

WESTERN WATER BULLETIN 2004

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

INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO

DEPARTMENT OF STATE  
UNITED STATES OF AMERICA

**2004**

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## FOREWORD

This bulletin is the forty-fifth 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 2004.

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 2004 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 2004.

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 2004) 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.

## WHITTEWATER 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					
-----					
1,000 Cubic Meters	x	35.31467	=	Cubic Feet	
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	

#### 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 2004. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 2004 measured at 3 index stations was 84 millimeters, compared to an average of 50 millimeters during the last 46 years (1959 to 2004).

The flow of the Colorado River reaching Imperial Dam was 6,819,911 thousand cubic meters, about 70% of the 70-year average (1935-2004) of 9,777,916 thousand cubic meters. At the Northerly International Boundary, the total flow of the river during 2004 was 1,803,196 thousand cubic meters, about 40% of the 1935-2004 average of 4,539,378 thousand cubic meters. At the Southerly International Boundary, the flow during 2004 was 49,867 thousand cubic meters, about 2% of the 1935-2004 average of 3,015,056 thousand cubic meters.

The total of all flows of the Colorado River entering Mexico in 2004 amounted to 2,087,000 thousand cubic meters, 41% of the 1935-2004 average of 5,103,892 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 2004, other waters arrived at the Mexican points of diversion and amounted to 114,883 thousand cubic meters. These waters consisted mainly of excess waters released from reservoirs on the Colorado River. A maximum instantaneous flow of 173 cubic meters per second occurred in the Colorado River at the Northerly International Boundary station on April 5, 2004.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 20,411.2 million cubic meters, 58% of the usable capacity of 35,263.2 million cubic meters. The greater part (17,706.6 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 2004 due to drought or accident to the irrigation system.

The total reported area irrigated from waters of the Colorado River below Imperial Dam in 2004 was 437,294 hectares; 297,913 hectares in the United States and 139,381 hectares in Mexico. An estimated 33% of the total area irrigated in Mexico is served by pumping from ground water.

#### TIJUANA RIVER BASIN

During 2004, the temperatures at Barrett Dam, California (elevation 533.40 meters) in the upper portion of the basin in the United States averaged 16.3 degrees Celsius, 0.3 degree Celsius above the 74-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 20 degrees Celsius, about 1 degree below the normal for many years.

At Barrett Dam, in the upper portion of the basin in the United States, the recorded precipitation was 524 millimeters, 117% of normal; and at Lower Otay Dam near the lower end of the basin, 359 millimeters, or 127% 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 432 millimeters, 185% of the 66-year average.

Runoff above Barrett and Rodriguez Reservoirs during 2004 was about 2% of normal. Above Morena Reservoir, the runoff was 267 thousand cubic meters, or about 2% of the 68-year 1937-2004 mean of 12,400 thousand cubic meters. Above Barrett Reservoir, the runoff was 1,153 thousand cubic meters, or about 7% of the 68-year 1937-2004 mean of 16,549 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 19,164 thousand cubic meters during 2004.

#### WHITTEWATER DRAW

During 2004, the average annual temperature over the watershed was 14.5 degrees Celsius above normal, while the annual precipitation was 27% of normal. Runoff for the year at the gaging station near Douglas, Arizona, was 1,151 thousand cubic meters, or about 18% of average.

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION  
GENERAL HYDROLOGIC CONDITIONS FOR 2004

SAN PEDRO RIVER

During 2004, the average annual temperature was 0.6 degree Celsius above normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 109% of the 1961-2004 mean of 523 millimeters. The stream flow at the international boundary was 12,315 thousand cubic meters, 48% of the 1951-2004 average.

SANTA CRUZ

During 2004, the average annual temperature over the watershed averaged 16.5 degrees Celsius, 0.2 degree Celsius above the long term average. The annual precipitation was about 43% of the 66-year 1939-2004 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 345 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 128 thousand cubic meters. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 217 thousand cubic meters from the loop of the river lying in Mexico, or approximately 63% of the flow reaching the Nogales Station.

ALAMO AND NEW RIVERS

During 2004, 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, 0.8 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 79-year average.

At El Centro, the precipitation was 112 millimeters, about 165% of the 74-year average; and in Mexicali, the annual precipitation record was 90 millimeters, 114% of the 79-year average. The total flow of the New River at the international boundary in 2004 was 137,528 thousand cubic meters, which was about 94% of the 1943-2004 average.

SALTON SEA

During 2004, the average annual temperature around the Salton Sea was 0.3 degree Celsius above the long-term average, while the annual precipitation recorded at Brawley, California was approximately 194% of the long-term mean of 69 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 May 5th. The minimum stage, 69.920 meters below mean sea level, was recorded on October 2nd through the 4th, October 6th through the 8th, October 10th through November 22nd, and November 29th through December 3rd inclusive.

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2003 to December 2004. (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 2004 --- 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	.11	0	0	0	0	0
3	0	0	0	0	0	0	.18	0	0	0	0	0
4	0	0	0	0	0	0	.18	0	0	0	0	0
5	0	0	0	0	0	0	.18	0	0	0	0	0
6	0	0	0	0	0	0	.18	0	0	0	0	0
7	0	0	0	0	0	0	.18	0	0	0	0	0
8	0	0	0	0	0	0	.18	0	0	0	0	0
9	0	0	0	0	0	0	.18	0	0	0	0	0
10	0	0	0	0	0	0	.18	0	0	0	0	0
11	0	0	0	0	0	0	.18	0	0	0	0	0
12	0	0	0	0	0	0	.16	0	0	0	0	0
13	0	0	0	0	0	0	.14	0	0	0	0	0
14	0	0	0	0	0	0	.16	0	0	0	0	0
15	0	0	0	0	0	0	.17	0	0	0	0	0
16	0	0	0	0	0	0	.17	0	0	0	0	0
17	0	0	0	0	0	0	.17	0	0	0	0	0
18	0	0	0	0	0	0	.17	0	0	0	0	0
19	0	0	0	0	0	0	.17	0	0	0	0	0
20	0	0	0	0	0	0	.19	0	0	0	.29	0
21	0	0	0	0	0	0	.19	0	0	0	.23	0
22	0	0	0	0	0	0	.19	0	0	0	0	0
23	0	0	0	0	0	0	.19	0	0	0	0	0
24	0	0	0	0	0	0	.19	0	0	0	0	0
25	0	0	0	0	0	0	.19	0	0	0	0	0
26	0	0	0	0	0	0	.19	0	0	0	0	0
27	0	0	0	0	0	0	.19	0	0	0	0	0
28	0	0	0	0	0	0	.19	0	0	0	0	0
29	0	0	0	0	0	0	.10	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	4.85	0	0	0	0.52	0

Current Year 2004

Period 1973-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	450	1,113	0
Feb.			! 1	0	! 1	0	0	0	452	1,003	0
Mar.			! 1	0	! 1	0	0	0	479	1,047	0
April			! 1	0	! 1	0	0	0	465	1,057	0
May			! 1	0	! 1	0	0	0	490	1,094	0
June			! 1	0	! 1	0	0	0	492	1,216	0
July			! 21	.19	! 1	0	.16	419	530	1,259	0
Aug.			! 1	0	! 1	0	0	0	474	1,132	0
Sept.			! 1	0	! 1	0	0	0	390	1,115	0
Oct.			! 1	0	! 1	0	0	0	407	1,116	0
Nov.			! 20	.29	! 1	0	.02	44.9	419	1,113	0
Dec.			! 1	0	! 1	0	0	0	417	1,225	0
Yearly				0.29		0	0.01	464	5,465	12,653	0

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.73	1.56	1.39	1.61	1.98	1.95	1.64	1.56	1.61	1.76	2.01	1.73
2	1.70	1.53	1.39	1.73	1.98	1.93	1.59	1.53	1.61	1.78	2.04	1.70
3	1.70	1.53	1.50	1.67	2.01	1.93	1.61	1.50	1.61	1.81	2.01	1.70
4	1.70	1.56	1.47	2.29	2.01	1.93	1.64	1.50	1.61	1.84	1.98	1.67
5	1.67	1.47	1.39	2.32	2.01	1.90	1.64	1.50	1.64	1.76	2.01	1.64
6	1.70	1.50	1.36	1.64	2.01	1.90	1.53	1.50	1.61	1.81	1.98	1.76
7	1.70	1.47	1.30	1.67	2.04	1.90	1.47	1.47	1.64	1.95	2.01	1.70
8	1.70	1.56	1.19	1.76	2.07	1.90	1.47	1.47	1.70	1.98	1.98	1.78
9	1.67	1.50	1.13	1.64	2.07	1.87	1.39	1.47	1.73	1.90	1.95	1.64
10	1.67	1.53	1.25	1.67	2.29	1.87	1.36	1.44	1.76	1.93	2.04	1.64
11	1.67	1.50	1.16	1.73	2.35	1.87	1.42	1.44	1.70	1.90	2.07	1.64
12	1.53	1.44	1.16	1.84	2.38	1.84	1.39	1.47	1.78	1.87	2.15	1.61
13	1.53	1.47	1.22	1.90	2.41	1.81	1.33	1.44	1.78	1.84	2.12	1.56
14	1.53	1.44	1.19	1.87	2.41	1.84	1.33	1.44	1.76	1.93	2.07	1.61
15	1.53	1.59	1.19	1.93	2.35	1.87	1.30	1.42	1.73	1.84	2.12	1.47
16	1.53	1.59	1.22	1.95	2.32	1.93	1.25	1.42	1.78	1.93	2.18	1.59
17	1.53	1.53	1.25	1.95	2.41	1.90	1.30	1.42	1.67	1.87	2.15	1.50
18	1.53	1.56	1.27	1.93	2.46	1.81	1.39	1.42	1.70	1.93	2.21	1.39
19	1.56	1.47	1.27	1.95	2.27	1.90	1.33	1.44	1.67	1.87	2.18	1.36
20	1.50	1.44	1.30	1.93	2.18	1.84	1.42	1.44	1.70	1.87	2.15	1.36
21	1.53	1.39	1.33	1.95	2.21	1.87	1.36	1.44	1.73	1.87	2.15	1.44
22	1.50	1.44	1.36	1.93	2.21	1.81	1.39	1.44	1.84	2.29	2.01	1.53
23	1.50	1.53	1.39	1.93	2.24	1.81	1.44	1.56	1.70	2.75	1.84	1.50
24	1.53	1.64	1.44	1.93	2.24	1.84	1.44	1.47	1.73	2.80	1.93	1.50
25	1.56	2.04	1.50	1.93	2.24	1.93	1.47	1.50	1.73	2.21	1.47	1.56
26	1.50	1.81	1.47	1.95	2.21	1.95	1.47	1.50	1.76	2.10	1.81	1.56
27	1.56	1.53	1.50	1.95	2.04	1.95	1.50	1.53	1.76	1.84	1.93	1.53
28	1.56	1.44	1.56	1.95	2.04	1.93	1.61	1.56	1.81	1.98	1.81	1.47
29	1.56	1.47	1.50	1.95	1.98	1.90	1.53	1.56	1.81	1.95	1.76	1.36
30	1.59		1.50	1.98	2.01	1.67	1.50	1.59	1.81	1.56	1.84	.96
31	1.56		1.53		1.95		1.56	1.59		1.84		1.13
Sum	49.33	44.53	41.68	56.43	67.38	56.35	45.07	46.03	51.47	60.56	59.96	47.59

Current Year 2004

Period 1937-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			1	1.73	!20	1.50	1.59	4,262	4,195	6,054	711
Feb.			25	2.04	21	1.39	1.54	3,847	3,873	5,493	456
Mar.			28	1.56	9	1.13	1.34	3,601	4,730	6,617	1,005
April			5	2.32	1	1.61	1.88	4,876	4,747	6,476	940
May			18	2.46	31	1.95	2.17	5,822	4,975	6,895	804
June			! 1	1.95	30	1.67	1.88	4,869	4,756	6,883	717
July			! 1	1.64	16	1.25	1.45	3,894	4,974	8,079	662
Aug.			!30	1.59	!15	1.42	1.48	3,977	4,992	8,400	698
Sept.			22	1.84	! 1	1.61	1.72	4,447	4,741	7,672	721
Oct.			24	2.80	30	1.56	1.95	5,232	4,998	7,080	843
Nov.			18	2.21	25	1.47	2.00	5,181	4,751	7,367	806
Dec.			8	1.78	30	.96	1.54	4,112	4,523	6,241	783
Yearly				2.80		0.96	1.71	54,120	56,255	78,573	10,410

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.6	7.39	1.73	0.62	0.28	0.28	0.28	15.3	19.1	1.64	12.7	7.22
2	18.3	3.77	1.42	.28	.28	.28	.28	14.5	16.3	3.40	12.0	1.08
3	19.2	1.73	.99	1.02	.37	.28	.28	8.01	13.1	.28	10.7	.85
4	18.6	1.10	.28	4.19	.71	.28	2.10	13.0	8.89	.57	3.12	.42
5	7.87	.93	.28	2.86	.88	.28	3.29	16.9	1.33	1.22	5.21	1.78
6	7.79	1.53	.28	.57	.74	.42	1.98	12.9	4.64	5.52	5.66	6.97
7	18.0	2.27	.65	.28	.88	.28	.28	13.9	11.7	5.07	8.50	8.35
8	21.5	4.19	1.19	7.39	.59	.28	.28	14.7	12.9	4.39	7.79	7.99
9	23.8	1.90	1.25	12.1	.57	.28	.28	8.89	12.7	3.03	8.50	8.07
10	24.8	.76	1.78	7.84	2.89	.31	.28	.28	11.6	2.41	8.72	6.85
11	21.2	.34	1.13	.45	16.3	.65	.42	.28	5.47	1.56	11.2	7.16
12	3.60	.96	.93	.28	17.1	.48	1.16	7.00	5.86	3.09	11.5	6.94
13	7.00	.62	.28	.28	16.3	1.25	.28	12.5	5.44	1.30	11.4	7.08
14	6.12	.48	1.27	.28	15.6	7.25	.28	15.7	8.64	.28	11.5	7.25
15	7.14	.45	.88	.28	15.4	14.3	.28	12.8	9.94	.42	14.0	10.1
16	2.35	1.44	.42	.28	15.7	15.3	.28	7.02	10.0	3.31	10.8	17.9
17	1.08	.31	4.93	2.04	13.3	11.2	.28	5.98	9.60	3.51	14.2	11.9
18	3.82	.28	7.79	1.73	12.2	15.7	2.21	.37	12.3	1.36	15.3	1.08
19	3.91	.42	8.04	.48	7.08	19.1	.28	.31	13.5	1.59	14.5	2.44
20	3.46	.51	.28	.68	11.8	18.6	.28	.34	13.6	5.47	11.7	3.85
21	2.86	.79	.40	1.25	14.5	21.4	.28	5.52	11.4	6.20	7.02	13.8
22	2.61	3.37	.28	1.27	16.3	21.9	.28	4.81	.45	5.75	4.19	23.5
23	4.96	4.98	.28	.28	16.0	21.5	6.83	13.6	3.65	5.58	3.40	24.7
24	7.25	4.30	.74	1.13	17.9	22.7	1.50	11.2	5.83	5.72	2.97	23.9
25	7.11	2.38	1.30	1.02	19.8	23.1	3.17	14.6	8.72	5.92	6.26	21.2
26	4.42	1.05	2.04	.28	8.86	21.6	1.70	13.5	11.8	5.13	8.33	22.1
27	7.56	1.22	1.87	.28	.28	21.2	5.64	16.1	5.38	3.77	7.79	24.0
28	7.87	1.13	.71	.48	.54	22.3	16.5	17.9	11.2	4.42	9.40	25.1
29	7.28	2.12	.28	.28	1.56	19.5	7.11	17.6	9.52	6.00	6.49	19.0
30	4.22		1.81	.28	3.46	.28	6.85	17.6	3.77	5.92	13.4	4.47
31	2.92		1.70		1.47		15.5	17.4		5.35		6.09
Sum	292.20	52.72	47.21	50.48	249.64	302.28	80.44	330.51	278.33	109.18	278.25	333.14

Current Year 2004

Period 1935-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			10	24.8	17	1.08	9.43	25,246	51,323	136,546	550
Feb.			1	7.39	18	.28	1.82	4,555	41,787	109,952	444
Mar.			19	8.04	! 4	.28	1.52	4,079	41,707	111,248	440
April			9	12.1	! 2	.28	1.68	4,361	41,094	106,795	402
May			25	19.8	! 1	.28	8.05	21,569	49,313	108,892	411
June			25	23.1	! 1	.28	10.1	26,117	42,873	107,263	422
July			28	16.5	! 1	.28	2.59	6,950	39,756	112,518	455
Aug.			28	17.9	! 10	.28	10.7	28,556	44,234	110,878	455
Sept.			1	19.1	22	.45	9.28	24,048	48,601	103,193	440
Oct.			21	6.20	! 3	.28	3.52	9,433	42,966	111,075	699
Nov.			18	15.3	24	2.97	9.28	24,041	44,181	125,198	882
Dec.			28	25.1	4	.42	10.7	28,783	50,278	134,203	570
Yearly				25.1		0.28	6.57	207,738	538,113	1,286,335	8,226

@ Mean daily ! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	35.1	25.1	22.0	23.0	18.9	21.5	17.9	37.7	35.4	20.3	28.9	24.6
2	34.0	21.6	21.5	20.4	19.4	20.6	17.5	36.8	36.0	21.2	27.2	17.5
3	34.0	18.9	34.3	45.3	19.3	19.6	18.1	37.9	34.0	24.6	26.6	18.6
4	34.6	17.7	34.0	106	19.5	20.4	24.7	36.5	34.8	24.1	27.6	18.1
5	38.2	17.2	29.2	104	18.0	21.1	32.0	37.7	41.1	20.0	25.9	18.9
6	54.4	18.0	27.9	74.5	18.7	22.5	22.5	37.9	34.3	21.7	26.1	24.0
7	59.5	18.5	24.4	44.5	21.2	21.5	18.7	38.5	33.4	21.9	25.4	31.7
8	40.5	20.7	18.6	32.9	21.1	20.4	18.1	37.1	33.1	20.1	25.7	65.1
9	38.5	20.6	20.6	37.1	24.6	20.8	17.3	33.7	31.7	20.4	25.7	59.8
10	38.2	21.4	24.4	44.2	36.5	20.6	17.2	21.6	32.6	20.6	25.2	36.0
11	36.8	16.1	20.8	39.4	38.8	26.2	19.1	18.2	32.0	21.6	27.7	28.0
12	20.7	15.4	18.9	30.3	37.7	38.5	18.7	27.4	42.2	20.0	27.6	27.8
13	23.0	15.6	18.7	22.7	37.4	32.0	17.2	34.3	36.5	21.7	28.2	26.8
14	23.8	15.7	18.6	21.7	36.5	31.2	17.8	33.4	30.9	24.2	28.1	26.3
15	24.5	26.2	19.2	21.3	36.0	41.1	17.6	34.0	29.5	20.1	30.3	25.6
16	19.1	25.3	24.0	24.3	35.7	45.9	18.0	37.4	30.3	20.3	30.3	32.0
17	16.4	22.6	28.3	21.0	43.0	48.7	18.0	33.4	28.6	20.9	29.7	27.2
18	19.2	18.9	44.5	22.3	58.1	41.1	20.7	52.7	29.7	28.2	31.2	15.7
19	20.4	17.4	50.1	20.6	39.1	42.5	19.2	43.3	30.0	17.7	32.3	17.2
20	20.0	17.6	24.6	19.9	34.6	40.8	23.6	30.9	29.5	20.2	32.3	18.5
21	19.8	16.9	22.2	20.5	34.8	43.6	19.9	24.3	31.7	31.4	32.6	25.7
22	18.3	20.5	21.0	28.0	36.2	43.0	18.3	25.3	58.6	90.1	40.5	34.3
23	20.1	23.2	19.7	28.2	36.5	42.5	24.6	39.1	34.3	111	71.4	35.4
24	22.2	57.2	19.5	29.5	38.8	43.0	18.1	33.4	32.3	111	73.6	35.1
25	23.4	100	20.2	25.5	40.2	45.6	21.2	33.7	29.2	85.2	56.4	33.1
26	20.2	77.6	21.4	23.5	42.8	42.5	20.0	32.9	31.2	79.6	40.2	33.4
27	23.5	31.2	21.4	21.7	22.5	42.2	25.0	33.7	30.3	68.8	33.4	34.0
28	25.5	22.9	21.0	20.4	21.1	43.0	37.4	35.1	29.7	28.6	36.8	35.1
29	24.9	22.3	19.9	20.3	23.9	41.3	29.2	35.1	29.2	33.4	36.0	31.2
30	21.3		18.3	19.9	27.8	18.4	27.4	35.1	30.3	51.0	29.7	17.5
31	19.9		18.5		25.0		38.2	34.6		34.0		25.9
Sum	870.0	762.3	747.7	1,012.9	963.7	1,002.1	673.2	1,062.7	1,002.4	1,153.9	1,012.6	900.1

Current Year 2004

Period 1951-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			7	59.5	17	16.4	28.1	75,168	250,986	1,317,479	36,828
Feb.			25	100	12	15.4	26.3	65,863	206,209	1,228,424	41,083
Mar.			19	50.1	30	18.3	24.1	64,601	227,927	1,610,496	42,683
April			4	106	!20	19.9	33.8	87,515	204,129	1,119,312	41,552
May			18	58.1	5	18.0	31.1	83,264	203,549	1,065,554	43,373
June			17	48.7	30	18.4	33.4	86,581	197,649	1,113,679	36,996
July			31	38.2	!10	17.2	21.7	58,164	221,924	2,013,773	37,956
Aug.			18	52.7	11	18.2	34.3	91,817	228,749	2,073,958	41,457
Sept.			22	58.6	17	28.6	33.4	86,607	206,405	1,669,785	53,264
Oct.			!23	111	19	17.7	37.2	99,697	178,277	1,789,911	43,129
Nov.			24	73.6	10	25.2	33.8	87,489	180,551	1,292,035	42,965
Dec.			8	65.1	18	15.7	29.0	77,769	209,241	1,374,775	40,733
Yearly				111		15.4	30.5	964,535	2,515,596	13,065,596	633,707

@ 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 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.315	3.140	3.085	3.105	3.025	3.075	3.000	3.360	3.310	3.035	3.195	3.110
2	3.295	3.075	3.075	3.055	3.035	3.055	2.995	3.345	3.315	3.055	3.165	2.980
3	3.300	3.025	3.305	3.450	3.030	3.035	3.005	3.365	3.290	3.120	3.155	3.000
4	3.305	3.000	3.300	4.250	3.035	3.050	3.135	3.340	3.295	3.110	3.175	2.990
5	3.370	2.985	3.215	4.220	3.000	3.065	3.260	3.360	3.395	3.030	3.140	3.005
6	3.610	3.000	3.195	3.870	3.020	3.095	3.095	3.360	3.290	3.065	3.145	3.105
7	3.680	3.015	3.125	3.465	3.070	3.075	3.020	3.370	3.270	3.065	3.135	3.245
8	3.405	3.055	3.020	3.280	3.065	3.055	3.005	3.345	3.270	3.035	3.140	3.870
9	3.375	3.055	3.055	3.345	3.125	3.060	2.990	3.285	3.245	3.035	3.135	3.775
10	3.370	3.070	3.130	3.455	3.340	3.055	2.985	3.070	3.260	3.040	3.130	3.320
11	3.340	2.965	3.060	3.385	3.375	3.160	3.025	3.005	3.250	3.060	3.175	3.180
12	3.055	2.945	3.025	3.235	3.360	3.370	3.020	3.170	3.415	3.030	3.175	3.175
13	3.105	2.955	3.020	3.100	3.355	3.265	2.985	3.300	3.320	3.065	3.180	3.160
14	3.120	2.955	3.020	3.080	3.340	3.245	3.000	3.285	3.230	3.110	3.180	3.150
15	3.130	3.165	3.030	3.070	3.330	3.415	2.995	3.290	3.205	3.035	3.220	3.135
16	3.025	3.145	3.120	3.125	3.325	3.485	3.005	3.345	3.220	3.035	3.220	3.260
17	2.970	3.095	3.205	3.065	3.440	3.525	3.000	3.285	3.195	3.050	3.215	3.160
18	3.025	3.025	3.465	3.090	3.660	3.410	3.055	3.575	3.210	3.180	3.235	2.930
19	3.050	2.995	3.545	3.055	3.380	3.435	3.030	3.430	3.215	2.980	3.250	2.965
20	3.045	2.995	3.130	3.040	3.305	3.410	3.115	3.240	3.205	3.035	3.255	2.985
21	3.040	2.980	3.090	3.055	3.310	3.450	3.045	3.120	3.245	3.235	3.260	3.135
22	3.010	3.055	3.065	3.195	3.335	3.440	3.010	3.135	3.650	4.140	3.395	3.305
23	3.045	3.105	3.040	3.200	3.340	3.435	3.120	3.360	3.285	4.390	3.910	3.325
24	3.090	3.640	3.035	3.220	3.375	3.440	3.005	3.275	3.250	4.390	3.945	3.320
25	3.110	4.190	3.050	3.150	3.400	3.485	3.070	3.285	3.205	4.070	3.675	3.290
26	3.050	3.905	3.070	3.110	3.435	3.430	3.045	3.270	3.235	4.010	3.390	3.295
27	3.110	3.250	3.070	3.080	3.090	3.430	3.140	3.285	3.220	3.855	3.275	3.305
28	3.150	3.100	3.065	3.055	3.065	3.445	3.345	3.305	3.210	3.190	3.340	3.325
29	3.140	3.090	3.045	3.050	3.120	3.415	3.205	3.305	3.205	3.265	3.320	3.245
30	3.070		3.010	3.040	3.190	3.010	3.180	3.305	3.220	3.575	3.210	2.955
31	3.040		3.015		3.140		3.370	3.295		3.280		3.140
Avg.	3.185	3.135	3.120	3.265	3.240	3.275	3.075	3.290	3.270	3.310	3.280	3.200

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.91	0.91	1.08	1.30	1.05	1.30	0	1.27	0	0.57	1.42	0
2	.91	1.08	1.08	1.30	1.05	1.30	0	1.27	.57	0	1.42	.79
3	.91	1.08	1.08	1.30	1.05	1.25	0	1.27	1.27	0	1.44	1.53
4	.91	1.08	1.08	1.30	1.05	1.16	0	1.27	1.27	0	1.44	1.53
5	.91	.99	1.08	1.30	1.05	1.16	0	1.27	1.27	0	1.42	1.53
6	.99	.93	1.08	1.30	1.05	1.16	.79	1.27	1.27	0	1.42	.68
7	1.08	.93	1.08	1.30	1.05	1.16	1.27	1.27	1.27	.82	1.42	0
8	1.08	.93	1.08	1.30	1.05	.93	1.16	1.27	1.27	1.42	1.47	0
9	1.08	.93	1.08	1.30	1.05	1.13	1.27	1.27	1.27	1.42	1.50	0
10	1.08	.93	1.02	.91	1.05	1.27	1.27	1.27	1.19	1.33	1.50	.79
11	.96	.93	.85	.59	1.05	1.27	1.27	1.27	1.19	1.33	1.50	1.53
12	1.08	.93	.93	.71	1.05	1.27	1.33	1.27	1.27	1.42	1.50	1.53
13	1.08	.93	.93	.71	1.05	1.27	1.36	1.13	1.27	1.42	1.50	1.53
14	1.08	.93	.93	.96	1.05	1.30	1.36	1.08	1.36	1.42	1.50	1.53
15	1.08	.93	.91	1.22	1.05	1.36	1.30	1.08	1.42	1.42	1.47	1.53
16	1.08	.93	.91	1.22	1.05	1.36	1.25	1.08	1.42	1.42	1.44	1.53
17	1.08	.93	.99	1.13	1.10	.45	1.25	1.08	1.36	1.42	1.39	1.53
18	1.08	.93	1.08	1.08	1.16	0	1.25	1.08	1.27	1.42	1.42	1.53
19	1.08	.85	1.08	1.08	1.16	0	1.25	1.08	1.27	1.42	1.44	1.53
20	1.08	.79	1.08	1.08	1.19	0	1.25	1.08	1.27	1.42	1.44	1.53
21	1.08	.79	1.08	1.08	1.19	0	1.25	1.08	1.30	1.27	1.44	1.53
22	1.08	.79	1.10	.99	1.10	0	1.33	1.08	1.22	1.19	1.44	1.53
23	1.08	.88	1.25	.99	1.10	0	1.36	1.08	1.22	1.19	.62	1.53
24	1.08	.93	1.30	1.08	1.19	0	1.36	1.22	1.27	1.19	0	1.53
25	1.08	.93	1.30	1.08	1.19	0	1.36	1.27	1.27	1.19	0	1.53
26	1.08	.93	1.30	1.08	1.19	0	1.36	1.27	1.27	1.19	.96	1.53
27	1.08	.93	1.30	1.08	1.19	0	1.36	.54	1.27	1.36	1.30	1.53
28	1.08	.93	1.30	1.08	1.27	0	1.36	0	1.27	1.42	1.30	1.22
29	1.08	.93	1.27	.96	1.30	0	1.30	0	1.19	1.42	.62	1.53
30	1.08		1.30	.93	1.30	0	1.27	0	1.16	1.42	0	1.53
31	1.08		.51		1.30		1.27	0		1.42		1.53
Sum	32.42	26.91	33.44	32.74	34.73	20.10	33.21	31.47	36.19	33.93	36.73	38.67

