0
22	.95	.77	1.25	1.32	0	.74	.74	.35	.68	0	0	0
23	1.25	.76	1.25	1.17	0	.72	1.63	.35	.67	0	0	0
24	1.25	.75	1.26	.93	0	.71	2.05	.36	.67	0	0	0
25	1.25	.44	1.26	.81	0	.69	2.05	.36	.62	0	0	0
26	1.25	0	1.27	.81	0	.69	2.06	.36	.36	0	0	0
27	1.25	0	1.27	.81	0	.62	2.07	.36	.35	0	0	0
28	1.25	0	1.27	.80	0	.01	1.90	.37	.35	0	0	0
29	1.24		1.27	.81	0	0	1.76	.67	.35	0	0	0
30	1.24		1.28	.91	0	.18	1.90	.92	.27	0	0	0
31	1.25		1.28		0		1.97	.93		0		0
Sum	14.50	22.24	27.63	34.50	4.06	17.17	37.93	32.98	23.02	2.72	0	0

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
				High		Low		Total	Average	Maximum	Minimum
	High	Low	Day		Day						
	Current Year 2003							Period 1979-2003			
Jan.	0.285	0	28	1.35	! 1	0	0.47	1,253	747	3,406	0
Feb.	.350	0	12	1.81	!14	0	.79	1,922	1,131	3,677	0
Mar.	.275	0	!26	1.29	! 1	0	.89	2,387	1,166	4,717	0
April	.280	.150	3	1.34	29	.59	1.15	2,981	1,363	4,265	0
May	.210	0	1	.92	!10	0	.13	351	1,190	4,269	0
June	.225	0	11	.97	! 1	0	.57	1,483	1,178	4,272	0
July	.400	.130	28	2.11	14	.41	1.22	3,277	1,451	5,868	0
Aug.	.425	.110	1	2.30	!20	.34	1.06	2,849	1,478	4,988	0
Sept.	.215	.010	! 1	.94	26	.03	.77	1,989	1,177	3,397	0
Oct.	.075	0	8	.20	!17	0	.09	235	741	3,344	0
Nov.	0	0	! 1	0	! 1	0	0	0	311	2,101	0
Dec.	0	0	! 1	0	! 1	0	0	0	668	3,654	0
Yearly	0.425	0		2.30		0	0.59	18,727	12,601	38,461	201

! And other days

09-5348.00 TOTAL FLOWS CROSSING INTERNATIONAL BOUNDARY INTO MEXICO NEAR SAN LUIS, SONORA

DESCRIPTION: The tabulated data below are the combined flows of the East Main Canal Wasteway, West Main Canal Wasteway, 242 Lateral, and the Yuma Main Drain and represent the total water crossing the international land boundary into the Sanchez Mejorada Canal near San Luis, Arizona. The mean daily discharges are combined and rounded and the monthly volumes are obtained by adding the volumes of the four stations.
RECORDS: Records obtained and computed by the United States Section of the Commission. Records available: February 23, 1971 through 2003; 242 Lateral from November 1978 through 2003.
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 on preceding pages of this bulletin.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.71	5.79	3.84	5.80	5.66	4.58	5.24	4.80	5.21	5.72	7.12	6.07
2	3.66	4.91	3.25	5.41	5.42	4.86	5.17	3.84	3.94	5.60	6.26	4.98
3	3.58	4.82	3.72	6.06	5.63	4.86	5.17	3.59	3.33	5.58	6.09	4.64
4	3.74	4.70	3.49	6.20	5.50	5.03	5.28	4.52	4.15	5.13	6.68	4.92
5	4.01	4.56	3.57	6.32	5.55	5.07	5.63	4.15	5.22	5.75	6.55	4.63
6	3.04	5.81	3.55	6.01	5.09	4.77	5.65	3.63	5.21	6.42	6.65	5.21
7	2.88	6.06	3.84	6.10	4.84	5.01	5.10	3.78	5.33	6.06	6.58	5.43
8	4.15	6.08	4.43	6.02	5.55	4.87	4.94	3.78	5.10	5.86	7.07	5.30
9	3.94	6.51	4.89	5.74	5.16	4.78	5.79	4.42	5.08	5.10	6.36	4.78
10	4.43	7.17	5.37	5.85	4.65	5.13	5.10	4.99	5.45	6.28	5.78	4.48
11	3.64	6.43	5.10	5.92	5.64	5.00	5.43	5.44	4.94	5.63	6.26	4.36
12	3.22	5.37	4.96	6.72	5.09	4.75	5.90	4.92	4.85	6.41	6.51	4.33
13	2.99	5.54	5.52	6.65	4.83	4.56	5.68	5.36	5.00	6.65	5.78	5.25
14	2.95	4.09	5.48	6.45	4.39	4.95	5.87	5.89	5.26	6.22	6.25	6.19
15	3.59	3.15	5.28	6.09	4.31	4.92	5.29	6.01	5.05	5.95	6.29	5.48
16	3.37	3.13	6.03	6.35	5.23	4.43	5.10	6.18	5.10	6.26	5.58	4.87
17	3.36	3.40	5.36	6.20	4.56	4.63	4.59	6.30	4.99	5.74	5.20	5.30
18	3.48	3.57	5.10	6.82	4.46	4.66	3.87	5.83	5.63	5.84	6.55	5.19
19	4.13	3.34	5.34	6.56	4.49	5.31	4.07	4.65	5.76	6.94	7.42	4.83
20	2.95	3.71	5.14	6.35	4.78	4.86	4.35	5.07	5.12	6.32	6.61	4.98
21	3.45	3.65	4.93	6.49	4.46	4.81	3.73	4.48	5.70	6.72	5.77	5.81
22	4.34	4.48	5.54	6.11	4.94	5.11	4.35	5.70	5.88	5.94	6.28	4.97
23	4.64	4.64	6.17	6.62	5.18	4.73	5.00	5.14	5.76	6.49	5.75	4.73
24	5.37	4.78	6.22	5.66	5.35	4.23	5.61	5.25	5.87	6.94	6.29	5.88
25	5.60	4.35	5.36	5.68	4.93	4.40	5.88	4.50	5.37	6.14	5.91	5.13
26	5.53	5.17	4.89	5.85	5.28	4.78	5.57	4.31	5.23	6.50	5.50	4.31
27	5.21	3.68	5.01	6.21	5.28	4.27	5.75	4.56	5.98	6.04	6.04	4.35
28	4.67	3.77	5.27	6.27	5.34	3.95	4.75	4.92	5.17	6.58	5.66	4.54
29	4.26		5.24	6.92	4.56	4.44	4.48	4.52	6.05	6.65	5.33	4.86
30	4.86		5.45	5.66	4.09	4.60	4.86	4.95	5.86	5.85	5.83	4.78
31	4.72		5.68		5.41		4.75	5.53		5.72		5.18
Sum	124.47	132.66	153.02	185.09	155.65	142.35	157.95	151.01	156.59	189.03	185.95	155.76

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
			Current Year 2003					Total	Period 1935-2003		
	High	Low	Day	ϕ High	Day	ϕ Low			Average	Maximum	Minimum
Jan.			25	5.60	7	2.88	4.02	10,754	11,826	14,963	2,619
Feb.			10	7.17	16	3.13	4.74	11,462	11,615	15,998	2,495
Mar.			24	6.22	2	3.25	4.94	13,221	13,067	16,904	2,864
April			29	6.92	2	5.41	6.17	15,992	13,230	16,013	2,611
May			1	5.66	30	4.09	5.02	13,448	13,434	17,145	3,050
June			19	5.31	28	3.95	4.75	12,299	12,283	15,505	3,115
July			12	5.90	21	3.73	5.10	13,647	12,529	15,320	3,610
Aug.			17	6.30	3	3.59	4.87	13,047	12,622	15,612	3,687
Sept.			29	6.05	3	3.33	5.22	13,529	12,449	15,357	3,210
Oct.			19	6.94	9	5.10	6.10	16,332	13,725	17,143	4,248
Nov.			19	7.42	17	5.20	6.20	16,066	12,863	16,066	4,202
Dec.			14	6.19	26	4.31	5.02	13,458	12,541	14,863	3,562
Yearly				7.42		2.88	5.18	163,255	152,184	183,801	39,274

ϕ Mean daily ! And other days

09-5222.00 COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

DESCRIPTION: Water-stage recorder was located in Mexico on the right bank of the river about 305 meters upstream from the southerly international boundary, 3.2 kilometers west of San Luis, Arizona, and 35 kilometers downstream from Morelos Dam. The zero of the gage was at mean sea level, U. S. C. & G. S. datum. This gage was destroyed on January 19, 1983. Between January 19, 1983 and December 10, 1985, temporary gages were installed on the United States side and levels were established to ensure continuous record. On December 10, 1985, a permanent water-stage recorder was relocated on the left bank of the river about 24 meters upstream from the southerly international boundary. On January 30, 1998 a new gage was installed on the left bank of the river about 305 meters downstream from the southerly international boundary.

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 2003; continuous record of gage heights, January 1947 through 1993. During 1993, from January 1 to February 4 and May 1, 1993 to January 30, 1998, the gage was inoperable. Records of gage height and discharge were estimated from instantaneous observations and discharge measurements. 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 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. In September 2002, a dike was constructed in Mexico by CNA approximately 1 mile downstream of the boundary, to divert the water into a new channel. This construction has caused a backwater condition upstream.

EXTREMES: Since January 1950: Maximum instantaneous discharge, 937 CMS on August 19, 1983; maximum gage height, 25.860 meters on November 29, 1957. Minimum discharge, no flow on several occasions since September 1, 1956.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.96	1.03	10.1	0.65	0.62	0	0	0	0	0	0	0
2	.96	.91	5.26	.69	.59	0	0	0	0	0	0	0
3	1.04	.86	3.66	.67	.59	0	0	0	0	0	0	0
4	1.02	.82	2.55	.66	.58	0	0	0	0	0	0	0
5	.99	.94	1.54	.65	.58	0	0	0	0	0	0	0
6	1.02	1.03	1.33	.64	.63	0	0	0	0	0	0	0
7	1.12	1.09	1.29	.63	.65	0	0	0	0	0	0	0
8	1.07	1.08	1.26	.62	.51	0	0	0	0	0	0	0
9	1.19	1.09	1.20	.61	.41	0	0	0	0	0	0	0
10	1.32	1.99	1.16	.61	.38	0	0	0	0	0	0	0
11	1.37	2.57	1.13	.61	.35	0	0	0	0	0	0	0
12	1.65	1.77	1.10	.59	.38	0	0	0	0	0	0	0
13	2.61	1.89	1.07	.59	.33	0	0	0	0	0	0	0
14	2.95	1.85	1.00	.59	.28	0	0	0	0	0	0	0
15	1.92	11.0	.96	.59	.33	0	0	0	0	0	0	0
16	1.38	17.9	.94	.59	.40	0	0	0	0	0	0	0
17	1.45	12.5	1.03	.59	.34	0	0	0	0	0	0	0
18	1.22	9.62	2.35	.59	.46	0	0	0	0	0	0	0
19	.98	13.4	13.3	.59	.65	0	0	0	0	0	0	0
20	1.76	19.5	5.07	.65	.75	0	0	0	0	0	0	0
21	5.75	11.4	1.37	7.02	.32	0	0	0	0	0	0	0
22	3.94	7.24	1.07	7.00	.18	0	0	0	0	0	0	0
23	1.86	4.98	.97	3.80	.10	0	0	0	0	0	0	0
24	1.15	4.36	.94	1.93	.05	0	0	0	0	0	0	0
25	.91	3.35	.94	.82	.03	0	0	0	0	0	0	0
26	.87	3.34	.85	.71	.01	0	0	0	0	0	0	0
27	.80	25.8	.77	.69	0	0	0	0	0	0	0	0
28	.73	29.8	.72	.67	0	0	0	0	0	0	0	0
29	.80		.69	.66	0	0	0	0	0	0	0	0
30	.85		.63	.65	0	0	0	0	0	0	0	0
31	1.03		.60		0		0	0		0		0
Sum	46.67	193.11	66.85	36.36	10.50	0	0	0	0	0	0	0

Current Year 2003 — Period 1935–2003

Month	Extreme Gage Meters High	Extreme Gage Meters Low	Extreme–Cubic Meters per Second High Day	Extreme–Cubic Meters per Second High	Extreme–Cubic Meters per Second Low Day	Extreme–Cubic Meters per Second Low	Average	Volume–Thousand Cubic Meters Total	Volume–Thousand Cubic Meters Average	Volume–Thousand Cubic Meters Maximum	Volume–Thousand Cubic Meters Minimum
Jan.	23.140	22.495	21	6.45	28	0.71	1.51	4,032	389,371	2,062,379	0
Feb.	24.000	22.410	27	39.2	4	.76	6.90	16,685	319,973	1,708,370	0
Mar.	23.565	22.550	1	17.4	31	.59	2.16	5,776	268,829	1,458,432	0
April	23.125	22.060	21	12.8	1	.58	1.21	3,142	174,860	947,722	0
May	22.450	21.570	20	.96	!26	0	.34	907	233,993	1,430,837	0
June	21.570	21.570	! 1	0	! 1	0	0	0	199,504	1,455,506	0
July	21.570	21.570	! 1	0	! 1	0	0	0	171,788	1,821,962	0
Aug.	21.570	21.570	! 1	0	! 1	0	0	0	185,615	2,103,318	0
Sept.	21.570	21.570	! 1	0	! 1	0	0	0	214,771	1,956,768	0
Oct.	21.570	21.570	! 1	0	! 1	0	0	0	251,645	2,144,909	0
Nov.	21.570	21.570	! 1	0	! 1	0	0	0	290,167	1,761,409	0
Dec.	21.570	21.570	! 1	0	! 1	0	0	0	357,516	2,268,370	0
Yearly	24.000	21.570		39.2		0	0.97	30,542	3,058,032	15,656,495	0

! And other days

09-5222.01 COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY – STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	22.560	22.575	23.305	22.540	22.190	21.570	21.570	21.570	21.570	21.570	21.570	21.570
2	22.560	22.545	23.075	22.500	22.035	21.570	21.570	21.570	21.570	21.570	21.570	21.570
3	22.580	22.535	22.985	22.440	22.035	21.570	21.570	21.570	21.570	21.570	21.570	21.570
4	22.575	22.510	22.950	22.385	22.030	21.570	21.570	21.570	21.570	21.570	21.570	21.570
5	22.565	22.475	22.915	22.345	22.030	21.570	21.570	21.570	21.570	21.570	21.570	21.570
6	22.575	22.450	22.890	22.300	22.250	21.570	21.570	21.570	21.570	21.570	21.570	21.570
7	22.595	22.435	22.875	22.250	22.400	21.570	21.570	21.570	21.570	21.570	21.570	21.570
8	22.585	22.420	22.865	22.210	22.275	21.570	21.570	21.570	21.570	21.570	21.570	21.570
9	22.610	22.410	22.845	22.170	22.220	21.570	21.570	21.570	21.570	21.570	21.570	21.570
10	22.635	22.480	22.825	22.130	22.205	21.570	21.570	21.570	21.570	21.570	21.570	21.570
11	22.640	22.520	22.815	22.110	22.185	21.570	21.570	21.570	21.570	21.570	21.570	21.570
12	22.690	22.455	22.805	22.095	22.205	21.570	21.570	21.570	21.570	21.570	21.570	21.570
13	22.805	22.460	22.795	22.090	22.160	21.570	21.570	21.570	21.570	21.570	21.570	21.570
14	22.860	22.460	22.765	22.080	22.100	21.570	21.570	21.570	21.570	21.570	21.570	21.570
15	22.740	23.005	22.745	22.080	22.125	21.570	21.570	21.570	21.570	21.570	21.570	21.570
16	22.645	23.390	22.735	22.075	22.140	21.570	21.570	21.570	21.570	21.570	21.570	21.570
17	22.655	23.090	22.775	22.070	22.090	21.570	21.570	21.570	21.570	21.570	21.570	21.570
18	22.615	22.925	22.925	22.070	22.100	21.570	21.570	21.570	21.570	21.570	21.570	21.570
19	22.565	23.145	23.450	22.065	22.100	21.570	21.570	21.570	21.570	21.570	21.570	21.570
20	22.680	23.500	23.140	22.310	22.085	21.570	21.570	21.570	21.570	21.570	21.570	21.570
21	23.085	23.085	22.900	22.895	22.010	21.570	21.570	21.570	21.570	21.570	21.570	21.570
22	22.940	22.855	22.795	22.910	21.930	21.570	21.570	21.570	21.570	21.570	21.570	21.570
23	22.720	22.730	22.750	22.795	21.855	21.570	21.570	21.570	21.570	21.570	21.570	21.570
24	22.600	22.705	22.735	22.715	21.765	21.570	21.570	21.570	21.570	21.570	21.570	21.570
25	22.545	22.645	22.740	22.655	21.695	21.570	21.570	21.570	21.570	21.570	21.570	21.570
26	22.535	22.660	22.695	22.590	21.610	21.570	21.570	21.570	21.570	21.570	21.570	21.570
27	22.520	23.725	22.660	22.515	21.570	21.570	21.570	21.570	21.570	21.570	21.570	21.570
28	22.500	23.850	22.630	22.435	21.570	21.570	21.570	21.570	21.570	21.570	21.570	21.570
29	22.520		22.610	22.390	21.570	21.570	21.570	21.570	21.570	21.570	21.570	21.570
30	22.530		22.575	22.325	21.570	21.570	21.570	21.570	21.570	21.570	21.570	21.570
31	22.575		22.555		21.570		21.570	21.570		21.570		21.570
Avg.	22.640	22.785	22.845	22.350	21.990	21.570	21.570	21.570	21.570	21.570	21.570	21.570

09-5333.00 WELLTON-MOHAWK BYPASS DRAIN AT SOUTHERLY INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and Parshall flume located 24 meters upstream from the southerly land boundary, 168 meters east of the Colorado River, and 2.9 kilometers 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 2003.
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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.63	4.44	4.38	3.90	3.88	3.75	4.64	4.84	4.86	4.69	4.70	4.34
2	7.04	4.65	4.45	3.86	3.99	3.72	4.50	4.50	4.61	4.53	4.67	4.12
3	5.30	4.30	4.37	4.25	3.79	3.82	4.51	4.31	4.75	4.57	5.06	3.71
4	5.11	4.37	4.19	4.40	3.79	3.73	4.39	4.26	4.37	4.38	5.01	3.74
5	4.95	4.46	4.44	4.11	3.81	3.82	4.41	4.20	4.59	4.41	4.91	3.88
6	4.85	4.61	4.32	4.13	3.94	4.10	4.53	4.08	4.64	4.72	5.17	3.89
7	4.98	4.45	4.52	4.07	3.84	4.48	4.68	4.19	5.08	4.74	5.32	3.82
8	5.17	4.70	4.49	4.35	3.81	4.37	4.59	4.33	5.23	4.73	5.08	4.44
9	4.99	4.77	4.85	4.03	3.73	4.35	4.61	4.25	4.86	4.48	4.97	4.45
10	4.84	4.51	4.88	3.96	3.92	4.63	4.36	4.08	4.68	4.51	5.20	4.06
11	4.53	4.53	5.02	4.01	3.83	4.63	4.36	4.50	4.59	4.38	4.64	4.28
12	4.56	4.36	4.92	3.83	3.90	4.43	4.31	4.59	4.49	4.80	4.97	4.34
13	4.31	4.53	5.17	3.94	3.72	4.23	4.30	4.77	4.73	4.70	5.26	4.56
14	4.40	4.98	4.77	4.08	3.70	4.30	4.38	4.53	4.73	4.77	4.96	4.36
15	4.42	4.36	4.93	3.95	3.48	4.88	4.52	4.69	5.33	4.79	4.79	4.36
16	4.60	4.34	4.79	3.86	3.59	4.93	4.56	4.72	4.83	4.65	4.93	4.57
17	4.76	4.48	4.97	3.74	4.20	4.62	4.76	4.69	4.59	4.99	4.44	4.13
18	4.68	4.75	5.23	3.88	4.05	4.96	4.82	4.55	4.52	4.63	4.63	3.93
19	4.54	4.59	4.80	3.99	4.03	5.02	4.80	4.67	4.83	4.75	4.66	4.07
20	4.66	4.47	4.76	3.82	5.04	4.62	4.49	4.43	4.92	4.93	4.59	4.12
21	4.81	4.66	4.94	4.01	4.22	4.46	4.64	4.30	4.64	5.22	4.56	4.17
22	4.77	4.64	4.64	4.04	4.09	4.60	4.59	4.28	5.20	4.99	4.39	4.71
23	4.66	4.52	4.90	4.03	4.13	4.48	4.28	4.44	4.95	4.84	4.63	4.41
24	4.50	4.53	4.64	3.72	3.96	4.54	4.26	4.27	4.76	4.79	4.81	4.22
25	4.60	4.59	4.61	3.65	3.97	4.40	4.25	4.74	5.27	4.42	4.74	4.09
26	4.57	4.89	4.58	3.56	4.02	4.42	4.38	4.83	5.22	4.54	4.55	4.15
27	4.56	4.43	4.59	3.75	4.38	4.63	4.01	4.95	5.44	4.73	4.71	3.89
28	4.58	4.39	4.36	4.13	4.34	4.55	4.09	4.51	4.96	4.93	4.65	4.23
29	4.64		4.59	3.91	4.14	4.58	4.31	4.43	5.15	4.86	4.25	4.14
30	4.77		4.20	3.81	3.91	4.80	4.25	4.42	4.72	5.27	4.06	3.82
31	4.73		3.75		3.73		4.38	4.82		4.82		4.04
Sum	150.51	127.30	144.05	118.77	122.93	132.85	137.96	139.17	145.54	146.56	143.31	129.04

