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WESTERN WATER BULLETIN 1999

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

COLORADO RIVER

TIJUANA RIVER

SANTA CRUZ RIVER

SAN PEDRO RIVER

WHITEWATER DRAW

1999

CONTENTS

Foreword and Acknowledgments	4
General Hydrologic Conditions for 1999	6
Map of Western Boundary - Douglas, Arizona to Pacific Ocean	44

I - COLORADO RIVER - IMPERIAL DAM TO GULF OF CALIFORNIA

Map of Lower Colorado River, United States and Mexico	Following Page	84
---	----------------	----

QUANTITY OF WATER

Stream-Flow and Stage Records	
Tributary - Reservation Main Drain No. 4 (California Drain)	8
Yuma Main Canal Wasteway to Colorado River at Yuma, Arizona	9
Colorado River below Yuma Main Canal Wasteway at Yuma, Arizona - Discharges	10
below Yuma Main Canal Wasteway at Yuma, Arizona - Stages	11
Tributary - Yuma Mesa Outlet Drain to Colorado River near Yuma, Arizona	12
Drain No. 8-B (Araz Drain)	13
Pilot Knob Power Plant and Wasteway near Pilot Knob, California	14
Colorado River at Northerly International Boundary - Discharges	15
at Northerly International Boundary - Stages	16
Tributary - Cooper Wasteway (Valley Division, Yuma Project)	17
Colorado River immediately above Morelos Dam - Stages	18
Diversions from the Colorado River - Intake Canal at Morelos Diversion Structure - Discharges	19
at Morelos Diversion Structure - Stages	20
Colorado River immediately below Morelos Dam - Stages	21
Tributary - Wellton-Mohawk Drainage Water Discharged to Colorado River below Morelos Dam	22
Tributary - Eleven Mile Wasteway (Valley Division, Yuma Project)	23
Colorado River at Eleven Mile Gage - Stages	24
Tributary - Twenty-one Mile Wasteway (Valley Division, Yuma Project)	25
East Main Canal Wasteway (Valley Division, Yuma Project)	26
Yuma Main Drain (Valley Division, Yuma Project)	27
West Main Canal Wasteway (Valley Division, Yuma Project)	28
242 Well Field near San Luis, Arizona	29
Total Flows Crossing International Boundary into Mexico near San Luis, Sonora	30
Colorado River at Southerly International Boundary - Discharges	31
at Southerly International Boundary - Stages	32
Wellton-Mohawk Bypass Drain at Southerly International Boundary	33
Tributary - Wasteway to Colorado River at Kilometer 27 in Mexico	34
Tributary - Wasteway to Colorado River at Kilometer 38 in Mexico	35
Stored Water in Large Reservoirs of the Colorado River	36

QUALITY OF WATER

Suspended Silt in the Colorado River and Intake Canal at Morelos Diversion Structure	37
Chemical Analyses of Water Samples	38
Specific Conductance of Water Samples	39

CLIMATOLOGICAL DATA AND IRRIGATED AREAS

Rainfall on the Colorado River Watershed	41
Location of Rainfall Stations on the Colorado River	42
Evaporation in the Colorado River Basin	43
Temperature in the Colorado River Basin	46
Irrigated Areas along the Colorado River below Imperial Dam	48

II - ALAMO AND NEW RIVERS

QUANTITY OF WATER

Stream-Flow and Stage Records	
Alamo River at International Boundary	49
New River at International Boundary	50
Tributary - Wastes from Mexicali Potable Water Plant to New River in Mexico	51
Waste Waters from Mexican System of Canals Entering the United States	52
Salton Sea - Elevations of Water Surface	53

CONTENTS

QUALITY OF WATER

Chemical Analyses of Water Samples	54
Specific Conductance of Water Samples	56

III - TIJUANA RIVER

Map of Tijuana River Drainage Basin	57
---	----

QUANTITY OF WATER

Stream-Flow Records	
Cottonwood Creek above Morena Dam, California	58
below Morena Dam, California	59
above Barrett Dam, California	60
Diversions from Cottonwood Creek - Dulzura Conduit below Barrett Dam, California	61
Cottonwood Creek below Barrett Dam, California	62
above Tecate Creek near Dulzura, California	63
Tributary - Campo Creek near Campo, California	64
Inflows to Rodriguez Reservoir, Baja California	65
Diversions from Rodriguez Reservoir, Baja California	66
Tijuana River at International Boundary	67
Stored Water in Reservoirs, Tijuana River Basin	68