Current Year 2004

Period 1971-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 7	1.08	! 1	0.91	1.05	2,801	3,148	7,204	0
Feb.			! 2	1.08	! 20	.79	.93	2,325	2,957	6,753	0
Mar.			! 24	1.30	31	.51	1.08	2,889	3,287	7,530	4.9
April			! 1	1.30	11	.59	1.09	2,829	3,336	7,491	299
May			! 29	1.30	! 1	1.05	1.12	3,001	3,379	7,617	0
June			! 15	1.36	! 18	0	.67	1,737	3,091	7,206	0
July			! 13	1.36	! 1	0	1.07	2,869	3,288	6,796	613
Aug.			! 1	1.27	! 28	0	1.02	2,719	3,298	7,401	222
Sept.			! 15	1.42	1	0	1.21	3,127	3,223	7,253	0
Oct.			! 8	1.42	! 2	0	1.09	2,932	3,328	7,106	194
Nov.			! 9	1.50	! 24	0	1.22	3,173	3,354	7,103	386
Dec.			! 3	1.53	! 1	0	1.25	3,341	3,574	7,580	0
Yearly				1.53		0	1.07	33,743	39,263	78,926	2,162

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.31	0.34	0.28	0.34	0.34	0.34	0.34	0.34	0.34	0.40	0.42	0.40
2	.31	.31	.28	.31	.34	.34	.34	.34	.34	.37	.42	.40
3	.34	.34	.28	.31	.34	.34	.34	.34	.34	.40	.42	.40
4	.34	.37	.28	.31	.34	.34	.34	.34	.37	.37	.42	.40
5	.31	.34	.28	.31	.34	.34	.34	.34	.37	.40	.40	.40
6	.34	.31	.28	.34	.37	.34	.34	.34	.34	.40	.45	.40
7	.34	.31	.27	.34	.37	.34	.34	.34	.34	.40	.42	.37
8	.34	.34	.27	.37	.37	.34	.34	.34	.34	.40	.42	.37
9	.34	.31	.27	.34	.37	.34	.34	.34	.34	.42	.42	.37
10	.34	.31	.28	.34	.37	.31	.34	.34	.34	.40	.40	.37
11	.31	.31	.28	.34	.34	.31	.34	.34	.34	.40	.40	.37
12	.31	.31	.28	.34	.34	.34	.34	.34	.37	.42	.40	.37
13	.34	.34	.31	.34	.34	.34	.34	.34	.34	.42	.40	.37
14	.34	.31	.28	.34	.34	.34	.34	.34	.37	.42	.42	.37
15	.34	.31	.28	.34	.34	.34	.34	.34	.37	.42	.42	.37
16	.34	.31	.28	.34	.34	.34	.34	.34	.37	.40	.40	.37
17	.34	.31	.28	.37	.34	.31	.34	.34	.37	.42	.45	.37
18	.31	.31	.28	.37	.34	.31	.34	.34	.37	.42	.42	.42
19	.31	.31	.28	.37	.34	.31	.34	.34	.40	.45	.40	.40
20	.31	.31	.28	.37	.34	.31	.34	.37	.37	.42	.42	.37
21	.31	.31	.28	.34	.34	.31	.34	.37	.40	.42	.40	.37
22	.31	.31	.28	.34	.34	.31	.34	.34	.40	.42	.40	.37
23	.34	.31	.31	.34	.34	.31	.34	.34	.37	.42	.45	.40
24	.34	.28	.31	.34	.34	.34	.34	.34	.37	.42	.40	.37
25	.34	.28	.31	.34	.34	.34	.34	.34	.37	.42	.42	.34
26	.34	.31	.31	.34	.34	.34	.34	.34	.37	.42	.40	.34
27	.31	.31	.31	.34	.34	.34	.34	.34	.37	.42	.40	.34
28	.34	.31	.31	.34	.34	.34	.34	.34	.37	.45	.42	.37
29	.37	.28	.31	.34	.34	.34	.34	.34	.40	.42	.40	.34
30	.34		.31	.34	.34	.34	.34	.34	.37	.42	.40	.34
31	.31		.31	.34	.34	.34	.34	.34		.42		.37
Sum	10.21	9.11	8.95	10.23	10.69	9.93	10.54	10.60	10.92	12.80	12.41	11.61

Current Year 2004

Period 1948-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			29	0.37	! 1	0.31	0.33	882	524	1,337	49.0
Feb.			4	.37	! 24	.28	.31	787	441	920	50.0
Mar.			! 13	.31	! 7	.27	.29	773	512	1,052	77.0
April			! 8	.37	! 2	.31	.34	884	522	1,233	82.0
May			! 6	.37	! 1	.34	.34	924	559	1,551	72.0
June			! 1	.34	! 10	.31	.33	858	536	1,270	83.0
July			! 1	.34	! 1	.34	.34	911	598	1,554	90.0
Aug.			! 20	.37	! 1	.34	.34	916	661	1,665	91.0
Sept.			! 19	.40	! 1	.34	.36	943	675	1,690	66.0
Oct.			! 19	.45	! 2	.37	.41	1,106	759	1,505	68.0
Nov.			! 6	.45	! 5	.40	.41	1,072	703	1,530	71.0
Dec.			! 1	.42	! 25	.34	.37	1,003	609	12,295	52.0
Yearly				0.45		0.27	0.35	11,059	7,099	15,331	955

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	38.5	53.5	66.3	48.7	19.9	28.9	0	0	0	0	11.8
2	0	39.4	53.8	68.5	46.2	22.2	29.2	0	0	0	0	27.4
3	0	40.8	54.1	69.1	32.0	22.6	30.3	0	0	0	0	25.4
4	0	40.5	54.1	69.4	32.3	22.9	26.8	0	0	0	0	24.4
5	0	39.9	51.8	69.4	32.0	21.3	23.5	0	0	0	0	24.4
6	0	40.2	49.8	69.4	32.0	19.9	26.4	0	0	0	0	28.9
7	0	38.8	50.7	64.6	29.5	20.0	27.8	0	0	0	0	26.6
8	0	38.2	56.1	60.3	29.2	21.2	28.9	0	0	0	0	26.2
9	0	42.2	55.2	56.4	28.0	21.4	29.2	4.50	0	0	0	26.2
10	0	40.5	50.1	58.1	0	21.4	28.9	19.7	0	0	0	25.3
11	0	42.8	55.8	65.1	0	20.6	27.7	20.6	0	0	0	23.9
12	35.1	41.3	59.8	60.9	0	20.0	27.2	17.8	0	0	0	24.0
13	32.6	47.0	62.6	66.3	0	19.9	28.3	0	0	0	0	21.8
14	28.6	47.0	61.7	66.6	0	13.6	28.3	0	0	0	0	19.1
15	28.6	41.9	71.4	69.7	0	0	28.9	0	0	0	0	15.6
16	31.7	42.8	65.4	66.6	0	0	30.9	0	0	0	0	0
17	33.4	45.3	61.2	69.4	0	0	30.3	0	0	0	0	5.07
18	32.6	49.6	61.2	68.0	0	0	27.6	0	0	0	0	25.4
19	33.1	54.7	61.5	70.8	0	0	33.1	0	0	0	0	24.7
20	32.6	63.2	59.5	60.6	0	0	34.3	0	0	0	0	20.3
21	37.4	63.7	61.2	58.9	0	0	33.1	0	0	0	0	17.4
22	34.0	58.6	62.3	53.8	0	0	32.9	0	0	0	0	0
23	35.4	60.3	65.7	52.1	0	0	32.6	0	0	0	0	0
24	35.1	62.0	68.0	47.3	0	0	32.0	0	0	0	0	0
25	36.0	60.0	68.3	48.4	0	0	30.3	0	0	0	0	0
26	37.7	59.2	68.5	48.4	1.56	0	30.9	0	0	11.5	0	0
27	38.8	58.9	68.5	49.3	20.1	0	29.7	0	0	34.6	0	0
28	38.8	62.3	69.1	47.9	23.0	0	15.1	0	0	14.4	0	0
29	39.1	62.0	70.8	48.7	20.0	0	16.5	0	0	0	0	4.81
30	40.2		67.4	48.7	19.8	27.2	0	0	0	0	0	27.6
31	40.5		67.7		19.8		0	0	0	0	0	23.8
Sum	701.3	1,421.6	1,886.8	1,819.0	414.16	314.1	829.6	62.60	0	60.5	0	500.08

Current Year 2004

Period 1944-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			31	40.5	! 1	0	22.6	60,592	114,046	643,620	0
Feb.			21	63.7	8	38.2	49.0	122,826	95,984	579,127	0
Mar.			15	71.4	6	49.8	60.9	163,020	147,295	501,939	0
April			19	70.8	24	47.3	60.6	157,162	152,870	447,013	0
May			1	48.7	!10	0	13.4	35,783	73,361	454,461	0
June			30	27.2	!15	0	10.5	27,138	111,816	501,523	0
July			20	34.3	!30	0	26.8	71,677	158,449	512,385	0
Aug.			11	20.6	! 1	0	2.02	5,409	150,902	498,782	0
Sept.			1	0	! 1	0	0	0	95,879	591,679	0
Oct.			27	34.6	! 1	0	1.95	5,227	68,317	617,269	0
Nov.			1	0	! 1	0	0	0	68,226	609,196	0
Dec.			6	28.9	!22	0	16.1	43,207	106,586	700,894	0
Yearly				71.4		0	21.9	692,041	1,343,731	6,000,505	0

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004; daily discharge records available January 1, 1950 through 2004.

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 2004 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39.0	62.5	79.4	93.9	72.8	43.2	47.6	43.9	37.7	29.5	39.2	43.4
2	38.2	62.5	75.1	96.7	67.5	44.3	46.6	43.1	38.8	27.6	38.4	52.0
3	38.2	64.6	94.0	109	55.7	44.4	49.3	43.0	38.8	31.2	36.9	52.9
4	38.3	63.7	89.5	148	52.0	45.4	50.7	43.3	39.1	30.0	38.4	52.7
5	43.2	64.3	80.0	156	49.7	45.7	54.2	43.8	44.9	24.0	36.8	53.8
6	55.1	66.2	75.7	145	51.4	45.1	49.2	44.0	39.7	25.6	37.3	59.8
7	59.3	63.9	75.6	128	48.5	44.6	50.6	44.4	38.1	27.3	35.6	59.5
8	47.6	63.8	79.1	96.4	46.8	43.9	51.1	43.4	38.1	26.0	36.2	102
9	45.3	67.7	79.3	96.5	46.4	44.3	51.7	44.6	37.5	27.1	36.7	99.5
10	45.0	65.9	75.8	109	38.2	44.6	51.4	43.1	38.6	26.4	39.4	66.0
11	45.1	66.9	78.2	113	39.5	48.8	51.8	40.8	38.4	28.4	45.1	58.5
12	52.2	69.9	76.1	99.1	40.5	61.9	50.5	41.9	44.7	25.8	38.7	58.2
13	51.4	69.9	85.0	89.4	41.3	59.4	49.6	40.1	43.0	28.5	38.3	56.7
14	51.8	67.6	82.9	87.9	39.3	47.7	50.0	38.7	38.0	33.0	38.6	54.8
15	53.3	65.8	94.5	92.1	39.2	44.6	49.6	39.2	36.4	26.8	39.6	51.2
16	55.3	69.4	96.2	94.7	39.1	47.9	54.0	40.8	37.1	26.5	40.7	46.0
17	54.6	73.8	98.5	95.8	45.3	53.1	53.5	39.0	36.2	27.0	41.0	45.6
18	55.0	80.1	110	94.8	53.9	46.7	49.1	48.1	36.5	44.1	41.2	48.5
19	59.7	80.6	115	94.9	44.0	46.1	50.9	46.2	37.0	31.4	41.7	49.0
20	57.6	83.4	95.0	83.3	36.6	45.8	57.2	35.7	37.0	26.9	42.4	44.7
21	57.8	80.4	87.8	82.1	36.6	47.5	53.3	28.0	37.9	34.4	42.7	48.4
22	58.8	78.4	89.1	82.6	37.9	47.3	49.5	28.0	53.8	85.1	46.9	45.5
23	60.6	87.2	90.9	82.3	38.6	47.0	54.2	37.8	43.0	116	72.4	46.7
24	59.0	112	92.7	78.6	41.2	45.7	49.2	38.7	40.1	119	81.1	47.0
25	59.3	149	92.1	76.9	41.7	49.9	49.5	38.2	37.9	88.4	61.3	45.3
26	60.4	139	92.4	74.4	47.8	47.8	48.9	37.3	39.6	89.4	54.8	45.7
27	69.0	91.0	92.3	73.8	45.9	46.7	51.1	37.0	39.4	119	50.2	46.1
28	68.8	84.0	93.5	70.5	44.4	45.8	51.1	37.7	38.0	50.8	50.5	47.1
29	69.9	89.6	92.8	70.9	45.7	48.5	49.5	37.5	37.8	40.1	50.9	47.7
30	70.2		95.1	71.4	49.7	48.6	48.3	38.0	40.8	57.5	38.4	49.0
31	67.1		91.2		48.4		44.6	37.3		44.8		54.8
Sum	1,686.1	2,283.1	2,744.8	2,887.0	1,425.6	1,422.3	1,567.8	1,242.6	1,183.9	1,417.6	1,331.4	1,678.1

Month	Current Year 2004							Period 1935-2004			
	Extreme Gage Meters		Extreme-Cubic Meters per Second			Average	Total	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum
Jan.	32.255	31.625	27	91.6	11	35.4	54.4	145,679	473,879	2,027,841	39,348
Feb.	32.545	32.030	25	163	10	58.0	78.7	197,260	409,946	1,705,506	74,502
Mar.	32.630	32.010	19	131	5	62.6	88.5	237,151	440,899	1,642,378	23,930
April	32.550	32.055	5	173	28	64.9	96.2	249,437	364,794	1,322,616	0
May	32.145	31.695	1	74.7	10	29.8	46.0	123,172	341,164	1,419,735	88,077
June	32.130	31.810	12	70.1	29	40.3	47.4	122,887	340,373	1,629,906	10,485
July	32.235	31.560	23	63.4	31	43.4	50.6	135,458	361,947	2,303,937	30,097
Aug.	31.800	31.285	18	53.9	21	24.6	40.1	107,361	368,351	2,485,718	54,026
Sept.	31.770	31.430	22	56.6	23	31.9	39.5	102,289	328,414	2,286,076	66,424
Oct.	32.650	31.300	27	169	5	21.0	45.7	122,481	317,075	2,417,702	52,985
Nov.	31.780	31.300	24	94.2	7	31.6	44.4	115,033	350,954	1,889,976	51,070
Dec.	31.830	31.240	8	108	20	27.3	54.1	144,988	441,582	2,259,735	51,806
Yearly	32.650	31.240		173		21.0	57.0	1,803,196	4,539,378	19,033,104	890,696

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.645	32.155	32.115	32.230	32.100	31.820	32.020	31.560	31.515	31.385	31.435	31.365
2	31.650	32.160	32.090	32.255	32.095	31.830	32.025	31.530	31.545	31.360	31.430	31.485
3	31.645	32.205	32.195	32.320	31.930	31.840	32.085	31.520	31.555	31.425	31.400	31.505
4	31.650	32.190	32.210	32.405	31.860	31.845	32.115	31.540	31.555	31.455	31.415	31.460
5	31.720	32.200	32.145	32.455	31.840	31.850	32.190	31.550	31.650	31.395	31.395	31.465
6	31.875	32.210	32.130	32.485	31.865	31.825	32.085	31.570	31.565	31.370	31.395	31.580
7	31.955	32.190	32.135	32.470	31.860	31.815	32.120	31.585	31.520	31.415	31.365	31.575
8	31.780	32.185	32.165	32.260	31.850	31.840	32.120	31.575	31.520	31.435	31.375	31.680
9	31.755	32.225	32.175	32.255	31.840	31.845	32.135	31.595	31.500	31.445	31.355	31.695
10	31.750	32.190	32.175	32.370	31.810	31.855	32.135	31.635	31.510	31.435	31.330	31.605
11	31.760	32.220	32.230	32.420	31.775	31.905	32.145	31.580	31.510	31.455	31.355	31.490
12	31.855	32.245	32.225	32.315	31.795	32.055	32.115	31.590	31.600	31.420	31.375	31.475
13	31.850	32.280	32.305	32.255	31.795	32.045	32.120	31.575	31.590	31.460	31.355	31.460
14	31.855	32.280	32.305	32.265	31.775	31.930	32.130	31.530	31.505	31.510	31.370	31.440
15	31.880	32.275	32.410	32.280	31.775	31.875	32.115	31.545	31.470	31.450	31.390	31.395
16	31.915	32.305	32.420	32.300	31.780	31.915	32.145	31.590	31.475	31.445	31.405	31.335
17	31.895	32.340	32.450	32.315	31.840	31.995	32.025	31.565	31.470	31.460	31.370	31.340
18	31.910	32.395	32.545	32.305	32.015	31.920	31.925	31.695	31.480	31.595	31.375	31.365
19	32.000	32.440	32.555	32.285	31.850	31.895	31.930	31.660	31.495	31.420	31.375	31.375
20	31.970	32.445	32.435	32.145	31.755	31.895	31.985	31.480	31.490	31.350	31.390	31.355
21	31.970	32.350	32.385	32.135	31.755	31.910	31.885	31.340	31.490	31.460	31.400	31.395
22	31.990	32.325	32.395	32.145	31.765	31.925	31.785	31.315	31.705	31.650	31.455	31.365
23	32.035	32.370	32.395	32.140	31.770	31.935	31.875	31.465	31.550	31.725	31.655	31.370
24	32.020	32.410	32.405	32.120	31.795	31.925	31.770	31.540	31.505	31.725	31.655	31.370
25	32.030	32.355	32.385	32.110	31.800	31.990	31.780	31.530	31.505	31.710	31.690	31.355
26	32.055	32.255	32.390	32.100	31.870	31.980	31.760	31.505	31.525	31.805	31.520	31.360
27	32.130	32.160	32.395	32.100	31.850	31.970	31.785	31.485	31.520	32.250	31.390	31.365
28	32.155	32.130	32.405	32.090	31.820	31.960	31.760	31.500	31.510	31.705	31.380	31.380
29	32.175	32.190	32.365	32.095	31.845	32.000	31.690	31.515	31.515	31.445	31.465	31.400
30	32.180		32.270	32.095	31.890	31.990	31.675	31.530	31.540	31.595	31.310	31.410
31	32.170		32.195		31.885		31.595	31.510		31.480		31.460
Avg.	31.910	32.265	32.305	32.250	31.845	31.915	31.970	31.540	31.530	31.525	31.420	31.440

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0	0.01	0	0	0	0.06	0	0	0.13	0	0.06
2	.01	0	.01	.02	0	.01	0	0	0	.16	0	.05
3	.01	.01	0	.02	0	0	0	0	0	.05	0	0
4	.01	.01	.01	0	0	0	0	0	0	.16	0	.02
5	0	.01	.01	0	0	0	0	.03	.01	.10	.01	.07
6	0	.03	0	0	0	0	0	.10	.01	.01	.01	.01
7	0	.02	0	0	0	.03	0	.01	0	.01	.01	0
8	0	.01	0	0	.01	.04	.02	.01	0	.01	.01	0
9	.08	.01	0	0	0	.01	.04	.01	0	.01	0	0
10	.05	0	0	0	0	0	.02	.01	0	0	0	0
11	.01	.03	.01	0	.01	.01	0	.01	0	0	0	0
12	0	.05	.01	0	0	.01	0	.04	0	0	.04	0
13	0	.01	.01	0	0	.01	.01	.01	.01	0	0	0
14	0	.07	.01	0	0	0	0	0	.01	0	0	0
15	0	.06	.01	0	0	0	0	0	0	.13	.05	.01
16	0	.07	0	0	0	0	0	0	0	.04	.02	.01
17	0	.04	0	0	0	0	.08	0	0	.07	.02	.01
18	0	.02	0	0	.01	0	.01	0	.01	.25	.02	.01
19	0	.02	0	0	.01	0	.01	0	0	.30	.01	.01
20	0	.01	0	.01	.01	0	.01	0	0	.06	.01	.01
21	0	.02	0	0	0	0	0	0	0	.34	.01	.01
22	0	0	0	0	0	0	0	0	0	.10	.01	0
23	0	.04	0	0	0	.01	0	0	0	.28	.01	0
24	0	.02	0	0	0	0	0	0	0	.02	.01	0
25	.01	.01	0	0	0	0	0	0	0	.01	.01	0
26	.01	.01	0	0	0	.01	.01	.02	0	.01	.01	0
27	.12	.01	0	0	0	.01	.01	0	0	.01	.01	0
28	.15	.01	0	0	0	.01	0	.01	0	.01	.01	0
29	.02	0	0	0	0	.24	0	.01	.11	.01	.07	0
30	.01	0	0	0	0	.23	0	.01	.13	.01	.05	.01
31	0	0	0	0	0	0	0	0	0	0	.05	.02
Sum	0.50	0.60	0.09	0.05	0.05	0.63	0.28	0.28	0.29	2.29	0.41	0.31

Current Year 2004

Period 1935-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.360	0	9	0.52	! 4	0	0.02	43.2	181	1,127	0
Feb.	.400	0	11	.60	! 1	0	.02	51.8	161	493	7.4
Mar.	.030	0	! 1	.01	! 1	0	0	7.8	163	638	0
April	.320	0	2	.43	! 1	0	0	4.3	158	524	4.3
May	.015	0	! 7	.01	! 1	0	0	4.3	160	543	4.3
June	.255	0	29	.31	! 1	0	.02	54.4	144	734	19.0
July	.410	0	17	.63	! 1	0	.01	24.2	134	636	0
Aug.	.255	0	26	.31	! 1	0	.01	24.2	112	761	0
Sept.	.400	0	29	.60	! 1	0	.01	25.1	124	570	0
Oct.	.605	0	19	1.13	! 4	0	.07	198	174	604	0
Nov.	.385	.005	29	.57	! 1	0	.01	35.4	179	570	11.1
Dec.	.375	0	1	.55	! 2	0	.01	26.8	194	730	16.9
Yearly	0.605	0		1.13		0	0.02	500	1,884	5,551	500

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.640	32.160	32.110	32.200	32.080	31.830	32.030	31.540	31.540	31.400	31.440	31.310
2	31.660	32.160	32.070	32.220	32.060	31.840	32.030	31.530	31.550	31.470	31.430	31.460
3	31.650	32.200	32.190	32.280	31.910	31.850	32.080	31.510	31.560	31.400	31.400	31.480
4	31.660	32.180	32.160	32.340	31.840	31.850	32.110	31.530	31.550	31.470	31.410	31.440
5	31.730	32.200	32.120	32.370	31.840	31.870	32.190	31.530	31.630	31.410	31.400	31.440
6	31.850	32.210	32.110	32.430	31.860	31.860	32.090	31.570	31.560	31.380	31.400	31.530
7	31.940	32.200	32.120	32.430	31.860	31.850	32.110	31.590	31.520	31.420	31.370	31.540
8	31.780	32.190	32.150	32.220	31.840	31.850	32.130	31.700	31.520	31.440	31.370	31.650
9	31.750	32.220	32.160	32.210	31.840	31.860	32.140	31.590	31.500	31.450	31.360	31.650
10	31.750	32.190	32.160	32.320	31.780	31.870	32.140	31.640	31.510	31.450	31.330	31.560
11	31.760	32.200	32.220	32.360	31.780	31.920	32.150	31.580	31.510	31.460	31.340	31.440
12	31.850	32.230	32.220	32.280	31.800	32.060	32.120	31.580	31.590	31.440	31.370	31.420
13	31.850	32.260	32.300	32.210	31.810	32.050	32.130	31.580	31.590	31.460	31.350	31.400
14	31.860	32.250	32.300	32.210	31.780	31.930	32.130	31.530	31.510	31.520	31.360	31.370
15	31.880	32.250	32.390	32.240	31.780	31.880	32.110	31.540	31.480	31.420	31.380	31.300
16	31.920	32.280	32.390	32.270	31.790	31.920	32.140	31.600	31.470	31.460	31.390	31.190
17	31.910	32.320	32.420	32.280	31.860	32.000	32.020	31.570	31.480	31.470	31.360	31.170
18	31.910	32.380	32.510	32.270	32.020	31.920	31.910	31.680	31.480	31.600	31.360	31.250
19	32.010	32.410	32.530	32.260	31.870	31.900	31.920	31.660	31.500	31.450	31.360	31.270
20	31.970	32.400	32.420	32.210	31.760	31.900	31.970	31.490	31.490	31.360	31.370	31.240
21	31.970	32.310	32.360	32.110	31.760	31.920	31.870	31.350	31.490	31.460	31.380	31.290
22	31.990	32.270	32.370	32.120	31.770	31.930	31.770	31.320	31.690	31.630	31.430	31.270
23	32.030	32.300	32.370	32.120	31.780	31.940	31.850	31.470	31.530	31.690	31.620	31.260
24	32.010	32.360	32.380	32.090	31.800	31.930	31.750	31.550	31.500	31.700	31.610	31.260
25	32.020	32.310	32.360	32.090	31.810	32.000	31.760	31.520	31.500	31.680	31.650	31.240
26	32.040	32.210	32.530	32.070	31.870	31.990	31.780	31.510	31.520	31.690	31.480	31.240
27	32.120	32.100	32.360	32.080	31.850	31.980	31.780	31.490	31.530	31.950	31.330	31.260
28	32.150	32.120	32.370	32.070	31.830	31.970	31.760	31.500	31.510	31.590	31.320	31.310
29	32.170	32.160	32.340	32.070	31.860	32.010	31.690	31.520	31.520	31.440	31.440	31.350
30	32.180		32.240	32.080	31.900	32.010	31.690	31.530	31.540	31.570	31.250	31.370
31	32.170		32.170		31.890		31.580	31.520		31.480		31.420
Avg.	31.910	32.240	32.285	32.215	31.850	31.925	31.965	31.545	31.530	31.510	31.400	31.365