Current Year 2003 | Period 1977–2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	0.625	0.450	2	7.30	13	4.27	4.86	13,004	14,013	21,638	7,412
Feb.	.510	.445	26	5.15	3	4.14	4.55	10,999	13,223	18,374	8,506
Mar.	.520	.405	!12	5.38	31	3.61	4.65	12,446	14,116	21,496	2,593
April	.475	.405	8	4.60	26	3.50	3.96	10,262	13,143	20,613	3,445
May	.625	.395	20	6.99	15	3.33	3.97	10,621	13,319	20,732	5,215
June	.630	.415	18	7.28	2	3.58	4.43	11,478	12,343	19,842	2,227
July	.520	.415	18	5.28	10	3.83	4.45	11,920	12,574	22,235	2,728
Aug.	.615	.440	1	6.63	7	3.89	4.49	12,024	12,537	22,444	3,656
Sept.	.530	.425	15	5.61	!17	4.04	4.85	12,575	11,991	23,538	51.4
Oct.	.510	.430	21	5.54	11	4.21	4.73	12,663	12,985	23,600	23.9
Nov.	.525	.420	7	5.74	!29	3.99	4.78	12,382	11,971	2,003	59.2
Dec.	.495	.410	16	4.90	4	3.64	4.16	11,149	13,036	22,518	138
Yearly	0.630	0.395		7.30		3.33	4.49	141,523	155,251	222,488	75,784

! And other days

09-5350.00 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, 1.0 kilometer downstream from the wasteway gates on the Central Feeder Canal on the right bank of the Colorado River, 27 kilometers downstream from Morelos Dam, and 250 meters south of the junction of the Mexicali-San Luis and Algodones-Pescaderos highways.
RECORDS: Data obtained and computed by the Colorado River Irrigation District 14 of the National Water Commission 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 2003.
REMARKS: The Colorado River Irrigation District 14 transports water for irrigation of land on the left bank of the Colorado River by the Central Feeder Canal to a point called Kilometer 27. At this point, flows may be returned to the river through the wasteway or diverted to the Bacanora-Monumentos Canal system through the Sanchez Mejorada Siphon, which was placed in operation on June 28, 1963. As part of the rehabilitation works, started in 1968, of the Colorado River Irrigation District, the Canal de Conexion was enlarged and lined, and is now known as the Central Feeder Canal.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1964 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	3,262	10,973	85,761	0
February	13,024	6,300	50,898	0
March	5,368	8,859	72,049	0
April	2,684	12,851	85,372	0
May	1,997	12,561	99,576	0
June	162	10,404	61,705	0
July	0	10,730	56,912	0
August	0	15,492	132,183	0
September	313	14,521	83,943	0
October	9.5	13,201	136,198	0
November	599	12,307	122,170	0
December	1,412	10,835	86,607	0
Yearly	28,831	137,663	628,347	0

09-5365.00 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 1.3 kilometers upstream from the Sonora-Baja California railroad bridge, 5.9 kilometers downstream from the Miguel C. Rodriguez gaging station, and 45 kilometers downstream from the southerly international boundary.
RECORDS: The records are computed by the National Water Commission and are based upon gate openings. Records available: January 1964 through 2003.
REMARKS: The wasteway structure on the left bank of the Colorado River has two manually operated radial gates 3.0 meters wide. It discharges into a dirt canal 200 meters long with a total capacity of 13.0 CMS which discharges to the river.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1964 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	108	1,664	10,541	0
February	3,524	1,446	12,035	0
March	776	861	5,932	0
April	3,277	474	5,555	0
May	4,752	1,471	14,246	0
June	108	756	8,585	0
July	221	607	9,114	0
August	0	1,044	17,765	0
September	0	2,130	16,855	0
October	0	4,344	28,669	0
November	1,617	2,627	25,263	0
December	360	2,136	13,380	0
Yearly	14,743	19,151	103,228	0

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 million cubic meters. 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 MILLION CUBIC METERS

Month	LAKE MEAD (Capacity 32,266)		LAKE MOHAVE (Capacity 2,232)		HAVASU LAKE (Capacity 764)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 35,263)	
	2003	Average 1935–2003	2003	Average 1951–2003	2003	Average 1939–2003	2003	Estimated Average
Jan.	20,789.1	23,443.0	2,100.6	2,054.0	665.0	682.7	23,554.7	26,179.7
Feb.	20,942.0	23,310.4	2,132.7	2,065.2	707.0	686.8	23,781.7	26,062.4
Mar.	20,754.5	23,037.8	2,079.6	2,071.4	668.5	700.8	23,502.6	25,810.0
April	20,089.7	23,014.8	2,078.4	2,061.1	731.8	736.7	22,899.9	25,812.6
May	19,603.7	23,638.6	2,114.2	2,126.3	738.9	744.2	22,456.8	26,509.1
June	19,406.3	24,620.2	2,094.4	2,029.7	730.1	739.0	22,230.8	27,388.9
July	19,239.8	24,742.6	2,150.0	1,905.3	737.9	725.6	22,127.7	27,373.5
Aug.	19,416.2	24,558.3	2,143.8	1,861.6	736.6	711.9	22,296.6	27,131.8
Sept.	19,264.5	24,360.4	2,024.1	1,812.9	696.3	703.3	21,984.9	26,876.6
Oct.	19,139.9	24,159.8	1,808.3	1,793.0	699.3	699.6	21,647.5	26,652.4
Nov.	18,917.9	24,009.7	1,878.6	1,866.1	692.4	688.1	21,488.9	26,563.9
Dec.	18,872.2	23,849.2	1,960.0	1,978.5	638.8	687.2	21,471.0	26,514.9
Avg.	19,703.0	23,895.4	2,047.1	1,968.8	703.6	708.8	22,453.6	26,573.0
Max.	20,942.0	! 34,266.1	2,150.0	! 2,230.1	738.9	! 849.5	23,781.7	! 35,934.1
Min.	18,872.2	* 13,231.5	1,808.3	!!1,462.9	638.8	!! 94.9	21,471.0	!!16,112.5

! Maximum end of month storage for period of record
!! Minimum end of month storage for period of record
* Minimum end of month storage since 1940

SUSPENDED SILT – 2003

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

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

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

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

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY

2003 Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent	Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent	Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent
Jan. 3	0755	44.9	0.0041	June 5	0810	44.6	0.0065	Nov. 6	0845	38.2	0.0040
9	0920	46.5	0.0019	12	0815	47.9	0.0035	13	1010	55.9	0.0038
16	0900	50.8	0.0048	19	0745	45.3	0.0048	20	0840	37.3	0.0063
23	0910	62.2	0.0050	27	0815	54.9	0.0042	26	0850	44.0	0.0032
30	0900	63.3	0.0040	July 3	0815	51.7	0.0036	Dec. 4	1050	53.2	0.0089
Feb. 6	0920	78.0	0.0028	10	0805	45.0	0.0057	11	1015	56.8	0.0078
13	0935	69.9	0.0028	15	0735	49.2	0.0046	18	1000	68.3	0.0031
20	0745	109	0.0036	24	0805	63.7	0.0056	31	1150	38.0	0.0110
26	0935	121	0.0037	31	0810	54.5	0.0040				
Mar. 6	0845	83.0	0.0045	Aug. 7	0810	47.7	0.0084				
12	0910	96.4	0.0038	14	0750	39.7	0.0010				
20	0920	109	0.0039	21	0820	38.9	0.0020				
27	0805	87.3	0.0175	27	0810	38.9	0.0058				
Apr. 3	0705	94.8	0.0078	Sep. 4	0800	38.0	0.0035				
10	0845	108	0.0042	11	0810	34.4	0.0032				
17	0815	88.3	0.0043	18	0840	37.5	0.0044				
24	0800	78.7	0.0023	25	0715	41.0	0.0064				
30	0700	67.2	0.0028	Oct. 2	0755	36.0	0.0032				
May 8	0840	59.8	0.0036	9	0820	24.6	0.0040				
15	0810	43.6	0.0047	16	0815	24.3	0.0041				
21	0640	40.9	0.0031	23	0905	24.0	0.0033				
29	0650	43.4	0.0036	29	0850	24.8	0.0036				

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

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

2003 Month	Monthly Weight Megagrams		Number of Samples	Gravimetric Percentages			* Silt Volume – Thousand Cubic Meters			
	Water	Silt		Average	Maximum Sample	Minimum Sample	Total 2003	Period 1952 – 2003 Average	Maximum	Minimum
Jan.	152,280,000	1,144	5	0.0008	0.0010	0.0005	0.84	11.0	62.6	0.30
Feb.	194,979,000	1,244	4	0.0006	0.0015	0.0002	0.91	12.5	127.8	0.91
Mar.	240,201,000	2,698	4	0.0011	0.0021	0.0003	1.98	49.3	605.2	1.10
April	234,325,000	1,415	5	0.0006	0.0016	0.0003	1.04	53.4	856.8	0.62
May	123,388,000	528	4	0.0004	0.0005	0.0003	0.39	19.1	318.2	0.39
June	124,917,000	495	4	0.0004	0.0005	0.0003	0.36	29.6	256.6	0.36
July	136,434,000	932	5	0.0007	0.0010	0.0005	0.68	36.8	189.8	0.53
Aug.	110,912,000	502	4	0.0005	0.0009	0.0003	0.37	33.7	166.9	0.37
Sep.	99,602,000	390	4	0.0004	0.0005	0.0003	0.29	15.5	72.8	0.29
Oct.	71,842,000	306	5	0.0004	0.0005	0.0003	0.22	8.54	124.0	0.22
Nov.	106,116,000	573	4	0.0005	0.0007	0.0003	0.42	8.58	165.2	0.30
Dec.	133,695,000	515	5	0.0006	0.0005	0.0003	0.38	8.57	54.4	0.38
Year	1,728,691,000	10,742	53	0.0006	0.0021	0.0002	7.88	286.7	2,706.5	7.88

* Volume calculated at 1.362 megagrams per cubic meter

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

2003 Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent	Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent	Date	Time Std.	Stream-flow, Momen-tary CMS	Gravimetric Percent
*											

Samples by U.S. Section and analyses by United States Bureau of Reclamation, Method A
* No samples were collected in 2003.

CHEMICAL ANALYSES OF WATER SAMPLES
2003

The tables below are based on chemical analyses of samples from the Colorado River taken at the Northerly International Boundary by the United States Section of the Commission and analyzed under a contract with the U. S. Bureau of Reclamation.

Colorado River at Northerly International Boundary

2003 Date	Time Standard	Streamflow Momentary CMS	Specific Conductance Microsiemens/cm	pH Units	Hardness, Total (as CaCO3) mg/L	Hardness, Noncarbonate (CaCO3) mg/L	Calcium ion (Ca), Dissolved mg/L	Magnesium ion (Mg), Dissolved mg/L
Jan. 6	0815	48.3	1,450	8.2	386.00	205.00	98.4	34.2
21	0800	85.9	1,260	8.2	335.00	171.00	82.0	31.8
Feb. 3	0800	75.7	1,360	8.2	344.00	171.00	85.1	32.0
18	0745	101	1,340	8.3	346.00	176.00	84.5	32.9
Mar. 3	0800	80.4	1,480	8.3	395.00	206.00	99.5	35.7
17	0730	106	1,260	8.2	332.00	172.00	81.7	31.2
April 7	0800	117	1,170	8.2	333.00	178.00	82.7	30.8
21	0800	125	1,180	8.2	331.00	175.00	82.2	30.7
May 5	0800	85.6	1,240	8.1	327.00	165.00	80.5	30.7
19	1000	42.5	1,500	8.2	396.00	214.00	100	35.6
June 2	0700	40.9	1,370	8.2	344.00	171.00	83.7	32.8
16	0730	47.1	1,390	8.2	359.00	188.00	90.8	32.3
July 7	0730	50.3	1,370	8.2	333.00	160.00	82.2	31.1
22	0735	52.5	1,340	8.2	321.00	156.00	78.5	30.4
Aug. 4	0700	45.6	1,400	8.1	339.00	165.00	84.1	31.4
18	0730	40.0	1,390	8.1	354.00	183.00	85.9	34.0
Sept. 8	0745	34.1	1,410	8.2	348.00	177.00	85.0	33.1
22	0830	35.1	1,410	8.1	348.00	176.00	84.8	33.1
Oct. 6	0800	28.6	1,460	8.2	450.00	172.00	86.7	32.4
20	0745	28.7	1,480	8.2	396.00	216.00	98.0	36.9
Nov. 3	1100	40.0	1,410	8.1	376.00	201.00	94.0	34.4
17	0740	41.1	1,440	8.1	382.00	201.00	95.1	35.1
Dec. 1	0815	47.3	1,410	8.2	385.00	209.00	96.6	35.0
15	1100	65.6	1,320	8.2	361.00	189.00	90.3	33.1

2003 Date	Sodium ion (Na), Dissolved mg/L	Potassium ion (K) Dissolved mg/L	Sulfate ion (SO4) Dissolved mg/L	Chloride ion (Cl), Dissolved mg/L	Carbonate (as CO3) mg/L	Bicarbonate (as HCO3) mg/L	Nitrate (as NO3) mg/L	Total Solids Dissolved (Calculated) mg/L
Jan. 6	163	4.8	321	166	N.D.	221	N.D.	911
21	144	4.4	293	138	N.D.	200	N.D.	803
Feb. 3	151	4.7	289	139	N.D.	211	N.D.	816
18	148	5.0	303	140	N.D.	207	N.D.	826
Mar. 3	163	5.0	335	167	N.D.	231	N.D.	932
17	137	4.6	286	136	N.D.	195	N.D.	783
April 7	124	4.6	280	119	N.D.	189	N.D.	744
21	125	4.6	277	118	N.D.	190	N.D.	740
May 5	140	4.6	284	129	N.D.	198	N.D.	776
19	175	5.2	329	177	N.D.	222	N.D.	943
June 2	149	4.8	331	158	N.D.	211	N.D.	875
16	148	4.7	300	150	N.D.	209	N.D.	840
July 7	144	4.6	299	147	N.D.	211	N.D.	824
22	142	4.7	287	142	N.D.	201	N.D.	795
Aug. 4	151	4.5	298	150	N.D	212	N.D.	836
18	162	5.0	316	161	N.D.	209	N.D.	880
Sept. 8	162	4.9	311	162	N.D.	209	N.D.	874
22	158	4.9	316	162	N.D.	210	N.D.	875
Oct. 6	157	4.6	319	171	N.D.	217	N.D.	891
20	184	5.7	327	178	N.D.	220	N.D.	953
Nov. 3	157	5.8	345	168	N.D.	214	N.D.	923
17	167	6.1	336	169	N.D.	221	N.D.	930
Dec. 1	167	6.9	332	165	N.D.	215	N.D.	924
15	140	5.2	306	149	N.D.	210	N.D.	840

N.D. – Not Detected

SPECIFIC CONDUCTANCE OF WATER SAMPLES

The following table shows specific conductance of individual water samples taken at the Colorado River station and in Mexican canals. Samples were taken at the Northerly International Boundary and at the Southerly International Boundary by the United States Section of the Commission. Determinations for the Northerly International Boundary were made by the Bureau of Reclamation and the United States Section of the Commission (jointly); and for the Southerly International Boundary, by the United States Section of the Commission. Samples for the Intake Canal at Morelos Dam were taken by the Mexican Section of the Commission, and determinations were made by the Ministry of Agriculture and Hydraulic Resources of Mexico.

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C – 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,470	1,360	1,290	1,210	1,320	1,370	1,320	1,410	1,460	1,350	1,470	1,410
2	1,390	1,360	1,390	1,230	1,330	1,370	1,310	1,410	1,470	1,380	1,440	1,410
3	1,500	1,360	1,480	1,220	1,300	1,400	1,320	1,400	1,450	1,470	1,410	1,420
4	1,480	1,370	1,280	1,220	1,270	1,360	1,330	1,400	1,440	1,470	1,370	1,430
5	1,470	1,360	1,270	1,200	1,240	1,370	1,350	1,400	1,440	1,460	1,440	1,440
6	1,450	1,340	1,290	1,190	1,280	1,370	1,360	1,430	1,430	1,460	1,420	1,420
7	1,480	1,310	1,350	1,170	1,260	1,360	1,370	1,430	1,420	1,490	1,490	1,400
8	1,470	1,320	1,330	1,190	1,330	1,360	1,360	1,420	1,410	1,490	1,490	1,380
9	1,440	1,330	1,320	1,210	1,400	1,350	1,370	1,430	1,430	1,510	1,480	1,360
10	1,440	1,340	1,300	1,190	1,460	1,370	1,380	1,430	1,420	1,510	1,480	1,330
11	1,390	1,320	1,230	1,230	1,510	1,350	1,320	1,440	1,430	1,510	1,440	1,330
12	1,350	1,350	1,260	1,230	1,570	1,340	1,330	1,410	1,420	1,500	1,410	1,290
13	1,300	1,320	1,230	1,240	1,520	1,380	1,330	1,400	1,440	1,490	1,410	1,300
14	1,420	1,360	1,230	1,240	1,490	1,380	1,340	1,400	1,420	1,490	1,410	1,310
15	1,470	1,360	1,240	1,250	1,500	1,390	1,320	1,400	1,410	1,490	1,420	1,320
16	1,520	1,350	1,250	1,240	1,480	1,390	1,310	1,400	1,390	1,500	1,430	1,380
17	1,480	1,340	1,260	1,210	1,490	1,380	1,350	1,390	1,360	1,480	1,440	1,340
18	1,420	1,340	1,130	1,210	1,490	1,400	1,410	1,390	1,380	1,480	1,540	1,290
19	1,370	1,250	1,180	1,200	1,500	1,380	1,420	1,420	1,360	1,470	1,490	1,350
20	1,320	1,240	1,180	1,190	1,490	1,390	1,420	1,400	1,380	1,470	1,490	1,370
21	1,260	1,260	1,240	1,180	1,480	1,380	1,430	1,350	1,390	1,530	1,510	1,390
22	1,340	1,290	1,240	1,230	1,480	1,370	1,340	1,420	1,410	1,540	1,520	1,410
23	1,400	1,310	1,240	1,260	1,470	1,370	1,300	1,430	1,370	1,520	1,540	1,380
24	1,430	1,340	1,240	1,270	1,460	1,320	1,340	1,430	1,340	1,480	1,550	1,420
25	1,440	1,330	1,260	1,290	1,440	1,310	1,340	1,440	1,330	1,490	1,490	1,430
26	1,440	1,250	1,230	1,300	1,420	1,330	1,340	1,430	1,280	1,500	1,470	1,450
27	1,450	1,150	1,250	1,310	1,410	1,300	1,340	1,410	1,310	1,510	1,480	1,460
28	1,410	1,200	1,260	1,320	1,360	1,320	1,340	1,400	1,330	1,510	1,490	1,480
29	1,350		1,260	1,320	1,360	1,330	1,350	1,440	1,360	1,490	1,470	1,490
30	1,350		1,250	1,320	1,360	1,350	1,380	1,450	1,350	1,480	1,450	1,510
31	1,360		1,250		1,360		1,360	1,460		1,500		1,490

SPECIFIC CONDUCTANCE OF WATER SAMPLES

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C – 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,510	1,350	1,310	1,240	1,340	1,370	1,340	#	1,490	1,360	1,540	#
2	1,510	1,380	1,390	#	1,380	1,400	1,340	1,390	1,470	#	1,470	1,460
3	1,540	1,380	1,490	1,230	1,410	1,400	1,340	1,370	1,480	#	1,500	1,450
4	1,530	1,380	1,300	1,240	1,450	1,360	1,330	1,420	1,480	#	1,460	1,470
5	1,500	1,350	1,270	1,290	1,360	1,370	1,390	1,420	1,450	#	1,450	1,460
6	1,530	1,340	1,260	1,250	1,290	1,380	1,380	1,440	1,450	#	1,450	1,480
7	1,520	1,320	1,310	1,200	1,310	1,340	1,370	1,460	1,430	#	1,400	1,440
8	1,490	1,330	1,350	1,210	1,340	1,340	1,380	1,450	1,420	#	1,490	1,430
9	1,480	1,330	1,330	1,210	1,430	1,360	1,380	1,450	1,450	1,570	1,490	1,440
10	1,450	1,350	1,300	1,200	1,510	1,390	1,400	1,420	1,460	1,550	1,490	#
11	1,450	1,360	1,240	1,220	1,530	1,360	1,340	1,440	1,460	#	1,400	1,360
12	1,440	1,340	#	1,240	1,560	1,380	1,370	1,460	1,460	#	1,440	1,330
13	1,330	1,320	1,260	1,270	1,530	1,390	1,400	1,440	1,470	#	1,470	1,350
14	1,430	1,340	1,250	1,250	1,500	1,400	1,370	1,380	1,460	1,520	1,350	1,400
15	1,480	1,250	1,300	1,250	1,480	1,400	1,350	1,380	1,470	1,520	1,360	1,380
16	1,510	1,270	1,330	1,250	1,510	1,400	1,330	1,400	1,410	1,530	1,410	1,400
17	1,490	1,300	1,230	1,230	1,490	1,400	1,380	1,410	1,390	1,500	1,450	1,350
18	1,480	1,370	1,170	1,230	1,500	1,420	1,430	1,370	1,410	1,550	1,540	1,340
19	1,500	1,280	1,170	1,230	1,510	1,400	1,420	#	1,390	1,510	1,530	1,360
20	1,290	1,260	1,210	1,210	1,480	1,380	1,370	#	1,390	1,500	1,520	1,420
21	1,310	1,270	1,270	1,190	#	1,370	1,440	1,360	1,400	1,550	1,520	1,420
22	1,330	1,360	1,240	1,230	1,460	1,390	1,460	1,420	1,430	1,490	1,550	1,430
23	1,400	1,400	1,250	1,310	1,460	1,390	1,320	1,390	1,430	1,590	1,580	1,420
24	1,430	1,400	1,250	1,270	1,450	1,350	1,340	1,420	1,300	1,390	1,580	1,440
25	1,410	1,340	#	1,330	1,340	1,340	1,360	1,450	1,380	1,390	1,540	1,490
26	1,430	1,330	1,240	1,310	1,340	1,360	1,350	#	1,320	#	1,500	1,530
27	1,450	1,170	1,270	1,340	1,420	1,320	1,340	#	1,370	#	1,490	1,560
28	1,460	1,210	1,290	1,340	1,370	1,310	1,380	1,460	1,340	1,540	1,500	1,530
29	1,380		1,270	1,340	1,360	#	1,410	1,440	1,400	1,520	1,500	1,530
30	1,360		1,280	1,340	1,360	#	1,410	1,380	1,370	1,510	#	1,550
31	1,360		1,250		1,340		#	1,380		1,510		1,520

– No Sample

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C – 2003

January	March	May	July	September	November
8 1,580	5 1,590				
February	**April**	**June**	**August**	**October**	**December**
4 1,570	15 1,760				
18 1,310					

RAINFALL ON THE COLORADO RIVER WATERSHED IN MILLIMETERS

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 following page in this bulletin.