CLIMATOLOGICAL DATA AND DRAINAGE BASIN AND IRRIGATED AREAS

Rainfall on the Tijuana River Watershed	69
Location of Rainfall Stations on the Tijuana River Watershed	71
Evaporation in the Tijuana River Basin	72
Temperature in the Tijuana River Basin	73
Drainage Areas above gaging Stations and Irrigated Areas along Tijuana River and Tributaries	74

IV - WHITEWATER DRAW, SAN PEDRO, AND SANTA CRUZ RIVERS

Map of Western Boundary - Santa Cruz River, San Pedro River, and Whitewater Draw Basins	75
---	----

QUANTITY OF WATER

Stream-Flow Records	
Whitewater Draw near Douglas, Arizona	76
Sewage Influent, Douglas, Arizona International Treatment Plant	77
San Pedro River at Palominas, Arizona	78
Santa Cruz River near Lochiel, Arizona	79
near Nogales, Arizona	80
Sewage Influent, Nogates International Treatment Plant	81

CLIMATOLOGICAL DATA

Rainfall and Location of Rainfall Stations on the Santa Cruz River Watershed	82
Temperature in the Santa Cruz River Basin	83
Drainage Areas above Gaging Stations and Irrigated Areas along Santa Cruz River, San Pedro River, and Whitewater Draw	84

FOREWORD

This bulletin is the fortieth 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 1999.

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 1999 amounted to 2,096,931 thousand cubic meters, in accordance with Article 10 of the 1944 Water Treaty. No diversions were made to a substitute canal in 1999.

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) have been diverted to the Alamo Canal at Morelos Dam.

TIJUANA RIVER BASIN

The total drainage area of the Tijuana River basin is 4,483 square kilometers, of which 27 percent lies in the United States and 73 percent in Mexico. This river is formed by the principal tributaries, Cottonwood Creek, which rises in the United States and Rio de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 34 kilometers from the Pacific Ocean to join the Rio de las Palmas in Mexico. From the confluence of these tributaries, the Tijuana River flows northwesterly 8 kilometers to cross the land boundary into the United States near San Ysidro, California and Tijuana, Baja California, and then flows westerly 10 kilometers to discharge into the Pacific Ocean 3 kilometers north of the boundary. The flow of Cottonwood Creek is partially controlled by Barrett and Morena Reservoirs in the United States, and the flow of the Rio de las Palmas is partially controlled by Rodriguez Reservoir in Mexico.

WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

Whitewater Draw rises in the United States and flows south into Mexico, crossing the international boundary near Douglas, Arizona, eventually discharging into the Gulf of California through the Yaqui River in Mexico. The total drainage area above the Douglas Gaging Station is 2,650 square kilometers. A number of mountain streams in the upper reaches of the basin are diverted for irrigation, but they would normally sink or go to ground water before reaching the main water course.

FOREWORD

SAN PEDRO RIVER AT PALOMINAS, ARIZONA

The San Pedro River rises in Mexico and flows north into the United States, crossing the boundary near Palominas, Arizona and thence northwesterly into the Gila River. The river in the vicinity of the international boundary drains an area of 1,919 square kilometers, of which 1,681 square kilometers are in Mexico.

SANTA CRUZ RIVER NEAR NOGALES AND LOCHIEL, ARIZONA

The Santa Cruz River rises in the United States and flows south into Mexico, crossing the international boundary near Lochiel, Arizona and returning to the United States near Nogales, Arizona, eventually discharging into the Gila River southwest of Phoenix, Arizona. The drainage area of the Santa Cruz River above Nogales station is 1,380 square kilometers. Of this amount, 901 square kilometers lie in Mexico. There are a few ground water irrigation diversions above the Lochiel station in Arizona and an unknown amount of water diverted for irrigation in Mexico.