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004, 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39.0	62.5	79.4	93.9	72.8	43.2	47.7	43.9	37.7	29.6	39.2	43.5
2	38.2	62.5	75.1	96.7	67.5	44.3	46.6	43.1	38.8	27.8	38.4	52.0
3	38.2	64.6	94.0	96.9	55.7	44.4	49.3	43.0	38.8	31.2	36.9	52.9
4	38.3	63.7	89.5	106	52.0	45.4	50.7	43.3	39.1	30.2	38.4	52.7
5	43.2	64.3	80.0	109	49.7	45.7	54.2	43.8	44.9	24.1	36.8	53.9
6	55.1	66.2	75.7	114	51.4	45.1	49.2	44.1	39.7	25.6	37.3	59.8
7	59.3	63.9	75.6	119	48.5	44.6	50.6	44.4	38.1	27.3	35.6	59.5
8	47.6	63.8	79.1	96.4	46.8	43.9	51.1	43.4	38.1	26.0	36.2	71.8
9	45.4	67.7	79.3	96.5	46.4	44.3	51.7	44.6	37.5	27.1	36.7	76.8
10	45.0	65.9	75.8	109	38.2	44.6	51.4	43.1	38.6	26.4	39.4	66.0
11	45.1	66.9	78.2	113	39.5	48.8	51.8	40.8	38.4	28.4	45.1	58.5
12	52.2	69.9	76.1	99.1	40.5	61.9	50.5	41.9	44.7	25.8	38.7	58.2
13	51.4	69.9	85.0	89.4	41.3	59.4	49.6	40.1	43.0	28.5	38.3	56.7
14	51.8	67.7	82.9	87.9	39.3	47.7	50.0	38.7	38.0	33.0	38.6	54.8
15	53.3	65.9	94.5	92.1	39.2	44.6	49.6	39.2	36.4	26.9	39.6	51.2
16	55.3	69.5	96.2	94.7	39.1	47.9	54.0	40.8	37.1	26.5	40.7	46.0
17	54.6	73.8	98.5	95.8	45.3	53.1	53.6	39.0	36.2	27.1	41.0	45.6
18	55.0	80.1	104	94.8	53.9	46.7	49.1	48.1	36.5	44.3	41.2	48.5
19	59.7	80.6	108	94.9	44.0	46.1	50.9	46.2	37.0	31.7	41.7	49.0
20	57.6	83.4	95.0	83.3	36.6	45.8	57.2	35.7	37.0	27.0	42.4	44.7
21	57.8	80.4	87.8	82.1	36.6	47.5	53.3	28.0	37.9	34.7	42.7	48.4
22	58.8	78.4	89.1	82.6	37.9	47.3	49.5	28.0	53.8	51.7	46.9	45.5
23	60.6	87.2	90.9	82.3	39.6	47.0	54.2	37.8	43.0	64.0	59.5	46.7
24	59.0	101	92.7	78.6	41.2	45.7	49.2	38.7	40.1	66.8	64.4	47.0
25	59.3	113	92.1	76.9	41.7	49.9	49.5	38.2	37.9	61.5	61.3	45.3
26	60.4	107	92.4	74.4	47.8	47.8	48.9	37.3	39.6	66.4	54.8	45.7
27	69.1	89.0	92.3	73.8	45.9	46.7	51.1	37.0	39.4	62.9	50.2	46.1
28	68.9	84.0	93.5	70.5	44.4	45.8	51.1	37.7	38.0	45.8	50.5	47.1
29	69.9	89.6	92.8	70.9	45.7	48.7	49.5	37.5	37.9	40.1	51.0	47.7
30	70.2		95.1	71.4	49.7	48.8	48.3	38.0	40.9	55.8	38.4	49.0
31	67.1		91.2		48.4		44.6	37.3		44.6		54.8
Sum	1,686.4	2,202.4	2,731.8	2,745.9	1,426.6	1,422.7	1,568.0	1,242.7	1,184.1	1,168.8	1,301.9	1,625.4

Current Year 2004

Period 1950-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			30	70.2	! 2	38.2	54.4	145,705	120,366	275,305	1,192
Feb.			25	113	! 1	62.5	75.9	190,287	130,506	292,464	11,387
Mar.			19	108	2	75.1	88.1	236,028	237,072	435,370	120,761
April			7	119	28	70.5	91.5	237,246	252,854	404,698	189,700
May			1	72.8	!20	36.6	46.0	123,258	146,881	286,174	81,665
June			12	61.9	1	43.2	47.4	122,921	191,964	332,588	117,400
July			20	57.2	31	44.6	50.6	135,475	252,169	439,171	135,475
Aug.			18	48.1	!21	28.0	40.1	107,369	240,031	420,673	107,369
Sept.			22	53.8	17	36.2	39.5	102,306	152,855	336,960	66,156
Oct.			24	66.8	5	24.1	37.7	100,984	93,243	280,817	12,894
Nov.			24	64.4	7	35.6	43.4	112,484	89,571	258,388	9,271
Dec.			9	76.8	1	43.5	52.4	140,435	120,323	247,899	10,886
Yearly				119		24.1	55.5	1,754,498	2,027,835	3,451,533	1,569,404

@ 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 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.610	32.130	32.080	32.170	32.050	31.800	32.000	31.510	31.520	31.370	31.410	31.280
2	31.630	32.130	32.040	32.190	32.030	31.810	32.000	31.500	31.520	31.440	31.400	31.430
3	31.620	32.170	32.160	32.250	31.880	31.820	32.050	31.480	31.530	31.370	31.370	31.490
4	31.630	32.150	32.130	32.310	31.810	31.820	32.080	31.500	31.520	31.440	31.380	31.410
5	31.700	32.170	32.090	31.340	31.810	31.840	32.160	31.500	31.600	31.390	31.370	31.410
6	31.820	32.180	32.080	32.400	31.830	31.830	32.060	31.540	31.530	31.350	31.370	31.500
7	31.910	32.170	32.050	32.400	31.830	31.820	32.080	31.560	31.490	31.390	31.340	31.510
8	31.750	32.190	32.120	32.190	31.810	31.820	32.100	31.550	31.490	31.410	31.340	31.620
9	31.720	32.220	32.130	32.180	31.810	31.830	32.110	31.560	31.470	31.420	31.330	31.620
10	31.720	32.190	32.130	32.290	31.750	31.840	32.110	31.610	31.480	31.430	31.300	31.530
11	31.730	32.200	32.190	32.330	31.750	31.890	32.120	31.550	31.480	31.430	31.310	31.410
12	31.820	32.230	32.190	32.250	31.770	32.030	32.090	31.550	31.560	31.410	31.340	31.390
13	31.820	32.260	32.270	32.180	31.780	32.020	32.100	31.550	31.560	31.430	31.320	31.370
14	31.830	32.250	32.270	32.180	31.750	31.900	32.100	31.500	31.480	31.490	31.340	31.340
15	31.850	32.220	32.360	32.210	31.750	31.850	32.080	31.520	31.450	31.390	31.350	31.270
16	31.890	32.250	32.360	32.240	31.760	31.890	32.040	31.570	31.440	31.430	31.360	31.160
17	31.880	32.290	32.390	32.250	31.830	31.970	31.990	31.540	31.450	31.440	31.330	31.140
18	31.880	32.350	32.480	32.240	31.990	31.890	31.880	31.650	31.450	31.570	31.330	31.220
19	31.980	32.380	32.500	32.230	31.840	31.870	31.890	31.630	31.470	31.420	31.330	31.240
20	31.940	32.370	32.390	32.180	31.730	31.870	31.940	31.460	31.460	31.330	31.340	31.210
21	31.940	32.280	32.330	32.080	31.730	31.890	31.840	31.320	31.460	31.430	31.350	31.260
22	31.960	32.240	32.340	32.090	31.740	31.900	31.740	31.290	31.660	31.600	31.400	31.240
23	32.000	32.270	32.340	32.090	31.750	31.910	32.040	31.440	31.500	31.660	31.590	31.230
24	31.980	32.330	32.350	32.060	31.770	31.900	31.720	31.520	31.470	31.670	31.580	31.230
25	31.990	32.280	32.330	32.060	31.780	31.970	31.730	31.490	31.470	31.650	31.620	31.210
26	32.010	32.180	32.500	32.040	31.840	31.960	31.720	31.480	31.490	31.660	31.450	31.210
27	32.090	32.070	32.330	32.050	31.820	31.950	31.750	31.460	31.500	31.920	31.300	31.230
28	32.120	32.090	32.340	32.040	31.800	31.940	31.730	31.470	31.480	31.560	31.290	31.280
29	32.140	32.130	32.310	32.040	31.830	31.980	31.660	31.490	31.480	31.410	31.410	31.320
30	32.150		32.210	32.050	31.870	31.980	31.660	31.500	31.510	31.540	31.220	31.340
31	32.140		32.140		31.860		31.550	31.490		31.450		31.390
Avg.	31.880	32.220	32.255	32.155	31.820	31.895	31.940	31.510	31.500	31.480	31.370	31.340

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004

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	30.600	30.600	30.500	30.500	30.500	30.500	30.500	30.350	30.500
4	30.500	30.500	30.500	31.150	31.150	30.500	30.500	30.500	30.500	30.500	30.500	30.500
5	30.500	30.500	30.500	32.250	32.250	30.500	30.500	30.500	30.500	30.500	30.500	30.500
6	30.500	30.500	30.500	31.770	31.770	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	30.800
9	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.710
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	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
12	30.500	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	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
15	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
16	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
17	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
18	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
19	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
20	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
21	30.500	30.500	30.500	30.500	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	31.110	31.110
24	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.110	31.310
25	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
26	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
27	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500
28	30.500	30.500	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	30.500
30	30.500		30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.010	30.500	30.500
31	30.500		30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.810		30.510
Avg.	30.500	30.500	30.500	30.625	30.620	30.500	30.500	30.500	30.500	30.525	30.535	30.565

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- 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	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 2004										Period 1966-2004		
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters					
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum	
Jan.	0	0	! 1	0	! 1	0	0	0	6,216	23,088	0	
Feb.	0	0	! 1	0	! 1	0	0	0	4,779	20,959	0	
Mar.	0	0	! 1	0	! 1	0	0	0	3,372	22,827	0	
April	0	0	! 1	0	! 1	0	0	0	3,020	22,944	0	
May	0	0	! 1	0	! 1	0	0	0	4,552	23,548	0	
June	0	0	! 1	0	! 1	0	0	0	3,583	23,135	0	
July	0	0	! 1	0	! 1	0	0	0	3,290	23,370	0	
Aug.	0	0	! 1	0	! 1	0	0	0	3,345	23,668	0	
Sept.	0	0	! 1	0	! 1	0	0	0	4,702	22,787	0	
Oct.	0	0	! 1	0	! 1	0	0	0	6,617	23,683	0	
Nov.	0	0	! 1	0	! 1	0	0	0	6,273	22,792	0	
Dec.	0	0	! 1	0	! 1	0	0	0	5,771	23,585	0	
Yearly	0	0		0		0	0	0	55,520	264,928	0	

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004, 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.12	0.03	0.20	0.02	0.20	0.09	0.01	0.02	0.04	0.13	0.03	0.81
2	.06	.03	.40	.35	.09	.08	.01	.04	.01	.13	.30	.96
3	.12	.52	.08	.40	.61	.01	.01	.07	.02	.45	.28	.20
4	.24	.03	.21	.08	.01	.06	.34	.02	.03	.11	.01	.43
5	.03	.83	.45	.07	.03	.01	.01	.01	.01	.11	.43	.61
6	.20	.40	.27	.06	.58	.01	.01	.24	.03	.10	.03	.24
7	.62	.54	.30	.09	.17	.01	.01	.03	.01	.26	.47	.07
8	.78	.46	.06	.04	.08	.01	.64	.01	.08	.33	.01	.29
9	.35	.07	.01	.05	.26	.06	.70	.22	.43	.02	.48	.02
10	.02	.08	.01	.02	.02	.01	.33	.24	.35	.86	.21	.16
11	.46	.25	.16	.01	.01	.01	.02	.01	.16	.77	.41	.11
12	.75	.29	0	.08	.20	.01	.02	.01	.01	.01	.02	.01
13	.02	.03	.82	.01	.35	.25	.01	.26	.01	.02	.23	.33
14	.09	.04	1.26	.01	.03	.14	.02	.05	.36	.44	.02	.06
15	.28	.75	.28	.01	.25	.07	.02	.16	.12	.19	.03	.20
16	.10	.05	.52	.01	.04	.01	.01	.21	.01	.58	.25	.33
17	.41	.03	1.27	.01	.07	.06	.11	.16	.06	.27	.49	.22
18	.15	.01	.49	.01	.12	.01	.07	.12	.02	.14	.01	.47
19	.02	.24	.51	.02	.25	.04	.04	.01	.17	.01	.36	.08
20	.09	.48	.22	.03	.01	.37	.01	.54	.74	.01	.01	.07
21	.03	.02	.02	.01	.01	.43	.03	.35	.23	1.21	.44	.01
22	.13	.01	.64	.02	.01	.03	.03	.10	.05	.32	.25	.23
23	.35	.18	.52	.01	.24	.01	.02	.07	.01	.11	.02	.18
24	.03	.23	.33	.06	.02	.01	.06	.03	.01	.09	.10	.31
25	.08	.30	.17	.03	.02	.01	.11	.13	.14	.26	.40	.08
26	.04	.22	.37	.01	.04	.02	.01	.07	.03	.50	.11	0
27	.66	0	.07	.04	.05	.80	.05	.14	.01	.13	.75	.20
28	.03	.42	.89	.06	.04	.26	.19	.41	.01	.17	.91	.63
29	.08	.13	.48	.05	.28	.19	.02	.28	.15	.52	.13	.60
30	.29		.06	.03	.07	.01	.16	.14	.11	.28	.25	.57
31	.53		.31		.01		.02	.11		.13		.94
Sum	7.16	6.67	11.38	1.70	4.17	3.09	3.10	4.26	3.42	8.66	7.44	9.42
Current Year 2004												
Period 1935-2004												
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters					
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum	
Jan.	0.525	0.020	9	2.20	13	0.01	0.23	619	2,495	11,804	0	
Feb.	.880	0	15	4.56	18	0	.23	576	2,034	10,398	18.0	
Mar.	.600	.005	13	2.51	11	0	.37	983	1,918	7,685	52.0	
April	.355	.005	2	1.83	19	0	.06	147	1,740	7,771	0	
May	.830	.005	3	4.15	31	0	.13	360	2,063	11,496	10.0	
June	.435	.005	20	2.00	24	0	.10	267	1,962	9,177	13.0	
July	.420	0	30	1.98	1	0	.10	268	1,992	10,263	11.0	
Aug.	.585	0	13	2.41	4	0	.14	368	1,725	12,014	18.0	
Sept.	.285	0	11	1.51	2	0	.11	295	1,299	7,574	7.0	
Oct.	.975	0	21	5.38	12	0	.28	748	1,796	7,006	15.0	
Nov.	.430	0	27	1.99	2	0	.25	643	2,151	10,139	23.0	
Dec.	.680	0	31	3.05	3	0	.30	814	2,742	11,632	52.0	
Yearly	0.975	0		5.38		0	0.19	6,088	23,917	102,255	707	

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004; 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, 27.620 meters on December 26, 2004.

MEAN DAILY GAGE HEIGHT IN METERS 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	28.040	28.130	27.995	28.025	27.950	28.065	28.020	27.955	27.960	28.000	27.825	27.730
2	28.030	28.115	27.975	28.060	27.940	28.070	28.015	27.960	27.950	27.980	27.820	27.745
3	28.030	28.240	27.935	28.425	28.005	28.060	28.015	27.960	27.960	28.025	27.800	27.680
4	28.050	28.165	27.950	30.065	27.925	28.070	28.060	27.950	27.965	27.995	27.770	27.695
5	28.020	28.260	27.990	30.305	27.935	28.065	28.055	27.955	27.965	27.985	27.790	27.715
6	28.055	28.205	28.000	29.455	27.995	28.065	28.070	27.985	27.970	27.975	27.765	27.820
7	28.100	28.220	27.950	28.175	27.965	28.065	28.060	27.955	27.965	28.005	27.785	27.670
8	28.120	28.225	27.925	28.040	27.965	28.060	28.115	27.950	27.975	28.015	27.760	28.900
9	28.075	28.280	27.915	28.010	27.995	28.070	28.120	27.970	28.015	27.980	27.780	28.900
10	28.020	28.220	27.920	27.995	27.975	28.060	28.085	27.985	28.010	28.075	27.765	28.040
11	28.075	28.225	27.940	27.980	27.980	28.060	28.040	27.945	27.985	28.065	27.770	27.720
12	28.115	28.245	27.925	27.980	28.005	28.065	28.040	27.945	27.970	27.975	27.755	27.675
13	28.025	28.240	28.025	27.960	28.035	28.090	28.045	27.990	27.975	27.975	27.765	27.700
14	28.035	28.275	28.090	27.950	28.005	28.080	28.040	27.955	28.015	28.030	27.755	27.675
15	28.070	28.335	27.990	27.950	28.025	28.065	28.035	27.980	27.995	28.010	27.755	27.665
16	28.050	28.270	28.000	27.945	28.010	28.060	28.025	27.985	27.970	28.050	27.760	27.665
17	28.085	28.125	28.080	27.920	28.025	28.070	28.030	27.970	27.980	28.015	27.760	27.655
18	28.055	28.165	28.020	27.915	28.040	28.060	28.025	27.965	27.980	28.015	27.720	27.670
19	28.040	28.295	28.425	27.915	28.060	28.060	28.010	27.945	28.000	27.990	27.730	27.645
20	28.050	28.175	28.055	27.915	28.025	28.105	28.005	28.005	28.055	27.990	27.705	27.640
21	28.050	28.080	27.965	27.910	28.030	28.090	28.010	27.990	28.005	28.140	27.730	27.630
22	28.075	28.075	28.025	27.910	28.030	28.040	28.005	27.955	27.980	29.380	27.715	27.650
23	28.105	28.110	28.025	27.910	28.060	28.030	28.005	27.955	27.975	30.015	28.185	27.645
24	28.060	28.645	28.025	27.920	28.040	28.035	28.005	27.950	27.975	30.085	28.895	27.655
25	28.070	30.030	28.000	27.915	28.035	28.035	28.010	27.970	27.995	29.710	27.955	27.635
26	28.065	29.990	28.035	27.915	28.045	28.035	27.980	27.960	27.980	29.060	27.720	27.620
27	28.145	28.910	28.005	27.920	28.055	28.115	27.985	27.970	27.980	30.565	27.755	27.645
28	28.110	28.695	28.085	27.930	28.050	28.065	28.000	27.990	27.980	28.890	27.750	27.685
29	28.155	28.185	28.065	27.930	28.080	28.055	27.975	27.990	28.000	27.960	27.680	27.675
30	28.180		28.020	27.925	28.060	28.025	27.985	27.975	27.985	28.120	27.680	27.685
31	28.205		28.055		28.055		27.960	27.970		28.285		27.735
Avg.	28.075	28.385	28.015	28.170	28.015	28.065	28.025	27.965	27.985	28.400	27.815	27.770

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 limítrophe 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 2004, 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.69	0.41	0	0	0.05	0.02	0	0	0	0.15	0.09	0.27
2	.49	.13	0	0	.13	.08	0	0	0	.06	.02	.10
3	.27	.21	0	.34	.17	.14	0	.02	.10	.06	.20	.18
4	.15	.04	0	.18	.03	.33	.14	.14	.16	0	.07	.06
5	.10	.01	0	.01	0	.09	.16	0	0	0	.13	.07
6	.44	.07	.09	0	0	.23	.12	0	0	.05	.13	.01
7	.29	.09	0	0	0	.05	.14	.03	0	.18	.04	.01
8	.42	0	0	0	0	.01	0	.32	0	0	.07	.01
9	.16	.10	.01	0	0	.01	0	.18	0	0	.07	.01
10	.19	.07	.03	0	.08	.03	.02	.19	.14	.14	.12	.01
11	.40	.47	.15	0	.13	.14	0	.01	.18	.03	.35	.07
12	.14	.41	.24	0	.08	.16	0	.01	.01	0	.08	.02
13	0	.28	.01	0	.19	.20	0	.08	.01	0	.07	.21
14	0	.39	.05	0	.14	.19	0	.15	.01	0	.11	.15
15	0	.07	.36	0	.08	.02	0	.08	.09	0	.19	.20
16	0	.13	.20	0	.24	.01	0	.04	0	0	.02	.26
17	0	.13	.32	0	.30	0	0	.03	.12	0	.26	.06
18	.12	.08	0	.10	.01	0	0	.15	.27	0	.24	.07
19	.11	.12	0	0	.17	0	0	.06	.31	0	.31	.09
20	0	.09	0	0	.05	0	0	.04	.22	.01	.38	.07
21	0	0	0	.02	.16	0	.26	.28	.04	.15	.20	.14
22	.11	0	.24	.09	.13	0	.23	.22	0	.07	.48	.42
23	.40	0	.11	0	.42	0	.13	.09	0	.17	.25	.33
24	.36	0	.12	0	.16	0	.08	.15	.08	.32	.17	.07
25	.38	0	.11	.19	.10	0	.21	0	.05	.16	.23	.26
26	.35	0	.21	.14	.17	0	.18	0	0	.10	.19	.18
27	.07	0	.09	.51	.02	0	.24	.03	0	.15	.11	.05
28	0	.15	.04	.32	.20	0	.17	0	0	.04	.41	.08
29	.40	.02	.16	.39	.13	0	0	0	.20	.04	.20	.07
30	.33	0	0	.15	.17	0	0	0	.08	.24	.34	.27
31	.32	0	.01	0	.20	0	0	0	0	.13	0	.44
Sum	6.69	3.47	2.55	2.44	3.71	1.71	2.08	2.30	2.07	2.25	5.53	4.24

Current Year 2004

Period 1939-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.525	0	6	1.09	!12	0	0.22	578	621	3,528	0
Feb.	.505	0	20	.90	!22	0	.12	300	525	3,096	0
Mar.	.395	0	17	.62	!1	0	.08	220	478	2,048	0
April	.455	0	27	.77	!1	0	.08	211	510	2,393	0
May	.375	0	23	.58	!4	0	.12	321	625	3,047	0
June	.390	0	4	.62	!16	0	.06	148	537	2,899	0
July	.560	0	4	1.05	!1	0	.07	180	467	2,405	0
Aug.	.350	0	21	.53	!1	0	.07	199	486	3,121	0
Sept.	.425	0	20	.69	!1	0	.07	179	440	2,689	0
Oct.	.440	0	10	.73	!1	0	.07	194	582	2,590	0
Nov.	.570	0	15	1.08	!2	0	.18	478	708	2,936	0
Dec.	.540	.010	16	1.00	!21	0	.14	366	728	3,306	0
Yearly	0.570	0		1.09		0	0.11	3,374	6,707	30,060	0

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.11	0.01	0.12	0.24	0.15	0.02	0.20	0.09	0.11	0.05	0.08	0.13
2	.02	.09	.17	.19	.06	.03	.16	.08	.08	.15	0	.10
3	0	.12	.07	.11	.08	.03	.11	.45	.10	.31	0	.25
4	.02	.02	.15	.12	.03	.04	.03	.28	.19	.16	.03	.15
5	.07	.19	.21	.15	.02	0	.02	.06	.17	.17	.02	.02
6	.09	.11	.13	.03	.01	0	.01	.22	.09	.07	.08	.19
7	.03	.14	.01	.01	0	0	.01	.23	.49	.15	0	.15
8	.02	.03	.21	.01	0	.08	.20	.29	.35	.04	0	.02
9	.01	.04	.04	.05	0	.40	.17	.14	.15	.21	0	.14
10	.01	.01	.08	.06	.06	.06	.16	.03	.30	0	0	.18
11	0	.14	.10	.02	.01	0	.03	0	.26	.01	0	.02
12	.01	.03	.14	.01	.01	.05	.05	0	0	.06	0	.16
13	0	.05	.08	.03	.05	.07	.10	.09	.01	.06	.07	.17
14	0	.04	.10	.12	.03	0	.29	.37	.03	.05	.09	.04
15	.12	.14	0	.05	.12	0	.16	.37	.03	.01	0	.01
16	.08	.02	.02	.03	0	0	.06	.16	.04	.01	0	0
17	.05	0	.31	0	0	0	.03	.33	.01	0	.12	0
18	.06	.26	.13	0	0	0	.06	.22	.16	.23	0	.18
19	.01	.01	.16	.11	.01	0	.11	.51	.11	.01	0	.19
20	.27	0	.04	.17	.06	0	.05	.32	.23	.02	.15	.06
21	.12	.24	.01	.03	.21	0	.04	.29	.33	0	.10	.03
22	0	.12	.03	.13	.17	.04	0	.05	.21	0	.03	.07
23	0	.25	.17	.42	.01	0	.01	.15	.02	0	.02	.03
24	0	.01	.01	.25	.08	.02	.05	.27	.29	0	.03	.09
25	0	.28	.01	0	.25	.19	.11	.27	.31	0	.04	.06
26	.13	.35	.08	0	.13	.02	0	.03	.31	0	.02	.03
27	.17	.07	.05	0	.09	.06	.02	0	.11	.01	.02	.02
28	0	0	0	.17	.15	0	.23	.27	.23	.26	.02	.03
29	.03	.20	0	.23	.07	.01	.10	.12	.25	.02	.01	.06
30	.08	0	.03	.36	0	.20	.01	.13	.40	.11	.02	.14
31	0	0	.12	0	.01	0	.17	.29	0	.03	0	.03
Sum	1.51	2.97	2.78	3.10	1.87	1.32	2.75	6.11	5.37	2.20	0.95	2.75

Current Year 2004

Period 1935-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Low	Average	Total	Average	Maximum	Minimum	
Jan.	0.240	0	20	0.54	! 2	0	0.05	130	1,073	4,144	111
Feb.	.275	0	23	.66	! 1	0	.10	257	898	3,910	164
Mar.	.255	0	8	.58	! 2	0	.09	240	1,020	3,602	175
April	.275	0	1	.64	! 5	0	.10	268	989	3,910	165
May	.355	0	3	.93	! 3	0	.06	162	1,108	3,750	162
June	.255	0	9	.58	! 1	0	.04	114	926	4,515	114
July	.265	0	14	.62	! 8	0	.09	238	1,003	4,428	210
Aug.	.285	0	3	.68	! 10	0	.20	528	1,035	4,885	196
Sept.	.295	0	30	.72	! 2	0	.18	464	968	3,910	0
Oct.	.255	0	2	.59	! 1	0	.07	190	1,019	4,046	0
Nov.	.220	0	1	.47	! 1	0	.03	82.1	1,101	4,404	0
Dec.	.265	0	13	.61	! 14	0	.09	238	1,085	3,799	51.0
Yearly	0.355	0		0.93		0	0.09	2,911	12,225	47,255	2,911

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.67	4.09	2.80	3.68	3.48	4.13	2.85	2.45	2.72	4.64	4.77	3.90
2	4.40	3.65	2.97	3.57	3.79	4.12	3.14	2.45	2.67	4.87	4.60	5.13
3	4.41	3.70	2.85	3.94	3.76	4.00	3.28	2.91	2.90	4.57	4.66	4.56
4	4.56	4.00	2.96	3.92	4.38	3.94	3.68	2.91	2.62	4.93	4.93	4.04
5	4.25	4.52	3.24	3.41	4.48	4.15	3.66	3.02	2.99	3.94	4.71	4.67
6	4.25	3.64	3.56	3.21	4.78	4.25	2.92	3.63	2.82	5.03	4.43	5.37
7	4.66	4.05	3.48	3.33	4.97	4.25	2.79	3.78	2.35	4.69	5.15	4.17
8	4.61	4.14	2.91	2.86	4.50	3.96	2.98	3.90	2.71	4.99	5.37	3.46
9	4.81	4.05	3.11	3.11	4.76	3.81	2.67	3.38	2.75	5.17	4.31	3.48
10	4.62	4.05	2.78	3.73	4.48	4.08	3.33	3.48	2.48	5.42	5.33	3.44
11	5.00	3.37	2.77	4.16	4.26	4.28	3.84	2.95	2.81	6.50	4.65	4.02
12	4.77	3.32	2.97	3.60	4.07	4.40	3.42	2.72	3.08	4.79	4.81	3.95
13	5.08	3.08	3.07	2.90	4.95	4.28	2.83	2.71	2.85	5.24	4.44	3.55
14	3.91	3.12	4.02	2.87	4.82	4.38	2.67	3.77	3.46	5.90	4.28	3.15
15	3.90	3.75	4.08	3.39	4.83	4.01	2.97	3.71	3.48	5.61	4.51	2.57
16	3.82	3.41	3.70	3.72	5.13	3.89	2.86	3.54	3.08	5.51	4.92	2.76
17	4.21	3.71	3.32	3.47	4.93	3.82	3.14	3.02	3.09	5.02	4.98	3.10
18	5.01	3.55	3.74	4.12	4.66	3.53	3.07	3.00	3.02	4.90	4.67	3.76
19	4.90	3.95	3.38	3.94	4.66	2.81	3.23	3.09	3.51	4.86	5.22	4.28
20	4.07	3.78	3.78	4.03	4.57	3.16	2.99	3.33	3.59	5.52	5.35	4.44
21	4.03	3.42	3.57	3.83	4.52	3.00	2.86	3.29	3.71	6.29	5.27	3.79
22	4.45	3.77	3.25	3.56	4.93	3.33	2.92	3.44	3.62	6.12	5.57	3.53
23	3.82	3.89	3.88	3.34	4.75	2.85	2.80	2.93	3.52	5.43	4.26	3.50
24	3.43	2.81	3.06	3.57	4.39	3.05	2.94	2.71	3.64	5.85	4.49	3.17
25	3.55	2.84	3.17	4.03	4.67	3.38	3.02	2.17	4.16	5.48	4.64	3.14
26	3.12	3.00	3.47	3.86	4.36	3.28	2.89	2.45	4.43	5.14	4.30	2.94
27	3.56	2.67	3.71	3.47	4.80	3.15	2.70	3.17	4.63	4.94	3.75	2.71
28	3.39	2.73	3.99	3.48	4.57	3.17	2.44	2.95	4.05	4.20	4.10	3.30
29	2.85	3.36	3.44	3.42	4.28	2.76	2.44	3.29	4.40	4.71	4.00	3.34
30	3.31		3.12	3.49	4.46	2.76	2.46	2.57	4.39	4.49	3.99	2.76
31	4.10		3.10		4.66		2.38	2.43		5.05		3.14
Sum	129.52	103.42	103.25	107.01	140.65	109.98	92.17	95.15	99.53	159.80	140.46	113.12

Current Year 2004

Period 1935-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.			26	7.36	26	0	4.18	11,191	9,432	13,819	2,146
Feb.			4	5.78	4	0	3.57	8,935	9,034	14,787	2,023
Mar.			15	7.08	1	1.06	3.33	8,921	10,270	15,332	2,393
April			11	5.47	11	0	3.57	9,246	10,278	14,666	2,368
May			2	5.50	2	0	4.54	12,152	10,651	16,208	2,405
June			8	5.48	24	1.89	3.67	9,502	9,698	14,851	2,825
July			4	5.11	28	.83	2.97	7,963	9,558	14,715	3,121
Aug.			6	6.03	12	1.06	3.07	8,221	9,510	14,752	3,158
Sept.			28	5.61	5	1.81	3.32	8,599	9,739	14,269	2,812
Oct.			11	7.69	29	1.44	5.15	13,807	11,472	15,321	3,626
Nov.			10	7.75	10	0	4.68	12,136	11,023	15,206	3,454
Dec.			22	8.31	22	0	3.65	9,774	10,268	14,160	3,022
Yearly				8.31		0	3.81	120,447	120,933	171,922	33,353

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

Diversion Channel at Southerly International Boundary

DESCRIPTION: Water-stage recorder and control weir on Wasteway located immediately below the Yuma Main Drain Pumping Plant, approximately 52 meters north of the international boundary near San Luis, Arizona/Sonora and approximately two kilometers east of the Colorado River.