IN THE UNITED STATES

Month	Brawley, California		El Centro, California		Blythe, California		Yuma Quartermaster Depot, Arizona		Bullhead City, Arizona	
	2003	Average 1931–2003	2003	Average 1931–2003	2003	Average 1931–2003	2003	Average 1998–2003	2003	Average 1978–2003
Jan.	0	10	0	10	23	12	2	3	2	27
Feb.	28	9	34	9	15	12	31	19	65	29
Mar.	6	7	11	6	10	10	2	9	24	25
April	0	2	0	2	2	3	T	6	0	5
May	0	1	0	0	0	1	0	0	0	2
June	0	0	0	0	0	1	0	0	0	0
July	0	1	3	2	5	5	0	3	0	8
Aug.	13	9	26	8	1	18	7	5	32	19
Sept.	0	8	0	7	0	10	0	0	1	10
Oct.	0	6	0	7	0	6	0	7	0	9
Nov.	2	4	3	4	11	6	10	4	3	11
Dec.	0	10	1	11	1	13	1	0	0	13
Yearly	49	67	78	66	68	97	53	56	127	158

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		El Centinela, Baja California		Delta, Baja California	
	2003	Average 1948–2003	2003	Average 1926–2003	2003	Average 1948–2003	2003	Average 1975–2003	2003	Average 1948–2003
Jan.	T	8	T	9	0	10	#	5	2	7
Feb.	34	5	25	8	28	7	#	7	20	7
Mar.	2	4	5	6	0	6	#	3	1	5
April	0	2	0	2	0	2	#	2	0	1
May	0	T	0	T	0	T	#	0	0	T
June	0	T	0	T	0	1	#	T	0	T
July	1	3	T	4	#	2	#	1	0	2
Aug.	6	8	1	9	#	5	#	4	T	6
Sept.	T	4	T	9	#	5	#	7	0	6
Oct.	0	5	0	8	#	6	#	5	0	7
Nov.	13	4	3	4	#	3	#	1	0	3
Dec.	T	8	T	16	#	7	#	7	9	10
Yearly	56	54	34	79		57		42	32	51

Month	San Felipe, Baja California		Riito, Sonora							
	2003	Average 1948–2003	2003	Average 1949–2003						
Jan.	0	6	0	5						
Feb.	0	5	25	6						
Mar.	0	3	5	5						
April	0	1	0	1						
May	0	1	0	T						
June	0	1	0	T						
July	0	3	0	2						
Aug.	0	9	0	5						
Sept.	132	19	0	9						
Oct.	20	8	0	8						
Nov.	0	5	0	4						
Dec.	0	9	0	9						
Yearly	152	74	30	57						

T Trace # Missing Record

LOCATION OF RAINFALL STATIONS ON THE COLORADO RIVER WATERSHED

The precipitation records of the stations listed alphabetically below began on the date shown and extend through 2003.

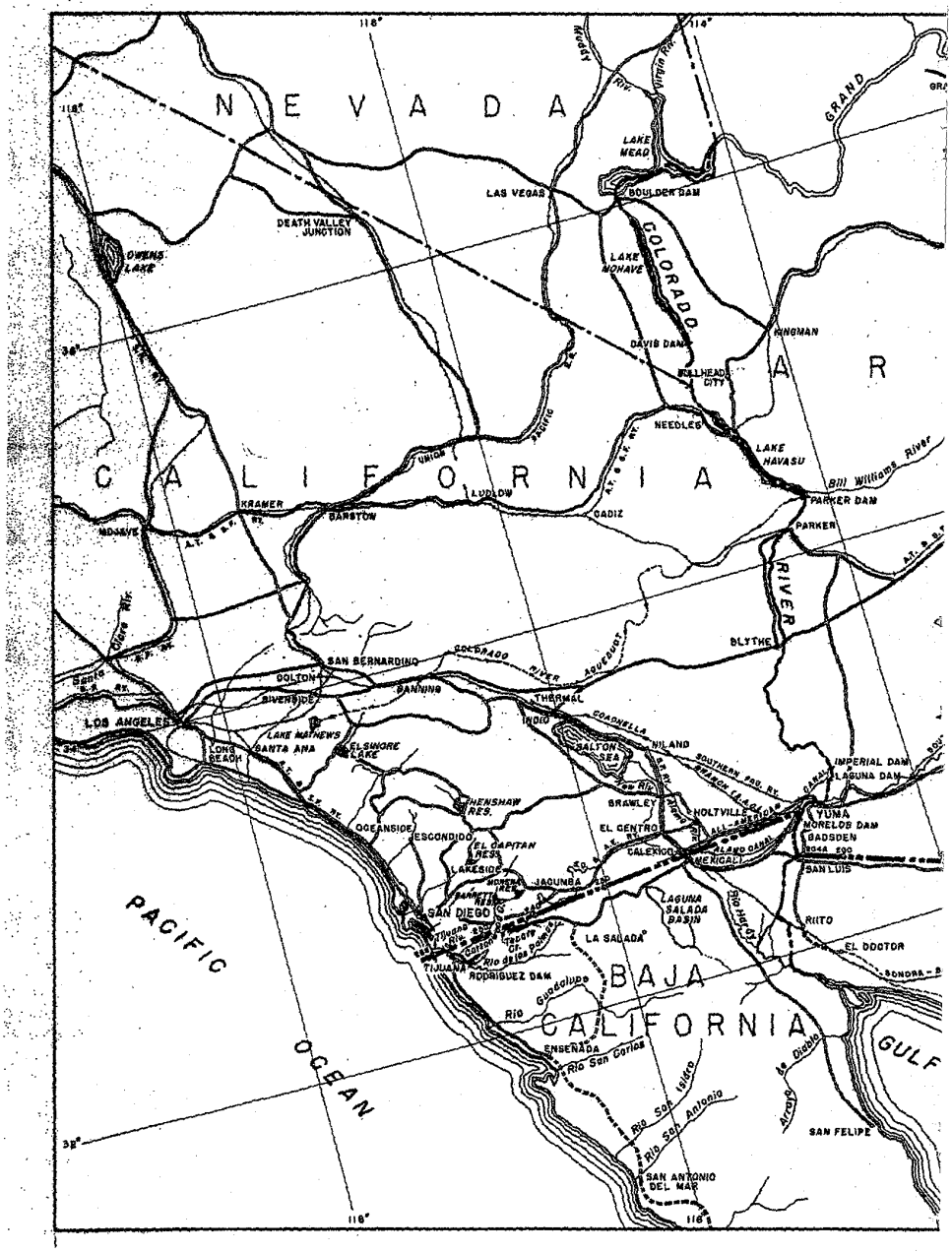
IN THE UNITED STATES

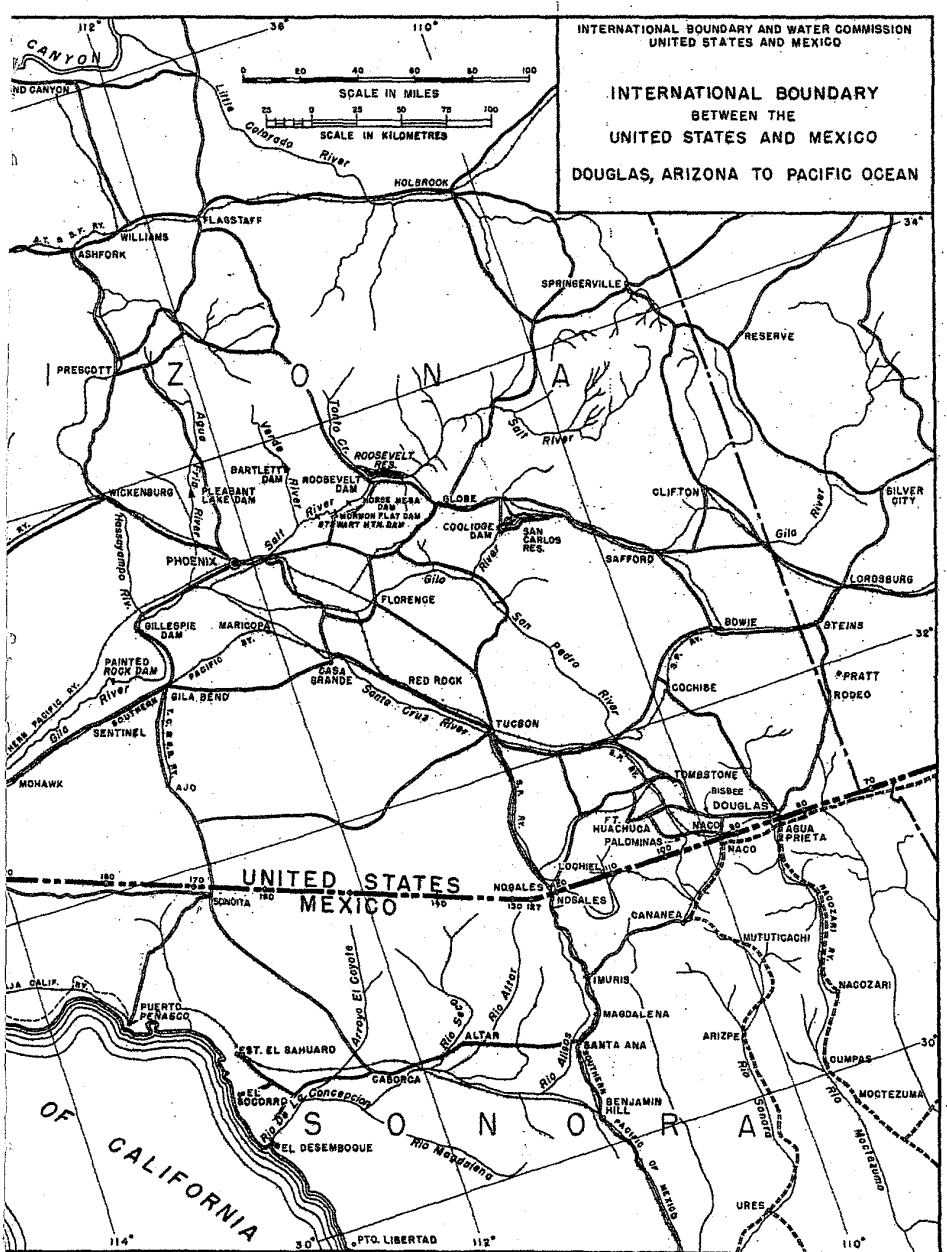
NAME OF STATION	LATITUDE	LONGITUDE	@ ELEV. (Meters)	RECORD BEGAN	OBSERVER
* Blythe, California	33° 37'	114° 36'	81.69	1909	State Division of Forestry
Brawley, California	32° 57'	115° 33'	30.48	1908	Agricultural Research Service
Bullhead City, Arizona	35° 07'	114° 36'	176.78	1980	Bullhead City Fire Department
El Centro, California	32° 46'	115° 34'	9.14	1930	El Centro Water Department
+ Yuma Citrus Station, Arizona	32° 37'	114° 39'	58.22	1923	University of Arizona Experimental Farm
Yuma Quartermaster Depot, Arizona	32° 44'	114° 37'	48.77	1998	Yuma Crossing State Park

IN MEXICO

NAME OF STATION	LATITUDE	LONGITUDE	@ ELEV. (Meters)	RECORD BEGAN	OBSERVER
Bataques, Baja California	32° 34'	115° 00'	**20.12	1948	# S. A. R. H.
Delta, Baja California	32° 21'	115° 11'	**11.89	1948	S. A. R. H.
El Centinela, Baja California	32° 35'	115° 45'	49.99	1978	S. A. R. H.
Los Algodones, Baja California	32° 42'	114° 44'	35.05	1948	S. A. R. H.
Mexicali, Baja California	32° 40'	115° 28'	3.96	1926	S. A. R. H.
Riito, Sonora	32° 13'	115° 01'	13.11	1959	S. A. R. H.
San Felipe, Baja California	31° 01'	114° 51'	21.95	1969	S. A. R. H.

* Not shown on rainfall map
@ Elevation above mean sea level except Brawley and El Centro, which are elevations below mean sea level
** Elevation obtained from International Boundary and Water Commission topographic maps
# Ministry of Agriculture and Hydraulic Resources
+ Evaporation only


NEVADA
CALIFORNIA
ARIZONA
BAJA CALIFORNIA
PACIFIC OCEAN
GULF
LAS VEGAS
LAKE MEAD
BOULDER DAM
COLORADO RIVER
DEATH VALLEY JUNCTION
OWENS LAKE
LAKE MOHAVE
DAVIS DAM
RINGMAN
NEEDLES
LAKE HAVASU
Bill Williams River
PARKER DAM
PARKER
KRAMER
BARSTOW
LUDLOW
CADIZ
MOJAVE
SAN BERNARDINO
COLORADO RIVER AQUEDUCT
BLYTHE
DALTON
SAN GORGONIO PASS
RIVERSIDE
BANNING
THERMAL
INDIO
COACHELLA
LOS ANGELES
LAKE MATHEWS
SANTA ANA
LONG BEACH
EL SINORE LAKE
WILAND
SOUTHERN PAC. RY.
IMPERIAL DAM
LAGUNA DAM
HENSHAW RES.
BRAWLEY
HOLTVILLE
YUMA
MORELOS DAM
BADSDEN
OCEANSIDE
ESCONDIDO
EL CENTRO
CALEXICO
MEXICALI
SAN LUIS
EL CAPITAN RESV.
LAKESIDE
JAGUNBA
SAN DIEGO
LAGUNA SALADA BASIN
LA SALADA
RIITO
EL DOCTOR
TIJUANA
RODRIGUEZ DAM
ENSENADA
Rio San Carlos
Rio San Isidro
Rio San Antonio
SAN FELIPE
SAN ANTONIO DEL MAR


INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
INTERNATIONAL BOUNDARY
BETWEEN THE
UNITED STATES AND MEXICO
DOUGLAS, ARIZONA TO PACIFIC OCEAN
SCALE IN MILES
SCALE IN KILOMETRES
Little Colorado River
HOLBROOK
FLAGSTAFF
WILLIAMS
ASHFORK
SPRINGERVILLE
RESERVE
PRESCOTT
Z O N A
Agua Fria River
Verde River
Tonto Cr.
Salt River
ROOSEVELT RES.
BARTLETT DAM
ROOSEVELT DAM
HORSE MESA DAM
MORMON FLAT DAM
STEWART MTN. DAM
WICKENBURG
PLEASANT LAKE DAM
GLOBE
CLIFTON
SILVER CITY
Gila River
COOLIDGE DAM
SAN CARLOS RES.
SAFFORD
LORDSBURG
PHOENIX
Hassayampo River
FLORENCE
GILLESPIE DAM
MARICOPA
BOWIE
STEINS
San Pedro River
PAINTED ROCK DAM
CASA GRANDE
RED ROCK
COCHISE
PRATT
RODEO
GILA BEND
Santa Cruz River
SENTINEL
TUCSON
TOMBSTONE
BISBEE
DOUGLAS
MOHAWK
AJO
FT. HUACHUCA
PALOMINAS
NACO
AGUA PRIETA
UNITED STATES
MEXICO
NOGALES
SONOITA
CANANEA
MUTUTICACHI
IMURIS
NACOZARI
PUERTO PEÑASCO
EST. EL BAHUARO
Arroyo El Coyote
Rio Sta. Cr.
Rio Altar
ALTAR
MAGDALENA
SANTA ANA
ARIZPE
CUMPAS
CABORCA
Rio Concepcion
Rio Asuncion
BENJAMIN HILL
MOCTEZUMA
Rio Sonora
Rio Moctezuma
EL DESEMBOQUE
Rio Magdalena
URES
OF CALIFORNIA
S O N O R A
PTO. LIBERTAD

EVAPORATION IN THE COLORADO RIVER BASIN
IN MILLIMETERS

Tabulated below are records of evaporation observed at one station in Arizona, at five stations in Baja, California, and at one station in Sonora. 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 1.22 meters diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," in this bulletin.

IN THE UNITED STATES

Month	Yuma Citrus Station, Arizona	
	2003	Average 1931–2003
Jan.	#	99
Feb.	#	120
Mar.	#	184
April	#	251
May	136	321
June	#	359
July	#	382
Aug.	#	335
Sept.	#	264
Oct.	#	190
Nov.	#	125
Dec.	#	94
Yearly		2,724

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		Riito, Sonora		San Felipe, Baja California	
	2003	Average 1948–2003	2003	Average 1926–2003	2003	Average 1948–2003	2003	Average 1949–2003	2003	Average 1948–2003
Jan.	99	105	71	63	115	84	#	76	133	120
Feb.	95	127	68	127	94	102	#	98	121	138
Mar.	194	180	114	145	182	151	#	146	199	169
April	249	248	162	195	215	206	#	187	218	198
May	269	309	211	264	322	271	#	256	254	243
June	300	333	237	289	324	306	#	286	269	259
July	316	343	243	295	#	283	#	315	270	258
Aug.	289	306	222	254	#	256	#	266	262	263
Sept.	241	255	177	202	#	211	#	215	219	229
Oct.	202	200	136	144	#	147	#	153	177	198
Nov.	103	131	67	85	#	112	#	95	106	147
Dec.	122	105	63	60	#	81	#	77	98	120
Yearly	2,479	2,643	1,771	2,068		2,585		2,246	2,326	2,413

Month	Delta, Baja California	
	2003	Average 1948–2003
Jan.	101	85
Feb.	92	107
Mar.	148	153
April	222	208
May	232	254
June	295	282
July	262	285
Aug.	247	264
Sept.	129	219
Oct.	156	156
Nov.	89	104
Dec.	88	145
Yearly	2,061	2,057

Missing record

TEMPERATURE IN THE COLORADO RIVER BASIN
IN DEGREES CELSIUS

The maximum, minimum, and monthly mean temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located approximately one meter 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," in this bulletin.