ACKNOWLEDGMENTS

Other agencies which have contributed to the data published herein include the Bureau of Reclamation and the Geological Survey of the U. S. Department of the Interior; the National Weather Service, Department of Commerce; the Yuma County Water Users' Association; the Imperial Irrigation District; the city of San Diego, California; the Otay Municipal Water District; and the Ministry of Agriculture and Hydraulic Resources of Mexico. Specific notation is made of each of the above named agencies, where the data appear. The courtesy and cooperation of those who have made these contributions are acknowledged with appreciation.

UNITS OF MEASURE

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

GENERAL HYDROLOGIC CONDITIONS FOR 1999

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 1999. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 1999 measured at 3 index stations was 21 millimeters, compared to an average of 52 millimeters during the last 41 years (1959 to 1999).

The flow of the Colorado River reaching Imperial Dam was 8,156,827 thousand cubic meters, about 89% of the 65-year average (1935-1999) of 9,959,779 thousand cubic meters. At the Northerly International Boundary, the total flow of the river during 1999 was 3,403,962 thousand cubic meters, about 72% of the 1935-1999 average of 4,739,968 thousand cubic meters. At the Southerly International Boundary, the flow during 1999 was 1,110,798 thousand cubic meters, about 34% of the 1935-1999 average of 3,238,488 thousand cubic meters.

The total of all flows of the Colorado River entering Mexico in 1999 amounted to 3,666,889 thousand cubic meters, 69% of the 1935-1999 average of 5,324,539 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 1999, other waters arrived at the Mexican points of diversion and amounted to 1,472,914 thousand cubic meters. These waters consisted mainly of excess waters released from reservoirs on the Colorado River. A maximum instantaneous flow of 417 cubic meters per second occurred in the Colorado River at the Northerly International Boundary station on January 1, 1999.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 33,463.3 million cubic meters, 95% of the usable capacity of 35,263.2 million cubic meters. The greater part (30,833.3 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 1999 due to drought or accident to the irrigation system.

The total reported area irrigated from waters of the Colorado River below Imperial Dam in 1999 was 401,723 hectares; 277,854 hectares in the United States and 123,869 hectares in Mexico. An estimated 33% of the total area irrigated in Mexico is served by pumping from ground water.

TIJUANA RIVER BASIN

During 1999, the temperatures at Barrett Dam, California (elevation 533.40 meters) in the upper portion of the basin in the United States averaged 17.1 degrees Celsius, which is the same as the 69-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 Celsius below the normal for many years.

At Barrett Dam, in the upper portion of the basin in the United States, the recorded precipitation was 208 millimeters, 46% of normal; and at Lower Otay Dam near the lower end of the basin, 187 millimeters, or 65% 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 141 millimeters, 60% of the 61-year average.

Runoff above Barrett and Rodriguez Reservoirs during 1999 was about 7% of normal. Above Morena Reservoir, the runoff was 2,617 thousand cubic meters, or about 20% of the 63-year 1937-1999 mean of 13,199 thousand cubic meters. Above Barrett Reservoir, the runoff was 3,691 thousand cubic meters, or about 20% of the 63-year 1937-1999 mean of 17,330 thousand cubic meters. At Rodriguez Reservoir, the runoff was 197 thousand cubic meters, or about 0.6% of the 62-year mean of 33,562 thousand cubic meters.

The flow of the Tijuana River at the international boundary was 6,812 thousand cubic meters during 1999.

WHITEWATER DRAW

During 1999, the average annual temperature over the watershed was 1.2 degrees Celsius above normal, while the annual precipitation was 68% of normal. Runoff for the year at the gaging station near Douglas, Arizona, was 5,818 thousand cubic meters, or about 89% of average.

GENERAL HYDROLOGIC CONDITIONS FOR 1999

SAN PEDRO RIVER

During 1999, the average annual temperature was 0.4 degree Celsius above normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 62% of the 1961-1999 mean of 521 millimeters. The stream flow at the international boundary was 15,627 thousand cubic meters, 61% of the 1951-1999 average.