RECORDS: Weir flows are checked by current meter discharge measurements. Records obtained and computed by the United States Section of the Commission. Records available from October through December 2004. Records considered poor due to back-water conditions caused by insignificant slope of channel. Alternative measurement methods undergoing review to improve station accuracy.

REMARKS: Operation began October 6, 2004. Channel constructed as a part of a salinity reduction program undertaken by U.S. Bureau of Reclamation and U.S. Section of the Commission. Main purpose is to divert a maximum of 9,868 thousand cubic meters of higher saline drainage water into the Wellton Mohawk Bypass chain during the four (4) critical planting season months of September through December within San Luis, Sonora and left bank irrigation zone.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1											0.32	0.05
2											.57	.48
3											.49	.35
4											.68	.09
5											.65	.40
6										.01	.60	.59
7										.01	.64	.30
8										.15	1.19	0
9										.19	1.67	0
10										.12	.81	.42
11										.58	1.37	1.22
12										.31	1.40	1.26
13										.65	1.12	.70
14										.35	1.63	.29
15										.28	1.09	.02
16										.28	.54	.01
17										.01	.60	0
18										.19	.50	.13
19										.33	.75	.55
20										.55	.96	.78
21										.56	.99	.45
22										.45	1.14	.76
23										.07	.13	0
24										.19	.12	0
25										.18	.11	0
26										.44	.17	0
27										.47	0	0
28										.42	.02	0
29										.49	.03	0
30										.03	.02	0
31										.09		0
Sum										7.40	20.31	8.85

Month	Current Year 2004							Period 2004-2004				
	Extreme Gage Meters		Extreme-Cubic Meters per Second			Average	Total	Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.												
Feb.												
Mar.												
April												
May												
June												
July												
Aug.												
Sept.												
Oct.	.680	0	20	1.40	! 6	0	.24	639				
Nov.	.895	0	8	3.22	! 1	0	.68	1,755				
Dec.	.770	0	12	1.64	! 1	0	.29	765				
Yearly	0.895	0		3.22		0	0.10	3,159				

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.41	0.23	0.10	0	0	0.07	0.05	0.01	0.11	0.16	0.05
2	.02	.34	.32	.11	0	0	.17	.10	.03	.10	.01	.05
3	0	.39	.24	.05	.04	.03	.26	.01	.36	.09	.13	.04
4	0	.14	.36	0	.08	.01	.32	.07	.10	.13	.04	.01
5	0	.01	.26	.02	.30	0	.02	.02	.12	.20	.06	.03
6	0	.01	.16	.07	.03	0	0	.01	.34	.29	.04	.01
7	0	.03	.28	.06	0	.03	0	.08	.12	.45	.01	0
8	.01	.01	.29	.16	.05	.19	.01	.01	.01	.26	.03	0
9	0	.02	.07	.09	.03	0	.19	0	.40	.10	.01	0
10	.02	.01	.01	.12	.09	0	.15	.08	.18	.41	.06	0
11	.17	.01	0	.02	.06	0	.24	.01	.22	.20	.02	0
12	.07	.10	0	.07	.04	0	.10	.01	.03	.01	.03	0
13	0	.01	.03	.20	.07	0	.01	.01	.10	.03	.02	0
14	0	0	.09	.18	.06	0	.13	.01	.26	.15	.04	.04
15	0	0	.09	.19	.03	0	.13	.01	.15	.16	.09	.12
16	.02	.01	.08	.35	.08	.01	.29	0	.21	.02	.17	.09
17	.63	0	.17	.17	.07	.08	.07	0	.20	.01	.11	.06
18	.49	.03	.44	.10	.01	.35	.19	0	.16	.47	.08	.07
19	.36	.02	.51	.21	.02	.07	.21	0	.16	.08	.05	.10
20	.53	.53	.28	.11	.02	.17	.02	0	.09	.01	.03	.09
21	.14	.23	.30	.11	0	.20	.23	.06	.12	.10	.15	.06
22	.38	.21	.21	.07	.08	.21	.31	.01	.10	.06	.04	.04
23	.55	.38	.07	.01	.05	.08	.21	.01	0	.19	.07	.06
24	.37	.17	.05	.07	.08	.12	.07	0	.17	.17	.10	.06
25	.39	.12	.13	.09	.04	.13	.28	.12	.11	.10	.07	.02
26	.36	.15	.10	.04	.01	.29	.62	.03	.05	.06	.09	.02
27	.14	.24	0	.07	0	.26	.25	.27	.10	.08	.05	.02
28	.16	.19	0	0	.11	.21	.13	.20	.10	.04	.06	.01
29	.27	.34	.03	0	.03	.41	.26	.12	.47	.03	.05	0
30	.20		.05	0	0	.17	.10	.02	.16	.07	.05	.01
31	.16		.01	.12	.12		.11	.17		.20		.02
Sum	5.45	4.11	4.86	2.84	1.60	3.02	5.15	1.49	4.63	4.38	1.92	1.08

Current Year 2004

Period 1971-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.715	0	17	0.99	! 2	0	0.18	471	581	1,376	45.0
Feb.	.770	0	20	1.16	! 4	0	.14	355	535	1,117	42.0
Mar.	.725	0	2	1.02	! 10	0	.16	420	576	1,158	68.0
April	.635	.005	16	.63	! 3	0	.09	245	564	1,280	49.0
May	.665	0	5	.79	! 1	0	.05	138	483	1,445	39.0
June	.755	0	29	1.11	! 1	0	.10	261	460	1,067	25.0
July	.695	.005	22	.93	! 5	0	.17	445	481	944	77.0
Aug.	.655	0	25	.73	! 1	0	.05	129	560	1,447	121
Sept.	.675	0	17	.83	! 1	0	.15	400	538	1,128	234
Oct.	.775	0	18	1.18	! 5	0	.14	378	511	1,135	16.0
Nov.	.675	0	3	.84	! 2	0	.06	166	421	845	13.0
Dec.	.645	0	16	.68	! 1	0	.03	93.3	489	1,204	19.0
Yearly	0.775	0		1.18		0	0.11	3,501	6,199	10,047	1,808

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.  
 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.34	0.74	1.44	0.20	1.28	1.67	1.71	0.86	0.63	0
2	0	0	.34	.93	1.43	.20	1.25	1.67	1.71	.86	.63	.22
3	0	0	.14	1.10	1.45	.20	1.21	1.67	1.70	.87	.98	.90
4	0	0	0	1.10	1.46	.20	.94	1.66	1.71	.90	1.32	1.20
5	0	0	0	1.11	1.46	.20	.86	1.66	1.70	.88	1.33	1.20
6	0	0	0	1.11	1.33	.20	1.16	1.67	1.70	.85	1.33	.65
7	0	0	0	1.11	.97	.42	1.57	1.67	1.70	.61	1.33	0
8	0	0	0	1.12	.96	.87	1.43	1.67	1.71	.51	1.33	0
9	0	0	0	1.13	.96	.87	1.57	1.67	1.72	.34	1.33	0
10	0	0	.21	1.12	.87	.87	1.57	1.68	1.71	.31	1.34	.68
11	0	0	.53	1.12	.75	.87	1.56	1.68	1.71	.31	1.33	1.41
12	0	0	.53	.60	.75	.87	1.55	1.68	1.71	.31	1.32	1.41
13	0	0	.53	0	.75	.87	1.52	1.69	1.71	.31	1.34	1.40
14	0	0	.53	0	.75	.46	1.50	1.69	1.71	.31	1.32	1.87
15	0	0	.54	0	.75	.18	1.50	1.70	2.02	.31	1.33	2.49
16	0	0	.54	0	.74	.18	1.48	1.70	2.43	.31	1.36	2.49
17	0	.14	.54	0	.75	.59	1.47	1.70	2.52	.31	1.53	2.50
18	0	.33	.62	0	.80	.98	1.46	1.71	2.50	.31	1.70	2.50
19	0	.15	.73	0	.56	1.06	1.47	1.70	2.51	.31	1.70	2.50
20	0	.36	.73	.60	.39	1.06	.73	1.71	2.36	.31	1.70	2.49
21	0	.35	.73	1.34	.38	1.06	.66	1.71	1.69	.32	1.70	2.49
22	0	.34	.72	1.43	.38	1.06	1.07	1.71	.95	.31	1.24	2.04
23	0	.19	.72	1.43	.38	1.15	1.47	1.71	.04	.31	.91	1.24
24	0	.18	.73	1.42	.38	1.24	1.47	1.70	.86	.31	.47	1.32
25	0	.18	.73	1.42	.33	1.24	1.47	1.71	1.49	.31	0	1.32
26	0	.18	.73	1.43	.20	1.24	1.47	1.55	1.43	.31	0	1.32
27	0	.24	.73	1.43	.20	1.24	1.47	1.39	1.50	.31	0	1.31
28	0	.34	.72	1.44	.20	1.23	1.54	1.39	1.40	.47	0	.80
29	0	.33	.73	1.46	.20	1.23	1.65	1.39	.81	.63	0	.51
30	0		.73	1.45	.20	1.23	1.68	1.40	.73	.63	0	2.34
31	0		.73		.20		1.68	1.54		.63		2.34
Sum	0	3.31	14.85	27.14	22.37	23.27	42.71	50.85	49.15	14.63	30.50	42.94

Current Year 2004

Period 1979-2004

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	0	! 1	0	! 1	0	0	0	718	3,406	0
Feb.	.115	0	18	.40	! 1	0	.11	286	1,098	3,677	0
Mar.	.195	0	29	.80	! 3	0	.48	1,283	1,170	4,717	0
April	.300	0	! 27	1.47	! 12	0	.90	2,345	1,401	4,265	0
May	.300	.070	! 3	1.47	! 25	.20	.72	1,933	1,219	4,269	0
June	.265	.060	! 23	1.25	! 14	.18	.78	2,011	1,210	4,272	0
July	.340	.170	29	1.76	! 20	.65	1.38	3,690	1,538	5,868	0
Aug.	.390	.285	18	2.14	! 27	1.38	1.64	4,393	1,590	4,988	0
Sept.	.445	0	20	2.62	23	0	1.64	4,247	1,295	4,247	0
Oct.	.235	.015	4	1.04	18	.04	.47	1,264	761	3,344	0
Nov.	.330	0	22	1.73	! 24	0	1.02	2,635	400	2,635	0
Dec.	.440	0	17	2.58	! 1	0	1.39	3,710	785	3,710	0
Yearly	0.445	0		2.62		0	0.88	27,797	13,185	38,461	201

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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, Yuma Main Drain and the Diversion Channel. These 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 adding the volumes of the four stations and subtracting the Diversion Channel obtain the monthly volumes.

RECORDS: Records obtained and computed by the United States Section of the Commission. Records available: February 23, 1971 through 2004; 242 Lateral from November 1978 through 2004; Diversion Channel from October 6, 2004 through December 2004

REMARKS: Descriptions and flows of the individual stations, East Main Canal Wasteway, West Main Canal Wasteway, the Yuma Main Drain, 242 Lateral and the Diversion Channel at SIB are published separately on preceding pages of this bulletin.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.79	4.51	3.49	4.76	5.07	4.35	4.40	4.26	4.55	5.66	5.32	4.03
2	4.44	4.08	3.80	4.80	5.28	4.35	4.72	4.30	4.49	5.98	4.67	5.02
3	4.41	4.21	3.30	5.20	5.33	4.26	4.86	5.04	5.06	5.84	5.28	5.40
4	4.58	4.16	3.47	5.14	5.95	4.19	4.97	4.92	4.62	6.12	5.64	5.31
5	4.32	4.72	3.71	4.69	6.26	4.35	4.56	4.76	4.98	5.19	5.47	5.52
6	4.34	3.76	3.85	4.42	6.15	4.45	4.09	5.53	4.95	6.23	5.28	5.63
7	4.69	4.22	3.77	4.51	5.94	4.70	4.37	5.76	4.66	5.89	5.85	4.02
8	4.64	4.18	3.41	4.15	5.51	5.10	4.62	5.87	4.78	5.65	5.54	3.48
9	4.82	4.11	3.22	4.38	5.75	5.08	4.60	5.19	5.02	5.63	3.98	3.62
10	4.65	4.07	3.08	5.03	5.50	5.01	5.21	5.27	4.67	6.02	5.92	3.88
11	5.17	3.52	3.40	5.32	5.08	5.15	5.67	4.64	5.00	6.44	4.63	4.23
12	4.85	3.45	3.64	4.28	4.87	5.32	5.12	4.41	4.82	4.86	4.76	4.26
13	5.08	3.14	3.71	3.13	5.82	5.22	4.46	4.50	4.67	4.99	4.75	4.42
14	3.91	3.16	4.74	3.17	5.66	4.84	4.59	5.84	5.46	6.06	4.10	4.81
15	4.02	3.89	4.71	3.63	5.73	4.19	4.76	5.79	5.68	5.81	4.84	5.17
16	3.92	3.44	4.34	4.10	5.95	4.08	4.69	5.40	5.76	5.57	5.91	5.33
17	4.89	3.85	4.34	3.64	5.75	4.49	4.71	5.05	5.82	5.33	6.14	5.66
18	5.56	4.17	4.93	4.22	5.47	4.86	4.78	4.93	5.84	5.72	5.95	6.38
19	5.27	4.13	4.78	4.26	5.25	3.94	5.02	5.30	6.29	4.93	6.22	6.52
20	4.87	4.67	4.83	4.91	5.04	4.39	3.79	5.36	6.27	5.31	6.27	6.30
21	4.29	4.24	4.61	5.31	5.11	4.26	3.79	5.35	5.85	6.15	6.23	5.92
22	4.83	4.44	4.21	5.19	5.56	4.64	4.30	5.21	4.88	6.04	5.74	4.92
23	4.37	4.71	4.84	5.20	5.19	4.08	4.49	4.80	3.58	5.86	5.13	4.83
24	3.80	3.17	3.85	5.31	4.93	4.43	4.53	4.68	4.96	6.14	4.97	4.64
25	3.94	3.42	4.04	5.54	5.29	4.94	4.88	4.27	6.07	5.71	4.64	4.54
26	3.61	3.68	4.38	5.33	4.70	4.83	4.98	4.06	6.22	5.07	4.24	4.31
27	3.87	3.22	4.49	4.97	5.09	4.71	4.44	4.83	6.34	4.87	3.82	4.06
28	3.55	3.26	4.71	5.09	5.03	4.61	4.34	4.81	5.78	4.55	4.16	4.14
29	3.15	4.23	4.20	5.11	4.58	4.41	4.45	4.92	5.93	4.90	4.03	3.91
30	3.59		3.93	5.30	4.66	4.36	4.25	4.12	5.68	5.27	4.04	5.25
31	4.26		3.96		4.99		4.34	4.43		5.82		5.53
Sum	136.48	113.81	125.74	140.09	166.49	137.59	142.78	153.60	158.68	173.61	153.52	151.04
Current Year 2004												
Period 1935-2004												
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.			18	5.56	29	3.15	4.40	11,792	11,804	14,963	2,619	
Feb.			5	4.72	13	3.14	3.92	9,833	11,565	15,998	2,495	
Mar.			18	4.93	10	3.08	4.06	10,864	13,036	16,904	2,864	
April			25	5.54	13	3.13	4.67	12,104	13,232	16,013	2,611	
May			5	6.26	29	4.58	5.37	14,385	13,461	17,145	3,050	
June			12	5.32	19	3.94	4.59	11,888	12,294	15,505	3,115	
July			11	5.67	20	3.79	4.61	12,336	12,580	15,320	3,610	
Aug.			8	5.87	26	4.06	4.95	13,271	12,695	15,612	3,687	
Sept.			27	6.34	23	3.58	5.29	13,710	12,540	15,357	3,210	
Oct.			11	6.44	28	4.55	5.60	15,000	13,124	17,143	4,248	
Nov.			20	6.27	27	3.82	5.12	13,264	11,190	16,066	4,202	
Dec.			19	6.52	8	3.48	4.87	13,050	11,862	14,863	3,562	
Yearly				6.52		3.08	4.79	151,497	149,383	183,801	39,274	

@ Mean daily ! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 river 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 2004; 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	3.85	0	0	0	0	0	0	0	5.10	0.53
2	0	0	1.78	0	0	0	0	0	0	0	1.44	.42
3	0	0	1.22	0	0	0	0	0	0	0	.72	.45
4	0	0	.88	4.66	0	0	0	0	0	0	.53	.39
5	0	0	.62	78.9	0	0	0	0	0	0	.41	.38
6	0	0	.79	42.8	0	0	0	0	0	0	.39	.71
7	0	0	.95	19.3	0	0	0	0	0	0	.40	1.29
8	0	0	.56	5.58	0	0	0	0	0	0	.41	.98
9	0	0	.44	2.93	0	0	0	0	0	0	.42	11.2
10	0	0	.39	1.83	0	0	0	0	0	0	.41	17.2
11	0	0	.37	1.09	0	0	0	0	0	0	.31	5.86
12	0	0	.30	.79	0	0	0	0	0	0	.23	1.46
13	0	0	.17	.57	0	0	0	0	0	0	.17	.93
14	0	0	.13	.42	0	0	0	0	0	0	.12	.82
15	0	0	.73	.37	0	0	0	0	0	0	.09	.64
16	0	0	.37	.29	0	0	0	0	0	0	.07	.45
17	0	0	.07	.26	0	0	0	0	0	0	.07	.41
18	0	0	.02	.25	0	0	0	0	0	0	.08	.40
19	0	0	.01	.24	0	0	0	0	0	0	.09	.36
20	0	0	2.74	.23	0	0	0	0	0	0	.10	.35
21	0	0	5.03	.19	0	0	0	0	0	0	.11	.31
22	0	.01	3.41	.16	0	0	0	0	0	0	.12	.30
23	0	.01	1.34	.14	0	0	0	0	0	3.90	.13	.28
24	0	.02	.23	.11	0	0	0	0	0	20.8	6.70	.26
25	0	8.94	.04	.10	0	0	0	0	0	28.1	20.1	.25
26	0	37.8	.01	.08	0	0	0	0	0	20.8	12.9	.23
27	0	31.9	0	.04	0	0	0	0	0	24.9	8.47	.22
28	0	14.1	0	0	0	0	0	0	0	41.2	7.25	.20
29	0	8.33	0	0	0	0	0	0	0	13.7	6.92	.20
30	0	0	0	0	0	0	0	0	0	4.85	4.59	.17
31	0	0	0	0	0	0	0	0	0	3.35	0	.17
Sum	0	101.11	26.45	161.33	0	0	0	0	0	161.60	78.85	47.82

Current Year 2004

Period 1935-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	21.570	21.570	! 1	0	! 1	0	0	0	383,808	2,062,379	0
Feb.	23.945	21.570	! 26	46.2	! 1	0	3.49	8,736	315,527	1,708,370	0
Mar.	22.955	21.570	1	5.78	! 27	0	.85	2,285	265,021	1,458,432	0
April	23.965	21.570	5	112	! 1	0	5.38	13,939	172,561	947,722	0
May	21.865	21.865	! 1	0	! 1	0	0	0	230,650	1,430,837	0
June	21.865	21.865	! 1	0	! 1	0	0	0	196,654	1,455,506	0
July	21.865	21.865	! 1	0	! 1	0	0	0	169,334	1,821,962	0
Aug.	21.865	21.865	! 1	0	! 1	0	0	0	182,963	2,103,318	0
Sept.	21.865	21.865	! 1	0	! 1	0	0	0	211,702	1,956,768	0
Oct.	21.865	21.865	! 1	41.2	! 1	0	5.21	13,962	248,250	2,144,909	0
Nov.	23.110	22.040	25	21.4	16	.06	2.63	6,813	286,119	1,761,409	0
Dec.	23.005	22.080	10	20.5	! 30	.16	1.54	4,132	352,467	2,268,370	0
Yearly	23.965	21.570		112		0	1.58	49,867	3,015,056	5,656,495	0

! And other days

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21.570	21.570	22.870	21.570	21.865	21.865	21.865	21.865	21.865	21.865	22.510	22.155
2	21.570	21.570	22.765	21.570	21.865	21.865	21.865	21.865	21.865	21.865	22.320	22.125
3	21.570	21.570	22.715	21.570	21.865	21.865	21.865	21.865	21.865	21.865	22.255	22.130
4	21.570	21.570	22.675	22.165	21.865	21.865	21.865	21.865	21.865	21.865	22.220	22.105
5	21.570	21.570	22.635	23.735	21.865	21.865	21.865	21.865	21.865	21.865	22.185	22.095
6	21.570	21.570	22.625	23.480	21.865	21.865	21.865	21.865	21.865	21.865	22.165	22.150
7	21.570	21.570	22.610	23.095	21.865	21.865	21.865	21.865	21.865	21.865	22.155	22.240
8	21.570	21.570	22.560	22.595	21.865	21.865	21.865	21.865	21.865	21.865	22.150	22.195
9	21.570	21.570	22.490	22.415	21.865	21.865	21.865	21.865	21.865	21.865	22.145	22.685
10	21.570	21.570	22.400	22.330	21.865	21.865	21.865	21.865	21.865	21.865	22.135	22.895
11	21.570	21.570	22.335	22.275	21.865	21.865	21.865	21.865	21.865	21.865	22.120	22.490
12	21.570	21.570	22.250	22.245	21.865	21.865	21.865	21.865	21.865	21.865	22.105	22.265
13	21.570	21.570	22.095	22.215	21.865	21.865	21.865	21.865	21.865	21.865	22.090	22.210
14	21.570	21.570	22.030	22.185	21.865	21.865	21.865	21.865	21.865	21.865	22.075	22.195
15	21.570	21.570	22.255	22.165	21.865	21.865	21.865	21.865	21.865	21.865	22.055	22.165
16	21.570	21.570	22.155	22.120	21.865	21.865	21.865	21.865	21.865	21.865	22.045	22.140
17	21.570	21.570	21.880	22.095	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.145
18	21.570	21.570	21.695	22.090	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.150
19	21.570	21.570	21.625	22.080	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.145
20	21.570	21.570	22.325	22.070	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.150
21	21.570	21.570	22.565	22.040	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.135
22	21.570	21.650	22.450	22.010	21.865	21.865	21.865	21.865	21.865	21.865	22.040	22.145
23	21.570	21.805	22.295	21.980	21.865	21.865	21.865	21.865	21.865	22.250	22.040	22.145
24	21.570	21.985	22.075	21.950	21.865	21.865	21.865	21.865	21.865	23.080	22.455	22.145
25	21.570	22.910	21.780	21.920	21.865	21.865	21.865	21.865	21.865	23.260	23.070	22.145
26	21.570	23.860	21.635	21.895	21.865	21.865	21.865	21.865	21.865	23.070	22.830	22.145
27	21.570	23.755	21.600	21.865	21.865	21.865	21.865	21.865	21.865	23.120	22.670	22.150
28	21.570	23.290	21.575	21.865	21.865	21.865	21.865	21.865	21.865	23.410	22.620	22.150
29	21.570	23.060	21.570	21.865	21.865	21.865	21.865	21.865	21.865	22.840	22.610	22.155
30	21.570		21.570	21.865	21.865	21.865	21.865	21.865	21.865	22.500	22.490	22.135
31	21.570		21.570		21.865	21.865	21.865	21.865	21.865	22.430		22.150
Avg.	21.570	21.905	22.185	22.175	21.865	21.865	21.865	21.865	21.865	22.160	22.260	22.205

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.69	4.47	4.11	3.72	3.73	3.74	4.33	2.95	3.68	3.69	3.40	4.10
2	3.44	4.11	4.18	3.77	3.84	3.79	3.61	2.97	3.58	3.53	3.55	4.24
3	3.54	4.23	4.47	3.62	3.81	4.02	2.84	2.77	3.67	3.51	4.19	4.20
4	3.86	4.24	4.71	3.67	3.68	4.29	3.01	3.20	3.52	3.49	3.74	4.51
5	3.93	4.29	4.10	3.57	3.93	4.38	3.03	3.25	3.61	3.34	3.95	4.66
6	3.95	4.19	4.41	3.73	3.69	4.30	3.05	3.56	3.90	3.43	3.91	4.56
7	4.04	4.17	4.34	3.53	3.91	4.57	3.15	3.75	3.75	3.60	3.92	4.49
8	3.88	4.02	4.03	3.47	3.90	4.86	3.14	3.59	3.78	3.62	4.25	4.42
9	3.78	4.17	3.98	3.63	3.86	4.20	3.06	3.53	3.79	3.61	4.08	4.36
10	4.19	4.51	4.35	3.63	3.79	3.84	3.31	3.50	3.58	3.76	4.12	4.24
11	3.97	4.26	4.22	3.57	3.75	4.13	3.30	3.61	3.84	3.50	3.94	4.27
12	3.46	4.58	4.25	3.76	3.66	3.93	2.91	3.45	3.90	3.77	3.99	4.26
13	3.77	4.20	3.95	3.71	3.70	4.10	2.72	3.59	4.05	3.87	3.86	4.21
14	3.98	4.06	3.90	3.92	3.85	4.15	2.62	3.43	4.46	4.00	3.84	4.23
15	3.67	4.24	3.92	3.43	3.67	4.17	2.84	3.50	4.05	4.31	4.11	4.22
16	3.68	3.98	3.99	3.50	3.93	4.42	2.53	3.54	3.95	4.03	4.04	4.40
17	4.03	4.26	3.93	3.56	3.82	4.26	2.70	3.79	4.07	4.11	4.32	4.16
18	4.06	4.54	4.07	3.53	3.85	4.03	2.65	3.66	3.91	3.84	4.16	4.13
19	3.94	4.46	4.13	3.51	3.76	4.08	3.73	3.39	4.00	3.71	4.36	4.18
20	3.92	4.31	4.46	3.43	3.60	4.10	2.64	3.42	4.21	4.08	4.32	4.26
21	4.27	4.18	3.83	3.37	3.57	4.56	2.80	3.56	4.16	4.06	4.44	4.31
22	4.08	4.33	3.92	3.40	3.56	4.71	2.78	3.47	3.91	4.07	4.20	4.10
23	4.11	4.16	4.17	3.58	3.69	4.61	2.61	3.66	4.26	3.62	4.25	4.37
24	4.16	4.34	4.34	3.88	4.02	4.40	2.65	3.42	4.42	3.64	3.99	4.47
25	4.38	4.01	4.10	3.76	3.76	4.27	2.68	3.51	3.91	4.20	3.91	4.54
26	3.89	4.51	3.85	3.58	3.82	4.43	2.58	3.44	3.95	3.74	4.08	3.92
27	3.98	4.41	4.01	3.69	3.74	4.11	2.63	3.23	3.68	3.88	3.86	4.00
28	4.21	4.43	3.86	3.66	3.75	4.44	2.69	3.16	3.98	3.77	3.90	4.38
29	4.28	4.38	3.82	3.66	3.88	4.22	2.53	3.24	3.60	3.97	4.01	4.50
30	4.28		3.70	3.68	3.82	4.15	2.50	3.48	3.90	3.44	4.03	4.60
31	4.14		3.80		3.94		2.63	3.34		3.39		4.25
Sum	122.56	124.04	126.90	108.52	117.28	127.26	90.25	105.96	117.07	116.58	120.72	133.54

Current Year 2004

Period 1977-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.470	0.390	25	4.59	2	3.35	3.95	10,589	13,886	21,638	7,412
Feb.	.500	.375	27	4.99	6	3.23	4.28	10,717	13,130	18,374	8,506
Mar.	.510	.405	4	5.14	30	3.42	4.09	10,964	13,999	21,496	2,593
April	.470	.395	14	4.30	21	3.25	3.62	9,376	13,003	20,613	3,445
May	.470	.400	5	4.39	1	3.42	3.78	10,133	13,201	20,732	5,215
June	.615	.405	8	6.97	1	3.64	4.24	10,995	12,293	19,842	2,227
July	.785	.290	19	10.1	16	2.06	2.91	7,798	12,404	22,235	2,728
Aug.	.455	.350	7	4.11	1	2.66	3.42	9,155	12,416	22,444	3,656
Sept.	.485	.385	14	4.77	1	3.28	3.90	10,115	11,924	23,538	51.0
Oct.	.470	.375	15	4.53	5	3.15	3.76	10,073	12,881	23,600	24.0
Nov.	.485	.380	21	4.70	1	3.29	4.02	10,430	11,916	20,944	59.0
Dec.	.495	.415	5	4.81	26	3.79	4.31	11,538	12,982	22,518	138
Yearly	0.785	0.290		10.1		2.06	3.85	121,883	154,035	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 2004.