IN THE UNITED STATES

Month	Blythe, California				Yuma Quartermaster Depot, Arizona				Brawley, California			
	2003				2003				2003			
	Mean	Max.	Min.	Average 1931–03	Mean	Max.	Min.	Average 1998–03	Mean	Max.	Min.	Average 1931–03
Jan.	14.9	27.8	3.3	11.6	18.3	31.7	7.2	15.4	16.2	29.4	2.8	12.4
Feb.	13.7	29.4	-0.6	14.2	15.8	31.1	1.7	15.6	15.1	32.2	1.1	14.7
Mar.	18.4	33.9	4.4	17.4	19.6	35.6	6.1	18.6	18.1	32.2	3.9	17.4
April	20.3	35.0	5.6	21.3	20.5	35.0	7.2	21.3	19.4	33.3	5.6	21.0
May	26.8	43.9	8.9	25.6	26.7	43.9	10.0	25.8	25.1	42.8	9.4	25.1
June	30.7	45.6	18.3	30.0	30.2	46.7	15.6	30.3	28.8	45.6	15.6	29.4
July	35.3	48.3	22.8	33.6	34.6	48.3	21.1	33.4	34.0	47.2	20.6	33.1
Aug.	34.3	46.7	21.7	33.0	33.4	47.8	21.7	33.5	33.8	46.1	21.7	33.0
Sept.	31.3	45.0	16.7	29.5	31.1	44.4	16.1	30.7	31.6	43.9	17.2	30.1
Oct.	27.1	41.7	10.0	23.0	28.1	41.7	12.8	24.8	27.6	41.1	11.1	24.0
Nov.	14.4	25.6	2.8	15.7	16.7	29.4	3.3	17.6	15.8	28.9	0	17.0
Dec.	12.2	25.0	-2.2	11.7	14.3	26.1	0	13.3	12.9	26.1	-2.2	12.7
Yearly	23.3	48.3	-2.2	22.2	24.1	48.3	0	23.4	23.2	47.2	-2.2	22.5

Month	El Centro, California				Bullhead City, Arizona			
	2003				2003			
	Mean	Max.	Min.	Average 1931–03	Mean	Max.	Min.	Average 1978–03
Jan.	17.1	30.6	4.4	12.6	16.3	28.3	5.6	12.5
Feb.	15.3	30.0	2.8	14.8	14.4	29.4	-0.6	14.8
Mar.	19.1	35.6	6.1	17.5	17.9	31.7	5.0	18.0
April	20.4	31.7	8.9	21.1	20.6	33.9	6.7	22.3
May	25.7	41.7	10.0	25.3	28.1	46.7	11.1	27.5
June	29.7	45.0	15.6	29.7	#	#	#	32.4
July	34.7	47.2	22.8	33.2	36.9	51.1	24.4	35.3
Aug.	33.8	46.1	23.9	32.9	35.7	48.3	22.8	34.8
Sept.	31.9	43.9	19.4	30.0	32.9	45.6	19.4	30.9
Oct.	28.3	41.1	13.3	23.9	28.2	42.8	13.9	24.1
Nov.	16.8	28.3	2.2	17.0	14.6	28.3	3.3	16.7
Dec.	13.7	26.7	0	12.8	12.1	23.9	-5.0	12.0
Yearly	23.9	47.2	0	22.6				23.4

IN MEXICO

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	2003		1948–2003		2003		1926–2003		2003		1948–2003	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	31	4	31	-5	30	7	34	-7	31	6	45	-9
Feb.	31	2	35	-2	31	4	34	-5	30	1	37	-6
Mar.	34	6	38	0	34	8	38	-1	31	5	45	-4
April	34	8	43	3	33	9	41	1	31	8	48	-9
May	43	11	47	6	44	12	47	6	42	10	51	1
June	46	17	52	11	46	17	49	9	46	15	57	6
July	47	22	50	13	49	26	49	13	#	#	56	7
Aug.	47	23	49	16	46	24	49	12	#	#	54	8
Sept.	45	18	50	10	44	20	50	8	#	#	57	4
Oct.	42	12	44	0	40	15	44	0	#	#	48	0
Nov.	29	5	38	-3	28	5	40	-2	#	#	46	0
Dec.	23	2	32	-5	25	2	32	-5	#	#	36	-5
Yearly	47	2	52	-5	49	2	50	-7			57	-9

Missing Data

TEMPERATURE IN THE COLORADO RIVER BASIN
IN DEGREES CELSIUS

IN MEXICO

Month	Riito, Sonora				San Felipe, Baja California				El Centinela, Baja California			
	2003		1949–2003		2003		1948–2003		2003		1975–2003	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	30	5	30	–7	37	3	37	–1	#	#	30	1
Feb.	31	3	35	–6	40	7	40	0	#	#	35	–4
Mar.	39	5	39	–7	39	10	41	0	#	#	38	4
April	36	7	43	2	39	9	45	1	#	#	46	6
May	45	8	46	5	41	7	49	5	#	#	48	9
June	44	15	51	7	42	5	51	5	#	#	49	10
July	48	19	60	11	44	9	51	9	#	#	52	20
Aug.	47	21	50	8	44	18	57	5	#	#	50	18
Sept.	50	12	48	4	42	15	52	3	#	#	50	11
Oct.	40	10	46	–1	39	12	47	–5	#	#	46	3
Nov.	30	5	48	–3	39	5	48	–6	#	#	40	3
Dec.	28	3	30	–6	39	5	39	–2	#	#	30	–3
Yearly	50	3	60	–7	44	3	57	–6			52	–4

Month	Delta, Baja California											
	2003		1948–2003									
	Max.	Min.	Max.	Min.								
Jan.	29	5	40	–4								
Feb.	28	0	40	–2								
Mar.	38	4	45	–2								
April	36	5	48	0								
May	45	9	54	0								
June	48	13	56	2								
July	50	20	57	7								
Aug.	49	22	60	15								
Sept.	47	18	57	4								
Oct.	43	9	47	1								
Nov.	31	2	50	0								
Dec.	28	–2	40	–5								
Yearly	50	–2	60	–5								

Missing Data

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

2003

The total drainage area within the Colorado River basin is about 637,000 square kilometers, of which 478,100 square kilometers lie above Imperial Dam and about 159,000 square kilometers, are below the dam. Of the area below Imperial Dam, 153,800 square kilometers are in the United States and about 5,180 square kilometers are in Mexico. The area below Imperial Dam includes the Gila River watershed with a total area of about 150,700 square kilometers, of which about 2,850 square kilometers 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 U. S. Bureau of Reclamation; and 3) those within the Imperial Valley; California, the data for which are furnished by the U. S. Bureau of Reclamation. 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 Hectares
IN THE UNITED STATES:	
Imperial Dam	
Yuma Valley Division	21,548
Reservation Division	6,079
Yuma Mesa	7,305
Yuma Aux. Project Unit "B" (Yuma Mesa)	1,043
South Gila Valley	3,970
North Gila Valley	2,544
Wellton-Mohawk	25,143
Coachella Valley	30,596
Imperial Valley	200,524
Warren Act	41
Non-Project lands adjacent to Colorado River	4,367
Total in United States	303,160
IN MEXICO:	
San Luis Valley, R. C., Sonora	17,816
Mexicali Valley	118,265
Total in Mexico	136,081
Total in United States and Mexico	439,241

10-2545.80 ALAMO RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Staff gage located on the right bank of the river, about 11.3 kilometers east of Calexico, California, immediately downstream from the international land boundary between the United States and Mexico and approximately three meters upstream from a 1.22-meter Cipolletti weir in the throat of a twin-tube concrete culvert which carries the river flow under the All-American Canal. On November 18, 1992 continuous gage height recording equipment was installed at the site.
RECORDS: From June 1942 through November 18, 1992 flows 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. A continuous gage height record and mean daily discharge records are available November 19, 1992 through 2003. Records obtained and furnished by Imperial Irrigation District.
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. On September 28, 1995 the National Water Commission of Mexico completed the construction of a weir immediately upstream of the international boundary. The result is that all the Alamo River flow, or a portion thereof, is being diverted into the New River via the interconnected agricultural drainage system in Mexico. After September 28, 1995 the recorded flow at the gage is affected by this diversion.
EXTREMES: Maximum mean daily discharge, 7.31 CMS (estimated), April 13, 1946; minimum discharge, no flow July 22-23, 29-30, 1949 and numerous days after September 28, 1995. 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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.02	0.01	0.01	0.01	0.03	0.01	0	0	0	0	0	0
2	.01	.01	.02	.01	.02	.01	0	0	0	0	0	0
3	.02	.01	.01	.01	.01	.01	0	0	0	0	0	0
4	.02	.01	.01	.02	.01	.01	0	0	0	0	0	0
5	.01	.01	.01	.02	.01	.01	0	0	0	0	0	0
6	.01	.01	.01	.02	.01	.01	0	0	0	0	0	0
7	.01	.01	.01	.01	.03	.01	0	0	0	0	0	0
8	.01	.01	.01	.01	.02	.01	0	0	0	0	0	0
9	.01	.01	.01	.02	.02	.01	0	0	0	0	0	0
10	.01	.01	.01	.02	.01	.01	0	0	0	0	0	0
11	.01	.01	.01	.02	.01	.01	0	0	0	0	0	0
12	.01	.01	.01	.01	.01	0	0	0	0	0	0	0
13	.01	.03	.01	.01	.01	0	0	0	0	0	0	0
14	.01	.08	.02	.02	.01	0	0	0	0	0	0	0
15	.01	.04	.02	.01	.01	0	0	0	0	0	0	0
16	.01	.02	.02	.01	.01	0	0	0	0	0	0	0
17	.01	.02	.02	.01	.01	0	0	0	0	0	0	0
18	.01	.03	.02	.01	.01	0	0	0	0	0	0	0
19	.01	.02	.02	.02	.01	0	0	0	0	0	0	0
20	.01	.01	.03	.03	.01	0	0	0	0	0	0	0
21	.01	.01	.03	.02	.01	0	0	0	0	0	0	0
22	.01	.01	.03	.02	.01	0	0	0	0	0	0	0
23	.01	.01	.03	.02	.01	0	0	0	0	0	0	0
24	.01	.01	.03	.02	.01	0	0	0	0	0	0	0
25	.01	.01	.03	.02	.01	0	0	0	0	0	0	0
26	.01	.01	.02	.02	.01	0	0	0	0	0	0	0
27	.01	.01	.02	.02	.01	0	0	0	0	0	0	0
28	.01	.01	.02	.02	.01	0	0	0	0	0	0	0
29	.01		.02	.02	.02	0	0	0	0	0	0	0
30	.01		.01	.02	.02	0	0	0	0	0	0	0
31	.01		.01		.02		0	0		0		0
Sum	0.34	0.45	0.54	0.50	0.41	0.11	0	0	0	0	0	0

Current Year 2003 | Period 1943-2003

Month	Extreme Gage Meters High	Extreme Gage Meters Low	Extreme-Cubic Meters per Second φ High Day	φ High	φ Low Day	φ Low	Average	Volume-Thousand Cubic Meters Total	Average	Maximum	Minimum
Jan.	0.050	0.025	! 1	0.02	! 2	0.01	0.01	29.4	320	3,441	0
Feb.	.135	.010	14	.08	! 1	.01	.02	38.9	293	3,481	0
Mar.	.065	.030	!20	.03	! 1	.01	.02	46.7	334	3,890	0
April	.060	.035	20	.03	! 1	.01	.02	43.2	348	2,741	0
May	.065	.040	! 1	.03	! 3	.01	.01	35.4	287	2,219	0
June	.045	0	! 1	.01	!12	0	0	9.5	271	2,080	0
July	0	0	! 1	0	! 1	0	0	0	256	2,112	0
Aug.	0	0	! 1	0	! 1	0	0	0	293	2,062	0
Sept.	0	0	! 1	0	! 1	0	0	0	270	1,734	0
Oct.	0	0	! 1	0	! 1	0	0	0	283	2,276	0
Nov.	0	0	! 1	0	! 1	0	0	0	297	2,566	0
Dec.	0	0	! 1	0	! 1	0	0	0	287	2,080	0
Yearly	0.135	0		0.08		0	0.01	203	3,539	27,317	203

φ Mean daily ! And other days

10-2549.70 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, 427 meters downstream (north) from the international land boundary between the United States and Mexico. Measurements are made from a foot bridge at the gage. Gage heights are in meters below mean sea level.
RECORDS: Based on a continuous record of gage heights and current meter measurements by the Imperial Irrigation District. Records computed and furnished by the District. Records available: June 1942 through 2003.
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 43,172 TCM during any successive five-year period under the provisions of Minute No. 197 of the Commission. Gage heights shown are meters below mean sea level.
EXTREMES: Maximum mean daily discharge, 29.2 CMS on December 9, 1982; minimum mean daily discharge, 0.06 CMS 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 CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.67	4.13	6.49	4.28	5.92	3.37	3.91	3.74	3.77	2.72	3.14	3.91
2	4.93	3.99	6.23	4.16	5.78	3.29	3.94	3.62	3.71	3.00	3.12	4.16
3	5.38	3.99	6.03	4.36	5.66	3.31	4.02	3.46	3.60	2.97	3.17	4.30
4	5.52	4.11	5.81	4.11	5.47	3.37	3.99	3.62	3.43	2.80	3.37	4.16
5	5.44	4.16	5.66	4.64	5.35	3.31	3.99	3.71	3.20	2.80	3.40	4.11
6	5.18	4.13	5.47	4.76	5.47	3.31	3.99	3.48	3.23	2.86	3.37	4.05
7	4.90	6.32	5.92	4.93	5.35	3.37	3.96	3.37	3.26	3.00	3.34	3.99
8	4.70	3.82	5.86	5.07	5.13	3.23	4.02	3.31	3.26	2.95	3.37	4.02
9	4.33	3.91	5.92	5.04	4.93	3.14	3.99	3.51	3.14	2.92	3.37	4.08
10	4.11	4.22	5.89	5.04	5.01	3.09	3.74	3.54	3.06	3.31	3.34	3.91
11	3.99	4.39	5.95	5.04	5.07	3.17	3.60	3.46	3.12	3.23	3.43	3.99
12	3.99	4.90	5.98	5.04	5.01	3.20	3.60	3.46	3.12	3.17	3.99	4.05
13	3.99	7.31	5.95	5.04	5.01	3.31	3.57	3.51	3.23	3.14	3.91	4.11
14	3.82	5.86	5.75	5.10	5.15	3.40	3.46	3.37	3.20	3.14	3.74	4.25
15	3.65	6.29	5.66	5.30	4.93	3.26	3.54	3.48	3.31	3.20	3.68	4.42
16	3.60	6.83	5.41	5.18	4.93	3.29	3.62	3.74	3.37	3.34	3.74	4.30
17	3.77	7.05	4.73	5.04	4.79	3.34	3.57	3.79	3.37	3.31	3.65	4.22
18	4.19	6.88	4.73	5.04	4.56	3.43	3.74	3.82	3.40	3.29	3.65	4.22
19	4.39	6.60	5.10	4.87	4.53	3.94	3.26	3.82	3.51	3.23	3.71	4.11
20	4.19	6.34	5.32	5.04	4.47	4.13	3.26	3.68	3.48	3.17	3.77	3.99
21	4.05	6.09	5.30	5.30	4.39	3.96	3.26	3.51	3.40	3.14	3.77	3.91
22	3.96	5.86	5.24	5.41	4.05	3.88	3.46	3.62	3.43	3.12	3.65	3.94
23	3.82	5.52	5.10	5.55	3.74	3.82	3.71	3.60	2.92	3.14	3.62	3.88
24	3.85	5.41	5.30	6.23	3.79	3.74	3.77	3.82	2.72	3.20	3.71	3.88
25	3.88	7.62	5.44	6.23	3.65	3.88	3.68	4.08	2.63	3.20	3.79	3.94
26	3.88	6.26	5.49	6.12	3.62	3.79	3.37	3.88	2.58	3.17	3.82	4.11
27	4.05	6.40	5.21	6.06	3.54	3.74	3.20	3.96	2.58	3.20	3.77	4.08
28	4.19	6.49	4.96	6.23	3.48	3.88	3.31	3.96	2.58	3.09	3.85	4.13
29	4.33		4.64	6.46	3.29	3.91	3.48	3.96	2.63	3.23	3.91	4.13
30	4.30		4.36	6.46	3.34	3.91	3.62	3.82	2.58	3.14	3.82	4.11
31	4.25		4.28		3.43		3.71	3.82		3.20		4.08
Sum	133.30	154.88	169.18	157.13	142.84	105.77	113.34	113.52	94.82	96.38	107.97	126.54

Current Year 2003 | Period 1943-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
			ϕ High		ϕ Low			Total	Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	12.235	12.510	4	5.52	16	3.60	4.30	11,517	13,305	27,387	2,160
Feb.	11.990	12.475	25	7.62	8	3.82	5.53	13,382	11,985	26,416	1,552
Mar.	12.110	12.415	1	6.49	31	4.28	5.46	14,617	13,735	31,213	1,243
April	12.185	12.435	!29	6.46	4	4.11	5.24	13,576	13,752	34,066	1,715
May	12.255	12.635	1	5.92	29	3.29	4.61	12,341	12,599	29,740	776
June	12.505	12.665	20	4.13	10	3.09	3.53	9,139	10,519	25,024	1,341
July	12.520	12.650	! 3	4.02	27	3.20	3.66	9,793	10,961	28,368	1,008
Aug.	12.510	12.630	25	4.08	8	3.31	3.66	9,808	12,442	34,066	1,405
Sept.	12.560	12.685	1	3.77	!26	2.58	3.16	8,192	11,628	29,251	2,214
Oct.	12.605	12.675	16	3.34	1	2.72	3.11	8,327	11,497	28,072	2,567
Nov.	12.530	12.665	12	3.99	2	3.12	3.60	9,329	10,935	25,310	3,063
Dec.	12.465	12.545	15	4.42	!23	3.88	4.08	10,933	12,912	28,104	2,175
Yearly	11.990	12.685		7.62		2.58	4.15	130,954	146,270	330,444	30,310

ϕ Mean daily ! And other days

10-2549.60 WASTES FROM MEXICALI POTABLE WATER PLANT TO NEW RIVER IN MEXICO

DESCRIPTION: A 3.5-meter Parshall flume, installed by the State Commission of Public Services of Mexicali, is located 2.0 kilometers upstream of the pumping plant on the supply canal. Excess water discharges into an open channel, thence into a 91 centimeter diameter pipe that empties into Rivera Drain (Drain 134), which is 2.0 kilometers below the plant and 2.0 kilometers south of the international boundary. From this point the waste is carried by a closed concrete box conduit into New River.

RECORDS: During 2003 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 2003.

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 1.4 kilometers upstream of the international boundary.

EXTREMES: Maximum instantaneous discharge, 2.32 CMS on March 26, 1969; minimum instantaneous discharge, zero during several days in the years 1977 through 2003.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0	0.01	0.01	0	0	0	0	0	0	0	0.02
2	0	0	.01	.01	.01	0	.01	0	0	0	0	.01
3	.01	0	0	.01	.01	0	.01	0	0	0	0	.02
4	0	.01	.01	.01	.01	0	.01	0	0	0	0	.02
5	.01	.01	.01	0	.01	0	.01	0	0	0	0	.01
6	0	0	.01	.01	.01	0	.01	0	0	0	0	.03
7	.01	.01	.01	.01	0	0	.01	0	0	0	0	.03
8	.01	0	0	.01	0	0	.01	0	0	0	0	.02
9	.01	.01	.01	.01	0	0	.01	0	0	0	0	.02
10	0	0	.01	.01	0	0	0	0	0	0	0	.02
11	.01	.01	.01	.01	0	0	0	0	0	0	0	.02
12	0	0	.01	.01	0	0	0	0	0	0	0	.02
13	.01	.01	.01	.01	0	0	0	0	0	0	0	.02
14	.01	.01	0	.01	0	0	0	0	0	0	0	.02
15	.01	0	.01	.01	0	0	0	0	0	0	0	.02
16	.01	0	.01	.01	0	0	0	0	0	0	0	.02
17	.01	.01	.01	.01	0	0	0	0	0	0	0	.02
18	.01	.01	.01	0	0	0	0	0	0	0	0	.02
19	.01	.01	.01	.01	0	0	0	0	0	0	0	.02
20	.01	.01	0	.01	0	0	0	0	0	0	0	0
21	.01	.01	.01	.01	0	0	0	0	0	0	0	0
22	.01	.01	0	.01	0	0	0	0	0	0	0	0
23	.01	.01	.01	.01	0	0	0	0	0	0	0	0
24	.01	.01	.01	0	0	0	0	0	0	0	0	0
25	0	.01	.01	.01	0	0	0	0	0	0	0	0
26	.01	.01	.01	.01	0	0	0	0	0	0	0	0
27	0	.01	0	.01	0	0	0	0	0	0	0	0
28	.01	0	.02	.01	0	0	0	0	0	0	0	0
29	.01		.01	.01	0	0	0	0	0	0	0	0
30	0		.01	.01	0	0	0	0	0	0	0	0
31	.01		.01		0		0	0		0		0
Sum	0.23	0.18	0.26	0.27	0.05	0	0.08	0	0	0	0	0.38

Current Year 2003 | Period 1968-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0.01	! 2	0	0.01	19.9	139	641	0
Feb.			! 4	.01	! 1	0	.01	15.6	96.1	384	0
Mar.			28	.02	! 3	0	.01	22.5	172	1,074	0
April			! 1	.01	! 5	0	.01	23.3	167	532	0
May			! 2	.01	! 1	0	0	4.3	180	537	4.3
June			! 1	0	! 1	0	0	0	169	504	0
July			! 2	.01	! 1	0	0	6.9	201	651	0
Aug.			! 1	0	! 1	0	0	0	217	735	0
Sept.			! 1	0	! 1	0	0	0	202	677	0
Oct.			! 1	0	! 1	0	0	0	189	625	0
Nov.			! 1	0	! 1	0	0	0	166	622	0
Dec.			! 6	.03	!20	0	.01	32.8	154	737	8.6
Yearly				0.03		0	0	125	2,054	6,610	125

ϕ Mean daily ! And other days

10-2549.65 WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

DESCRIPTION: During 2003 the flow to the New River in Mexico included 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, and starting January 1988, the north irrigation district watershed is included.