SANTA CRUZ

During 1999, the average annual temperature over the watershed averaged 61.1 degrees Celsius, 0.9 degree above the long term average. The annual precipitation was about 97% of the 61-year 1939-1999 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 10,846 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 5,184 thousand cubic meters. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 5,662 thousand cubic meters from the loop of the river lying in Mexico, or approximately 52% of the flow reaching the Nogales Station.

ALAMO AND NEW RIVERS

During 1999, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, was 23.2 degrees Celsius, 0.7 degree Celsius above normal; and over the drainage area of the New River as recorded at Mexicali, Baja California, it was 24 degrees Celsius, 2 degrees Celsius above the 74-year average.

At El Centro, the precipitation was 30 millimeters, about 44% of the 69-year average; and in Mexicali, the annual precipitation was 48 millimeters, 59% of the 74-year average. The total flow of the New River at the international boundary in 1999 was 218,825 thousand cubic meters, which was about 151% of the 1943-1999 average.

SALTON SEA

During 1999, the average annual temperature around the Salton Sea was 0.4 degree Celsius below the long-term average, while the annual precipitation recorded at Brawley, California was approximately 15% of the long-term mean of 68 millimeters. The water surface of the Salton Sea dropped slightly during the year. The maximum stage, 69.220 below mean sea level, was recorded on May 12 through May 31, 1999, inclusive. The minimum stage, 69.525 meters below mean sea level, was recorded on October 13 through October 28, and November 3 through December 31 inclusive.

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 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.01	2.29	2.44	2.07	2.07	2.07	1.81	1.95	2.10	2.07	2.12	2.15
2	2.01	2.12	2.29	2.21	2.07	2.04	1.84	1.95	2.10	2.07	2.12	2.15
3	2.15	2.27	2.44	2.21	2.12	2.07	1.90	1.90	2.12	2.07	2.12	2.15
4	2.04	2.24	2.15	1.95	2.38	2.07	1.84	1.93	2.18	2.12	2.12	2.15
5	2.10	2.46	2.10	1.87	2.12	2.10	1.78	2.01	2.18	2.04	2.12	2.12
6	2.01	2.21	2.10	1.84	2.07	2.10	1.78	1.95	2.21	2.15	2.12	2.15
7	2.12	2.29	2.21	1.87	2.01	2.15	1.87	1.98	2.24	2.12	2.12	2.18
8	2.15	2.21	2.18	1.87	2.04	2.38	1.84	1.95	2.24	2.04	2.12	2.12
9	2.21	2.41	2.12	1.84	2.04	2.41	1.84	1.93	2.27	1.98	2.15	2.12
10	2.29	2.44	2.21	1.84	1.98	2.44	2.01	1.95	2.27	1.98	2.15	2.15
11	2.27	2.12	2.10	1.87	1.98	2.35	2.01	1.98	2.27	1.98	2.15	2.18
12	2.27	2.10	2.04	1.84	1.98	2.24	1.84	1.93	2.32	2.01	2.15	2.15
13	2.35	2.01	2.21	1.87	1.98	2.21	1.84	1.95	2.24	2.15	2.15	2.15
14	2.27	2.10	2.24	1.84	2.10	2.18	1.81	1.95	2.18	2.01	2.15	2.12
15	2.35	2.15	2.27	1.87	2.07	2.10	1.81	1.98	2.07	2.01	2.15	2.04
16	2.41	2.15	2.18	1.90	2.04	1.95	1.93	2.01	2.04	2.01	2.15	2.12
17	2.52	2.07	2.04	1.87	2.10	2.01	1.93	2.04	2.04	1.98	2.15	2.10
18	2.52	2.07	2.07	1.87	2.07	1.98	1.90	2.10	2.18	2.01	2.15	2.15
19	2.49	2.27	1.98	1.90	2.07	1.98	1.98	2.07	2.10	2.04	2.15	2.07
20	2.49	2.10	2.07	1.90	1.98	1.98	1.87	2.10	2.12	2.01	2.15	2.07
21	2.49	2.07	2.10	1.87	1.98	1.98	1.90	2.07	2.15	2.12	2.15	2.15
22	2.46	2.10	1.98	1.93	2.10	1.93	1.93	2.10	2.15	2.15	2.15	2.07
23	2.46	2.04	1.93	1.90	2.07	1.90	1.98	2.10	2.18	2.15	2.15	2.10
24	2.49	2.10	1.95	1.90	2.07	1.84	1.93	2.12	2.32	2.15	2.15	2.12
25	2.32	2.07	1.95	1.95	2.10	1.95	1.90	2.15	2.24	2.15	2.15	2.10
26	2.12	2.10	1.95	1.90	2.15	1.95	1.95	2.12	2.21	2.15	2.15	2.04
27	2.12	2.10	1.98	1.93	2.07	1.98	1.90	2.12	2.15	2.52	2.15	2.01
28	2.10	2.10	2.01	1.93	2.01	1.90	1.93	2.10	2.63	2.61	2.15	1.98
29	2.12	2.07	2.07	2.04	2.10	1.90	1.95	2.10	2.15	2.21	2.12	2.10
30	2.12	2.04	2.04	2.10	1.84	1.84	1.95	2.12	2.04	2.12	2.15	2.15
31	2.24		1.98		2.10		1.95	2.12		2.12		2.07
Sum	70.07	60.76	65.38	57.69	64.12	61.98	58.70	62.83	65.69	65.30	64.23	65.48