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 2004	PERIOD 1964 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	1,328	10,768	85,761	0
February	9,761	6,374	50,898	0
March	3,250	8,740	72,049	0
April	3,893	12,664	85,372	0
May	1,901	12,343	99,576	0
June	948	10,207	61,705	0
July	16	10,507	56,912	0
August	511	15,179	132,183	0
September	2,365	14,262	83,943	0
October	9,600	13,125	136,198	0
November	3,236	12,114	122,170	0
December	3,817	10,685	86,607	0
Yearly	40,625	135,641	628,347	0

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.

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 2004	PERIOD 1964 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	1,225	1,653	10,541	0
February	0	1,409	12,035	0
March	0	839	5,932	0
April	0	462	5,555	0
May	0	1,434	14,246	0
June	0	736	8,585	0
July	0	591	9,114	0
August	0	1,017	17,765	0
September	0	2,075	16,855	0
October	1,833	4,279	28,669	0
November	747	2,579	25,263	0
December	0	2,082	13,380	0
Yearly	3,805	18,767	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)	
	2004	Average 1935-2004	2004	Average 1951-2004	2004	Average 1939-2004	2004	Estimated Average
Jan.	19,037.5	23,380.1	2,001.9	2,053.0	631.8	681.9	21,671.2	26,115.0
Feb.	19,000.5	23,248.9	2,119.1	2,066.2	688.7	686.8	21,808.3	26,001.9
Mar.	18,816.7	22,977.5	2,069.8	2,071.4	662.5	700.2	21,549.0	25,749.1
April	18,336.9	22,948.0	2,066.1	2,061.2	689.5	735.9	21,092.5	25,745.1
May	17,668.4	23,553.3	2,136.4	2,126.5	720.6	743.8	20,525.4	26,423.6
June	17,320.5	24,515.9	2,094.4	2,030.9	721.1	738.7	20,136.0	27,285.5
July	17,175.0	24,634.5	2,103.1	1,909.0	736.6	725.8	20,014.7	27,269.3
Aug.	17,290.9	24,454.5	2,101.8	1,866.0	713.6	712.0	20,106.3	27,032.5
Sept.	17,191.0	24,257.9	1,974.8	1,815.9	729.1	703.7	19,894.9	26,777.5
Oct.	17,384.7	24,063.9	1,846.5	1,794.0	750.7	700.3	19,981.9	26,557.3
Nov.	17,721.4	23,919.9	1,851.4	1,865.8	713.1	688.5	20,285.9	26,474.2
Dec.	17,706.6	23,761.4	2,010.6	1,979.1	694.0	687.3	20,411.2	26,427.8
Avg.	17,887.5	23,809.6	2,031.3	1,969.9	704.3	708.7	20,623.1	26,488.2
Max.	19,037.5	! 34,266.1	2,136.4	! 2,230.1	750.7	! 849.5	21,808.3	! 35,934.1
Min.	17,175.0	* 13,231.5	1,846.5	!! 1,462.9	631.8	!! 94.9	19,894.9	!! 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 - 2004

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

2004		Stream-flow, Momentary	Gravimetric Percent	2004		Stream-flow, Momentary	Gravimetric Percent	2004		Stream-flow, Momentary	Gravimetric Percent
Date	Time Std.	CMS		Date	Time Std.	CMS		Date	Time Std.	CMS	
Jan. 8	1025	49.8	0.0030	May 6	0835	50.8	0.0031	Sept. 2	0750	39.2	0.0038
15	0910	54.0	0.0067	13	0815	42.5	0.0049	9	0750	39.3	0.0009
22	1030	61.8	0.0074	20	0815	39.7	0.0040	16	0750	35.6	0.0046
29	0935	70.9	0.0032	27	0820	47.7	0.0048	23	0810	50.3	0.0020
Feb. 5	0950	69.0	0.0083	June 3	0710	44.7	0.0041	30	0920	43.1	0.0035
12	0840	65.5	0.0034	10	0750	43.9	0.0036	Oct. 7	0805	28.5	0.0034
19	0930	76.9	0.0018	17	0810	56.4	0.0040	14	0845	36.5	0.0034
26	0850	153	0.0027	24	0820	45.1	0.0035	21	1035	31.9	0.0039
Mar. 4	0855	96.8	0.0090	30	0635	47.1	0.0034	28	0900	62.6	0.0021
12	0720	79.7	0.0035	July 8	0745	52.8	0.0052	Nov. 4	0835	39.0	0.0031
18	0835	107	0.0047	15	0825	48.9	0.0023	10	0825	35.5	0.0033
24	1100	92.4	0.0025	21	0725	57.3	0.0044	18	0825	41.2	0.0047
Apr. 1	0840	94.4	0.0115	29	0845	49.5	0.0043	24	0830	90.1	0.0038
8	1005	98.7	0.0041	Aug. 5	0810	44.1	0.0057	Dec. 2	0905	52.0	0.0037
15	0900	89.6	0.0031	12	0755	41.0	0.0038	16	0810	49.0	0.0036
22	0810	84.1	0.0037	19	0755	53.7	0.0047	22	0800	45.6	0.0038
29	0655	73.5	0.0041	26	0750	37.7	0.0037	29	0720	47.7	0.0034

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

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

2004	Monthly Weight Megagrams		Number of Samples	Gravimetric Percentages			* Silt Volume - Thousand Cubic Meters			
	Water	Silt		Average	Maximum Sample	Minimum Sample	Total 2004	Period 1952 - 2004		
Month								Average	Maximum	Minimum
Jan.	145,705	563	4	0.0004	0.0005	0.0003	0.41	10.8	62.6	0.30
Feb.	190,287	906	4	0.0005	0.0007	0.0003	0.67	12.3	128	0.67
Mar.	236,028	1,344	5	0.0006	0.0010	0.0003	0.99	48.4	605	0.99
April	237,246	704	4	0.0003	0.0004	0.0002	0.52	52.4	857	0.52
May	123,172	486	4	0.0004	0.0005	0.0003	0.36	18.7	318	0.36
June	122,921	519	5	0.0004	0.0006	0.0003	0.38	29.1	257	0.36
July	135,475	784	4	0.0006	0.0007	0.0005	0.58	36.1	190	0.53
Aug.	107,369	424	4	0.0004	0.0005	0.0002	0.31	33.1	167	0.31
Sept.	102,306	441	5	0.0004	0.0005	0.0003	0.32	15.2	72.8	0.29
Oct.	100,984	459	4	0.0005	0.0006	0.0003	0.34	8.38	124	0.22
Nov.	112,484	597	4	0.0005	0.0008	0.0003	0.44	8.42	165	0.30
Dec.	140,435	823	5	0.0006	0.0008	0.0004	0.60	8.42	54.4	0.38
Year	1,754,412	8,050	52	0.0005	0.0010	0.0002	5.92	281.4	2,706.5	5.92

\* Volume calculated at 1.362 megagrams per cubic meter

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

2004	Time	Streamflow, Momentary	Gravimetric Percent
Date	Std.	CMS	
Feb. 26	1240	30.9	0.0030
Dec. 9	1200	11.8	0.0334

CHEMICAL ANALYSES OF WATER SAMPLES  
2004

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

2004	Time	Streamflow	Specific	pH	Hardness,	Hardness,	Calcium	Magnesium
Date	Standard	Momentary	Conductance	Units	Total	Noncarbonate	ion (Ca),	ion (Mg),
		CMS	MicroSiemens/ cm		(as CaCO3)	(CaCO3)	Dissolved	Dissolved
					mg/L	mg/L	mg/L	mg/L
Jan. 5	0750	45.0	1,490	8.1	384.23	200	95.8	35.3
20	0900	56.4	1,430	8.3	377.70	197	94.5	34.5
Feb. 2	0845	60.9	1,440	8.4	390.06	219	96.0	36.6
17	0815	69.3	1,380	8.2	336.48	168	80.8	32.8
Mar. 1	0815	78.9	1,490	8.2	366.19	185	87.6	35.9
15	0815	88.3	1,280	8.2	334.04	178	81.3	31.9
Apr. 5	0715	186	1,160	8.0	328.62	182	81.1	30.7
19	0745	96.3	1,270	8.1	339.54	183	83.5	31.9
May 3	1200	54.7	1,410	8.1	342.34	172	83.8	32.4
17	0750	45.1	1,530	8.1	394.89	215	99.9	35.4
June 7	0725	44.7	1,460	8.2	374.00	201	92.2	35.0
21	0715	45.4	1,450	8.3	353.09	180	84.0	34.9
July 6	0945	49.9	1,380	8.2	358.97	193	87.5	34.2
19	1000	47.9	1,470	8.2	377.34	203	93.7	34.9
Aug. 2	0815	44.7	1,480	8.2	365.11	189	89.3	34.6
16	0715	39.5	1,450	8.2	365.01	198	90.9	33.6
Sept. 7	0710	39.4	1,490	8.1	368.56	193	91.5	34.1
20	0735	38.0	1,620	8.3	407.93	222	102	37.3
Oct. 4	0810	26.9	1,580	8.2	398.63	215	99.1	36.8
19	0645	32.2	1,710	8.1	432.81	238	109	39.1
Nov. 1	0725	38.8	1,670	8.3	408.71	213	101	38.1
15	0810	40.5	1,660	8.4	393.29	201	92.7	39.4
Dec. 6	0835	57.4	1,440	8.4	371.01	193	93.3	33.6
20	0810	44.6	1,700	8.3	412.81	213	101	39.1

2004	Sodium	Potassium	Sulfate	Chloride	Carbonate	Bicarbonate	Nitrate	Total
Date	ion (Na),	ion (K)	ion (SO4)	ion (Cl),	(as CO3)	(as HCO3)	(as NO3)	Solids
	Dissolved	Dissolved	Dissolved	Dissolved				Dissolved
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	(Calculated)
								mg/L
Jan. 5	167	6.0	322	166	N.D.	224	0.44	918
20	160	6.9	311	159	1.79	217	0.48	887
Feb. 2	169	5.5	315	157	7.18	194	0.54	887
17	150	5.4	298	148	N.D.	205	0.67	828
Mar. 1	166	5.4	324	161	N.D.	221	0.51	901
15	135	5.3	285	133	N.D.	190	0.55	776
Apr. 5	118	5.1	260	104	N.D.	179	0.41	697
19	131	5.1	294	127	N.D.	192	0.53	778
May 3	149	4.9	310	152	N.D.	207	0.52	846
17	171	5.7	322	169	N.D.	220	0.56	925
June 7	167	5.6	326	167	N.D.	211	0.64	910
21	160	5.6	325	160	N.D.	211	0.48	887
July 6	149	6.4	309	149	N.D.	203	0.42	847
19	170	6.6	329	167	N.D.	212	0.46	920
Aug. 2	166	5.2	322	154	N.D.	215	0.39	890
16	166	5.8	317	161	N.D.	204	0.69	889
Sept. 7	163	5.1	329	162	N.D.	215	0.47	905
20	196	5.6	334	180	N.D.	227	0.62	983
Oct. 4	185	5.5	338	182	N.D.	224	0.61	972
19	215	5.8	365	208	N.D.	238	0.78	1,076
Nov. 1	190	5.5	350	188	N.D.	239	0.64	1,005
15	202	5.6	343	185	5.44	223	0.66	993
Dec. 6	162	5.6	296	161	3.28	210	0.60	869
20	204	5.7	348	193	N.D.	244	0.56	1,026

N.D. - Not Detected

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 - 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,480 *	1,430 *	1,490	1,290	1,370 *	1,470	1,380	1,470 *	1,450	1,560	1,670	1,570
2	1,480	1,440	1,470	1,260	1,390 *	1,470	1,380	1,480	1,440	1,570 *	1,700	1,490
3	1,490 *	1,360	1,430	1,220 *	1,410	1,420	1,380 *	1,480	1,420	1,570 *	1,720	1,510
4	1,490 *	1,380	1,310	1,180 *	1,390	1,420	1,380 *	1,430	1,440 *	1,580	1,720	1,490*
5	1,490	1,360	1,280	1,160	1,390	1,430 *	1,380 *	1,460	1,460 *	1,550	1,690	1,460*
6	1,350	1,360	1,320 *	1,190	1,430	1,450 *	1,380	1,430	1,470 *	1,590	1,700 *	1,440
7	1,390	1,370 *	1,350 *	1,250	1,400	1,460	1,390	1,440 *	1,490	1,580	1,710 *	1,430
8	1,370	1,370 *	1,390	1,280	1,420 *	1,430	1,410	1,450 *	1,460	1,620	1,720	1,300
9	1,430	1,380	1,340	1,280	1,430 *	1,410	1,370	1,460	1,470	1,630 *	1,700	1,240
10	1,440 *	1,310	1,350	1,280 *	1,450	1,460	1,400 *	1,400	1,450	1,640 *	1,690	1,290
11	1,460 *	1,320	1,330	1,280 *	1,440	1,450 *	1,430 *	1,470	1,440 *	1,660 *	1,670 *	1,380*
12	1,470	1,360	1,320	1,280	1,440	1,440 *	1,460	1,460	1,430 *	1,670	1,650	1,480*
13	1,510	1,370	1,310 *	1,260	1,480	1,430 *	1,420	1,430	1,420	1,660	1,650 *	1,570
14	1,520	1,370 *	1,290 *	1,270	1,480	1,420	1,400	1,440 *	1,510	1,630	1,660 *	1,620
15	1,460	1,380 *	1,280	1,260	1,500 *	1,440	1,400	1,440 *	1,510	1,730	1,660	1,630
16	1,430	1,380 *	1,250	1,300	1,510 *	1,450	1,390	1,450	1,490	1,660 *	1,620	1,690
17	1,430 *	1,380	1,260	1,290 *	1,530	1,370	1,420 *	1,410	1,560	1,600 *	1,680	1,690
18	1,440 *	1,370	1,240	1,270 *	1,330	1,380	1,440 *	1,370	1,580 *	1,530	1,620	1,690*
19	1,440 *	1,350	1,200	1,270	1,450	1,400 *	1,470	1,280	1,600 *	1,710	1,610	1,700*
20	1,430	1,340	1,230 *	1,290	1,450	1,430 *	1,400	1,390	1,620	1,770	1,590 *	1,700
21	1,430	1,340 *	1,260 *	1,290	1,490	1,450	1,370	1,430 *	1,600	1,610	1,570 *	1,680
22	1,370	1,330 *	1,290	1,340	1,490 *	1,420	1,420	1,460 *	1,460	1,400	1,550	1,600
23	1,370	1,330	1,270	1,310	1,480 *	1,410	1,390	1,500	1,310	1,370 *	1,400	1,580
24	1,400 *	1,320	1,240	1,320 *	1,480	1,400	1,400 *	1,430	1,390	1,340 *	1,310	1,590*
25	1,430 *	1,180	1,280	1,320 *	1,480	1,370	1,420 *	1,490	1,450 *	1,310	1,330 *	1,590*
26	1,460	1,190	1,270	1,330	1,500	1,390 *	1,430	1,500	1,500 *	1,340	1,340	1,590*
27	1,470	1,290	1,270 *	1,320	1,420	1,400 *	1,410	1,460	1,560	1,340	1,420 *	1,600
28	1,440	1,350 *	1,270 *	1,330	1,470	1,420	1,410	1,460 *	1,560	1,400	1,500 *	1,700
29	1,360	1,410 *	1,270	1,290	1,470 *	1,390	1,420	1,470 *	1,540	1,620	1,580	1,560
30	1,400		1,240	1,350	1,470 *	1,390	1,450	1,470	1,520	1,630 *	1,680	1,540
31	1,410 *		1,270		1,470 *		1,460 *	1,460		1,650 *		1,550*

\* Estimated

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

SPECIFIC CONDUCTANCE OF WATER SAMPLES

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,490	1,570	1,480	1,310	1,350	1,500	1,420	1,390	1,470	1,560	1,650	1,630
2	1,500	1,560	1,490	1,270	1,390	1,500	1,400	1,470	1,460	1,670	1,700	1,520
3	1,530	1,490	1,440	1,280	1,410	1,440	1,350	1,500	1,445	1,630	1,730	1,540
4	#	1,520	1,330	1,230	1,400	1,440	1,400	1,450	1,440	1,570	1,740	1,560
5	1,520	1,490	1,300	1,160	1,410	1,450	1,370	1,470	1,410	1,570	1,710	1,540
6	1,370	1,500	1,400	1,200	1,440	1,490	1,370	1,460	1,440	1,600	1,780	1,440
7	1,410	1,500	1,400	1,260	1,420	1,470	1,420	1,460	1,480	1,590	1,740	1,460
8	1,390	1,550	1,400	1,290	1,470	1,450	1,430	1,440	1,480	1,625	1,740	1,320
9	1,450	1,500	1,360	1,290	1,470	1,440	1,400	1,480	1,490	1,640	1,710	1,270
10	1,480	1,420	1,390	1,350	1,450	1,480	1,420	1,420	1,475	1,680	1,710	1,320
11	1,520	1,440	1,340	#	1,450	1,450	1,430	1,495	1,510	1,680	1,710	1,430
12	1,480	1,370	1,340	1,290	1,460	1,390	1,470	1,490	1,460	1,690	1,660	1,550
13	1,510	1,395	1,320	1,270	1,500	1,335	1,430	1,390	1,430	1,670	1,640	1,600
14	1,550	1,400	1,325	1,280	1,510	1,440	1,420	1,480	1,530	1,655	1,640	1,650
15	1,480	1,460	1,280	1,280	1,520	1,450	1,420	1,460	1,520	1,735	1,650	1,670
16	1,450	1,410	1,260	1,320	1,500	1,470	1,410	1,430	1,520	1,730	1,650	1,740
17	1,460	1,370	1,270	1,270	1,520	1,380	1,410	1,430	1,570	1,710	1,720	1,740
18	1,480	1,380	1,270	1,280	1,355	1,400	1,445	1,390	1,600	1,550	1,660	#
19	1,480	1,360	1,220	1,270	1,420	1,430	1,470	1,270	1,610	1,710	1,640	#
20	1,460	1,350	1,260	1,300	1,470	1,430	1,420	1,410	1,610	1,795	1,600	1,700
21	1,440	1,390	1,340	1,300	1,520	1,420	1,400	1,480	1,610	1,635	1,590	1,720
22	1,470	1,360	1,300	1,360	1,510	1,440	1,450	1,380	1,480	1,410	1,560	1,630
23	1,480	1,350	1,280	1,320	1,510	1,420	#	1,500	1,320	1,330	1,410	1,600
24	1,530	1,340	1,270	1,340	1,500	1,420	#	1,430	1,410	1,300	1,320	1,600
25	1,560	1,190	1,300	1,350	1,500	1,390	#	1,500	1,505	1,330	1,350	1,590
26	1,585	1,210	1,290	1,340	1,530	1,400	1,440	1,500	1,570	1,350	1,360	1,590
27	1,605	1,310	1,290	1,330	1,430	1,400	1,430	1,470	1,580	1,350	1,550	1,620
28	1,570	1,350	1,320	#	1,460	1,450	1,420	1,450	1,580	1,420	1,670	1,730
29	1,490	1,470	1,290	1,300	1,420	1,400	1,430	1,500	1,560	1,650	1,610	1,590
30	1,530		1,260	1,360	1,450	1,400	1,460	1,490	1,530	1,550	1,710	1,580
31	1,540		1,290		1,440		1,470	1,480		1,560		1,685

# - No Sample

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 2004

January	March	May	July	September	November
	2 1,450				2 1,560
	16 1,440				16 1,720
February	April	June	August	October	December
26 1,190	20 1,650				1 1,610
					9 1,350
					15 1,620

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	
	2004	Average 1931-2004	2004	Average 1931-2004	2004	Average 1931-2004	2004	Average 1998-2004	2004	Average 1978-2004
Jan.	0	10	2	10	2	12	3	3	T	26
Feb.	33	10	34	10	16	12	7	17	20	29
Mar.	11	7	4	6	#	10	6	8	0	24
April	14	2	11	2	6	3	1	5	0	4
May	0	1	0	0	0	1	0	0	0	2
June	0	0	0	0	0	1	0	0	0	0
July	3	1	0	2	T	5	0	2	0	8
Aug.	0	9	9	8	17	18	0	4	34	19
Sept.	0	8	1	7	11	10	0	0	0	9
Oct.	31	6	21	7	#	6	0	6	92	12
Nov.	13	4	17	5	16	7	4	4	25	11
Dec.	29	11	13	11	13	13	23	3	18	14
Yearly	134	69	112	68	#	98	44	52	189	158

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		El Centinela, Baja California		Delta, Baja California	
	2004	Average 1948-2004	2004	Average 1926-2004	2004	Average 1948-2004	2004	Average 1975-2004	2004	Average 1948-2004
Jan.	3	9	5	9	#	10	#	5	8	7
Feb.	5	5	23	9	#	7	#	7	21	7
Mar.	4	4	2	6	#	6	#	3	4	5
April	16	2	12	2	#	2	#	2	9	1
May	0	T	0	T	#	T	#	0	0	T
June	0	T	0	T	#	1	#	T	0	T
July	T	3	4	3	#	2	#	1	0	2
Aug.	0	8	0	9	#	5	#	4	0	6
Sept.	0	4	0	9	#	5	#	7	0	6
Oct.	30	6	21	8	#	6	#	5	30	7
Nov.	2	4	14	4	#	3	#	1	5	3
Dec.	21	9	9	16	#	7	#	7	4	10
Yearly	81	55	90	79	#	56	#	42	81	51

Month	San Felipe, Baja California		Riito, Sonora							
	2004	Average 1948-2004	2004	Average 1949-2004						
Jan.	3	6	22	6						
Feb.	24	5	15	6						
Mar.	0	3	0	4						
April	1	1	12	1						
May	0	1	0	T						
June	0	1	0	T						
July	0	3	0	2						
Aug.	0	9	0	5						
Sept.	0	18	0	8						
Oct.	9	8	26	8						
Nov.	T	5	9	4						
Dec.	8	9	5	9						
Yearly	45	73	89	58						

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 2004.

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 Quartermaster Depot, Arizona	32` 44'	114` 37'	48.77	1998	Yuma Crossing State Park

IN MEXICO

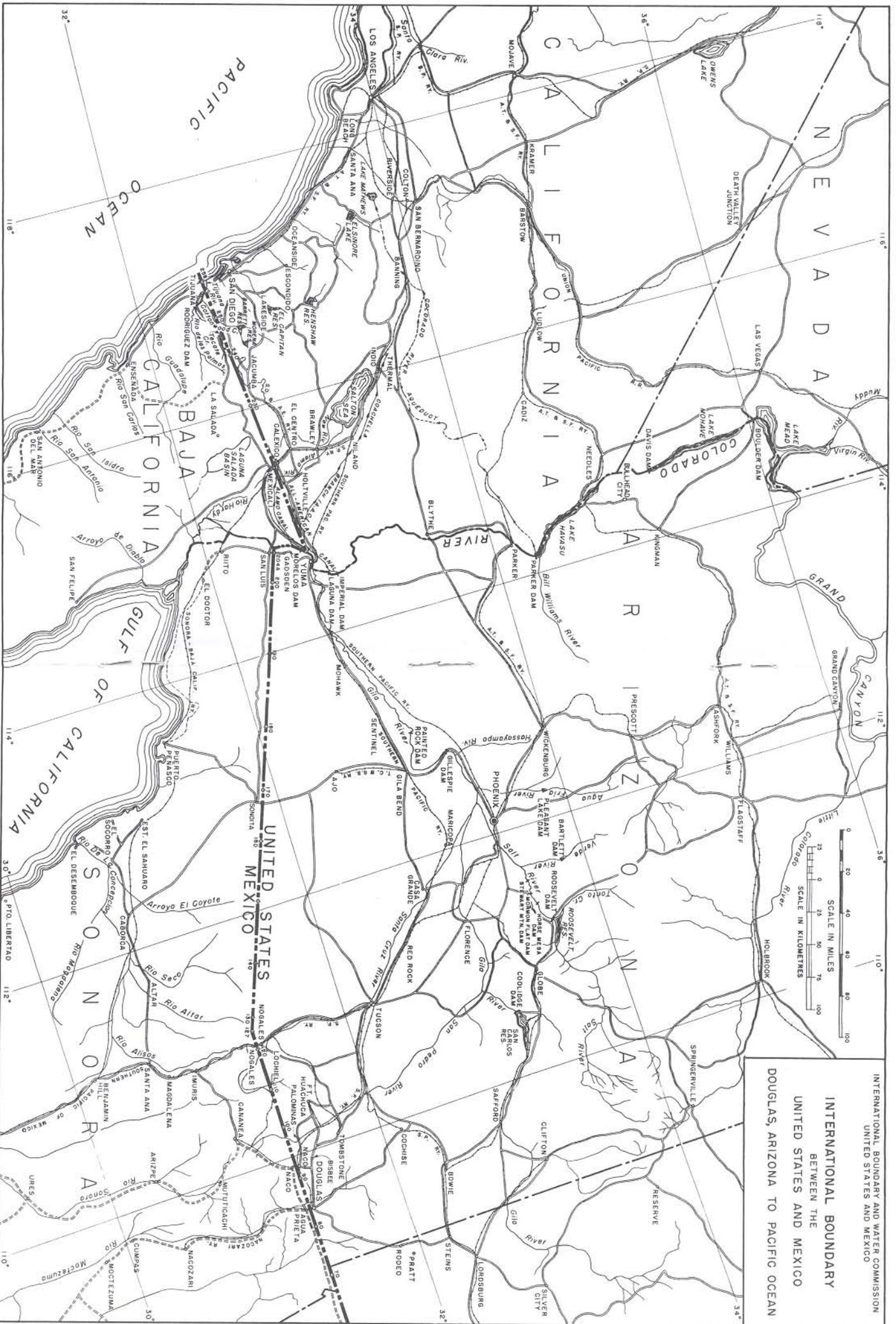
NAME OF STATION	LATITUDE	LONGITUDE	@ ELEV. (Meters)	RECORD BEGAN	OBSERVER
Bataques, Baja California	32` 34'	115` 00'	**20.12	1948	# S. A. R. H.
Delta, Baja California	32` 21'	115` 11'	**11.89	1948	S. A. R. H.
El Centinela, Baja California	32` 35'	115` 45'	49.99	1978	S. A. R. H.
Los Algodones, Baja California	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