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 2003.

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 previous page of this bulletin.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1956 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	19.9	950	10,803	7.8
February	120	787	8,981	7.8
March	22.5	704	5,506	22.5
April	23.3	574	3,940	19.9
May	4.3	408	3,174	4.3
June	0	414	6,994	0
July	6.9	626	12,644	0
August	0	631	5,103	0
September	0	482	3,966	0
October	0	603	4,285	0
November	0	604	4,668	0
December	32.8	727	10,720	0
Yearly	230	7,506	34,953	230

10-2540.05 SALTON SEA – ELEVATIONS OF WATER SURFACE

DESCRIPTION: Water-stage recorder and staff gage located on the western shore of the Salton Sea, 24.9 kilometers northwest of Westmorland, Imperial County, California. The Salton Sea is the sink of a closed basin which has a drainage area of 21,652 square kilometers. Zero of the gage is 76.200 meters below mean sea level, U. S. C. & G. S. datum.

RECORDS: Records of water surface elevations available from November 1904 through 2003. 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 35.4 kilometers 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 Westmorland, California." The elevation of the old station is at a datum of 0.305 meter 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 84.64 meters below mean sea level, U. S. C. & G. S. datum.

EXTREMES: Maximum elevation during 2003 was 69.495 meters below mean sea level. Minimum elevation during 2003 was 69.800 meters below mean sea level. Extremes for period of record: maximum elevation 59.710 below mean sea level February 10 to March 29, 1907; minimum elevation since 1906, 76.690 meters below mean sea level in November 1924.

MEAN DAILY WATER SURFACE ELEVATION IN METERS BELOW MEAN SEA LEVEL– 2003

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	69.675	69.615	69.555	69.495	69.525	69.495	69.585	69.615	69.645	69.710	69.770	69.800
2	69.675	69.615	69.555	69.495	69.525	69.495	69.585	69.615	69.645	69.740	69.770	69.800
3	69.675	69.615	69.555	69.525	69.525	69.495	69.585	69.615	69.645	69.740	69.770	69.800
4	69.675	69.615	69.555	69.525	69.525	69.525	69.585	69.615	69.615	69.740	69.800	69.800
5	69.675	69.615	69.555	69.525	69.525	69.525	69.585	69.615	69.615	69.740	69.800	69.800
6	69.675	69.615	69.555	69.525	69.525	69.525	69.585	69.615	69.645	69.740	69.800	69.800
7	69.675	69.615	69.555	69.525	69.525	69.525	69.585	69.615	69.645	69.740	69.800	69.800
8	69.675	69.615	69.555	69.525	69.525	69.525	69.585	69.615	69.645	69.740	69.800	69.800
9	69.675	69.615	69.555	69.495	69.525	69.525	69.585	69.615	69.645	69.740	69.800	69.800
10	69.675	69.615	69.555	69.495	69.525	69.525	69.585	69.645	69.675	69.740	69.800	69.800
11	69.675	69.615	69.555	69.495	69.525	69.525	69.585	69.645	69.675	69.740	69.800	69.800
12	69.675	69.615	69.525	69.495	69.525	69.525	69.585	69.645	69.675	69.740	69.800	69.800
13	69.675	69.585	69.525	69.495	69.525	69.525	69.585	69.645	69.675	69.740	69.800	69.800
14	69.675	69.585	69.525	69.495	69.525	69.525	69.585	69.645	69.675	69.740	69.800	69.800
15	69.675	69.585	69.525	69.495	69.525	69.555	69.585	69.645	69.675	69.740	69.800	69.800
16	69.675	69.585	69.525	69.495	69.525	69.555	69.585	69.645	69.710	69.740	69.800	69.800
17	69.645	69.585	69.525	69.495	69.525	69.525	69.585	69.675	69.710	69.740	69.800	69.800
18	69.645	69.585	69.525	69.525	69.525	69.525	69.585	69.645	69.710	69.740	69.800	69.800
19	69.645	69.585	69.525	69.525	69.525	69.525	69.585	69.645	69.710	69.740	69.800	69.800
20	69.645	69.585	69.525	69.525	69.525	69.525	69.585	69.645	69.710	69.740	69.800	69.800
21	69.645	69.585	69.525	69.525	69.525	69.555	69.585	69.645	69.710	69.740	69.800	69.800
22	69.645	69.585	69.525	69.525	69.525	69.555	69.585	69.645	69.710	69.740	69.800	69.800
23	69.645	69.585	69.525	69.525	69.525	69.555	69.585	69.645	69.710	69.740	69.770	69.800
24	69.645	69.585	69.525	69.525	69.525	69.555	69.585	69.645	69.710	69.740	69.770	69.800
25	69.645	69.555	69.525	69.525	69.495	69.555	69.585	69.645	69.710	69.740	69.770	69.800
26	69.615	69.555	69.525	69.525	69.495	69.555	69.585	69.615	69.710	69.740	69.800	69.770
27	69.615	69.555	69.525	69.525	69.495	69.555	69.585	69.615	69.710	69.740	69.800	69.770
28	69.615	69.555	69.525	69.525	69.495	69.555	69.585	69.615	69.710	69.740	69.800	69.770
29	69.615		69.525	69.525	69.495	69.555	69.585	69.615	69.710	69.740	69.800	69.770
30	69.615		69.495	69.525	69.495	69.585	69.585	69.615	69.710	69.740	69.800	69.770
31	69.615		69.495		69.495		69.585	69.615		69.770		69.770
Avg.	69.655	69.595	69.535	69.515	69.520	69.535	69.585	69.630	69.680	69.740	69.795	69.795

Current Year 2003			Period 1935–2003			Area and Capacity Table		
Month	@ Extreme Elevation Meters		Elevation Meters			Elevation	Area	Capacity
	High	Low	# Average	# Maximum	! Minimum	Meters Below M.S.L.	Hectares	Million Cubic Meters
Jan.	69.615	69.675	71.320	69.280	75.990	84.640	0	0
Feb.	69.555	69.615	71.230	69.190	75.830	83.520	8,337	31.7
Mar.	69.495	69.555	71.150	69.130	75.770	82.300	25,455	232.8
April	69.495	69.525	71.095	69.100	75.800	81.080	38,284	629.8
May	69.495	69.525	71.090	69.100	75.740	79.250	49,615	1,443.2
June	69.495	69.585	71.130	69.160	75.830	78.030	54,512	2,077.2
July	69.585	69.585	71.185	69.220	75.930	76.810	60,218	2,775.3
Aug.	69.615	69.675	71.240	69.250	76.020	74.370	72,723	4,393.7
Sept.	69.615	69.710	71.305	69.280	76.020	73.150	79,683	5,322.5
Oct.	69.710	69.770	71.335	69.310	76.140	71.630	89,760	6,611.5
Nov.	69.770	69.800	71.345	69.340	76.200	70.100	95,426	8,022.6
Dec.	69.770	69.800	71.315	69.340	76.080	67.060	106,029	11,092.7
						64.010	116,753	14,481.1
Yearly	69.495	69.800	71.230	69.100	76.200	60.960	127,680	18,206.2

@ Mean daily ! Reading near first day of month # Mean monthly

CHEMICAL ANALYSIS OF WATER SAMPLES

The tables below are based on samples collected and analyzed by the California Regional Water Quality Control Board – Colorado River Basin, Region-7. New River Samples prior to 1985 were collected and analyzed by the U.S. Geological Survey. Samples from the New River are taken from the right bank at the road bridge, 137 meters north of the international boundary.

NEW RIVER AT INTERNATIONAL BOUNDARY

2003 Date	Time Std.	*Streamflow Momentary CMS	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Turbidity NTU (1)
Jan. 27	0700	4.05	16.5	7.7	1.4	3,960	29.1
Feb. 26	0700	6.26	16.9	7.6	1.4	4,160	12.1
Mar. 25	0700	5.44	20.0	7.6	1.0	4,820	14.1
Apr. 28	0700	6.23	21.4	7.6	0.3	4,180	12.8
May 27	0700	3.54	28.6	7.4	0.1	5,850	36.1
June 24	0700	3.74	25.7	7.4	0	5,040	27.0
July 29	0700	3.48	29.9	7.4	1.1	5,010	150
Aug. 26	0700	3.88	31.3	7.4	2.0	4,590	18.9
Sep. 23	0700	2.92	28.3	7.4	0.4	4,500	19.8
Oct. 27	0800	3.20	22.0	7.6	0.4	4,650	40.8
Nov. 17	0700	3.65	17.9	7.5	1.4	4,210	12.3
Dec. 15	0700	4.42	13.4	7.4	1.9	4,080	7.8

* Flow provided by the Imperial Irrigation District (Mean Daily)
N.A.– Not Analyzed
(1) Composite of eight water samples collected hourly

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	Jan. 27, 2003	Feb. 26, 2003	Mar. 25, 2003	Apr. 28, 2003	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	2.00 ug/L	4.00 ug/L	3.00 ug/L	4.00 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D	N.D.	N.D.	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	0.030 mg/L	0.100 mg/L	0.020 mg/L	N.D.	0.002 mg/L
MBAS	3.820 mg/L	0.310 mg/L	0.680 mg/L	0.740 mg/L	0.025 mg/L
Zinc	N.D.	74.0 ug/L	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(PO4-P)	3.80 mg/L	1.10 mg/L	1.70 mg/L	1.55 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D.	0.32 mg/L	0.18 mg/L	0.10 mg/L	0.20 mg/L
Nitrite (NO2-N)	N.D.	0.08 mg/L	0.08 mg/L	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	12.1 mg/L	5.67 mg/L	5.96 mg/L	5.50 mg/L	0.05 mg/L
Total Dissolved Solids	2,730 mg/L	2,870 mg/L	2,990 mg/L	2,980 mg/L	10.0 mg/L
Total Suspended Solids	44.0 mg/L	52.8 mg/L	41.3 mg/L	62.4 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	May 27, 2003	June 24, 2003	July 29, 2003	Aug. 26, 2003	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	7.1 ug/L	6.6 ug/L	7.4 ug/L	7.0 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	83.0 ug/L	18.0 ug/L	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	0.020 mg/L	0.020 mg/L	0.020 mg/L	N.D.	0.002 mg/L
MBAS	2.900 mg/L	3.210 mg/L	0.390 mg/L	3.500 mg/L	0.025 mg/L
Zinc	71.4 ug/L	54.0 ug/L	15.0 ug/L	99.0 ug/L	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(PO4-P)	2.42 mg/L	2.16 mg/L	5.10 mg/L	1.47 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D.	N.D.	N.D.	N.D.	0.20 mg/L
Nitrite (NO2-N)	N.D.	N.D.	N.D.	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	8.15 mg/L	4.75 mg/L	8.10 mg/L	8.15 mg/L	0.05 mg/L
Total Dissolved Solids	3,240 mg/L	2,980 mg/L	3,000 mg/L	2,850 mg/L	10.0 mg/L
Total Suspended Solids	41.3 mg/L	51.0 mg/L	62.0 mg/L	45.0 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	

N.A. – Not Analyzed
N.D. – Not Detected

CHEMICAL ANALYSIS OF WATER SAMPLES

The tables below are based on samples collected and analyzed by the California Regional Water Quality Control Board – Colorado River Basin, Region-7. New River Samples prior to 1985 were collected and analyzed by the U.S. Geological Survey. Samples from the New River are taken from the right bank at the road bridge, 137 meters north of the international boundary.

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	Sep. 23, 2003	Oct. 27, 2003	Nov. 17, 2003	Dec. 15, 2003	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	4.00 ug/L	5.40 ug/L	3.00 ug/L	2.00 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	N.D	N.D.	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	N.D.	N.D.	N.D.	N.D.	0.002 mg/L
MBAS	2.080 mg/L	2.940 mg/L	2.000 mg/L	2.100 mg/L	0.025 mg/L
Zinc	N.D.	N.D.	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(PO4-P)	1.94 mg/L	2.28 mg/L	2.03 mg/L	1.57 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D.	0.28 mg/L	N.D.	0.40 mg/L	0.20 mg/L
Nitrite (NO2-N)	N.D.	N.D.	N.D.	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	5.30 mg/L	8.35 mg/L	7.57 mg/L	6.05 mg/L	0.05 mg/L
Total Dissolved Solids	2,700 mg/L	2,870 mg/L	2,760 mg/L	2,850 mg/L	10.0 mg/L
Total Suspended Solids	38.0 mg/L	44.4 mg/L	24.0 mg/L	20.0 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	

N.D.– None Detected
N.A.– Not Analyzed

SPECIFIC CONDUCTANCE OF WATER SAMPLES

The following table shows specific conductance 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.

NEW RIVER AT THE INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C – 2003

January		March		May		July		September		November	
13	5,000	3	4,500	6	5,200	21	5,400	1	4,900		
20	5,000	17	5,000	12	5,800	28	5,300	7	5,000		
27	5,700	24	5,600	26	5,400			15	4,900		
		31	6,100					22	5,200		
								29	5,300		
February		**April**		**June**		**August**		**October**		**December**	
3	5,800	7	5,800	10	5,800	4	4,900			29	5,000
10	5,800	14	6,200	23	5,500	11	4,900				
17	5,000	21	6,200	28	5,200						

CHEMICAL ANALYSES OF WATER SAMPLES

The tables below are based on samples collected and analyzed by the United States Section of the Commission.

Samples from the Alamo River are taken north of the international boundary upstream of the box culvert under the All-American Canal. Flow at this point includes drainage flows across the international boundary and flows from drain interceptors along the toe of the south bank of the All-American Canal. Samples from the New River are taken from the right bank at the road bridge, 137 meters north of the international boundary. Records of the sampling extend from April 1951 through 2003.

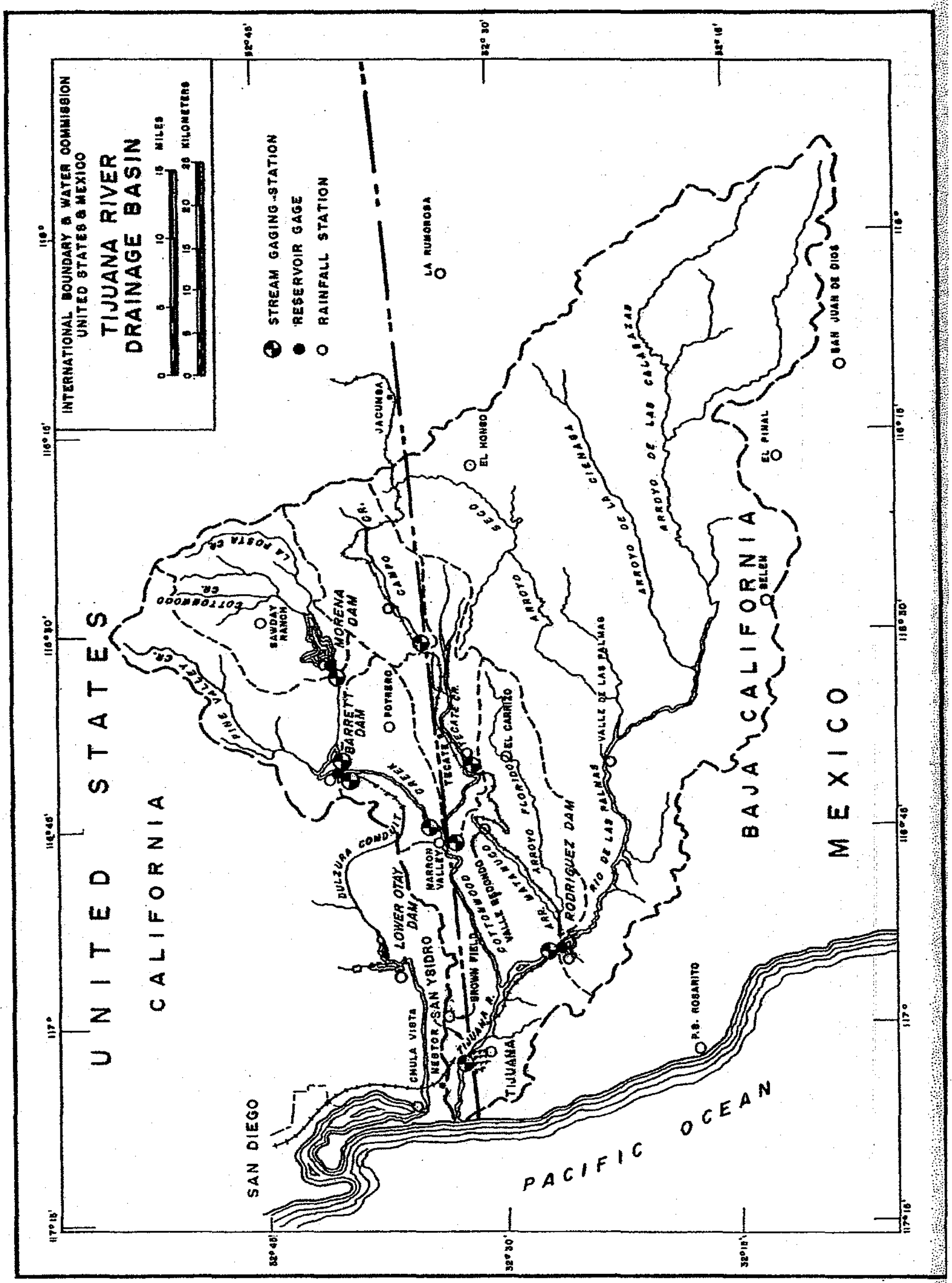
ALAMO RIVER

2003 Date	Time Std.	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Conductance Micro-siemens/cm	Coliform Fecal Colonies/ 100 mL	Flow CMS
Jan. 21	0810	13.3	7.5	8.2	1,320	100	0.01
Feb. 26	0810	15.1	7.7	8.2	4,180	799	0.01
Mar. 28	0750	19.0	7.8	6.4	4,320	150	0.02
Apr. 23	1030	17.9	7.6	6.6	4,480	590	0.02
May 29	0830	26.6	7.8	6.1	4,450	100	0.02
June 26	1120	24.8	7.7	2.1	4,430	10	0.02
July 23	0740						0
Aug. 27	0745						0
Sep. 25	0715						0
Oct. 22	0900						0
Nov. 25	0745						0

NEW RIVER

2003 Date	Time Std.	**Streamflow Momentary CMS	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Fecal Coliform Colonies/ 100 mL
Jan. 08	0815	4.70	14.4	7.2	1.2	4,120	1,375,000
Jan. 21	0905	4.05	16.3	7.5	1.0	4,670	750,000
Feb. 12	1350	4.90	14.6	7.5	1.2	5,000	690,000
Feb. 26	0900	6.26	16.6	7.6	1.8	4,600	1,775,000
Mar. 12	0810	5.98	19.5	7.5	0.5	4,850	1,005,000
Mar. 28	0820	4.96	20.7	7.6	0.6	5,050	1,825,000
Apr. 09	0935	5.04	21.3	7.1	0.2	5,490	2,800,000
Apr. 23	1120	5.55	19.1	7.6	0.8	5,260	280,000
May 08	0800	5.13	20.0	7.7	0.9	5,110	590,000
May 29	0905	3.29	28.1	7.5	0.1	5,680	1,200,000
June 11	0740	3.17	28.0	7.9	0.2	5,500	800,000
June 26	1205	3.79	28.4	7.6	0.3	4,910	975,000
July 09	0800	3.99	30.5	7.5	1.0	4,770	903,000
July 23	0830	3.71	30.6	7.5	0.2	4,830	925,000
Aug. 13	0750	3.51	30.8	7.4	0.2	4,800	1,225,000
Aug. 27	0830	3.96	30.4	7.5	0.1	4,500	2,200,000
Sep. 09	0750	3.14	30.0	7.6	0.2	4,630	950,000
Sep. 25	0810	2.63	27.0	7.5	0.2	4,810	1,625,000
Oct. 08	0830	2.95	26.6	7.6	0.2	4,470	160,000
Oct. 22	0815	3.12	25.3	7.5	0.3	4,670	755,000
Nov. 25	0815	3.79	13.9	7.5	1.7	4,560	570,000
Dec. 10	0820	3.91	13.8	7.1	1.5	4,630	370,000
Dec. 23	0805	3.88	13.5	7.7	1.6	4,650	340,000

Note: Temperature, pH, D.O., and Specific Conductance - Data collected in the field
** Flow reported by Imperial Irrigation District


INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
TIJUANA RIVER
DRAINAGE BASIN
0 5 10 15 MILES
0 5 10 15 20 25 KILOMETERS
STREAM GAGING STATION
RESERVOIR GAGE
RAINFALL STATION
UNITED STATES
CALIFORNIA
BAJA CALIFORNIA
MEXICO
PACIFIC OCEAN
SAN DIEGO
CHULA VISTA
NESTOR
SAN YSIDRO
TIJUANA
TIJUANA R.
BROWN FIELD
LOWER OTAY DAM
DULZURA CONDUIT
MARRON VALLEY
BARRETT DAM
MORENA DAM
POTRERO
SAWDAY RANCH
COTTONWOOD CR.
LA POSTA CR.
PINE VALLEY CR.
CAMPO CR.
CAMPO
COTTONWOOD CREEK
TECATE
TECATE CR.
JACUMBA
LA RUMOROSA
EL HONGO
SECO
ARROYO
ARROYO DE LA CIENAGA
ARROYO DE LAS CALABAZAS
EL PINAL
SAN JUAN DE DIOS
BELEN
VALLE DE LAS PALMAS
RIO DE LAS PALMAS
RODRIGUEZ DAM
ARR. MATANUCO
ARROYO FLORIDO
EL CARRIZO
COTTONWOOD
VALLE REDONDO
P.S. ROSARITO
32° 45'
32° 30'
32° 15'
116°
116° 15'
116° 30'
116° 45'
117°
117° 15'

11-0100.00 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 2.9 kilometers upstream from the mouth of Hauser Creek, 13.7 kilometers upstream from Barrett Dam, and about 32.2 kilometers upstream from the international boundary. The zero of the gage is 878.555 meters 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 2003.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 2003 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 47.855 meters, gage datum. Reservoir capacity at spillway crest, 1948 survey, is 61,934 TCM. 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, 55,845 TCM, March 1983. Prior to 1937, maximum monthly inflow, 45,886 TCM, January 1916; minimum no flow during parts of many years.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1937 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0	1,170	20,362	0
February	92.9	2,506	41,407	9.9
March	0	3,390	55,845	0
April	85.8	1,994	28,530	4.1
May	46.1	1,004	18,642	0
June	0	570	10,173	0
July	0	355	7,651	0
August	0	269	8,916	0
September	0	185	6,331	0
October	0	160	4,817	0
November	0	264	5,633	0
December	0	714	9,472	0
Yearly	226	12,581	177,579	149

11-0105.00 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 1.3 kilometers 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 2003.
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, 55,615 TCM, March 1983. Prior to 1937, maximum monthly discharge, 26,397 TCM February 1916; minimum, no flow during several months of various years.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1937 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0	293	2,583	0
February	0	970	19,644	0
March	0	1,886	55,615	0
April	0	1,429	28,159	0
May	0	793	18,100	0
June	0	604	9,260	0
July	0	376	6,236	0
August	0	361	7,937	0
September	0	399	7,253	0
October	0	253	4,639	0
November	0	282	5,071	0
December	0	500	9,099	0
Yearly	0	8,146	168,432	0

11-0110.00 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 13.7 kilometers downstream from Morena Dam, 1.6 kilometers downstream from the mouth of Pine Valley Creek, and about 19.3 kilometers upstream from the international boundary. Zero of gage is 440.775 meters 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 2003. 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 51.475 meters) is 55,205 TCM. Capacity at spillway crest (gage height 49.043 meters) is 46,811 TCM. Dead storage, 887 TCM below lowest outlet (gage height 17.945 meters) 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, 67,540 TCM, February 1980. Prior to 1937, maximum monthly discharge, 67,595 TCM February 1927; minimum, no flow during several months of various years.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1937 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0	1,463	29,627	0
February	100	3,264	67,539	9.4
March	547	5,565	62,041	17.4
April	197	2,795	26,680	12.6
May	109	1,303	10,509	0
June	0	615	4,818	0
July	0	373	5,042	0
August	1.0	193	4,472	0
September	0	196	3,858	0
October	0	112	796	0
November	0	245	2,519	0
December	0	656	6,845	0
Yearly	954	16,780	141,024	159

11-0114.90 DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder 0.8 kilometer downstream from Barrett Dam on right bank of Dulzura Conduit 15.2 meters 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 2003.
REMARKS: Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 2.4 kilometers 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 12.9 kilometers 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, 4.66 CMS on March 8, 1995; minimum discharge, no flow for long periods on many occasions.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

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

Current Year 2003 | Period 1937–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	601	2,899	0
Feb.			! 1	0	! 1	0	0	0	575	2,883	0
Mar.			! 1	0	! 1	0	0	0	835	7,639	0
April			! 1	0	! 1	0	0	0	1,045	5,016	0
May			! 1	0	! 1	0	0	0	1,180	3,750	0
June			! 1	0	! 1	0	0	0	1,212	4,611	0
July			! 1	0	! 1	0	0	0	1,101	4,914	0
Aug.			! 1	0	! 1	0	0	0	1,026	4,741	0
Sept.			! 1	0	! 1	0	0	0	820	2,862	0
Oct.			! 1	0	! 1	0	0	0	705	3,235	0
Nov.			! 1	0	! 1	0	0	0	739	3,404	0
Dec.			! 1	0	! 1	0	0	0	641	2,843	0
Yearly				0		0	0	0	10,480	40,526	0

ϕ Mean daily ! And other days

11-0111.00 COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located about 4.0 kilometers downstream from Barrett Dam and 0.8 kilometer 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 305 meters (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, January to May of 1980, April, December 1982, and the entire year of 1983, January to April 1993 and January to March 1995. 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 2003. 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, 111,775 TCM March 1983. Prior to 1937, maximum monthly discharge 47,366 TCM February 1927; minimum, no flow during several months of various years.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1937 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0	404	10,114	0
February	0	2,096	86,736	0
March	0	4,281	111,775	0
April	0	2,154	45,417	0
May	0	965	28,287	0
June	0	444	13,503	0
July	0	228	5,311	0
August	0	147	4,206	0
September	0	54.1	1,554	0
October	0	45.8	1,530	0
November	0	142	5,100	0
December	0	185	6,058	0
Yearly	0	11,146	254,099	0

11-0120.00 COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located 2.6 kilometers upstream from the international land boundary between the United States and Mexico, 1.3 kilometers upstream from the confluence with Tecate Creek, and 8.2 kilometers 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 213 meters downstream from the gage. Zero of the gage is 173.555 meters 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 2003.
REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 16.1 kilometers and 29.0 kilometers, respectively, upstream from this station.
EXTREMES: Maximum discharge 331 CMS February 21, 1980 (gage height 3.400 meters). Minimum discharge, no flow during part of each year.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.08	0.01	0	0	0	0	0	0	0	0
2	0	0	.06	.01	0	0	0	0	0	0	0	0
3	0	0	.04	.01	0	0	0	0	0	0	0	0
4	0	0	.04	.01	0	0	0	0	0	0	0	0
5	0	0	.04	.01	0	0	0	0	0	0	0	0
6	0	0	.03	0	0	0	0	0	0	0	0	0
7	0	0	.02	0	0	0	0	0	0	0	0	0
8	0	0	.02	0	0	0	0	0	0	0	0	0
9	0	0	.02	0	0	0	0	0	0	0	0	0
10	0	0	.01	0	0	0	0	0	0	0	0	0
11	0	0	.01	0	0	0	0	0	0	0	0	0
12	0	0	.01	0	0	0	0	0	0	0	0	0
13	0	0	.01	0	0	0	0	0	0	0	0	0
14	0	.05	0	0	0	0	0	0	0	0	0	0
15	0	.03	.03	.01	0	0	0	0	0	0	0	0
16	0	.01	.40	.02	0	0	0	0	0	0	0	0
17	0	.01	.34	.01	0	0	0	0	0	0	0	0
18	0	0	.22	.01	0	0	0	0	0	0	0	0
19	0	0	.14	.01	0	0	0	0	0	0	0	0
20	0	0	.10	.01	0	0	0	0	0	0	0	0
21	0	0	.08	.01	0	0	0	0	0	0	0	0
22	0	0	.06	.01	0	0	0	0	0	0	0	0
23	0	0	.05	0	0	0	0	0	0	0	0	0
24	0	0	.05	0	0	0	0	0	0	0	0	0
25	0	.01	.04	0	0	0	0	0	0	0	0	0
26	0	.05	.03	0	0	0	0	0	0	0	0	0
27	0	.09	.03	0	0	0	0	0	0	0	0	0
28	0	.14	.02	0	0	0	0	0	0	0	0	0
29	0		.01	0	0	0	0	0	0	0	0	0
30	0		.01	0	0	0	0	0	0	0	0	0
31	0		.01		0		0	0		0		0
Sum	0	0.39	2.01	0.14	0	0	0	0	0	0	0	0

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
								Current Year 2003	Period 1937–2003		
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	1,354	45,897	0
Feb.			28	.14	! 1	0	.01	33.7	3,435	85,134	0
Mar.			16	.40	14	0	.06	174	5,075	109,418	0
April			16	.02	! 6	0	0	12.1	2,499	49,635	0
May			! 1	0	! 1	0	0	0	912	22,439	0
June			! 1	0	! 1	0	0	0	318	7,301	0
July			! 1	0	! 1	0	0	0	102	3,599	0
Aug.			! 1	0	! 1	0	0	0	78.7	1,850	0
Sept.			! 1	0	! 1	0	0	0	76.8	4,209	0
Oct.			! 1	0	! 1	0	0	0	87.0	291	0
Nov.			! 1	0	! 1	0	0	0	52.5	1,378	0
Dec.			! 1	0	! 1	0	0	0	171	3,169	0
Yearly				0.40		0	0.01	220	14,161	220,556	0

ϕ Mean daily ! And other days

11-0125.00 CAMPO CREEK NEAR CAMPO, CALIFORNIA

DESCRIPTION: Water-stage recorder and broad-crested weir on left bank, 0.8 kilometer upstream from the international land boundary between the United States and Mexico, just upstream from the bridge on California State Highway 94, 5.6 kilometers southwest of Campo, California. Zero of gage is 664.135 meters 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 from October 1936 through 2003.
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, 1.6 kilometers upstream, from August 1956 to February 20, 1980, when it was destroyed by a flood.
EXTREMES: Maximum discharge, 25.3 CMS, March 24, 1983 (gage height 1.640 meters present datum), from rating curve extended above 3.12 CMS on basis of velocity-depth relation and cross section area at the control. Minimum discharge, no flow during part of most years.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.01	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	.01	0	0	0	0	0	0	0	0	0	0
13	0	.01	0	0	0	0	0	0	0	0	0	0
14	0	.01	0	0	0	0	0	0	0	0	0	0
15	0	.01	.01	.01	0	0	0	0	0	0	0	0
16	0	0	.01	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	.01	0	0	0	0	0	0	0	0	0	0
26	0	.01	0	0	0	0	0	0	0	0	0	0
27	0	.01	0	0	0	0	0	0	0	0	0	0
28	0	.01	0	0	0	0	0	0	0	0	0	0
29	0		0	0	0	0	0	0	0	0	0	0
30	0		0	0	0	0	.04	0	0	0	0	0
31	0		0		0		0	0		0		0
Sum	0	0.08	0.03	0.01	0	0	0.04	0	0	0	0	0

Current Year 2003 — Period 1937–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	411	10,581	0
Feb.			!12	.01	! 1	0	0	6.9	531	5,288	0
Mar.			! 1	.01	! 2	0	0	2.6	849	11,587	0
April			15	.01	! 1	0	0	.9	527	8,886	0
May			! 1	0	! 1	0	0	0	257	3,956	0
June			! 1	0	! 1	0	0	0	126	2,234	0
July			30	.04	! 1	0	0	3.5	68.0	1,525	0
Aug.			! 1	0	! 1	0	0	0	63.0	2,008	0
Sept.			! 1	0	! 1	0	0	0	46.0	1,214	0
Oct.			! 1	0	! 1	0	0	0	57.0	1,084	0
Nov.			! 1	0	! 1	0	0	0	114	1,522	0
Dec.			! 1	0	! 1	0	0	0	195	1,953	0
Yearly				0.04		0	0	13.9	3,244	38,639	0

ϕ Mean daily ! And other days

11-0131.00 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 9.0 kilometers upstream from its confluence with Cottonwood Creek, 17.0 kilometers upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 16.0 kilometers southeast of Tijuana, Baja California.

RECORDS: Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall. Records obtained by the Ministry of 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 2003. 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 115.85 meters above mean sea level; at top of spillway gates 125.00 meters above mean sea level. Reservoir capacity at spillway crest 94 TCM; at top of spillway gates 137 TCM.

EXTREMES: Maximum monthly inflow, 237,657 TCM, January 1993; minimum, no flow during part of most years.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1938 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0	5,868	237,657	0
February	0	8,017	194,216	0
March	0	11,806	172,556	0
April	0	3,515	95,953	0
May	0	754	14,136	0
June	0	221	5,749	0
July	0	112	1,806	0
August	0	61.9	950	0
September	0	62.8	575	0
October	0	78.7	432	0
November	0	163	2,393	0
December	0	868	19,348	0
Yearly	0	31,528	412,673	0

11-0132.00 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 1991 by the State of Baja California Commission of Public Services for Tijuana. Since 1992, the data have been obtained by the Baja California Regional Office of the National Water Commission. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 2003.
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, 36,018 TCM, March 1996; minimum, no flow on several occasions since March 1941.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 2003	PERIOD 1938 - 2003		
		AVERAGE	MAXIMUM	MINIMUM
January	0.1	635	6,183	0
February	0.1	619	6,028	0
March	0.2	1,155	36,018	0
April	0.3	759	6,142	0
May	0.3	952	6,578	0
June	0.3	1,064	5,893	0
July	0.3	1,224	7,523	0
August	0.3	1,145	5,931	0
September	0	1,016	6,158	0
October	0	925	6,054	0
November	0	800	5,873	0
December	0	751	6,212	0
Yearly	1.9	11,046	94,980	0

11-0133.00 TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on top of north levee about 1.1 kilometers downstream (north) from boundary, 1.8 kilometers upstream from the new Dairy Mart Road bridge, and 2.3 kilometers west of the international gate at San Ysidro, California. Zero of the gage is at mean sea level, U. S. C. & G. S. datum.
RECORDS: Based on current meter measurements, staff gage readings and record of gage heights. Records obtained and furnished by the United States Section of the Commission. Records available: May 1947 through 2003.
EXTREMES: Since May 1947: Maximum instantaneous discharge, 937 CMS, February 21, 1980; minimum discharge, no flow during many years since 1951.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.28	0	1.95	0	0	0	0	0	0	0	0	0
2	.10	0	1.38	0	0	0	0	0	0	0	0	0
3	.09	0	1.12	0	.23	0	0	0	0	0	0	0
4	.10	0	1.62	0	.41	0	0	0	0	0	0	0
5	.15	0	1.99	0	.33	0	0	0	0	0	0	0
6	.12	0	1.04	0	.24	0	0	0	0	0	0	0
7	.14	0	.91	0	.14	.03	0	0	0	0	0	0
8	.11	.95	.88	0	.65	0	0	0	0	0	0	0
9	.38	.64	.91	0	.49	0	0	0	0	0	0	0
10	.51	.44	.92	0	.29	0	0	0	0	0	0	0
11	.10	1.41	.77	0	.06	0	0	0	0	0	0	0
12	.01	3.97	.42	0	0	0	0	0	0	0	1.80	0
13	0	3.11	.30	0	0	0	0	0	0	0	.98	0
14	0	8.45	.24	6.81	0	0	0	0	0	0	.74	0
15	0	3.27	6.03	5.95	0	0	0	0	0	0	.33	0
16	0	2.61	13.6	3.54	0	0	0	0	0	0	.18	0
17	0	2.35	3.40	1.29	0	0	0	0	0	0	0	0
18	0	2.21	2.11	.65	0	0	0	0	0	0	0	0
19	0	2.21	1.53	.69	0	0	0	0	0	0	0	0
20	0	2.17	1.22	.68	0	0	0	0	0	0	0	0
21	0	1.87	1.04	.69	0	0	0	0	0	0	0	0
22	0	1.64	.98	.68	0	0	0	0	0	0	0	0
23	0	1.48	.89	.55	0	0	0	0	0	0	0	0
24	0	1.40	.77	.47	0	0	0	0	0	0	0	0
25	0	5.77	.73	.30	0	0	0	0	0	0	0	.02
26	0	3.45	.82	.14	0	0	0	0	0	0	0	2.67
27	0	3.23	.56	0	0	0	0	0	0	0	0	.98
28	0	2.85	.18	0	0	0	0	0	0	0	0	.90
29	0		.12	0	0	0	0	0	0	0	0	.64
30	0		.02	0	0	0	0	0	0	0	0	.06
31	0		0		0		0	0		.23		0
Sum		55.48		22.44		0.03		0		0.23		5.27
	2.09		48.45		2.84		0		0		4.03	

Current Year 2003 | Period 1947-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
				High		Low		Total	Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	12.035	11.920	1	1.14	! 3	0	0.07	181	8,770	297,879	0
Feb.	13.050	11.920	14	23.8	! 1	0	1.98	4,793	13,823	388,951	0
Mar.	13.380	11.920	16	102	!15	0	1.56	4,186	16,422	362,019	0
April	13.195	11.920	14	38.5	! 1	0	.75	1,939	4,267	77,633	0
May	12.010	11.920	8	.89	! 1	0	.09	245	2,039	52,545	0
June	11.945	11.920	7	.23	! 1	0	0	2.6	711	11,960	0
July	11.920	11.920	! 1	0	! 1	0	0	0	514	11,400	0
Aug.	11.920	11.920	! 1	0	! 1	0	0	0	614	21,083	0
Sept.	11.920	11.920	! 1	0	! 1	0	0	0	302	5,142	0
Oct.	12.050	11.920	31	1.28	! 1	0	.01	19.9	388	6,859	0
Nov.	12.365	11.920	12	1.80	! 1	0	.13	348	605	5,399	0
Dec.	12.740	11.920	26	10.8	! 1	0	.17	455	1,070	8,270	0
Yearly	13.380	11.920		102		0	0.39	12,170	49,525	734,832	0

! And other days

STORED WATER IN RESERVOIRS, TIJUANA RIVER BASIN

Data are presented below for all storage reservoirs in the Tijuana River Basin. The data represent contents on the last day of the month in thousand cubic meters. 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.

The storage data for Morena and Barrett reservoirs are obtained and provided by the City of San Diego, California and the U.S. Geological Survey. The data for Rodriguez Dam were provided by the Secretariat of Hydraulic Resources in Mexico up to May 1961, from June 1961 to March 1966 the data were provided by the Potable Water and Sewerage Board for the Urban District of Tijuana, from April 1966 to December 1991, the data were provided by the State Public Service Commission of Tijuana, Baja California, and since 1992, by the National Water Commission of Mexico.

IN THOUSAND CUBIC METERS

Month	MORENA RESERVOIR, CALIFORNIA (Capacity 61,933)		BARRETT RESERVOIR, CALIFORNIA (Capacity 55,211)		RODRIGUEZ RESERVOIR, BAJA CALIFORNIA (Capacity 138,000)		TOTAL IN TIJUANA RIVER BASIN RESERVOIRS (Capacity 255,147)	
	2003	Average 1937–2003	2003	Average 1937–2003	2003	Average 1937–2003	2003	Average 1937–2003
Jan.	5,922	24,599	8,726	18,680	13,592	40,526	28,240	83,805
Feb.	5,895	25,875	8,733	19,617	14,240	42,964	28,868	88,456
Mar.	6,051	27,258	8,931	21,804	14,340	48,260	29,322	97,322
April	6,137	27,409	9,485	22,469	13,820	49,128	29,442	99,006
May	6,103	27,197	9,627	22,263	13,155	48,297	28,885	97,757
June	6,002	26,512	9,627	21,495	12,414	46,431	28,043	94,438
July	5,768	25,731	9,467	20,602	11,790	44,603	27,025	90,936
Aug.	5,543	25,014	9,275	19,624	11,110	42,582	25,928	87,220
Sept.	5,368	24,324	9,068	18,901	10,855	41,018	25,291	84,243
Oct.	5,199	23,846	8,897	18,238	10,702	39,463	24,798	81,547
Nov.	5,091	23,646	8,796	17,736	10,634	38,696	24,521	80,078
Dec.	5,017	23,716	8,746	17,898	10,600	38,536	24,363	80,150
Avg.	5,675	25,428	9,115	19,944	12,271	44,352	27,061	88,747
Max.	6,137	#! 76,069	9,627	*! 56,641	14,340	! 138,486	29,442	! 263,471
Min.	5,017	!! 12	8,726	!! 131	10,600	!! 0	24,363	!! 1,559

\# – March 31, 1941 – Prior to removal of spillway gates
* – April 30, 1937 – Sandbags were placed on crest of spillway
! – Maximum end of month storage for period of record
!!– Minimum end of month storage for period of record

RAINFALL ON THE TIJUANA RIVER WATERSHED IN MILLIMETERS

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 following rainfall data.