Current Year 1999

Period 1937-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters				
	High	Low	Day	φ High		Day		φ Low	Total	Average	Maximum	Minimum
				Day	φ							
Jan.			117	2.52	1	2.01	2.26	6,054	4,165	6,054	711	
Feb.			5	2.46	13	2.01	2.17	5,250	3,849	5,493	456	
Mar.			1	2.44	23	1.93	2.11	5,649	4,730	6,617	1,005	
April			1	2.21	6	1.84	1.92	4,984	4,728	6,476	940	
May			4	2.38	110	1.98	2.07	5,540	4,921	6,895	804	
June			10	2.44	124	1.84	2.07	5,355	4,739	6,883	717	
July			110	2.01	5	1.78	1.89	5,072	4,988	8,079	662	
Aug.			25	2.15	3	1.90	2.03	5,429	4,992	8,400	698	
Sept.			28	2.63	116	2.04	2.19	5,676	4,755	7,672	721	
Oct.			28	2.61	9	1.98	2.11	5,642	5,006	7,080	843	
Nov.			9	2.15	1	2.12	2.14	5,549	4,710	7,367	806	
Dec.			7	2.18	28	1.98	2.11	5,657	4,498	6,241	783	
Yearly				2.63		1.78	2.09	65,857	56,081	78,573	10,410	

φ Mean daily

! And other days

09-5250.00 YUMA MAIN CANAL WASTEWAY TO COLORADO RIVER AT YUMA, ARIZONA

DESCRIPTION: The wasteway receives water from the Yuma Main Canal at the check structure on the canal, 501 meters upstream from the intake of the Colorado River siphon, and 5.1 kilometers downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side, 305 meters upstream from Colorado River below Yuma Main Canal Wasteway, and 10.5 kilometers upstream from the northerly international land boundary.