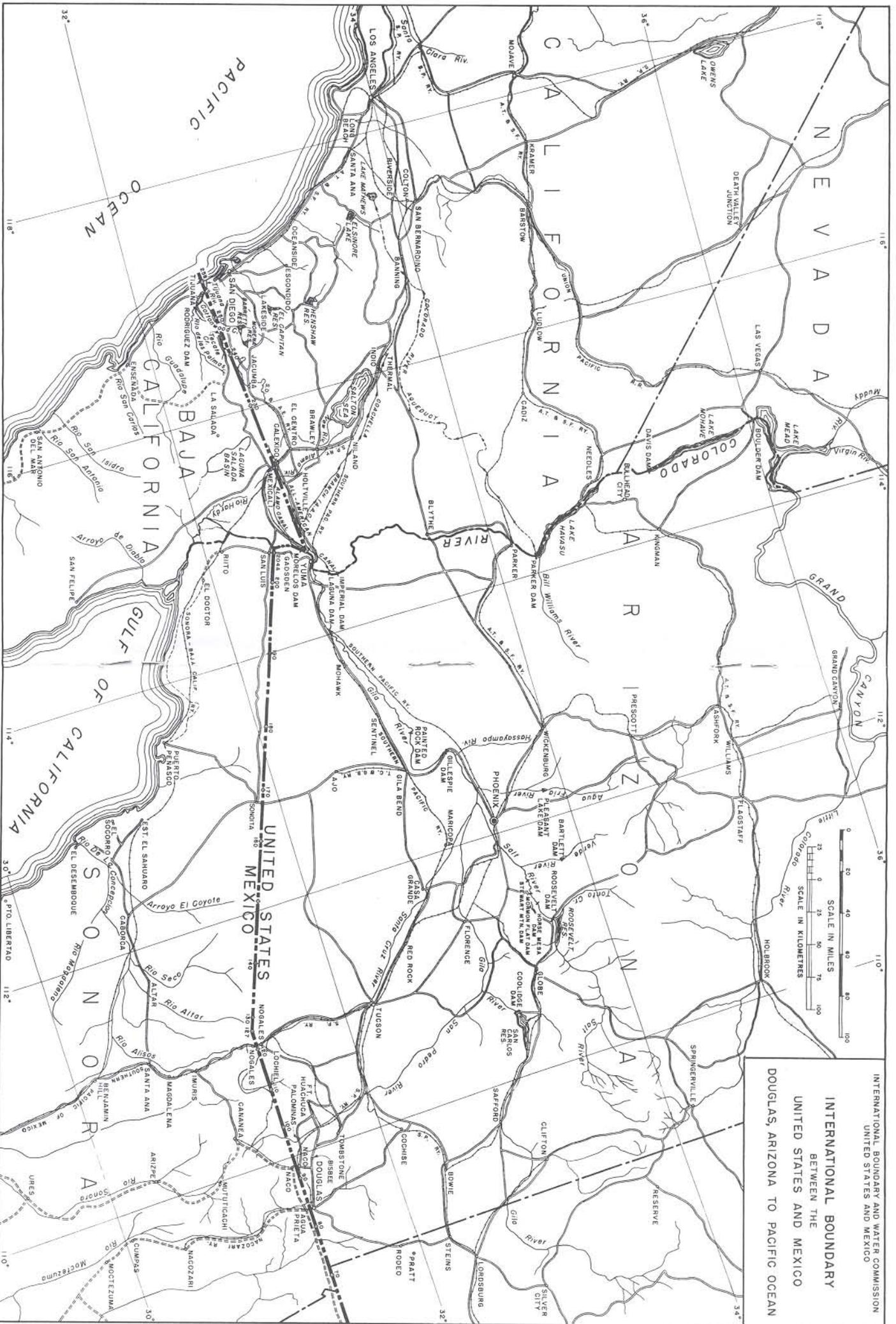
# Ministry of Agriculture and Hydraulic Resources



INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO

**INTERNATIONAL BOUNDARY  
BETWEEN THE  
UNITED STATES AND MEXICO**

**DOUGLAS, ARIZONA TO PACIFIC OCEAN**



INTERNATIONAL BOUNDARY AND WATER COMMISSION  
INTERNATIONAL BOUNDARY AND WATER COMMISSION  
BETWEEN THE  
UNITED STATES AND MEXICO  
DOUGLAS, ARIZONA TO PACIFIC OCEAN

EVAPORATION IN THE COLORADO RIVER BASIN  
IN MILLIMETERS

Tabulated below are records of evaporation observed at at five stations in Baja, California, and at one station in Sonora. 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 MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		Riito, Sonora		San Felipe, Baja California	
	2004	Average 1948-2004	2004	Average 1926-2004	2004	Average 1948-2004	2004	Average 1949-2004	2004	Average 1948-2004
Jan.	98	105	53	63	#	82	#	76	102	119
Feb.	116	126	111	127	#	98	#	98	120	138
Mar.	198	181	217	146	#	142	#	146	195	171
April	183	246	286	195	#	193	#	187	228	199
May	292	308	389	266	#	253	#	256	274	244
June	308	332	406	291	#	287	#	286	276	259
July	315	342	413	297	#	286	#	315	280	259
Aug.	299	305	375	256	#	240	#	266	285	264
Sept.	251	255	292	203	#	198	#	215	239	230
Oct.	115	198	173	145	#	138	#	153	159	197
Nov.	111	131	110	85	#	105	#	95	126	146
Dec.	87	105	81	60	#	76	#	77	109	119
Yearly	2,373	2,636	2,906	2,080		2,489		2,246	2,393	2,412

Month	Del ta, Baja California								
	2004	Average 1948-2004							
Jan.	75	85							
Feb.	105	107							
Mar.	174	153							
April	206	208							
May	281	255							
June	314	283							
July	298	285							
Aug.	321	266							
Sept.	218	219							
Oct.	146	155							
Nov.	88	104							
Dec.	73	144							
Yearly	2,299	2,065							

# 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			
	2004				2004				2004			
	Mean	Max.	Min.	Average 1931-04	Mean	Max.	Min.	Average 1998-04	Mean	Max.	Min.	Average 1931-04
Jan.	11.9	24.4	-0.6	11.6	14.4	26.1	3.9	15.3	13.1	27.2	-1.7	12.4
Feb.	13.0	26.1	0.0	14.2	14.7	28.9	2.2	15.5	13.4	27.8	-1.7	14.7
Mar.	#	#	#	17.2	23.2	40.0	8.9	19.2	21.6	37.8	7.2	17.5
April	22.9	39.4	9.4	21.4	23.1	41.1	11.1	21.5	22.2	38.9	9.4	21.0
May	27.9	42.2	14.4	25.6	27.3	42.2	13.3	26.0	26.4	40.0	12.8	25.1
June	31.1	44.4	15.6	30.0	30.3	44.4	15.6	30.3	29.6	42.8	14.4	29.4
July	34.3	46.1	18.3	33.6	34.4	46.7	18.9	33.6	32.7	45.0	18.3	33.0
Aug.	32.9	46.7	19.4	33.0	33.3	46.1	18.9	33.4	33.1	46.1	18.9	33.0
Sept.	29.3	44.4	13.9	29.5	29.9	45.0	13.9	30.5	30.0	45.0	13.9	30.1
Oct.	#	#	#	22.6	#	#	#	21.2	22.9	39.4	7.2	23.9
Nov.	15.3	28.3	3.3	15.7	15.2	27.2	1.7	17.2	15.6	27.8	-1.1	16.9
Dec.	#	23.9	-1.7	11.5	13.3	25.0	0.6	13.3	13.3	26.1	-1.1	12.8
Yearly				22.2				23.1	22.8	46.1	-1.7	22.5

Month	El Centro, California				Bullhead City, Arizona							
	2004				2004							
	Mean	Max.	Min.	Average 1931-04	Mean	Max.	Min.	Average 1978-04				
Jan.	14.0	27.2	1.1	12.6	12.5	23.3	1.1	12.5				
Feb.	14.1	28.9	1.1	14.8	12.5	26.7	1.7	14.7				
Mar.	22.8	38.3	9.4	17.6	23.5	38.9	7.8	18.2				
April	23.1	37.8	11.7	21.1	22.8	38.9	11.1	22.3				
May	26.9	40.0	14.4	25.3	#	41.7	14.4	26.4				
June	29.7	42.2	16.7	29.7	#	45.6	17.2	31.2				
July	33.4	44.4	20.0	33.2	#	47.2	21.7	34.0				
Aug.	33.1	45.0	20.0	32.9	34.6	48.9	22.2	34.8				
Sept.	30.4	43.3	15.6	30.0	30.6	45.0	16.7	30.8				
Oct.	23.4	38.9	9.4	23.9	22.7	38.9	8.3	24.0				
Nov.	16.0	27.8	2.2	17.0	14.5	27.8	5.0	16.6				
Dec.	13.8	26.7	1.7	12.8	12.4	22.8	0.6	12.0				
Yearly	23.4	45.0	1.1	22.6		48.9	0.6	23.1				

IN MEXICO

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	2004		1948-2004		2004		1926-2004		2004		1948-2004	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	26	1	31	-5	25	2	34	-7	#	#	45	-9
Feb.	27	2	35	-2	29	4	34	-5	#	#	37	-6
Mar.	39	7	39	0	40	9	40	-1	#	#	45	-4
April	38	11	43	3	40	12	41	1	#	#	48	-9
May	41	13	47	6	42	14	47	6	#	#	51	1
June	43	17	52	11	45	15	49	9	#	#	57	6
July	46	19	50	13	48	20	49	13	#	#	56	7
Aug.	47	18	49	16	48	21	49	12	#	#	54	8
Sept.	43	14	50	10	46	15	50	8	#	#	57	4
Oct.	40	8	44	0	43	10	44	0	#	#	48	0
Nov.	27	2	38	-3	31	2	40	-2	#	#	46	0
Dec.	28	1	32	-5	31	3	32	-5	#	#	36	-5
Yearly	47	1	52	-5	48	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			
	2004		1949-2004		2004		1948-2004		2004		1975-2004	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	28	2	30	-7	29	4	37	-1	#	#	30	1
Feb.	30	4	35	-6	30	4	40	0	#	#	35	-4
Mar.	28	2	39	-7	39	7	41	0	#	#	38	4
April	40	9	43	2	39	10	45	1	#	#	46	6
May	48	15	48	5	42	15	49	5	#	#	48	9
June	48	15	51	7	43	16	51	5	#	#	49	10
July	46	18	60	11	43	19	51	9	#	#	52	20
Aug.	47	20	50	8	42	19	57	5	#	#	50	18
Sept.	45	14	48	4	44	17	52	3	#	#	50	11
Oct.	42	14	46	-1	42	10	47	-5	#	#	46	3
Nov.	26	4	48	-3	29	3	48	-6	#	#	40	3
Dec.	27	3	30	-6	28	2	39	-2	#	#	30	-3
Yearly	48	2	60	-7	44	2	57	-6			52	-4

Month	Delta, Baja California											
	2004		1948-2004									
	Max.	Min.	Max.	Min.								
Jan.	26	0	40	-4								
Feb.	28	0	40	-2								
Mar.	34	5	45	-2								
April	40	8	48	0								
May	43	11	54	0								
June	45	14	56	2								
July	49	13	57	7								
Aug.	48	18	60	15								
Sept.	45	11	57	4								
Oct.	42	7	47	1								
Nov.	30	3	50	0								
Dec.	26	0	40	-5								
Yearly	49	0	60	-5								

# Missing Data

## IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

2004

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	21,574
Reservation Division	5,982
Yuma Mesa	7,458
Yuma Aux. Project Unit "B" (Yuma Mesa)	1,032
South Gila Valley	3,970
North Gila Valley	2,544
Wellton-Mohawk	25,158
Coachella Valley	30,704
Imperial Valley	194,629
Warren Act	41
Non-Project Lands adjacent to Colorado River	4,821
Total in United States	297,913
IN MEXICO:	
San Luis Valley, R. C., Sonora	17,630
Mexicali Valley	121,751
Total in Mexico	139,381
Total in United States and Mexico	437,294

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 --- 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	0.01	0.01	0
2	0	0	0	0	0	0	0	0	0	.01	.01	.01
3	0	0	0	0	0	0	0	0	0	.01	0	.01
4	0	0	0	0	0	0	0	0	0	.02	0	.01
5	0	0	0	0	0	0	0	0	0	.02	0	.01
6	0	0	0	0	0	0	0	0	0	.01	.01	.01
7	0	0	0	0	0	0	0	0	0	.01	.01	.01
8	0	0	0	0	0	0	0	0	0	.01	.01	.01
9	0	0	0	0	0	0	0	0	0	.01	.02	.01
10	0	0	0	0	0	0	0	0	0	.01	.02	.01
11	0	0	0	0	0	0	0	0	0	.02	.01	.01
12	0	0	0	0	0	0	0	0	0	.02	.01	0
13	0	0	0	0	0	0	0	0	0	.01	.01	.01
14	0	0	0	0	0	0	0	0	0	.01	.01	.01
15	0	0	0	0	0	0	0	0	0	.02	.01	.01
16	0	0	0	0	0	0	0	0	0	.02	0	.01
17	0	0	0	0	0	0	0	0	0	.02	0	.01
18	0	0	0	0	0	0	0	0	0	.02	0	.01
19	0	0	0	0	0	0	0	0	0	.02	0	.01
20	0	0	0	0	0	0	0	0	0	.01	0	.01
21	0	0	0	0	0	0	0	0	0	.02	0	.01
22	0	0	0	0	0	0	0	0	0	.02	.01	.01
23	0	0	0	0	0	0	0	0	0	.02	.03	.01
24	0	0	0	0	0	0	0	0	0	.02	.03	.01
25	0	0	0	0	0	0	0	0	0	.02	.03	.01
26	0	0	0	0	0	0	0	0	0	.02	.01	.01
27	0	0	0	0	0	0	0	0	0	.01	.01	.02
28	0	0	0	0	0	0	0	0	0	.01	0	.03
29	0	0	0	0	0	0	0	0	0	.01	0	.01
30	0	0	0	0	0	0	0	0	0	.01	0	.01
31	0	0	0	0	0	0	0	0	0	.01	0	.01
Sum	0	0	0	0	0	0	0	0	0	0.46	0.24	0.32

Current Year 2004

Period 1943-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.	0	0	! 1	0	! 1	0	0	0	314	3,441	0
Feb.	0	0	! 1	0	! 1	0	0	0	288	3,481	0
Mar.	0	0	! 1	0	! 1	0	0	0	328	3,890	0
April	0	0	! 1	0	! 1	0	0	0	342	2,741	0
May	0	0	! 1	0	! 1	0	0	0	282	2,219	0
June	0	0	! 1	0	! 1	0	0	0	267	2,080	0
July	0	0	! 1	0	! 1	0	0	0	252	2,112	0
Aug.	0	0	! 1	0	! 1	0	0	0	288	2,062	0
Sept.	0	0	! 1	0	! 1	0	0	0	266	1,734	0
Oct.	.060	.035	! 4	.02	! 1	.01	.01	39.7	279	2,276	0
Nov.	.065	0	! 23	.03	! 3	0	.01	20.7	292	2,566	0
Dec.	.065	.010	28	.03	! 1	0	.01	27.6	283	2,080	0
Yearly	0.065	0		0.03		0	0	88.0	3,481	27,317	88.0

@ 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 2004.  
 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.94	5.01	6.66	4.76	5.52	4.02	3.51	3.26	3.31	3.43	4.64	4.30
2	3.99	5.04	6.60	5.98	5.38	3.94	3.00	3.46	3.34	3.48	4.28	4.19
3	4.13	5.30	6.88	5.38	5.41	3.85	2.66	3.40	3.37	3.51	4.16	4.02
4	4.13	5.18	7.16	5.75	5.55	3.79	2.75	3.34	3.31	3.54	4.13	3.91
5	4.33	5.10	7.02	6.12	5.49	3.71	2.80	3.31	3.37	3.91	4.45	4.39
6	4.53	5.04	6.68	6.51	5.27	3.65	2.92	3.26	3.37	3.99	4.76	4.73
7	4.53	5.01	6.26	6.32	5.13	3.54	3.12	3.20	3.40	3.94	4.53	4.33
8	4.33	4.98	6.03	6.20	5.04	3.46	3.43	3.23	3.46	3.96	4.08	4.19
9	4.16	5.01	6.40	6.32	4.90	3.34	3.62	3.31	3.57	3.77	3.88	4.28
10	4.08	5.01	6.51	6.37	4.79	3.29	3.68	3.40	3.62	3.57	3.85	4.39
11	3.99	5.10	6.43	6.34	4.59	3.43	3.68	3.37	3.68	3.48	3.85	4.33
12	3.96	4.93	6.29	6.57	4.45	3.43	3.62	3.34	3.71	3.46	3.65	4.33
13	3.94	4.62	5.92	6.63	4.45	3.54	3.57	3.34	3.62	3.51	3.54	4.45
14	4.11	4.28	5.18	6.54	4.47	3.51	3.65	3.31	3.74	3.40	3.51	4.45
15	3.88	3.99	4.56	6.34	4.50	3.60	3.65	3.14	3.71	3.43	3.60	4.45
16	3.91	3.91	4.47	5.98	4.56	3.65	3.65	3.06	3.65	3.48	3.71	4.47
17	3.85	4.05	4.42	5.75	4.22	3.68	3.62	3.14	3.60	3.43	3.71	4.39
18	3.82	4.28	4.67	5.30	4.13	3.96	3.60	3.34	3.54	3.34	3.74	4.25
19	3.71	4.36	4.81	4.96	4.16	3.94	3.51	3.37	3.54	3.20	3.88	4.16
20	3.74	4.47	4.73	4.93	4.16	3.77	3.46	3.71	3.99	3.12	3.91	4.16
21	4.11	4.62	4.64	5.35	4.13	3.54	3.51	3.77	4.05	5.92	5.86	4.16
22	4.45	8.47	4.84	5.55	4.05	3.48	3.62	3.65	3.77	3.99	4.39	4.19
23	4.59	7.62	4.53	5.66	4.08	3.62	3.68	3.57	3.94	4.08	4.33	4.19
24	4.45	6.85	4.47	5.66	4.16	3.77	3.60	3.43	3.77	4.08	4.33	4.05
25	4.64	8.24	4.45	5.75	4.13	3.79	3.60	3.37	3.65	4.11	4.36	3.82
26	5.10	8.33	4.53	5.81	4.02	3.77	3.60	3.43	3.54	4.13	4.33	3.88
27	5.44	7.73	4.53	5.81	4.05	3.77	3.60	3.57	3.51	5.01	4.36	4.16
28	5.55	7.28	4.45	5.86	4.05	3.65	3.48	3.51	3.51	6.20	4.45	4.45
29	5.72	6.94	4.53	5.72	4.13	3.79	3.40	3.40	3.43	4.67	4.42	4.53
30	5.83		4.59	5.61	4.16	3.74	3.37	3.34	3.43	5.27	4.39	4.59
31	5.49		4.70		4.08		3.37	3.31		4.84		4.56
Sum	136.43	160.75	167.94	175.83	141.21	110.02	106.33	104.64	107.50	123.25	125.08	132.75

Current Year 2004							Period 1943-2004				
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.	12.270	12.575	30	5.83	19	3.71	4.40	11,788	13,280	27,387	2,160
Feb.	12.035	12.575	22	8.47	16	3.91	5.54	13,889	12,015	26,416	1,552
Mar.	12.130	12.490	4	7.16	17	4.42	5.42	14,510	13,747	31,213	1,243
April	12.225	12.470	13	6.63	1	4.76	5.86	15,192	13,775	34,066	1,715
May	12.365	12.580	4	5.55	26	4.02	4.56	12,201	12,593	29,740	776
June	12.580	12.695	1	4.02	10	3.29	3.67	9,506	10,503	25,024	1,341
July	12.630	12.800	! 10	3.68	3	2.66	3.43	9,187	10,933	28,368	1,008
Aug.	12.620	12.730	21	3.77	16	3.06	3.38	9,041	12,387	34,066	1,405
Sept.	12.575	12.690	21	4.05	! 1	3.31	3.58	9,288	11,591	29,251	2,214
Oct.	12.275	12.720	28	6.20	20	3.12	3.98	10,649	11,483	28,072	2,567
Nov.	12.340	12.655	21	5.86	14	3.51	4.17	10,807	10,933	25,310	12.6
Dec.	12.470	12.605	6	4.73	25	3.82	4.28	11,470	12,888	28,104	2,175
Yearly	12.035	12.800		8.47		2.66	4.35	137,528	146,128	330,444	30,310

@ Mean daily ! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004 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 2004.

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 2004.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 2004 --- 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	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0

Current Year 2004

Period 1968-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	136	641	0
Feb.			! 1	0	! 1	0	0	0	94.0	384	0
Mar.			! 1	0	! 1	0	0	0	168	1,074	0
April			! 1	0	! 1	0	0	0	162	532	0
May			! 1	0	! 1	0	0	0	176	537	0
June			! 1	0	! 1	0	0	0	164	504	0
July			! 1	0	! 1	0	0	0	196	651	0
Aug.			! 1	0	! 1	0	0	0	211	735	0
Sept.			! 1	0	! 1	0	0	0	197	677	0
Oct.			! 1	0	! 1	0	0	0	184	625	0
Nov.			! 1	0	! 1	0	0	0	162	622	0
Dec.			! 1	0	! 1	0	0	0	150	737	0
Yearly				0		0	0	0	2,000	6,610	0

@ Mean daily

! And other days

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

DESCRIPTION: During 2004 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 2004.

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 2004	PERIOD 1956 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	931	10,803	0
February	0	771	8,981	0
March	0	690	5,506	0
April	0	562	3,940	0
May	0	400	3,174	0
June	0	405	6,994	0
July	0	613	12,644	0
August	0	618	5,103	0
September	0	472	3,966	0
October	0	591	4,285	0
November	0	592	4,668	0
December	0	712	10,720	0
Yearly	0	7,353	34,953	0

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. 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 2004 was 69.495 meters below mean sea level. Minimum elevation during 2004 was 69.920 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- 2004

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	69.770	69.710	69.645	69.555	69.525	69.585	69.615	69.675	69.800	69.890	69.920	69.920
2	69.770	69.710	69.615	69.555	69.525	69.585	69.615	69.675	69.800	69.920	69.920	69.920
3	69.770	69.710	69.615	69.525	69.525	69.585	69.615	69.710	69.800	69.920	69.920	69.920
4	69.770	69.710	69.615	69.525	69.525	69.585	69.615	69.710	69.800	69.920	69.920	69.890
5	69.770	69.710	69.615	69.525	69.495	69.555	69.645	69.710	69.830	69.890	69.920	69.890
6	69.770	69.710	69.615	69.525	69.525	69.555	69.645	69.710	69.830	69.920	69.920	69.890
7	69.770	69.710	69.615	69.525	69.525	69.555	69.645	69.710	69.830	69.920	69.920	69.890
8	69.770	69.710	69.615	69.525	69.525	69.555	69.645	69.710	69.830	69.920	69.920	69.890
9	69.770	69.710	69.585	69.525	69.525	69.585	69.645	69.710	69.830	69.890	69.920	69.890
10	69.770	69.710	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.890
11	69.770	69.710	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
12	69.770	69.710	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
13	69.770	69.675	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
14	69.770	69.675	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
15	69.770	69.675	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
16	69.740	69.675	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
17	69.740	69.675	69.585	69.525	69.525	69.585	69.645	69.740	69.830	69.920	69.920	69.860
18	69.740	69.675	69.555	69.525	69.525	69.585	69.645	69.740	69.860	69.920	69.920	69.860
19	69.740	69.675	69.555	69.525	69.525	69.585	69.645	69.740	69.860	69.920	69.920	69.860
20	69.740	69.675	69.555	69.525	69.525	69.585	69.645	69.740	69.860	69.920	69.920	69.860
21	69.740	69.675	69.555	69.525	69.525	69.585	69.675	69.740	69.860	69.920	69.920	69.860
22	69.740	69.675	69.555	69.525	69.525	69.585	69.675	69.740	69.860	69.920	69.920	69.860
23	69.740	69.675	69.555	69.525	69.525	69.615	69.675	69.740	69.890	69.920	69.890	69.860
24	69.740	69.675	69.555	69.525	69.555	69.615	69.675	69.770	69.890	69.920	69.890	69.860
25	69.740	69.645	69.555	69.525	69.555	69.615	69.675	69.770	69.890	69.920	69.890	69.860
26	69.710	69.645	69.555	69.525	69.555	69.615	69.675	69.770	69.890	69.920	69.890	69.860
27	69.710	69.645	69.555	69.525	69.555	69.615	69.675	69.800	69.890	69.920	69.890	69.860
28	69.710	69.645	69.555	69.525	69.555	69.615	69.675	69.800	69.890	69.920	69.890	69.860
29	69.710	69.645	69.555	69.525	69.555	69.615	69.675	69.800	69.890	69.920	69.920	69.830
30	69.710	69.645	69.555	69.525	69.555	69.615	69.675	69.800	69.890	69.920	69.920	69.830
31	69.710	69.645	69.555	69.525	69.585	69.675	69.675	69.800	69.890	69.920	69.920	69.830
Avg.	69.750	69.685	69.580	69.525	69.535	69.590	69.650	69.740	69.845	69.915	69.915	69.870

Current Year 2004			Period 1935-2004			Area and Capacity Table		
Month	@ Extreme Elevation Meters		Elevation Meters			Elevation Meters Below M. S. L.	Area Hectares	Capacity Million Cubic Meters
	High	Low	# Average	# Maximum	! Minimum			
Jan.	69.710	69.770	71.300	69.280	75.990	84.640	0	0
Feb.	69.645	69.710	71.210	69.190	75.830	83.520	8,337	31.7
Mar.	69.555	69.645	71.125	69.130	75.770	82.300	25,455	232.8
April	69.525	69.555	71.075	69.100	75.800	81.080	38,284	629.8
May	69.495	69.585	71.065	69.100	75.740	79.250	49,615	1,443.2
June	69.555	69.615	71.110	69.160	75.830	78.030	54,512	2,077.2
July	69.615	69.675	71.160	69.220	75.930	76.810	60,218	2,775.3
Aug.	69.675	69.800	71.220	69.250	76.020	74.370	72,723	4,393.7
Sept.	69.800	69.890	71.280	69.280	76.020	73.150	79,683	5,322.5
Oct.	69.890	69.920	71.315	69.310	76.140	71.630	89,760	6,611.5
Nov.	69.890	69.920	71.325	69.340	76.200	70.100	95,426	8,022.6
Dec.	69.830	69.920	71.295	69.340	76.080	67.060	106,029	11,092.7
Yearly	69.495	69.920	71.205	69.100	76.200	64.010	116,753	14,481.1
						60.960	127,680	18,206.2

@ Mean daily

! Reading near first day of month

# Mean monthly

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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. The CRWQCB has sampled from 1986 to present; prior to that samples were collected and analyzed by the U.S. Geological Survey from 1974 to 1985. 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

2004 Date	Time Std.	Flow CMS	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Turbidity NTU
Jan. 27	0700	5.44	13.6	7.7	2.1	4,200	14.5 (1)
Feb. 23	0700	7.62	15.3	7.5	3.1	3,350	13.5 (1)
Mar. 30	0700	4.59	22.2	7.7	0.2	5,850	14.9 (1)
Apr. 27	0700	5.81	24.6	7.7	1.6	5,230	34.0 (1)
May 24	0700	4.16	23.1	7.3	1.2	5,410	38.0 (1)
June 29	0700	3.79	28.4	7.7	0.1	5,540	64.0 (1)
Aug. 03	0700	3.40	29.8	7.5	0.6	5,860	58.0 (2)
Aug. 31	0800	3.31	30.8	7.5	0.6	5,270	72.0 (2)
Sep. 28	0800	3.51	26.2	7.8	1.0	4,750	42.0 (2)
Oct. 26	0900	4.13	20.5	7.6	0.8	4,380	26.0 (2)
Nov. 30	0900	4.39	12.9	7.6	2.9	4,240	26.0 (2)
Dec. 28	0900	4.45	12.4	7.6	1.9	4,490	16.0 (2)

(1) - Composite of eight water samples collected hourly.  
 (2) - Composite of four water samples collected hourly.  
 Flow provided by Imperial Irrigation District (Mean Daily)

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE		COMPOSITE		COMPOSITE		COMPOSITE	
	DATE	DETECTION LIMIT						
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION
Arsenic	9.50 ug/L	2.0 ug/L	6.4 ug/L	2.0 ug/L	8.00 ug/L	2.0 ug/L	2.0 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Cadmium	2.90 ug/L	1.0 ug/L	N.D.	1.0 ug/L	N.D.	1.0 ug/L	1.0 ug/L	1.0 ug/L
Chromium	N.D.	10.0 ug/L	N.D.	10.0 ug/L	26.0 ug/L	10.0 ug/L	10.0 ug/L	10.0 ug/L
Copper	N.D.	50.0 ug/L	N.D.	50.0 ug/L	N.D.	50.0 ug/L	50.0 ug/L	50.0 ug/L
Lead	13.1 ug/L	5.0 ug/L	15.8 ug/L	5.0 ug/L	6.00 ug/L	5.0 ug/L	5.0 ug/L	5.0 ug/L
Phenol	N.D.	0.005 mg/L	N.D.	0.02 mg/L	N.D.	0.02 mg/L	0.02 mg/L	0.02 mg/L
MBAS	3.00 mg/L	0.05 mg/L	3.67 mg/L	0.1 mg/L	1.44 mg/L	0.1 mg/L	0.1 mg/L	0.1 mg/L
Zinc	N.D.	50.0 ug/L	149.0 ug/L	50.0 ug/L	N.D.	50.0 ug/L	50.0 ug/L	50.0 ug/L
Total Cyanide	N.D.	0.01 mg/L	N.D.	0.05 mg/L	N.D.	0.05 mg/L	0.05 mg/L	0.05 mg/L
Total Phosphate(P04-P)	2.75 mg/L	0.02 mg/L	1.60 mg/L	0.2 mg/L	1.11 mg/L	0.2 mg/L	0.2 mg/L	0.2 mg/L
Nitrate (NO3-N)	0.62 mg/L	0.1 mg/L	0.99 mg/L	0.1 mg/L	N.D.	0.1 mg/L	0.1 mg/L	0.1 mg/L
Nitrite (NO2-N)	N.D.	0.1 mg/L	0.17 mg/L	0.1 mg/L	N.D.	0.1 mg/L	0.1 mg/L	0.1 mg/L
Ammonia (NH3-NH4-N)	10.9 mg/L	0.1 mg/L	9.66 mg/L	0.05 mg/L	5.06 mg/L	0.05 mg/L	0.05 mg/L	0.05 mg/L
Total Dissolved Solids	2,680 mg/L	10.0 mg/L	2,210 mg/L	10.0 mg/L	3,612 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L
Total Suspended Solids	28.0 mg/L	2.0 mg/L	246.6 mg/L	10.0 mg/L	36.0 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

SAMPLE TYPE	COMPOSITE		COMPOSITE		COMPOSITE		COMPOSITE	
	DATE	DETECTION LIMIT						
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION
Arsenic	N.D.	5.0 ug/L	6.90 ug/L	5.0 ug/L	N.D.	20.0 ug/L	20.0 ug/L	20.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Cadmium	N.D.	5.0 ug/L	N.D.	2.5 ug/L	N.D.	10.0 ug/L	10.0 ug/L	10.0 ug/L
Chromium	N.D.	5.0 ug/L	N.D.	10.0 ug/L	N.D.	40.0 ug/L	40.0 ug/L	40.0 ug/L
Copper	N.D.	10.0 ug/L	13.0 ug/L	10.0 ug/L	N.D.	40.0 ug/L	40.0 ug/L	40.0 ug/L
Lead	N.D.	5.0 ug/L	N.D.	5.0 ug/L	N.D.	20.0 ug/L	20.0 ug/L	20.0 ug/L
Phenol	N.D.	0.1 mg/L	N.D.	0.1 mg/L	N.D.	0.1 mg/L	0.1 mg/L	0.1 mg/L
MBAS	1.30 mg/L	0.5 mg/L	1.80 mg/L	0.5 mg/L	3.90 mg/L	0.5 mg/L	0.5 mg/L	0.5 mg/L
Zinc	0.023 ug/L	20.0 ug/L	N.D.	100.0 ug/L	N.D.	400 ug/L	400 ug/L	400 ug/L
Total Cyanide	N.D.	0.025 mg/L	N.D.	0.025 mg/L	N.D.	0.025 mg/L	0.025 mg/L	0.025 mg/L
Total Phosphate(P04-P)	1.30 mg/L	0.05 mg/L	1.80 mg/L	0.05 mg/L	2.00 mg/L	0.05 mg/L	0.05 mg/L	0.05 mg/L
Nitrate (NO3-N)	N.D.	0.55 mg/L	0.11 mg/L	0.55 mg/L	N.D.	0.55 mg/L	0.55 mg/L	0.55 mg/L
Nitrite (NO2-N)	N.D.	0.75 mg/L	N.D.	0.75 mg/L	N.D.	0.75 mg/L	0.75 mg/L	0.75 mg/L
Ammonia (NH3-NH4-N)	3.90 mg/L	0.5 mg/L	6.30 mg/L	0.5 mg/L	5.70 mg/L	0.5 mg/L	0.5 mg/L	0.5 mg/L
Total Dissolved Solids	3,500 mg/L	10.0 mg/L	3,400 mg/L	10.0 mg/L	3,400 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L
Total Suspended Solids	35.0 mg/L	10.0 mg/L	24.0 mg/L	10.0 mg/L	55.0 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

N.A. - Not Analyzed  
 N.D. - Not Detected  
 NOTE: Due to funding, CRWQCB used various labs for 2004. Each lab has its own reporting/detection limits.