IN THE UNITED STATES

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Sawday Ranch, California		Campo, California	
	2003	Average 1906–2003	2003	Average 1907–2003	2003	Average 1951–2003	2003	Average 1950–2003	2003	Average 1900–2003
Jan.	5	97	4	88	#	#	7	88	5	78
Feb.	131	99	139	88	#	#	147	84	104	82
Mar.	85	89	70	81	#	#	80	79	56	72
April	49	42	42	37	#	#	59	37	39	34
May	24	15	22	13	#	#	21	9	23	12
June	0	3	0	2	#	#	0	1	0	2
July	14	9	4	3	#	#	24	14	49	12
Aug.	52	14	1	6	#	#	47	21	38	13
Sept.	4	11	0	7	#	#	18	12	10	9
Oct.	0	21	0	17	#	#	0	13	0	15
Nov.	26	39	20	37	#	#	15	41	14	33
Dec.	78	75	44	67	#	#	55	57	32	59
Yearly	468	514	346	446			473	456	370	421

Month	Chula Vista, California		Lower Otay Dam, California	
	2003	Average 1930–2003	2003	Average 1906–2003
Jan.	0	48	1	55
Feb.	104	47	94	48
Mar.	36	43	41	55
April	30	20	37	26
May	0	5	6	9
June	0	1	4	3
July	0	1	1	1
Aug.	0	2	0	3
Sept.	0	4	0	6
Oct.	0	9	17	10
Nov.	7	27	15	30
Dec.	0	37	15	36
Yearly	177	244	231	282

\# Missing record

IN MEXICO

Month	El Pinal, Baja California		El Hongo, Baja California		Ignacio Zaragoza, Baja California		Tecate, Baja California		El Carrizo, Baja California	
	2003	Average 1964–2003	2003	Average 1980–2003	2003	Average 1965–2003	2003	Average 1946–2003	2003	Average 1980–2003
Jan.	#	84	5	60	#	61	1	74	T	41
Feb.	#	90	98	68	#	73	143	59	117	54
Mar.	#	94	38	63	#	64	76	66	61	54
April	#	37	40	20	#	24	49	28	33	20
May	#	9	9	5	0	5	31	8	11	4
June	#	1	0	2	0	2	0	3	0	2
July	#	18	2	12	0	3	21	4	3	3
Aug.	#	23	71	20	0	7	13	5	T	2
Sept.	#	18	7	8	0	9	0	5	0	4
Oct.	#	16	0	10	0	13	0	11	0	12
Nov.	#	46	17	28	17	37	0	34	12	28
Dec.	#	71	4	32	19	46	18	48	16	30
Yearly		494	291	323		342	352	345	253	260

\# Missing record T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED
IN MILLIMETERS

IN MEXICO

	Valle de Palmas, Baja California		Rodriguez Dam, Baja California			
	2003	Average 1948–2003	2003	Average 1938–2003		
Jan.	T	43	2	45		
Feb.	100	41	86	44		
Mar.	48	40	57	43		
April	21	16	34	19		
May	T	4	7	4		
June	0	1	1	1		
July	0	2	2	1		
Aug.	T	5	T	2		
Sept.	5	6	T	5		
Oct.	0	8	0	9		
Nov.	11	19	14	22		
Dec.	T	27	17	37		
Yearly	185	202	220	231		

T Trace

LOCATION OF RAINFALL STATIONS ON THE TIJUANA RIVER WATERSHED

The precipitation records of the stations listed alphabetically below began on the date shown and extend through 2003.

IN THE UNITED STATES

NAME OF STATION	LATITUDE	LONGITUDE	@ ELEV. (Meters)	RECORD BEGAN	OBSERVER
Barrett Dam, California	32° 41'	116° 40'	494.69	1907	City of San Diego
Campo, California	32° 38'	116° 28'	801.62	1877	County of San Diego
Chula Vista, California	32° 36'	117° 06'	2.74	1930	Chula Vista Fire Department
Lower Otay Dam, California	32° 37'	116° 56'	164.59	1906	City of San Diego
Marron Valley, California	32° 34'	116° 46'	167.64	1951	County of San Diego
Morena Dam, California	32° 41'	116° 31'	937.26	1906	City of San Diego
Sawday Ranch, California	32° 45'	116° 29'	975.36	1950	Ben and Kelly Tulloch

IN MEXICO

NAME OF STATION	LATITUDE	LONGITUDE	@ ELEV. (Meters)	RECORD BEGAN	OBSERVER
Igncacio Zaragoza, Baja California	32° 12'	116° 29'	555.04	1965	** CNA
El Carrizo, Baja California	32° 29'	116° 42'	494.99	1980	CNA
El Hongo, Baja California	32° 31'	116° 18'	960.12	1981	CNA
El Pinal, Baja California	32° 11'	116° 17'	"1350.00	1964	CNA
Rodriguez Dam, Baja California	32° 27'	116° 54'	120.09	1938	CNA
Tecate, Baja California	32° 33'	116° 41'	480.06	1946	CNA
Valle de Las Palmas, Baja California	32° 22'	116° 37'	280.11	1948	CNA

@ Elevation above mean sea level " Estimated from topographic maps
** Baja California State Office of the National Water Commission

EVAPORATION IN THE TIJUANA RIVER BASIN
IN MILLIMETERS

Tabulated below are records of evaporation observed at 3 stations in California and at 2 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 on the Tijuana River Watershed" in this bulletin.

Types of pans used:

1. Barrett Reservoir: January 1921 through September 1926, square 0.91-meter by 0.91-meter by 0.46-meter deep floating pan. October 1926 through 2003, square 0.91-meter by 0.91-meter by 0.46-meter deep land pan set 0.38-meter in ground.

2. Morena Reservoir: October 1915 through December 1921, square 0.91-meter by 0.91-meter by 0.46-meter deep floating pan. January 1922 through August 1926 records are the average of evaporation in a square 0.91-meter by 0.91-meter by 0.46-meter deep floating pan and a land pan of the same dimensions. September 1926 through 2003, square 0.91-meter by 0.91-meter by 0.46-meter deep land pan set 0.38-meter in ground.

3. Lower Otay Dam: January 1950 through 2003, square 0.91-meter by 0.91-meter by 0.46-meter deep land pan set 0.38-meter in ground.

IN THE UNITED STATES

Month	Morena Dam, California		Barrett Dam, California		Lower Otay Dam, California	
	2003	Average 1916–2003	2003	Average 1921–2003	2003	Average 1950–2003
Jan.	75	55	50	47	80	50
Feb.	57	53	51	53	67	58
Mar.	106	82	64	82	85	86
April	136	118	88	115	133	119
May	171	165	115	161	142	153
June	91	210	162	199	128	175
July	288	242	186	234	172	207
Aug.	333	226	186	221	197	196
Sept.	237	179	157	179	172	161
Oct.	190	126	128	125	135	118
Nov.	100	79	64	77	74	73
Dec.	109	57	50	48	49	55
Yearly	1,893	1,592	1,301	1,541	1,434	1,451

IN MEXICO

Month	Rodriguez Dam, Baja California		El Carrizo, Baja California	
	2003	Average 1939–2003	2003	Average 1980–2003
Jan.	89	99	183	135
Feb.	65	102	110	117
Mar.	107	110	126	139
April	121	138	148	179
May	135	132	188	220
June	116	188	199	269
July	162	212	263	293
Aug.	171	197	288	291
Sept.	125	163	211	241
Oct.	112	135	224	206
Nov.	67	106	132	153
Dec.	60	84	130	132
Yearly	1,330	1,680	2,202	2,355

TEMPERATURE IN THE TIJUANA RIVER BASIN
IN DEGREES CELSIUS

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 meters 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 on Tijuana River Watershed" in this bulletin.

IN THE UNITED STATES

Month	Barrett Dam, California				Campo, California				Chula Vista, California			
	2003			Average 1931–2003	2003			Average 1951–2003	2003			Average 1931–2003
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	14.4	28.3	1.1	9.9	13.0	29.4	-2.2	8.8	16.8	32.2	5.0	12.2
Feb.	12.8	27.8	0	10.8	9.6	26.7	-3.3	9.3	14.3	28.3	0.6	12.9
Mar.	12.2	28.9	2.8	12.1	11.0	28.3	-2.2	10.2	14.1	30.0	0	13.6
April	12.8	30.6	1.7	14.6	10.6	27.8	-3.9	12.2	14.6	22.8	7.2	15.0
May	16.7	38.3	3.9	17.2	15.9	39.4	-2.2	15.1	#	24.4	8.3	16.4
June	21.1	37.2	8.9	20.6	18.3	37.2	2.2	18.7	#	25.0	12.8	17.8
July	25.6	38.3	11.1	24.4	24.6	40.0	6.1	22.7	#	29.4	15.6	19.9
Aug.	26.7	40.6	12.8	24.7	25.0	38.9	8.9	23.0	#	28.3	17.8	20.8
Sept.	24.4	38.9	10.0	22.6	22.8	37.8	5.6	20.6	#	#	#	20.1
Oct.	23.9	37.8	8.9	18.2	19.6	36.7	3.3	16.0	20.4	33.3	11.1	17.8
Nov.	11.7	26.1	-0.6	13.5	11.3	25.0	-2.8	11.5	15.5	27.8	4.4	14.9
Dec.	10.6	27.8	-2.8	10.4	8.8	25.6	-5.0	8.7	#	#	#	12.8
Yearly	17.7	40.6	-2.8	16.6	15.9	40.0	-5.0	14.7				16.2

IN MEXICO

Month	Rodriguez Dam, Baja California				El Hongo, Baja Californa				Ignacio Zaragoza, Baja California			
	2003		1938–2003		2003		1981–2003		2003		1965–2003	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	36	6	36	-3	24	3	26	-9	#	#	34	-11
Feb.	33	7	34	0	24	-1	27	-3	#	#	32	-9
Mar.	31	7	38	0	25	-6	31	-6	#	#	36	-9
April	31	6	40	2	25	-2	34	-1	#	#	38	-4
May	31	7	39	3	37	2	40	1	#	#	40	-2
June	29	12	42	8	34	5	47	2	49	10	49	-2
July	35	14	40	8	40	13	45	8	50	12	50	1
Aug.	36	14	41	10	39	15	41	3	51	14	51	3
Sept.	37	13	43	8	34	9	39	2	51	12	51	1
Oct.	34	11	42	1	34	8	37	0	49	10	49	-6
Nov.	29	7	37	-1	22	1	30	-2	39	2	39	-9
Dec.	28	3	34	-3	22	-2	27	-8	36	1	36	-9
Yearly	37	3	43	-3	40	-6	47	-9			51	-11

Month	Tecate, Baja California				El Carrizo, Baja California				Valle de Palmas, Baja California			
	2003		1946–2003		2003		1980–2003		2003		1948–2003	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	26	0	38	-9	32	5	32	-2	37	0	37	-11
Feb.	30	2	38	-8	31	6	34	-2	36	2	37	-5
Mar.	30	1	36	-5	32	5	37	-4	33	1	38	-2
April	28	0	39	-2	32	2	41	3	31	-1	41	-2
May	35	3	42	1	39	6	42	5	42	2	44	1
June	40	11	44	0	35	10	42	9	40	8	48	4
July	40	12	46	2	38	11	46	8	41	9	49	6
Aug.	42	13	47	1	40	13	45	5	43	10	48	5
Sept.	41	11	46	2	39	11	43	5	44	8	47	3
Oct.	39	8	41	-3	43	12	43	6	39	4	43	0
Nov.	31	-1	37	-3	34	2	35	4	34	1	38	-7
Dec.	31	-2	36	-5	30	2	34	-3	31	-2	35	-6
Yearly	42	-2	47	-9	43	2	46	-4	44	-2	49	-11

Missing Data

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

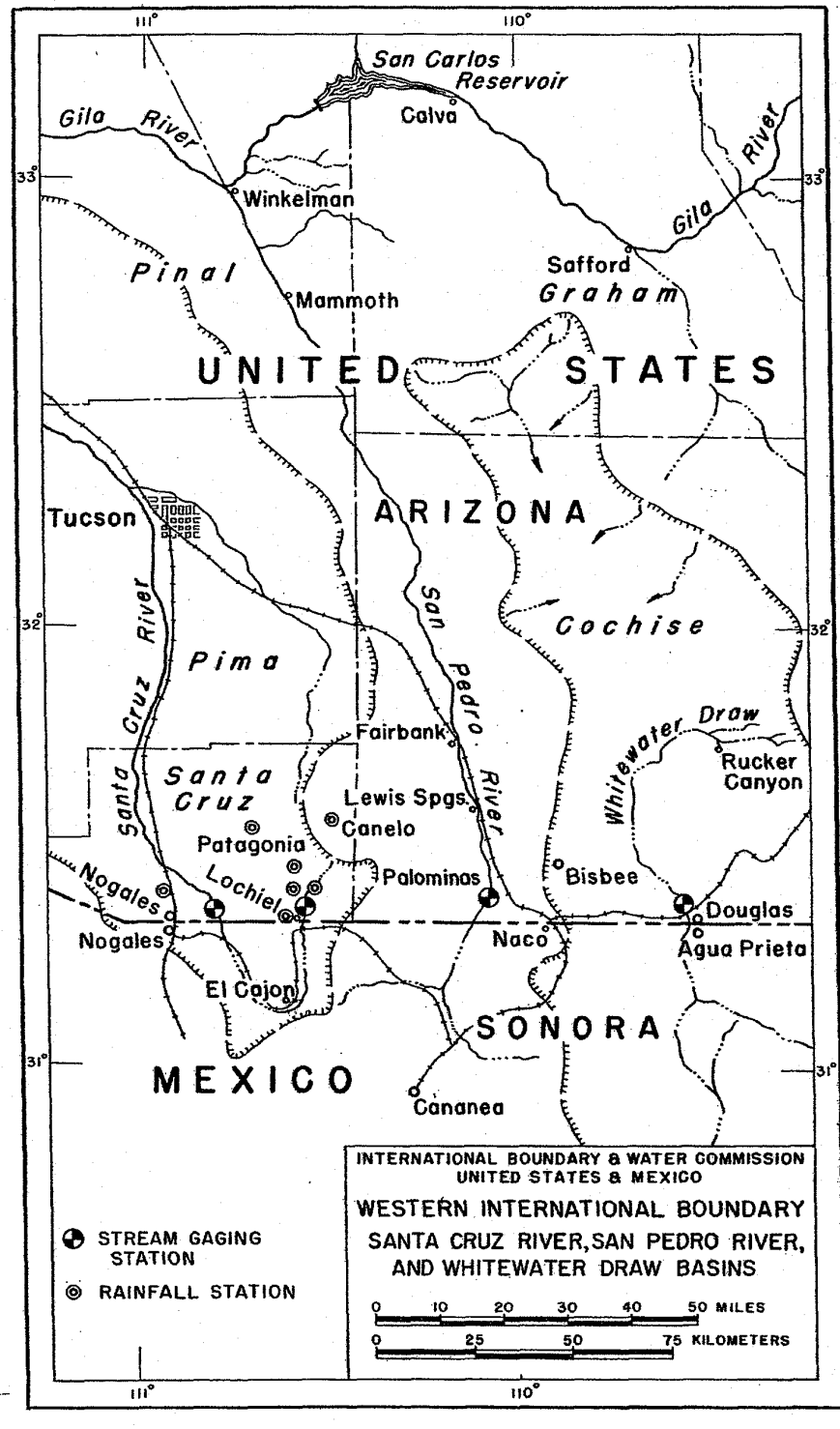
2003

The total area within the Tijuana River basin is 4,484 square kilometers, 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 Mr. Art Letter, General Manager, Tia Juana Valley County Water District, 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 2003 was by pumping from ground water.

Designation of Areas	Drainage Basin-Square Kilometers			Irrigated Areas-Hectares		
	United States	Mexico	Total	United States	Mexico	Total
Cottonwood Creek						
above Morena Dam	295	0	295	0		0
Morena Dam to Barrett Dam	344	0	344	0		0
above Barrett Dam	640	0	640	0		0
below Barrett Dam and above Tecate Creek	168	0	168	0		0
above Tecate Creek	808	0	808	0		0
Campo Creek						
above International Boundary	220	10	230	0		0
Tecate Creek						
above International Boundary (not including Campo Creek)	49	166	215	0		0
Cottonwood Creek						
above International Boundary Station	1,070	176	1,246	0		0
Rio de las Palmas						
above Rodriguez Dam	18	2,541	2,559	0	(b)	0
Tijuana River						
above Nestor Gaging Station	1,186	3,279	4,465	49		49
above the Mouth	1,197	3,287	4,484	(a) 244		244

(a) Data from Otay Water District, leased areas from IBWC irrigation and private landowners.
(b) There was no irrigation in 2003 in the Tijuana Irrigation District, Tijuana Valley, Baja California Mexico, from the Rodriguez Reservoir.


111°
110°
San Carlos Reservoir
Gila River
Calva
Winkelman
Gila River
33°
Pinal
Mammoth
Safford
Graham
UNITED STATES
ARIZONA
Tucson
Santa Cruz River
32°
Pima
San Pedro River
Cochise
Whitewater Draw
Rucker Canyon
Fairbank
Santa Cruz
Lewis Spgs.
Canelo
Patagonia
Nogales
Lochiel
Palominas
Bisbee
Douglas
Nogales
Naco
Agua Prieta
El Cajon
SONORA
31°
MEXICO
Cananea
INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
WESTERN INTERNATIONAL BOUNDARY
SANTA CRUZ RIVER, SAN PEDRO RIVER,
AND WHITEWATER DRAW BASINS
STREAM GAGING STATION
RAINFALL STATION
0 10 20 30 40 50 MILES
0 25 50 75 KILOMETERS

09-5375.00 WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

DESCRIPTION: Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 137 meters upstream from the Southern Pacific Railroad bridge, 2.4 kilometers upstream from the international boundary, and 3.2 kilometers west of Douglas, Arizona. Zero of gage is 1,191.505 meters above mean sea level, U. S. C. & G. S. datum of 1929. Location April 26, 1972 to April 10, 1974 was 61 meters upstream from bridge with the datum 1.340 meters higher.
RECORDS: Based on current meter measurements, observations of no flow, and a continuous record of gage heights. Computations by shifting control methods. Records obtained and furnished by the U. S. Section of the Commission are available for: 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), July 1930 to December 1933, May 1935 to July 1947, October 1947 through August 2002. (July 1954 to March 1955, monthly discharge only). Records from September 2002 through 2003 obtained and furnished by the U.S. Geological Survey.
REMARKS: Diversions above this station are mainly by pumping from ground water for irrigation. Records show flow at the international boundary into Mexico.
EXTREMES: Prior to 1936: Maximum recorded discharge, 97.7 CMS August 10, 1931 (gage height 3.700 meters); maximum estimated discharge, 115 CMS July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 143 CMS August 7, 1955; maximum gage height, 5.045 meters July 29, 1966; minimum daily discharge, no flow at times during most years.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	1.10	0.08	0	0	0
2	0	0	0	0	0	0	0	.08	.05	0	0	0
3	0	0	0	0	0	0	0	.04	.04	0	0	0
4	0	0	0	0	0	0	0	.03	.03	0	0	0
5	0	0	0	0	0	0	0	.02	.03	0	0	0
6	0	0	0	0	0	0	0	.02	.02	0	0	0
7	0	0	0	0	0	0	0	.01	.02	0	0	0
8	0	0	0	0	0	0	0	.01	.01	0	0	0
9	0	0	0	0	0	0	0	.24	.01	0	0	0
10	0	0	0	0	0	0	0	.05	.01	.19	0	0
11	0	0	0	0	0	0	0	.85	.01	.08	0	0
12	0	0	0	0	0	0	0	.05	.01	.01	0	0
13	0	0	0	0	0	0	0	.04	0	0	0	0
14	0	0	0	0	0	0	0	.26	0	0	.08	0
15	0	0	0	0	0	0	0	.08	0	0	.03	0
16	0	0	0	0	0	0	0	.05	0	0	.01	0
17	0	0	0	0	0	0	0	.04	0	0	0	0
18	0	0	0	0	0	0	0	.03	0	0	0	0
19	0	0	0	0	0	0	0	.03	0	0	0	0
20	0	0	0	0	0	0	0	.02	0	0	0	0
21	0	0	0	0	0	0	0	.02	0	0	0	0
22	0	0	0	0	0	0	0	.02	0	0	0	0
23	0	0	0	0	0	0	0	.01	0	0	0	0
24	0	0	0	0	0	0	0	.01	0	0	0	0
25	0	0	0	0	0	0	0	.07	0	0	0	0
26	0	0	0	0	0	0	.14	.06	0	0	0	0
27	0	0	0	0	0	0	.40	.04	0	0	0	0
28	0	0	0	0	0	0	.12	.03	0	0	0	0
29	0		0	0	0	0	.07	.03	0	0	0	0
30	0		0	0	0	0	.04	.05	0	0	0	0
31	0		0		0		.12	.04		0		0
Sum	0	0	0	0	0	0	0.89	3.43	0.32	0.28	0.12	0

Current Year 2003 — Period 1936–2003

Month	Extreme Gage Meters		Extreme–Cubic Meters per Second				Average	Volume–Thousand Cubic Meters			
			High		Low						
	High	Low	Day		Day			Total	Average	Maximum	Minimum
Jan.	0.670	0.670	! 1	0	! 1	0	0	0	39.0	556	0
Feb.	.670	.670	! 1	0	! 1	0	0	0	18.0	163	0
Mar.	.670	.670	! 1	0	! 1	0	0	0	23.0	364	0
April	.670	.665	! 1	0	! 1	0	0	0	17.0	213	0
May	.665	.665	! 1	0	! 1	0	0	0	12.0	170	0
June	.665	.665	! 1	0	! 1	0	0	0	122	1,961	0
July	1.790	.665	27	.96	! 1	0	.03	76.9	1,777	10,004	0
Aug.	2.015	1.205	11	3.06	! 8	.01	.11	296	2,938	17,861	0
Sept.	1.485	1.125	1	.17	!25	0	.01	27.6	767	3,910	0
Oct.	1.595	1.120	10	.42	! 1	0	.01	24.2	443	7,528	0
Nov.	1.485	1.135	14	.22	! 1	0	0	10.4	57.0	765	0
Dec.	1.190	1.165	! 1	0	! 1	0	0	0	121	2,915	0
Yearly	2.015	0.665		3.06		0	0.01	435	6,334	27,533	0

! And other days

SEWAGE INFLUENT, DOUGLAS, ARIZONA
INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Parshall flume in the influent line of the older trickling filter unit and a Parshall flume in the influent line of the newer extended aeration unit. The treatment plant is located about 1.6 kilometers west of the Douglas–Agua Prieta Port of Entry immediately adjacent to the international boundary in Douglas, Cochise County, Arizona.