RECORDS: Discharge is computed as the difference between the measured discharge of the Yuma Main Canal at the Siphon Drop Power Plant upstream and that of the same canal below the Colorado River siphon, with deductions for small irrigation diversions from the canal between the two gaging stations. Records obtained and furnished by U. S. Geological Survey. Records available: April 1913 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	23.9	3.20	7.99	3.74	4.81	1.10	0.59	1.13	11.6	8.92	11.0	13.3
2	21.7	3.85	12.3	5.55	5.21	1.16	.76	1.19	9.37	4.11	8.16	14.3
3	20.6	3.14	16.5	5.72	4.70	1.10	.93	1.87	5.27	5.64	9.18	14.9
4	18.9	3.71	7.48	5.75	2.92	1.13	.82	2.46	13.2	5.13	12.1	15.0
5	14.5	4.39	5.15	3.29	3.94	.76	.65	2.07	16.2	4.02	9.09	18.3
6	13.8	4.73	5.89	4.13	4.53	.42	.68	1.98	17.2	5.21	8.89	21.4
7	15.2	5.41	6.66	5.55	3.77	.20	1.02	2.21	17.1	4.81	13.9	12.6
8	17.1	3.74	6.03	5.98	3.29	.03	1.33	2.66	15.0	3.77	13.7	3.03
9	19.3	3.54	4.93	6.71	5.27	1.33	1.33	2.58	15.6	4.45	11.9	2.27
10	20.9	2.27	4.45	6.66	3.62	2.24	1.33	2.97	14.1	6.03	10.8	3.68
11	19.7	2.75	4.50	5.92	2.63	2.15	2.01	2.92	14.4	7.08	10.8	4.62
12	15.7	3.12	5.38	5.61	2.35	1.42	.57	2.92	15.7	5.69	12.0	4.13
13	14.6	3.12	5.32	4.79	2.29	1.27	2.24	2.72	13.6	4.13	12.0	3.79
14	14.9	3.20	4.39	4.22	2.15	.20	2.35	3.14	12.0	3.09	14.2	3.20
15	17.1	3.88	3.20	3.57	1.81	.62	2.01	2.63	9.26	3.26	14.2	1.87
16	18.3	3.88	1.53	3.43	.74	.62	1.44	1.67	7.08	4.22	11.6	1.73
17	21.4	4.36	3.40	3.77	1.02	0	.65	6.03	8.04	7.02	11.7	2.29
18	21.5	4.67	4.13	4.56	4.64	.91	3.31	16.2	9.06	7.96	13.1	1.78
19	15.4	3.65	3.37	4.42	6.43	.34	7.79	13.6	11.1	6.32	13.8	2.55
20	8.27	4.02	3.88	4.67	1.50	.82	7.08	14.6	12.2	4.73	14.3	3.40
21	4.13	5.10	5.15	4.02	.79	.06	7.14	13.1	12.3	4.93	16.5	5.15
22	3.46	4.53	4.47	3.88	.62	.23	3.85	13.4	11.8	6.15	15.7	1.93
23	3.23	3.88	4.08	3.46	.93	.93	1.81	12.8	13.2	6.40	12.5	2.69
24	4.08	3.85	3.94	3.82	.93	1.16	1.05	17.8	14.2	8.58	13.9	3.20
25	3.51	4.28	4.42	3.91	.65	.08	1.44	17.4	12.8	8.16	17.8	5.27
26	3.96	4.22	4.79	4.16	.82	.65	1.64	17.0	11.4	6.29	14.7	3.91
27	3.77	5.55	5.18	4.67	.79	.74	1.90	16.9	8.72	6.57	13.1	1.76
28	3.23	5.27	5.13	3.79	.85	.59	2.72	12.7	6.03	6.49	16.6	2.10
29	2.75		4.90	4.59	1.16	.34	3.51	12.8	4.59	6.97	16.7	3.17
30	3.23		4.70	4.73	.79	.65	1.95	9.83	3.71	6.03	13.3	2.63
31	3.23		4.70		.48		1.73	11.2		9.46		2.89
Sum	391.35	111.31	167.94	139.07	76.43	23.25	67.63	242.48	345.83	181.62	387.22	182.84

Month	Current Year 1999						Period 1935-1999				
	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			1	23.9	29	2.75	12.6	33,813	54,410	136,546	550
Feb.			27	5.55	10	2.27	3.98	9,617	44,348	109,952	444
Mar.			3	16.5	16	1.53	5.42	14,510	44,010	111,248	440
April			9	6.71	5	3.29	4.64	12,016	43,612	106,795	402
May			19	6.43	31	.48	2.47	6,604	51,503	108,892	411
June			10	2.24	17	0	.78	2,009	45,093	107,263	422
July			19	7.79	12	.57	2.18	5,843	42,034	112,518	455
Aug.			24	17.8	1	1.13	7.82	20,950	45,539	110,878	455
Sept.			6	17.2	30	3.71	11.5	29,880	50,760	103,193	440
Oct.			31	9.46	14	3.09	5.86	15,692	45,194	111,075	699
Nov.			25	17.8	2	8.16	12.9	33,456	45,973	125,198	882
Dec.			6	21.4	16	1.73	5.90	15,797	52,764	134,203	570
Yearly				23.9		0	6.35	200,187	565,240	1,286,335	8,226