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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	DETECTION	COMPOSITE	DETECTION	COMPOSITE	DETECTION
DATE	Aug. 03, 2004	LIMIT	Aug. 31, 2004	LIMIT	Sep. 28, 2004	LIMIT
PARAMETER	CONCENTRATION		CONCENTRATION		CONCENTRATION	
Arsenic	9.60 ug/L	2.0 ug/L	5.80 ug/L	2.0 ug/L	3.5 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Cadmium	N.D.	0.5 ug/L	N.D.	0.5 ug/L	N.D.	0.5 ug/L
Chromium	2.30 ug/L	1.0 ug/L	2.70 ug/L	1.0 ug/L	1.30 ug/L	1.0 ug/L
Copper	11.0 ug/L	2.0 ug/L	14.0 ug/L	2.0 ug/L	6.70 ug/L	2.0 ug/L
Lead	N.D.	5.0 ug/L	N.D.	5.0 ug/L	N.D.	5.0 ug/L
Phenol	0.024 mg/L	0.01 mg/L	0.05 mg/L	0.05 mg/L	N.D.	0.002 mg/L
MBAS	6.90 mg/L	1.5 mg/L	4.70 mg/L	0.5 mg/L	3.70 mg/L	0.5 mg/L
Zinc	10.0 ug/L	10.0 ug/L	58.0 ug/L	10.0 ug/L	26.0 ug/L	10.0 ug/L
Total Cyanide	N.D.	0.005 mg/L	N.D.	0.005 mg/L	N.D.	0.005 mg/L
Total Phosphate(P04-P)	2.70 mg/L	0.25 mg/L	2.30 mg/L	0.25 mg/L	2.40 mg/L	0.25 mg/L
Nitrate (NO3-N)	N.D.	0.5 mg/L	N.D.	0.5 mg/L	N.D.	0.05 mg/L
Nitrite (NO2-N)	N.D.	0.5 mg/L	N.D.	0.5 mg/L	N.D.	0.05 mg/L
Ammonia (NH3-NH4-N)	6.90 mg/L	2.0 mg/L	7.70 mg/L	1.0 mg/L	9.00 mg/L	2.0 mg/L
Total Dissolved Solids	3,700 mg/L	10.0 mg/L	3,200 mg/L	10.0 mg/L	2,900 mg/L	10.0 mg/L
Total Suspended Solids	43.0 mg/L	5.0 mg/L	46.0 mg/L	5.0 mg/L	43.0 mg/L	5.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

SAMPLE TYPE	COMPOSITE	DETECTION	COMPOSITE	DETECTION	COMPOSITE	DETECTION
DATE	Oct. 26, 2004	LIMIT	Nov. 30, 2004	LIMIT	Dec. 28, 2004	LIMIT
PARAMETER	CONCENTRATION		CONCENTRATION		CONCENTRATION	
Arsenic	3.80 ug/L	2.0 ug/L	4.60 ug/L	2.0 ug/L	N.D.	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Cadmium	N.D.	0.5 ug/L	N.D.	0.5 ug/L	N.D.	1.0 ug/L
Chromium	4.40 ug/L	1.0 ug/L	2.40 ug/L	1.0 ug/L	N.D.	10.0 ug/L
Copper	10.0 ug/L	2.0 ug/L	4.5 ug/L	2.0 ug/L	N.D.	50.0 ug/L
Lead	N.D.	5.0 ug/L	N.D.	5.0 ug/L	N.D.	5.0 ug/L
Phenol	N.D.	0.005 mg/L	N.D.	0.01 mg/L	N.D.	0.02 mg/L
MBAS	2.70 mg/L	0.5 mg/L	5.20 mg/L	1.5 mg/L	1.06 mg/L	0.1 mg/L
Zinc	11.0 ug/L	10.0 ug/L	11.0 ug/L	10.0 ug/L	N.D.	50.0 ug/L
Total Cyanide	N.D.	0.05 mg/L	0.024 mg/L	0.005 mg/L	<0.05 mg/L	0.05 mg/L
Total Phosphate(P04-P)	2.10 mg/L	0.25 mg/L	0.76 mg/L	0.25 mg/L	2.18 mg/L	0.2 mg/L
Nitrate (NO3-N)	0.78 mg/L	0.2 mg/L	0.77 mg/L	0.5 mg/L	0.21 mg/L	0.1 mg/L
Nitrite (NO2-N)	N.D.	0.5 mg/L	N.D.	0.5 mg/L	N.D.	0.1 mg/L
Ammonia (NH3-NH4-N)	8.30 mg/L	0.5 mg/L	8.80 mg/L	2.0 mg/L	9.66 mg/L	0.05 mg/L
Total Dissolved Solids	2,800 mg/L	10.0 mg/L	2,500 mg/L	10.0 mg/L	3,000 mg/L	10.0 mg/L
Total Suspended Solids	30.0 mg/L	5.0 mg/L	26.0 mg/L	5.0 mg/L	26.2 mg/L	10.0 mg/L
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: CRWQCB used various labs for 2004. Each lab has its own reporting/detection limits.  
 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 - 2004

January	February	March	April	May	June
	2 4,900	1 5,200	5 5,560	17 6,210	14 6,220
	9 5,040	8 4,990	19 5,950	24 6,210	21 5,830
	23 4,400	15 5,570	26 5,770	31 5,810	28 6,280
		22 5,900			
July	August	September	October	November	December
5 6,480		13 5,210	4 5,100	22 4,770	20 4,960
19 5,360		20 5,200	18 5,200	29 4,960	
			25 5,400		

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 2004.

ALAMO RIVER

2004 Date	Time Std.	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Conduct- ance Micro- siemens/cm	Coliform Fecal Colonies/ 100 mL	Flow* CMS
Jan. 21	0830	N. S.	N. S.	N. S.	N. S.	N. S.	0
Feb. 26	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.	0.02E
Mar. 24	0725	N. S.	N. S.	N. S.	N. S.	N. S.	0.02E
Apr. 28	0820	N. S.	N. S.	N. S.	N. S.	N. S.	0.02E
May 27	0720	N. S.	N. S.	N. S.	N. S.	N. S.	0.01E
June 23	0930	N. S.	N. S.	N. S.	N. S.	N. S.	0.01E
July 28	0755	N. S.	N. S.	N. S.	N. S.	N. S.	0.01E
Aug. 25	0805	N. S.	N. S.	N. S.	N. S.	N. S.	0.01
Sep. 22	0815	24.5	7.42	5.12	2,120	#	0.01
Oct. 27	0732	20.9	7.52	6.28	4,710	383#	0.01
Nov. 23	0750	13.6	7.50	9.05	5,240	733	0.03
Dec. 22	0800	11.4	7.41	10.21	4,670	60	0.01

\* - Flow provided by Imperial Irrigation District (Mean Daily)  
 N. S. - No Sample  
 # - Interference  
 E - Estimated

NEW RIVER

2004 Date	Time Std.	Flow ** CMS	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Fecal Coliform Colonies/ 100 mL
Jan. 07	0835	4.53	11.4	7.70	2.28	4,340	716,667
Jan. 21	0910	4.11	13.9	7.66	1.65	5,000	350,000
Feb. 11	0825	5.10	12.7	7.73	2.03	4,530	380,000
Mar. 10	0815	6.51	21.3	7.67	0.31	4,570	1,050,000
Mar. 24	0805	4.47	23.2	7.54	0.28	5,790	1,200,000
Apr. 14	0920	6.54	21.4	7.52	1.06	4,770	233,333
Apr. 28	0850	5.86	25.0	7.60	0.64	5,250	560,000
May 12	0800	4.45	24.2	7.69	0.16	5,630	600,000
May 27	0745	4.05	24.3	7.62	0.21	5,520	2,100,000
June 9	0735	3.34	25.7	7.64	0.18	5,570	1,125,000
June 23	0815	3.62	27.5	7.50	0.16	5,340	550,000
July 14	0815	3.65	30.3	7.56	0.28	5,210	383,000
July 28	0835	3.48	29.5	7.43	0.21	5,070	1,450,000
Aug. 11	0750	3.37	31.5	7.50	0.13	5,280	700,000
Aug. 25	0725	3.37	26.8	7.40	0.16	5,020	1,800,000
Sept. 8	0745	3.46	28.7	7.35	0.19	4,630	2,875,000
Sept. 22	0740	3.77	23.4	7.54	0.39	4,620	1,925,000
Oct. 13	0830	3.51	24.5	7.51	0.18	4,710	1,200,000
Oct. 27	0822	5.01	19.8	7.53	0.56	4,820	1,500,000
Nov. 9	0750	3.88	17.6	7.47	1.06	4,250	1,300,000
Nov. 23	0825	4.33	14.4	7.47	1.62	4,360	1,050,000
Dec. 8	0830	4.19	12.9	7.20	1.90	4,260	500,000
Dec. 22	0900	4.19	13.5	7.29	1.57	4,630	650,000

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



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 2004.

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 2004	PERIOD 1937 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	1,153	20,362	0
February	0	2,469	41,407	0
March	0	3,340	55,845	0
April	0	1,964	28,530	0
May	0	989	18,642	0
June	0	561	10,173	0
July	0	350	7,651	0
August	0	265	8,916	0
September	0	183	6,331	0
October	82.8	159	4,817	0
November	121	262	5,633	0
December	63.5	705	9,472	0
Yearly	267.3	12,400	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 2004.

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 2004	PERIOD 1937 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	19.7	289	2,583	0
February	18.4	956	19,644	0
March	11.2	1,859	55,615	0
April	11.2	1,408	28,159	0
May	19.7	782	18,100	0
June	19.7	596	9,260	0
July	19.7	371	6,236	0
August	17.4	356	7,937	0
September	16.8	393	7,253	0
October	30.2	250	4,639	0
November	19.1	278	5,071	0
December	19.1	493	9,099	0
Yearly	222.2	8,031	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 2004. 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 2004	PERIOD 1937 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	1,441	29,627	0
February	0	3,216	67,539	0
March	0	5,483	62,041	0
April	0	2,754	26,680	0
May	0	1,284	10,509	0
June	0	606	4,818	0
July	0	367	5,042	0
August	0	190	4,472	0
September	0	193	3,858	0
October	590	119	796	0
November	154	244	2,519	0
December	409	652	6,845	0
Yearly	1,153	16,549	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 2004.  
 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 2004 --- 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	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0

Current Year 2004

Period 1937-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	592	2,899	0
Feb.			! 1	0	! 1	0	0	0	567	2,883	0
Mar.			! 1	0	! 1	0	0	0	823	7,639	0
April			! 1	0	! 1	0	0	0	1,029	5,016	0
May			! 1	0	! 1	0	0	0	1,163	3,750	0
June			! 1	0	! 1	0	0	0	1,195	4,611	0
July			! 1	0	! 1	0	0	0	1,085	4,914	0
Aug.			! 1	0	! 1	0	0	0	1,011	4,741	0
Sept.			! 1	0	! 1	0	0	0	808	2,862	0
Oct.			! 1	0	! 1	0	0	0	694	3,235	0
Nov.			! 1	0	! 1	0	0	0	728	3,404	0
Dec.			! 1	0	! 1	0	0	0	632	2,843	0
Yearly				0		0	0	0	10,327	40,526	0

@ 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 2004. 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 2004	PERIOD 1937 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	399	10,114	0
February	0	2,066	86,736	0
March	0	4,218	111,775	0
April	0	2,122	45,417	0
May	0	951	28,287	0
June	0	438	13,503	0
July	0	225	5,311	0
August	0	145	4,206	0
September	0	53.3	1,554	0
October	0	45.1	1,530	0
November	0	140	5,100	0
December	0	182	6,058	0
Yearly	0	10,984	254,099	0

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.  
 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 2004 --- 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	0.13	0.01
2	0	0	0	0	0	0	0	0	0	0	.10	0
3	0	0	0	0	0	0	0	0	0	0	.08	0
4	0	0	0	0	0	0	0	0	0	0	.07	0
5	0	0	0	0	0	0	0	0	0	0	.05	.02
6	0	0	0	0	0	0	0	0	0	0	.05	.04
7	0	0	0	0	0	0	0	0	0	0	.05	.03
8	0	0	0	0	0	0	0	0	0	0	.08	.03
9	0	0	0	0	0	0	0	0	0	0	.07	.04
10	0	0	0	0	0	0	0	0	0	0	.06	.04
11	0	0	0	0	0	0	0	0	0	0	.05	.03
12	0	0	0	0	0	0	0	0	0	0	.05	.03
13	0	0	0	0	0	0	0	0	0	0	.05	.02
14	0	0	0	0	0	0	0	0	0	0	.05	.02
15	0	0	0	0	0	0	0	0	0	0	.04	.02
16	0	0	0	0	0	0	0	0	0	0	.04	.02
17	0	0	0	0	0	0	0	0	0	0	.03	.01
18	0	0	0	0	0	0	0	0	0	0	.03	.01
19	0	0	0	0	0	0	0	0	0	0	.03	.01
20	0	0	0	0	0	0	0	0	0	.07	.02	.01
21	0	0	0	0	0	0	0	0	0	.19	.03	.01
22	0	0	0	0	0	0	0	0	0	.07	.02	.01
23	0	0	0	0	0	0	0	0	0	.03	.02	0
24	0	0	0	0	0	0	0	0	0	.01	.02	0
25	0	0	0	0	0	0	0	0	0	.01	.01	0
26	0	0	0	0	0	0	0	0	0	0	.01	0
27	0	0	0	0	0	0	0	0	0	.51	.01	0
28	0	0	0	0	0	0	0	0	0	.88	.02	.03
29	0	0	0	0	0	0	0	0	0	.45	.01	1.50
30	0	0	0	0	0	0	0	0	0	.26	.01	1.53
31	0	0	0	0	0	0	0	0	0	.18		.74
Sum	0	0	0	0	0	0	0	0	0	2.66	1.29	4.21

Current Year 2004

Period 1937-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	1,334	45,897	0
Feb.			! 1	0	! 1	0	0	0	3,385	85,134	0
Mar.			! 1	0	! 1	0	0	0	5,000	109,418	0
April			! 1	0	! 1	0	0	0	2,462	49,635	0
May			! 1	0	! 1	0	0	0	898	22,439	0
June			! 1	0	! 1	0	0	0	313	7,301	0
July			! 1	0	! 1	0	0	0	100	3,599	0
Aug.			! 1	0	! 1	0	0	0	78.0	1,850	0
Sept.			! 1	0	! 1	0	0	0	76.0	4,209	0
Oct.			28	.88	! 1	0	.09	230	89.0	291	0
Nov.			1	.13	! 25	0	.04	111	53.0	1,378	0
Dec.			30	1.53	! 2	0	.14	364	174	3,169	0
Yearly				1.53		0	0.02	705	13,962	220,556	0

@ Mean daily

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.  
 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 2004 --- 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	.01	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	.01	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	.05
29	0	0	0	0	0	0	0	0	0	0	0	.12
30	0	0	0	0	0	0	0	0	0	0	0	.02
31	0	0	0	0	0	0	0	0	0	0	0	.02
Sum	0	0.01	0	0	0	0	0	0	0	0	0.01	0.21

Current Year 2004

Period 1937-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	405	10,581	0
Feb.			23	.01	! 1	0	0	.9	523	5,288	0
Mar.			! 1	0	! 1	0	0	0	837	11,587	0
April			! 1	0	! 1	0	0	0	519	8,886	0
May			! 1	0	! 1	0	0	0	253	3,956	0
June			! 1	0	! 1	0	0	0	124	2,234	0
July			! 1	0	! 1	0	0	0	67.0	1,525	0
Aug.			! 1	0	! 1	0	0	0	62.0	2,008	0
Sept.			! 1	0	! 1	0	0	0	45.0	1,214	0
Oct.			! 1	0	! 1	0	0	0	57.0	1,084	0
Nov.			21	.01	! 1	0	0	.9	112	1,522	0
Dec.			29	.12	! 1	0	.01	18.1	192	1,953	0
Yearly				0.12		0	0	19.9	3,196	38,639	0

@ 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 2004. 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 2004	PERIOD 1938 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	5,780	237,657	0
February	0	7,897	194,216	0
March	0	11,629	172,556	0
April	0	3,463	95,953	0
May	0	743	14,136	0
June	0	218	5,749	0
July	0	111	1,806	0
August	0	61.0	950	0
September	0	61.8	575	0
October	0	77.6	432	0
November	0	161	2,393	0
December	0	856	19,348	0
Yearly	0	32,513	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 2004.

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 2004	PERIOD 1938 - 2004		
		AVERAGE	MAXIMUM	MINIMUM
January	0	626	6,183	0
February	0	610	6,028	0
March	0	1,138	36,018	0
April	0.03	747	6,142	0
May	0.26	938	6,578	0
June	0.27	1,048	5,893	0
July	0.30	1,206	7,523	0
August	0.07	1,128	5,931	0
September	0	1,001	6,158	0
October	0	911	6,054	0
November	0	788	5,873	0
December	0	739	6,212	0
Yearly	0.93	10,881	94,980	0

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.  
 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.14	0	0	0	0	0	0	0	2.62	1.30
2	1.62	0	2.74	1.19	0	0	0	0	0	0	1.41	.99
3	1.18	2.33	2.04	1.15	0	0	0	0	0	0	1.08	1.03
4	.19	.99	1.43	.85	0	0	0	0	0	0	.89	1.42
5	0	.57	1.38	.74	0	0	0	0	0	0	.88	3.19
6	0	.31	1.28	.59	0	0	0	0	0	0	.87	2.84
7	0	.02	.80	.30	0	0	0	0	0	0	.72	1.83
8	0	0	.26	0	0	0	0	0	0	0	1.95	1.66
9	0	0	.01	0	0	0	0	0	0	0	1.37	1.42
10	0	0	0	0	0	0	0	0	0	0	1.25	.63
11	0	0	0	0	0	0	0	0	0	0	1.09	.62
12	0	0	0	0	0	0	0	0	0	0	.91	.19
13	0	0	0	0	0	0	0	0	0	0	.93	.21
14	0	0	0	0	0	0	0	0	0	0	1.11	.33
15	0	0	0	0	0	0	0	0	0	0	.54	.59
16	0	0	0	0	0	0	0	0	0	0	.25	.27
17	0	0	0	.36	0	0	0	0	0	2.51	0	0
18	0	0	.04	.02	0	0	0	0	0	.86	0	0
19	0	.78	0	0	0	0	0	0	0	3.53	.02	.01
20	0	.62	0	0	0	0	0	0	0	6.04	0	0
21	.07	.80	0	0	0	0	0	0	0	8.10	1.96	.07
22	.06	6.29	0	0	0	0	0	0	0	2.74	1.58	.01
23	0	4.93	0	0	0	0	0	0	0	1.60	1.29	.09
24	0	1.98	0	0	0	0	0	0	0	1.50	1.19	0
25	.62	1.16	0	0	0	0	0	0	0	1.48	1.22	.03
26	.67	2.58	0	0	0	0	0	0	0	1.49	1.23	0
27	0	1.62	0	0	0	0	0	0	0	16.4	1.32	0
28	.01	.80	0	0	0	0	0	0	0	8.68	2.30	3.54
29	0	.52	0	0	0	0	0	0	0	5.05	1.44	42.7
30	0	0	0	0	0	0	0	0	0	3.97	1.59	6.51
31	0	0	0	0	0	0	0	0	0	3.49	0	3.84
Sum	4.42	26.30	10.12	5.20	0	0	0	0	0	67.44	33.01	75.32

Current Year 2004

Period 1947-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Low	Average	Total	Average	Maximum	Minimum	
Jan.	12.345	11.920	2	4.35	! 1	0	0.14	382	8,625	297,879	0
Feb.	12.850	11.920	22	7.14	! 1	0	.91	2,272	13,623	388,951	0
Mar.	12.380	11.920	2	4.18	! 1	0	.33	874	16,154	362,019	0
April	12.135	11.920	17	2.27	! 1	0	.17	449	4,201	77,633	0
May	11.920	11.920	! 1	0	! 1	0	0	0	2,003	52,545	0
June	11.920	11.920	! 1	0	! 1	0	0	0	699	11,960	0
July	11.920	11.920	! 1	0	! 1	0	0	0	505	11,400	0
Aug.	11.920	11.920	! 1	0	! 1	0	0	0	603	21,083	0
Sept.	11.920	11.920	! 1	0	! 1	0	0	0	297	5,142	0
Oct.	13.280	11.920	27	102	! 1	0	2.18	5,827	482	6,859	0
Nov.	12.350	11.930	21	6.77	! 16	0	1.10	2,852	644	5,399	0
Dec.	13.365	11.920	29	242	! 13	0	2.43	6,508	1,164	8,270	0
Yearly	13.365	11.920		242		0	0.61	19,164	49,000	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)	
	2004	Average 1937-2004	2004	Average 1937-2004	2004	Average 1937-2004	2004	Average 1937-2004
Jan.	5,003	24,311	8,764	18,534	10,586	40,079	24,353	82,924
Feb.	4,988	25,568	8,780	19,458	10,804	42,484	24,572	87,510
Mar.	5,107	26,932	9,069	21,617	10,702	47,701	24,878	96,250
April	4,988	27,080	9,188	22,274	10,558	48,552	24,734	97,906
May	5,018	26,871	9,154	22,070	9,816	47,731	23,988	96,672
June	4,885	26,194	9,017	21,311	9,200	45,884	23,102	93,389
July	4,641	25,420	8,797	20,429	8,472	44,071	21,910	89,920
Aug.	4,423	24,711	8,598	19,462	8,094	42,075	21,115	86,248
Sept.	4,194	24,028	8,369	18,746	7,912	40,531	20,475	83,305
Oct.	4,000	23,557	8,190	18,090	11,144	39,047	23,334	80,694
Nov.	4,096	23,359	8,915	17,606	11,212	38,292	24,223	79,257
Dec.	4,194	23,429	9,069	17,769	14,760	38,186	28,023	79,384
Avg.	4,628	25,122	8,826	19,781	10,272	44,352	23,726	87,788
Max.	5,107	#! 76,069	9,188	*! 56,641	14,760	! 138,486	28,023	! 263,471
Min.	4,000	!! 12	8,190	!! 131	7,912	!! 0	20,475	!! 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	
	2004	Average 1906-2004	2004	Average 1907-2004	2004	Average 1951-2004	2004	Average 1950-2004	2004	Average 1900-2004
Jan.	25	96	19	88	19	53	16	87	17	77
Feb.	153	99	117	89	70	45	160	86	113	83
Mar.	19	89	13	80	12	59	25	78	17	72
April	36	42	25	37	20	24	26	37	34	34
May	0	15	0	13	0	7	0	9	0	11
June	0	3	0	2	0	1	0	1	0	2
July	6	9	0	3	0	1	17	14	4	12
Aug.	0	14	0	6	0	2	19	21	0	13
Sept.	0	11	0	6	0	5	0	12	0	9
Oct.	266	23	193	19	152	11	241	17	218	17
Nov.	39	39	27	37	42	29	23	41	27	33
Dec.	158	76	130	67	80	46	154	59	120	60
Yearly	702	516	524	447	395	283	681	462	550	423

Month	Chula Vista, California		Lower Otay Dam, California							
	2004	Average 1930-2004	2004	Average 1906-2004						
Jan.	10	47	15	54						
Feb.	72	48	92	48						
Mar.	2	43	11	54						
April	#	#	23	26						
May	0	5	0	9						
June	0	1	0	3						
July	0	1	0	1						
Aug.	0	2	0	2						
Sept.	0	4	0	6						
Oct.	131	10	145	13						
Nov.	55	27	15	30						
Dec.	49	37	58	37						
Yearly	#	#	359	283						

# Missing record

IN MEXICO

Month	El Pinal, Baja California		El Hongo, Baja California		Ignacio Zaragoza, Baja California		Tecate, Baja California		El Carri zo, Baja California	
	2004	Average 1964-2004	2004	Average 1980-2004	2004	Average 1965-2004	2004	Average 1946-2004	2004	Average 1980-2004
Jan.	#	84	14	58	#	59	20	73	11	40
Feb.	#	90	66	68	#	71	107	60	90	56
Mar.	#	94	19	61	14	62	19	65	14	52
April	#	37	22	20	#	24	30	28	26	20
May	#	9	0	5	#	5	0	7	0	4
June	#	1	0	2	#	1	0	2	0	1
July	#	18	9	12	#	3	0	4	0	3
Aug.	#	23	13	20	#	6	0	5	0	2
Sept.	#	18	0	7	0	9	0	5	0	4
Oct.	#	16	163	16	97	15	193	15	131	17
Nov.	#	46	17	27	30	37	24	34	19	27
Dec.	#	71	30	31	75	46	110	49	66	31
Yearly		494	353	325	216	338	503	348	357	265

# Missing record

RAINFALL ON THE TIJUANA RIVER WATERSHED  
IN MILLIMETERS

IN MEXICO

	Valle de Palmas, Baja California		Rodriguez Dam, Baja California			
	2004	Average 1948-2004	2004	Average 1938-2004		
Jan.	T	42	9	44		
Feb.	76	41	97	45		
Mar.	13	39	11	43		
April	0	15	18	19		
May	0	4	0	3		
June	0	1	0	T		
July	0	2	0	T		
Aug.	0	4	0	2		
Sept.	0	5	0	5		
Oct.	93	10	208	12		
Nov.	21	19	11	22		
Dec.	21	27	78	37		
Yearly	224	202	432	234		

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 2004.