RECORDS: Continuous monthly records since March 1948; daily records from March 18, 1948 through 1950 and from January 1952 through 2003.

REMARKS: The older 4.9 thousand cubic meters per day trickling filter unit was constructed in 1947 by the International Boundary and Water Commission. Since April 8, 1968 all sewage from Agua Prieta has been retained and treated in Mexico to be used for irrigation along with the effluent from the Douglas International Treatment Plant. On July 1, 1973, ownership and operation of the plant was transferred from the International Boundary and Water Commission to the City of Douglas. In 1980 the plant was enlarged, with the addition of the extended aeration unit bringing the total capacity up to 9.8 thousand cubic meters per day. The effluent from the Douglas Treatment Plant is discharged through a conduit to Mexico.

	Total Monthly Flows			Mean Daily Flows–Thousand Cubic Meters Per Day					
	Thousand Cubic Meters			Current Year 2003			Period 1952–2003		
Month	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	325	0	325	12.5	8.5	10.5	18.8	1.6	4.7
Feb.	290	0	290	12.2	8.2	10.4	17.7	2.1	4.6
Mar.	321	0	321	11.9	7.3	10.3	14.4	2.2	4.6
April	312	0	312	13.3	7.5	10.4	18.1	1.4	4.6
May	316	0	316	12.1	8.0	10.2	15.0	1.9	4.7
June	338	0	338	13.0	9.5	11.5	15.0	2.1	4.8
July	323	0	323	12.1	8.5	10.4	14.8	1.8	5.0
Aug.	344	0	344	14.3	8.3	11.1	15.1	1.4	5.1
Sept.	329	0	329	12.7	9.2	11.0	13.6	1.8	4.9
Oct.	333	0	333	13.3	8.5	10.7	13.8	2.2	4.8
Nov.	336	0	336	14.4	8.1	11.2	14.4	1.2	4.8
Dec.	361	0	361	15.4	7.1	11.6	17.9	1.7	4.8
Yearly	3,928	0	3,928	15.4	7.1	10.8	18.8	1.2	4.8

09-4705.00 SAN PEDRO RIVER AT PALOMINAS, ARIZONA

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

RECORDS: Based on current meter measurements, observations of no flow, and a continuous record of gage heights. Records available: May 1930 to October 1933, May 1935 to July 1941, and July 1950 through 2003. Records obtained and furnished by U. S. Geological Survey prior to October 1, 1981 and from October 1, 1995 through 2003, and by the United States Section of the Commission from October 1, 1981 through September 30, 1995.

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

EXTREMES: Maximum daily discharge, 623 CMS on August 14, 1940 (gage height 4.93 meters present datum), from rating curve extended above 159 CMS on basis of slope-area measurement of peak flow; no flow at times in most years. Greatest flood known occurred on September 28, 1926 (gage height, about 7.28 meters present datum), from flood marks; discharge not determined.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.03	0.05	0.05	0	0	0	0	0.07	0	0	0
2	0	.03	.05	.05	.01	0	0	0	.01	0	0	0
3	0	.03	.05	.06	0	0	0	0	0	0	0	0
4	0	.03	.05	.07	.01	0	0	0	0	0	0	0
5	.01	.03	.05	.06	.01	0	0	0	0	0	0	0
6	.01	.04	.04	.05	.01	0	0	0	0	0	0	0
7	.01	.04	.04	.05	.01	0	0	0	0	0	0	0
8	.01	.04	.04	.05	.01	0	0	.42	0	0	0	0
9	.01	.04	.04	.03	.01	0	0	0	.45	0	0	0
10	.01	.04	.04	.02	.01	0	0	0	.12	0	0	0
11	.01	.04	.04	.02	.01	0	0	0	0	0	0	0
12	.02	.03	.03	.02	.01	0	0	.62	0	0	0	0
13	.02	.03	.03	.02	.01	0	0	12.6	0	0	0	0
14	.02	.03	.03	.02	.01	0	0	.06	0	0	0	0
15	.02	.03	.03	.02	0	0	0	0	0	0	0	0
16	.02	.03	.03	.02	0	0	0	.10	0	0	0	0
17	.02	.03	.04	.01	0	0	0	0	0	0	0	0
18	.02	.03	.05	.01	0	0	0	0	0	0	0	0
19	.02	.03	.04	.01	0	0	0	5.69	0	0	0	0
20	.03	.03	.04	.01	0	0	0	.10	0	0	0	0
21	.03	.03	.04	.01	0	0	0	0	0	0	0	0
22	.03	.03	.03	.01	0	0	0	6.91	0	0	0	0
23	.03	.03	.03	.01	0	0	3.46	.06	0	0	0	0
24	.03	.04	.03	.01	0	0	0	0	.02	0	0	0
25	.03	.04	.03	.01	0	0	.48	.42	0	0	0	0
26	.03	.07	.03	.01	0	0	21.4	.07	0	0	0	0
27	.03	.05	.03	.01	0	0	1.08	6.97	0	0	0	0
28	.03	.05	.03	0	0	0	3.65	1.16	0	0	0	0
29	.03		.03	0	0	0	1.13	.09	0	0	0	0
30	.03		.04	0	0	0	.07	.02	0	0	0	0
31	.03		.04		0		0	.06		0		0
Sum	0.59	1.00	1.17	0.72	0.12	0	31.27	35.35	0.67	0	0	0

Current Year 2003 | Period 1951-2003

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	0.730	0.690	29	0.04	1	0	0.02	51.0	2,236	35,987	3.2
Feb.	.770	.715	26	.09	!17	.02	.04	86.4	949	8,343	3.7
Mar.	.755	.715	! 2	.06	!12	.02	.04	101	823	9,129	16.4
April	.775	.680	! 4	.09	!29	0	.02	62.2	197	1,282	0
May	.715	.650	!12	.01	!15	0	0	10.4	63.8	502	0
June	.695	.650	! 1	0	! 1	0	0	0	203	3,631	0
July	2.715	.635	26	88.1	!24	0	1.01	2,702	5,332	21,263	0
Aug.	2.680	.545	13	85.5	! 1	0	1.14	3,054	8,707	44,860	204
Sept.	.895	.515	9	2.52	! 1	0	.02	57.9	1,926	20,160	1.7
Oct.	.550	.510	! 1	0	! 1	0	0	0	2,709	58,371	0
Nov.	.545	.520	! 1	0	! 1	0	0	0	797	19,006	0
Dec.	.560	.545	! 1	0	! 1	0	0	0	1,849	31,428	0
Yearly	2.715	0.510		88.1		0	0.19	6,125	25,792	80,483	5,427

! And other days

09-4800.00 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, 4.0 kilometers northeast of Lochiel, Arizona, and 2.7 kilometers 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 1,408 meters.
RECORDS: Based on current meter measurements, observations of no flow, and a continuous record of gage heights. Records obtained and furnished by the U. S. Geological Survey. Records available: January 1949 through 2003.
REMARKS: There are small diversions by ground water pumping for irrigating about 80.9 hectares above this station.
EXTREMES: Maximum discharge, 362 CMS on August 15, 1984, (gage height 3.19 meters); minimum discharge, no flow for several days of many years.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.01	0.01	0.01	0.01	0	0	0	0	0	0	0.01
2	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
3	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
4	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
5	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
6	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
7	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
8	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
9	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
10	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
11	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
12	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
13	.01	.01	.01	.01	.01	0	0	0	0	0	.01	.01
14	.01	.01	.01	.01	.01	0	0	.04	0	0	0	.01
15	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
16	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
17	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
18	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
19	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
20	.01	.01	.01	.01	.01	0	0	0	0	0	0	.01
21	.01	.01	.01	.01	0	0	0	0	0	0	0	.01
22	.01	.01	.01	.01	0	0	0	0	0	0	0	.01
23	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
24	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
25	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
26	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
27	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
28	.01	.01	.01	.01	0	0	0	0	0	0	.01	.01
29	.01		.01	.01	0	0	0	0	0	0	.01	.01
30	.01		.01	.01	0	0	0	0	0	0	.01	.01
31	.01		.01		0		0	0		0		.01
Sum	0.31	0.28	0.31	0.30	0.20	0	0	0.04	0	0	0.09	0.31

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
				ϕ High		ϕ Low					
	High	Low	Day		Day			Total	Average	Maximum	Minimum
			Current Year 2003					Period 1949-2003			
Jan.			! 1	0.01	! 1	0.01	0.01	26.8	339	8,822	1.6
Feb.			! 1	.01	! 1	.01	.01	24.2	122	1,233	2.2
Mar.			! 1	.01	! 1	.01	.01	26.8	135	2,594	.9
April			! 1	.01	! 1	.01	.01	25.9	64.4	638	0
May			! 1	.01	21	0	.01	17.3	33.6	210	0
June			! 1	0	! 1	0	0	0	23.7	208	0
July			! 1	0	! 1	0	0	0	581	5,267	0
Aug.			14	.04	! 1	0	0	3.5	1,103	14,207	.1
Sept.			! 1	0	! 1	0	0	0	340	3,249	0
Oct.			! 1	0	! 1	0	0	0	349	5,837	0
Nov.			13	.01	! 1	0	0	7.8	91.7	1,185	0
Dec.			! 1	.01	! 1	.01	.01	26.8	138	1,348	0
Yearly				0.04		0	0.01	159	3,320	21,433	155

ϕ Mean daily ! And other days

09-4805.00 SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 8.9 kilometers east of Nogales, Arizona, 1.3 kilometers downstream from the international boundary and 9.7 kilometers upstream from the Santa Cruz bridge on State Highway No. 82. Zero of gage is 1,128.535 meters above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

RECORDS: Based on current meter measurements, observations of no flow, and a continuous record of gage heights. Records obtained and furnished by the U. S. Geological Survey. Records available: March to November 1907 and April 1909 to December 1912 (discharge measurements and fragmentary gage height record); January 1913 to June 1922 (October 1915 to September 1916, monthly discharges only); May 1930 to December 1933; and July 1935 through 2003.

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 2003.

EXTREMES: Maximum discharge, 949 CMS on October 9, 1977 (gage height 4.725 meters); minimum discharge, no flow for several days of many years.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2003 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	1.05	0.02	0	0	0
2	0	0	0	0	0	0	0	.19	.01	0	0	0
3	0	0	0	0	0	0	0	0	.01	0	0	0
4	0	0	0	0	0	0	0	0	.01	0	0	0
5	0	0	.02	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	.01	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	.01	.31	0	0
10	0	0	0	0	0	0	0	0	.01	.02	0	0
11	0	0	0	0	0	0	0	0	.01	.01	0	0
12	0	0	0	0	0	0	0	0	.01	0	0	0
13	0	0	0	0	0	0	0	2.78	.01	0	0	0
14	0	0	0	0	0	0	0	2.69	0	0	0	0
15	0	0	0	0	0	0	0	.01	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	.08	0	0	0	0	0
25	0	0	0	0	0	0	0	.19	0	0	0	0
26	0	0	0	0	0	0	.07	2.80	0	0	0	0
27	0	0	0	0	0	0	.10	.76	0	0	0	0
28	0	0	0	0	0	0	0	.79	0	0	0	0
29	0		0	0	0	0	.21	.04	0	0	0	0
30	0		0	0	0	0	.91	.02	0	0	0	0
31	0		0		0		0	.54		0		0
Sum	0	0	0.02	0	0	0	1.37	11.86	0.11	0.34	0	0

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
								Current Year 2003			Period 1936-2003
	High	Low	Day	ϕ High	Day	ϕ Low		Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	2,810	37,352	0
Feb.			! 1	0	! 1	0	0	0	2,087	25,344	0
Mar.			5	.02	! 1	0	0	1.7	1,807	24,145	0
April			! 1	0	! 1	0	0	0	585	4,263	0
May			! 1	0	! 1	0	0	0	132	1,272	0
June			! 1	0	! 1	0	0	0	90.0	1,787	0
July			30	.91	! 1	0	.04	118	2,811	19,255	0
Aug.			26	2.80	! 3	0	.38	1,025	5,998	56,481	12.1
Sept.			1	.02	! 5	0	0	9.5	1,678	111,633	0
Oct.			9	.31	! 1	0	.01	29.4	2,323	72,806	0
Nov.			! 1	0	! 1	0	0	0	750	12,180	0
Dec.			! 1	0	! 1	0	0	0	2,708	41,405	0
Yearly				2.80		0	0.04	1,184	23,779	108,071	775

ϕ Mean daily ! And other days

SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: One 61-centimeter Parshall flume with a water-stage recorder is located at the international boundary for measuring raw wastewater from Nogales, Sonora. The plant influent and effluent flows are measured by flow meters and recorded on individual chart recorders and continuous totalizers. The Nogales Wash Pumping Plant flows are contaminated surface waters from Mexico captured in the U.S. and pumped into the international sewer trunk line downstream of the influent recorder. Flows determined by pump hour clocks. The Nogales International Treatment Plant is located adjacent to I-19, approximately 14.5 kilometers north of the international boundary, all within the City of Nogales, Santa Cruz County, Arizona.

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 2003.

REMARKS: Nogales International Treatment Plant treats combined sewage from both Nogales, Arizona and Nogales Sonora by means of aerated stabilization lagoons. In February 1991, a plant expansion was completed which increased the capacity to 65.1 thousand cubic meters per day. Ultraviolet disinfected effluent is discharged directly into the Santa Cruz River. Prior to the expansion, the plant capacity was 31.0 thousand cubic meters per day and chlorinated effluent was discharged directly to the Santa Cruz River. Prior to December 18, 1971 the plant was located along the right bank of Nogales Wash, approximately 3.2 kilometers north of the international boundary.

	Total Monthly Flows				Daily Flows-Thousand Cubic Meters Per Day					
	Thousand Cubic Meters				Current Year 2003			Period 1952-2003		
Month	U.S.	Mexico	Plant*	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	595	1,126	0	1,721	59.1	48.1	55.5	93.0	2.5	26.3
Feb.	536	1,115	0	1,651	69.1	56.0	58.9	80.4	2.5	27.0
Mar.	633	1,104	0	1,737	63.4	50.4	56.0	85.7	2.8	26.8
April	554	1,052	0	1,606	58.8	48.7	53.6	87.9	2.6	25.4
May	515	1,076	0	1,591	55.0	48.0	51.4	69.2	2.1	24.0
June	447	991	0	1,438	50.8	41.9	48.0	64.9	2.6	22.4
July	576	1,009	0	1,585	60.0	44.9	51.2	68.1	2.6	23.3
Aug.	552	1,117	0	1,669	61.6	47.5	53.8	75.6	2.8	25.0
Sept.	214	1,479	0	1,693	66.2	53.5	56.4	67.9	3.0	26.3
Oct.	408	1,329	0	1,737	63.3	48.9	56.0	87.2	2.6	26.6
Nov.	704	987	0	1,691	65.6	52.4	56.4	84.7	3.0	26.3
Dec.	374	1,319	0	1,693	58.9	48.5	54.6	75.9	1.3	26.3
Yearly	6,108	13,704	0	19,812	69.1	41.9	54.3	93.0	1.3	25.5

* Nogales Wash Pumping Plant

RAINFALL ON THE SANTA CRUZ RIVER WATERSHED IN MILLIMETERS

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

IN THE UNITED STATES

Month	San Rafael #2, Arizona		Canelo, Arizona		Patagonia, Arizona		Nogales Sanitation Plant 6N, Arizona		Brush Hill, Arizona	
	2003	Average 1973–2003	2003	Average 1930–2003	2003	Average 1930–2003	2003	Average 1953–2003	2003	Average 1994–2003
Jan.	4	40	0	31	5	32	1	29	4	18
Feb.	74	38	67	29	49	28	43	22	70	40
Mar.	54	32	10	23	13	24	31	23	20	20
April	4	14	1	11	2	10	1	9	3	18
May	#	8	4	4	1	5	3	6	11	6
June	0	14	0	19	2	12	1	12	0	24
July	75	116	127	104	145	109	119	111	93	94
Aug.	133	109	73	105	65	105	75	106	77	115
Sept.	25	55	27	43	25	44	83	40	23	43
Oct.	29	36	#	28	22	29	28	34	28	36
Nov.	18	24	#	21	23	21	24	17	33	29
Dec.	0	38	0	35	22	37	12	36	22	37
Yearly		524		453	374	456	421	445	384	480

Missing Data

LOCATION OF RAINFALL STATIONS ON THE SANTA CRUZ RIVER WATERSHED

The precipitation records of the stations listed alphabetically below begin on the date shown and extend through 2003

IN THE UNITED STATES

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (Meters)	RECORD BEGAN	OBSERVER
Brush Hill, Arizona	S	31° 29'	110° 42'	1,426	July 1994	Sonny & Nancy McCuistion
Canelo, Arizona	S	31° 33'	110° 32'	1,527	1930	Margo Ewing
Nogales Sanitation Plant 6N, Arizona	S	31° 25'	110° 57'	1,085	June 1952	I. B. & W. C.
Patagonia, Arizona	S	31° 33'	110° 45'	1,277	1930	George R. Proctor
San Rafael #2, Arizona	S	31° 22'	110° 38'	1,481	Jan. 1973	Mike & Billie McFarland

S Standard 203 millimeter rain gage

TEMPERATURE IN THE SANTA CRUZ RIVER BASIN IN DEGREES CELSIUS

Tabulated below are monthly records of temperature at the station located at the Nogales Sanitation Plant in Arizona 14.5 kilometers north of the international boundary. On December 18, 1971, the station was moved to correspond with a new Nogales Sanitation Plant. Prior to this date, the station was located 3.2 kilometers 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. The equipment at the Nogales Sanitation Plant – 9N consists of a standard 203-millimeter rain gage and maximum and minimum thermometer. The collection of data for mean relative humidity, evaporation, and mean wind speed was discontinued in 1984.

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

	Nogales Sanitation Plant – 9N		
	2003		
Month	Mean	Max.	Min.
Jan.	10.5	28.3	-6.1
Feb.	9.7	27.8	-5.6
Mar.	11.2	29.4	-2.8
April	14.5	30.0	-2.8
May	20.2	36.7	1.7
June	24.3	40.0	10.0
July	27.8	40.6	15.6
Aug.	25.8	40.0	16.1
Sept.	23.5	36.1	10.0
Oct.	19.8	35.6	2.8
Nov.	12.1	28.3	-6.1
Dec.	8.6	27.8	-12.2
Yearly	17.3	40.6	-8.3

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

2003

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 Natural Resource Conservation Service at Douglas, Arizona and estimated from aerial photographs.

Designation of Areas	Drainage Basin–Square Kilometers			Irrigated Areas–Hectares		
	United Stated	Mexico	Total	United States	Mexico	Total
Santa Cruz River:						
Above Lochiel, Arizona Gaging Station	212	0	212	40	0	40
Above El Cajon, Mexico Gaging Station	464	324	788	40	952	992
Above Nogales, Arizona Gaging Station	479	901	1,380	40	1,091	1,131
San Pedro River:						
Above Palominas, Arizona Gaging Station	238	*1,621	1,859	578	1,400	1,978
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	2,650	0	2,650	8,634	0	8,634

* An additional 122 square kilometers in Mexico is tributary to the San Pedro River downstream from this station.