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
Ignacio 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 2004, 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 2004, 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	
	2004	Average 1916-2004	2004	Average 1921-2004	2004	Average 1950-2004
Jan.	65	55	40	47	55	50
Feb.	146	55	135	54	71	58
Mar.	128	83	88	83	111	86
April	147	118	114	115	131	119
May	268	166	161	161	165	153
June	329	211	185	199	188	175
July	330	243	205	234	216	207
Aug.	405	228	198	220	216	196
Sept.	283	180	166	179	183	162
Oct.	211	127	96	125	100	118
Nov.	44	79	42	77	56	72
Dec.	212	59	56	48	42	54
Yearly	2,568	1,604	1,486	1,542	1,534	1,450

IN MEXICO

Month	Rodriguez Dam, Baja California		El Carri zo, Baja California	
	2004	Average 1939-2004	2004	Average 1980-2004
Jan.	54	98	116	134
Feb.	54	101	109	117
Mar.	107	109	158	140
April	130	138	173	179
May	175	133	240	199
June	170	188	239	267
July	195	212	299	293
Aug.	173	196	251	289
Sept.	160	163	280	243
Oct.	79	134	132	203
Nov.	57	105	84	150
Dec.	64	83	110	131
Yearly	1,418	1,675	2,191	2,345

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			
	2004			Average 1931- 2004	2004			Average 1951- 2004	2004			Average 1931- 2004
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	11.0	26.0	-1.0	9.9	8.4	22.8	-4.4	8.8	#	22.8	3.9	12.2
Feb.	9.0	26.0	-2.0	10.8	8.1	27.8	-5.0	9.3	13.1	23.3	3.3	12.9
Mar.	14.0	33.0	1.0	12.2	14.4	32.8	-1.1	10.2	#	31.1	7.2	13.6
April	16.0	34.0	4.0	14.6	13.3	34.4	-1.7	12.3	#	34.4	11.1	15.0
May	19.0	38.0	7.0	17.3	16.3	35.0	1.1	15.2	19.2	35.0	12.2	16.4
June	21.0	36.0	9.0	20.6	18.1	35.0	3.9	18.6	18.9	25.0	13.9	17.8
July	23.0	39.0	4.0	24.4	22.8	38.3	3.3	22.7	#	27.8	15.0	19.9
Aug.	24.0	39.0	10.0	24.7	22.5	40.0	5.0	23.0	#	26.1	14.4	20.8
Sept.	23.0	41.0	9.0	22.6	20.2	38.3	2.2	20.6	#	39.4	13.3	20.1
Oct.	14.0	34.0	3.0	18.2	14.6	33.9	0.0	16.0	#	25.0	9.4	17.8
Nov.	12.0	23.0	-4.0	13.4	15.2	27.2	1.7	11.5	14.5	27.8	5.0	14.9
Dec.	10.0	27.0	-3.0	10.4	9.1	26.1	-5.6	8.8	#	26.7	2.8	12.8
Yearly	16.3	41.0	-4.0	16.6	15.2	40.0	-5.6	14.8		39.4	2.8	16.2

IN MEXICO

Month	Rodriguez Dam, Baja California				El Hongo, Baja California				Ignacio Zaragoza, Baja California			
	2004		1938-2004		2004		1981-2004		2004		1965-2004	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	28	4	36	-3	18	-3	26	-9	#	#	34	-11
Feb.	26	5	34	0	22	-2	27	-3	#	#	32	-9
Mar.	35	6	38	0	29	0	31	-6	42	3	42	-9
April	39	8	40	2	35	2	35	-1	#	#	38	-4
May	39	10	39	3	33	4	40	1	#	#	40	-2
June	31	12	42	8	36	5	47	2	#	#	49	-2
July	35	14	40	8	36	7	45	7	#	#	50	1
Aug.	32	15	41	10	37	7	41	3	#	#	51	3
Sept.	37	9	43	8	36	5	39	2	47	9	51	1
Oct.	31	8	42	1	34	1	37	0	46	11	49	-6
Nov.	25	3	37	-1	19	-3	30	-3	33	8	39	-9
Dec.	28	2	34	-3	21	-3	27	-8	33	9	36	-9
Yearly	39	2	43	-3	37	-3	47	-9			51	-11

Month	Tecate, Baja California				El Carrizo, Baja California				Valle de Palmas, Baja California			
	2004		1946-2004		2004		1980-2004		2004		1948-2004	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	28	-2	38	-9	29	4	32	-2	30	-2	37	-11
Feb.	29	0	38	-8	31	4	34	-2	29	-3	37	-5
Mar.	32	2	36	-5	34	5	37	-4	39	0	39	-2
April	31	5	39	-2	39	7	41	3	40	2	41	-2
May	40	7	42	1	41	8	42	5	39	5	44	1
June	39	8	44	0	33	10	42	9	38	7	48	4
July	40	10	46	2	37	10	46	8	37	7	49	6
Aug.	40	10	47	1	36	12	45	5	40	9	48	5
Sept.	42	7	46	2	39	11	43	5	43	6	47	3
Oct.	34	2	41	-3	36	7	43	6	39	2	43	0
Nov.	25	-2	37	-3	26	2	35	2	26	-1	38	-7
Dec.	30	-2	36	-5	30	2	34	-3	31	2	35	-6
Yearly	42	-2	47	-9	41	2	46	-4	43	-3	49	-11

# Missing Data

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

2004

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, Tijuana 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 2004 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 above Barrett Dam	344	0	344	0		0
below Barrett Dam and above Tecate Creek	640	0	640	0		0
above Tecate Creek	168	0	168	0		0
	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 2004 in the Tijuana Irrigation District, Tijuana Valley, Baja California Mexico, from the Rodriguez Reservoir.



WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0	0	0	0	0	0	0	0	0	0	0
2	.15	0	0	0	0	0	0	0	0	0	0	0
3	.01	0	0	0	0	0	0	.27	0	0	0	0
4	0	0	0	0	0	0	0	.93	0	0	0	0
5	0	0	0	0	0	0	0	.05	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	.37	0	0	0	0	0	0	0	0	0
13	0	0	.59	0	0	0	0	0	0	0	0	0
14	0	0	.91	0	0	0	0	.05	0	0	0	0
15	0	0	.04	0	0	0	0	.06	0	0	0	0
16	0	0	.01	0	0	0	0	.45	0	0	0	0
17	0	0	0	0	0	0	.03	1.16	0	0	0	0
18	.01	0	0	0	0	0	.42	.88	0	0	0	0
19	.03	0	0	0	0	0	.01	1.53	.12	0	0	0
20	.01	0	0	0	0	0	0	1.13	1.36	0	0	0
21	0	0	0	0	0	0	0	.08	2.35	0	0	0
22	0	0	0	0	0	0	0	.01	.03	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	.10	.08	0	0
27	0	0	0	0	0	0	0	0	.06	.02	0	0
28	0	0	0	0	0	0	0	0	.01	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0.22	0	1.92	0	0	0	0.46	6.60	4.03	0.10	0	0

Current Year 2004

Period 1936-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	1.630	1.160	! 18	0.15	! 1	0	0.01	19.0	38.5	556	0
Feb.	1.185	1.090	! 1	0	! 1	0	0	0	17.9	163	0
Mar.	1.925	1.090	! 14	1.90	! 1	0	.06	166	25.1	364	0
April	1.150	1.095	! 1	0	! 1	0	0	0	16.6	213	0
May	1.095	1.080	! 1	0	! 1	0	0	0	11.8	170	0
June	1.080	1.065	! 1	0	! 1	0	0	0	120	1,961	0
July	1.725	1.060	! 18	.85	! 1	0	.01	39.7	1,751	10,004	0
Aug.	2.465	1.095	! 19	7.67	! 1	0	.21	570	2,904	17,861	0
Sept.	2.200	.965	! 21	3.74	! 1	0	.13	348	761	3,910	0
Oct.	1.650	.995	! 26	.57	! 1	0	0	8.6	437	7,528	0
Nov.	1.245	.955	! 1	0	! 1	0	0	0	56.1	765	0
Dec.	.955	.955	! 1	0	! 1	0	0	0	119	2,915	0
Yearly	2.465	0.955		7.67		0	0.04	1,151	6,258	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 2004.

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.

2004 Month	Total Monthly Flows Thousand Cubic Meters			Mean Daily Flows-Thousand Cubic Meters Per Day					
	U. S.	Mexico	Total	Current Year 2004			Period 1952-2004		
				Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	338	0	338	13.1	8.4	10.9	18.8	1.6	4.8
Feb.	311	0	311	18.0	3.8	10.7	18.0	2.1	4.7
Mar.	331	0	331	12.6	8.1	10.7	14.4	2.2	4.7
April	314	0	314	12.7	8.6	10.5	18.1	1.4	4.8
May	338	0	338	13.1	8.6	10.9	15.0	1.9	4.8
June	321	0	321	12.5	8.4	10.7	15.0	2.1	4.9
July	327	0	327	13.8	8.5	10.5	14.8	1.8	5.1
Aug.	334	0	334	12.6	9.1	10.8	15.1	1.4	5.2
Sept.	330	0	330	13.1	8.5	11.0	13.6	1.8	5.0
Oct.	320	0	320	12.7	7.8	10.3	13.8	2.2	4.9
Nov.	334	0	334	13.5	9.3	11.1	14.4	1.2	4.9
Dec.	352	0	352	13.8	8.5	11.4	17.9	1.7	4.9
Yearly	3,950	0	3,950	18.0	3.8	10.8	18.8	1.2	4.9

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004. Records obtained and furnished by U. S. Geological Survey prior to October 1, 1981 and from October 1, 1995 through 2004, 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 2004 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.03	0.04	0.01	0.01	0	0	1.56	0	0	0	0.01
2	0	.03	.04	.02	0	0	0	2.89	0	0	0	.01
3	0	.03	.05	1.05	0	0	0	.04	0	0	0	0
4	0	.03	.05	.54	0	0	0	.03	.18	0	0	.01
5	0	.03	.04	.07	0	0	0	.03	.06	0	0	.01
6	0	.03	.03	.03	0	0	0	.03	0	0	0	.01
7	0	.03	.03	.03	0	0	0	.48	0	0	0	.01
8	0	.03	.03	.02	0	0	0	.21	0	0	0	.01
9	0	.03	.03	.02	0	0	0	.03	0	0	0	.01
10	0	.03	.03	.02	0	0	0	.02	0	0	0	.01
11	0	.03	.03	.02	0	0	0	.01	0	0	0	.01
12	0	.03	.04	.02	0	0	0	.01	0	0	0	.01
13	0	.03	.04	.01	0	0	0	16.2	0	0	0	.01
14	.01	.03	.04	.01	0	0	.01	.71	0	0	0	.01
15	.02	.04	.03	.01	0	0	3.17	.13	0	0	0	.01
16	.05	.04	.03	.01	0	0	15.4	.85	0	0	0	.01
17	.02	.04	.03	.01	0	0	.51	4.98	0	0	0	.01
18	.02	.04	.03	.01	0	0	.09	14.3	0	0	0	.02
19	.02	.04	.03	.01	0	0	1.53	2.78	21.4	0	0	.02
20	.02	.04	.03	.01	0	0	.16	.14	45.9	0	0	.02
21	.02	.04	.03	.01	0	0	.06	.04	.45	0	0	.02
22	.02	.04	.03	0	0	1.25	.22	.01	.11	0	0	.02
23	.02	.05	.02	0	0	0	.07	.01	.05	0	0	.02
24	.02	.04	.02	0	0	0	.06	.01	.03	0	0	.02
25	.02	.04	.02	0	0	0	.06	0	.02	0	0	.02
26	.02	.04	.02	0	0	0	.06	0	.02	0	0	.02
27	.02	.04	.02	0	0	0	.06	0	.01	0	.01	.02
28	.02	.04	.02	0	0	0	1.05	0	.01	0	.01	.02
29	.02	.04	.01	0	0	0	.19	0	.01	0	.01	.02
30	.03	.04	.01	.01	0	0	.02	0	0	0	.01	.04
31	.03	.04	.01	.01	0	0	.01	0	0	0	.01	.03
Sum	0.40	1.03	0.91	1.95	0.01	1.25	22.73	45.50	68.25	0	0.04	0.47

Current Year 2004

Period 1951-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum
Jan.	0.665	0.560	16	0.15	! 1	0	0.01	34.6	2,196	35,987	3.2
Feb.	.615	.585	23	.06	! 1	.03	.04	89.0	933	8,343	3.7
Mar.	.615	.555	! 3	.06	! 30	.01	.03	78.6	809	9,129	16.4
April	.995	.545	3	3.09	! 22	0	.07	168	197	1,282	0
May	.560	.525	! 1	.01	! 28	0	0	.9	62.7	502	0
June	1.125	.275	22	5.66	! 6	0	.04	108	201	3,631	0
July	2.765	.300	16	91.8	! 1	0	.73	1,964	5,270	21,263	0
Aug.	3.430	.520	13	147	! 27	0	1.47	3,931	8,619	44,860	204
Sept.	3.690	.495	20	171	! 6	0	2.28	5,897	2,000	20,160	1.7
Oct.	.505	.485	1	0	! 20	0	0	0	2,659	58,371	0
Nov.	.560	.490	30	.01	! 6	0	0	3.5	782	19,006	0
Dec.	.590	.525	30	.04	! 2	0	.02	40.6	1,816	31,428	0
Yearly	3.690	0.275		171		0	0.39	12,315	25,545	80,483	5,427

! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

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 2004.  
 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 2004 --- 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	0	0	0	0	0	0	0
2	.01	.01	.01	.01	0	0	0	0	0	0	0	0
3	.01	.01	.01	.01	0	0	0	0	0	0	0	0
4	.01	.01	.01	.01	0	0	0	0	0	0	0	0
5	.01	.01	.01	.01	0	0	0	.23	0	0	0	0
6	.01	.01	.01	.01	0	0	0	.02	0	0	0	0
7	.01	.01	.01	.01	0	0	0	0	0	0	0	0
8	.01	.01	.01	.01	0	0	0	0	0	0	0	0
9	.01	.01	.01	.01	0	0	0	0	0	0	0	0
10	.01	.01	.01	.01	0	0	0	0	0	0	0	0
11	.01	.01	.01	.01	0	0	0	0	0	0	0	0
12	.01	.01	.01	.01	0	0	0	0	0	0	0	0
13	.01	.01	.01	.01	0	0	0	0	0	0	0	0
14	.01	.01	.01	.01	0	0	0	0	0	0	0	0
15	.01	.01	.01	.01	0	0	0	0	0	0	0	0
16	.01	.01	.01	.01	0	0	.04	0	0	0	0	0
17	.01	.01	.01	.01	0	0	0	0	0	0	0	0
18	.01	.01	.01	.01	0	0	0	0	0	0	0	0
19	.01	.01	.01	.01	0	0	0	0	0	0	0	0
20	.01	.01	.01	.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	.01	.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	.01	0	0	0	0	0	0	0	0
25	.01	.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	.01	.01	.01	.01	0	0	0	0	0	0	0	0
28	.01	.01	.01	.01	0	0	0	0	0	0	0	0
29	.01	.01	.01	0	0	0	0	0	0	0	0	0
30	.01	.01	.01	0	0	0	0	0	0	0	0	0
31	.01	.01	.01	0	0	0	0	0	0	0	0	0
Sum	0.31	0.29	0.31	0.28	0	0	0.04	0.25	0	0	0	0
Current Year 2004									Period 1949-2004			
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.			! 1	0.01	! 1	0.01	0.01	26.8	333	8,822	1.6	
Feb.			! 1	.01	! 1	.01	.01	25.1	120	1,233	2.2	
Mar.			! 1	.01	! 1	.01	.01	26.8	133	2,594	.9	
April			! 1	.01	! 1	0	.01	24.2	63.7	638	0	
May			! 1	0	! 1	0	0	0	33.0	210	0	
June			! 1	0	! 1	0	0	0	23.3	208	0	
July			16	.04	! 1	0	0	3.5	571	5,267	0	
Aug.			5	.23	! 1	0	.01	21.6	1,084	14,207	.1	
Sept.			! 1	0	! 1	0	0	0	333	3,249	0	
Oct.			! 1	0	! 1	0	0	0	343	5,837	0	
Nov.			! 1	0	! 1	0	0	0	90.1	1,185	0	
Dec.			! 1	0	! 1	0	0	0	136	1,348	0	
Yearly				0.23		0	0	128	3,263	21,433	128	

@ Mean daily ! And other days

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

09-4805.00 SANTA CRUZ RIVER NEAR NOGALES, ARI ZONA

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 2004.

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 2004.

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 2004 --- 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	.01	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	.14	0	0	0	0
14	0	0	0	0	0	0	0	.04	0	0	0	0
15	0	0	0	0	0	0	1.56	0	0	0	0	0
16	0	0	0	0	0	0	1.90	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	.12	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	.22	0	0	0	0	0
29	0	0	0	0	0	0	.01	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	3.81	0.19	0	0	0	0

Current Year 2004

Period 1936-2004

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	@ High	Day	@ Low	Average	Total	Average	Maximum	Minimum
Jan.			! 1	0	! 1	0	0	0	2,769	37,352	0
Feb.			! 1	0	! 1	0	0	0	2,057	25,344	0
Mar.			! 1	0	! 1	0	0	0	1,781	24,145	0
April			! 1	0	! 1	0	0	0	577	4,263	0
May			! 1	0	! 1	0	0	0	130	1,272	0
June			! 1	0	! 1	0	0	0	88.5	1,787	0
July			15	1.90	! 1	0	.12	329	2,775	19,255	0
Aug.			13	.14	! 1	0	.01	16.4	5,911	56,481	12.1
Sept.			! 1	0	! 1	0	0	0	1,653	111,633	0
Oct.			! 1	0	! 1	0	0	0	2,289	72,806	0
Nov.			! 1	0	! 1	0	0	0	739	12,180	0
Dec.			! 1	0	! 1	0	0	0	2,669	41,405	0
Yearly				1.90		0	0.01	345	23,439	108,071	345

@ 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 2004.

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.

Month	Total Monthly Flows				Daily Flows-Thousand Cubic Meters Per Day					
	Thousand Cubic Meters				Current Year 2004			Period 1952-2004		
	U. S.	Mexico	Plant*	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	399	1,294	0	1,693	59.6	45.4	54.6	93.0	2.5	26.8
Feb.	388	1,269	0	1,657	64.0	54.7	57.1	80.4	2.5	27.6
Mar.	267	1,498	0	1,765	66.0	52.1	56.9	85.7	2.8	27.4
April	486	1,258	0	1,744	74.0	52.7	58.1	87.9	2.6	26.0
May	452	1,156	0	1,608	56.1	39.5	51.9	69.2	2.1	24.5
June	485	1,090	0	1,575	56.9	45.5	52.5	64.9	2.6	22.9
July	415	1,155	0	1,570	63.7	41.2	50.6	68.1	2.6	23.8
Aug.	331	1,360	0	1,691	68.0	49.8	54.5	75.6	2.8	25.6
Sept.	497	1,184	0	1,681	60.4	53.9	56.0	67.9	3.0	26.9
Oct.	662	1,007	0	1,669	58.8	49.8	53.9	87.2	2.6	27.1
Nov.	745	892	0	1,637	60.6	52.3	54.6	84.7	3.0	26.8
Dec.	745	974	0	1,719	74.0	48.1	55.5	75.9	1.3	26.9
Yearly	5,872	14,137	0	20,009	74.0	39.5	54.7	93.0	1.3	26.0

\* 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	
	2004	Average 1973-2004	2004	Average 1930-2004	2004	Average 1930-2004	2004	Average 1953-2004	2004	Average 1994-2004
Jan.	0	39	0	30	16	32	28	45	25	19
Feb.	0	37	0	29	17	28	8	47	24	39
Mar.	0	31	0	22	24	24	15	51	20	20
April	0	14	0	10	50	11	39	58	120	28
May	0	7	0	4	0	5	0	64	0	6
June	0	14	0	18	7	12	2	73	10	23
July	0	112	0	104	166	110	42	78	206	104
Aug.	0	105	0	105	126	105	67	77	72	111
Sept.	0	53	0	43	19	44	21	72	19	40
Oct.	0	34	0	28	5	28	7	62	9	34
Nov.	0	23	0	21	12	21	6	51	19	28
Dec.	0	37	0	35	35	37	37	46	43	37
Yearly	0	506	0	449	477	457	272	724	567	489

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 2004

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 McCuiston
Canelo, Arizona	S	31° 33'	110° 32'	1,527	1930	R. E. 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			
2004			
Month	Mean	Max.	Min.
Jan.	8.3	25.6	-6.7
Feb.	6.9	27.8	-8.9
Mar.	15.1	32.8	-2.2
April	15.3	31.7	2.2
May	19.7	35.0	2.2
June	23.8	38.9	6.1
July	25.8	37.8	8.3
Aug.	24.9	36.7	9.4
Sept.	23.0	37.8	5.0
Oct.	17.2	33.3	1.1
Nov.	10.0	28.9	-7.8
Dec.	8.1	26.7	-10.0
Yearly	13.9	38.9	-10.0

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

2004

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 States	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 Palomas, 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.

WESTERN BOUNDARY WATER BULLETIN - 2004 - INTERNATIONAL BOUNDARY AND WATER COMMISSION  
CORRECTIONS TO PREVIOUS WATER BULLETINS

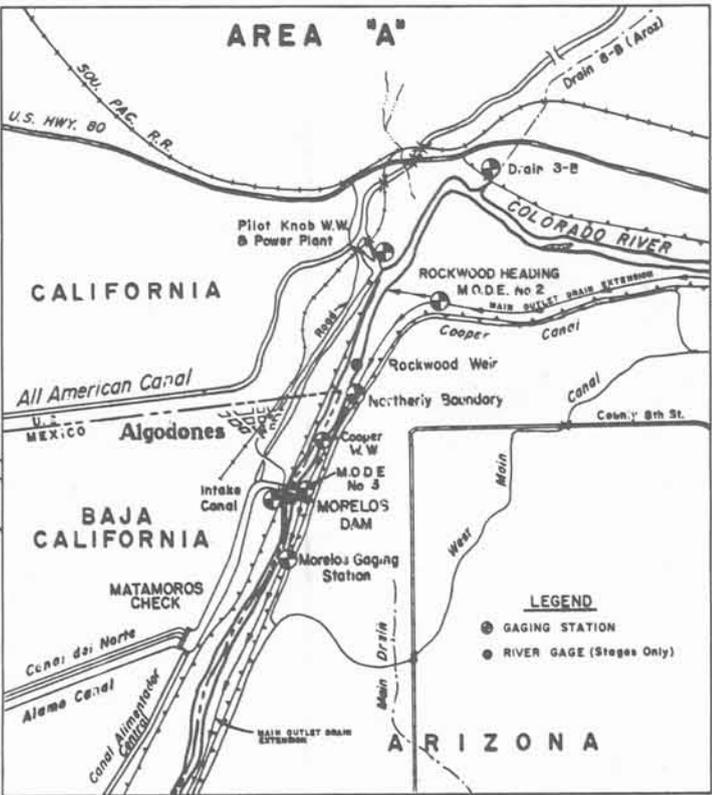
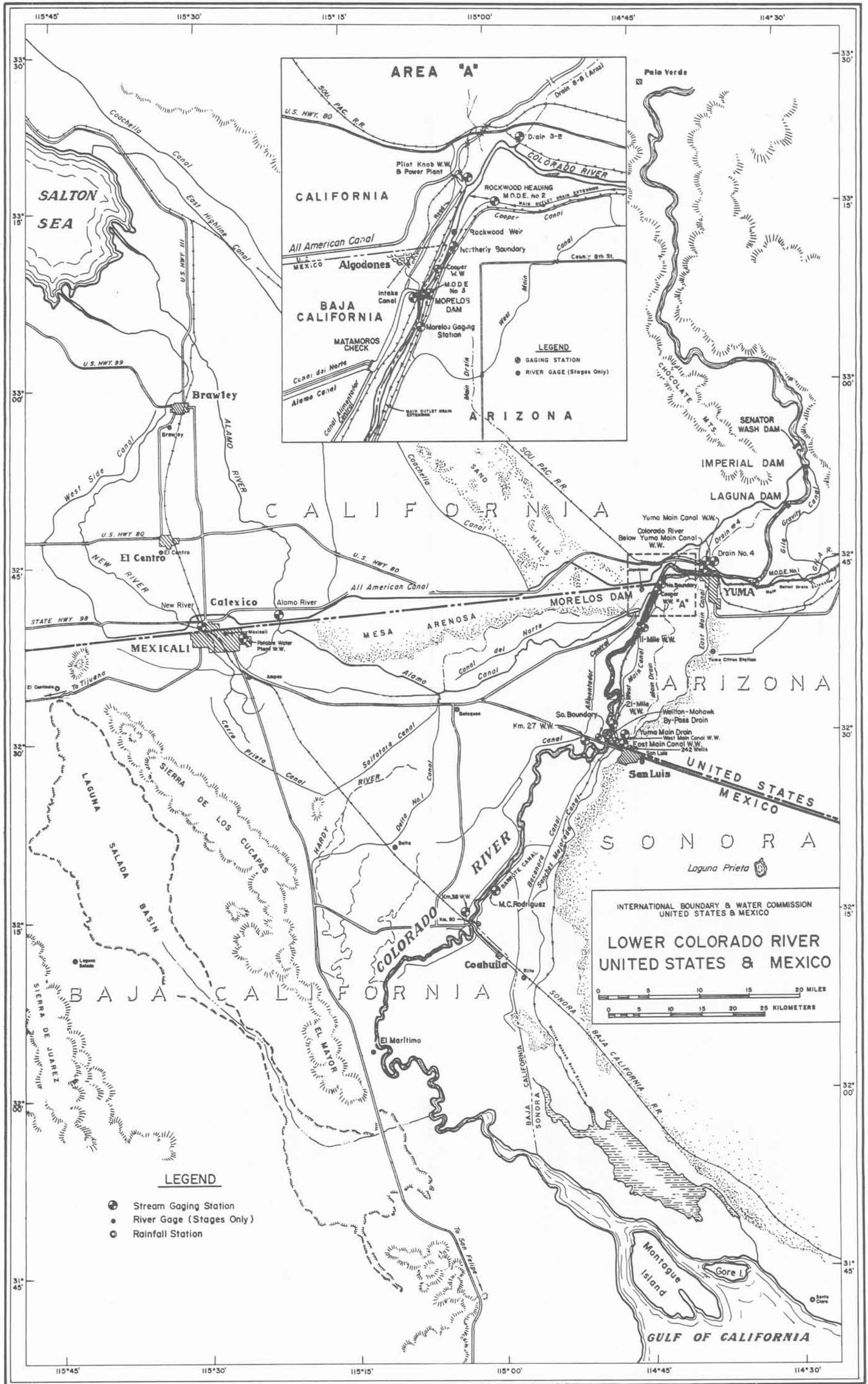
TEMPERATURE IN THE SANTA CRUZ RIVER BASIN IN DEGREES CELSIUS

2002 Bulletin, Page 83. Corrected Minimum Annual Temperature for Nogales Sanitation Plant-9N to -10.0 degrees C

2003 Bulletin, Page 84. Corrected Minimum Annual Temperature for Nogales Sanitation Plant-9N to -12.0 degrees C

09-5220.30 INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

2003 Bulletin, Page 20. Corrected November and December Average Volume for Period of Record, November is 89,139 Thousand Cubic Meters and December is 119,944 Thousand Cubic Meters.



INTERNATIONAL BOUNDARY & WATER COMMISSION  
 UNITED STATES & MEXICO

**LOWER COLORADO RIVER  
 UNITED STATES & MEXICO**

0 5 10 15 20 MILES  
 0 5 10 15 20 25 KILOMETERS

- LEGEND**
- Stream Gaging Station
  - River Gage (Stages Only)
  - Rainfall Station