φ Mean daily

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 1999. 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	192	38.8	39.6	24.7	31.7	20.5	20.0	24.8	30.9	29.7	78.7	63.4
2	151	27.2	58.6	30.9	31.2	20.7	20.1	22.0	29.5	24.9	73.3	63.4
3	108	30.0	46.2	37.7	36.8	20.5	21.0	23.1	24.2	25.8	73.3	64.6
4	73.6	29.7	28.6	28.2	47.3	21.2	21.6	27.0	32.9	26.4	77.6	63.7
5	36.2	45.6	24.9	24.2	32.6	20.6	23.6	32.9	35.7	27.3	74.8	64.6
6	35.4	72.5	25.0	33.4	27.7	19.7	20.4	22.8	36.8	27.7	73.6	64.3
7	36.2	65.7	27.5	45.9	26.9	49.3	30.3	18.1	36.5	25.9	79.6	36.5
8	37.4	72.5	30.9	32.3	24.5	83.8	21.2	19.6	34.6	24.7	75.9	25.5
9	40.2	54.7	25.8	24.7	25.4	91.2	18.4	19.1	34.6	25.5	59.5	24.1
10	63.4	46.2	25.7	25.3	23.9	94.9	19.3	19.3	33.1	26.8	56.6	24.5
11	77.9	24.6	24.9	30.3	25.2	79.3	20.4	20.2	33.4	27.6	57.2	24.6
12	62.6	21.8	25.3	24.9	22.4	65.7	20.2	20.8	34.8	33.4	58.6	23.9
13	53.8	20.7	25.5	24.9	22.8	62.9	25.3	21.1	32.9	72.5	58.3	23.0
14	52.1	23.9	32.3	23.0	22.8	60.9	23.8	22.1	30.9	29.7	60.6	22.0
15	57.2	27.3	39.9	23.8	22.5	36.5	23.3	21.4	28.0	24.6	60.3	20.5
16	58.9	22.3	30.3	30.6	25.6	24.2	22.4	27.8	26.0	25.2	58.1	20.0
17	46.2	22.3	30.3	28.6	26.4	22.9	21.7	27.6	26.5	27.2	57.8	20.3
18	41.1	24.6	27.9	28.1	27.2	22.7	22.9	37.9	27.9	27.7	59.8	19.9
19	35.4	30.6	24.7	27.2	28.3	22.3	30.3	34.3	29.5	26.9	60.9	20.9
20	28.0	22.1	27.4	27.6	22.9	23.1	27.9	35.7	30.3	25.6	60.9	22.4
21	23.8	22.3	32.9	27.3	21.6	21.7	26.8	33.4	30.3	57.8	63.4	40.8
22	22.3	24.8	25.7	27.6	20.8	21.4	23.1	32.9	30.3	73.3	61.7	23.9
23	21.4	21.8	24.7	26.5	20.7	21.6	22.5	34.6	31.7	75.0	57.8	22.8
24	22.1	21.6	21.5	27.9	24.0	21.9	22.2	41.3	33.4	77.9	59.5	22.9
25	21.4	21.4	22.8	29.2	27.5	20.4	21.5	46.2	32.9	78.7	63.2	24.6
26	22.6	21.4	23.8	28.3	24.9	21.2	21.4	41.3	32.0	100	59.5	22.7
27	23.4	22.6	24.7	28.9	21.5	21.6	28.9	37.9	28.6	135	57.2	20.1
28	22.9	24.9	24.8	30.3	21.1	21.3	23.5	32.9	58.6	140	62.0	19.7
29	22.5		24.6	33.1	21.6	20.4	27.0	32.6	31.7	112	68.0	20.6
30	22.5		23.8	33.1	21.0	20.2	29.7	34.6	27.1	78.4	64.3	20.0
31	31.2		24.3		20.2		26.6	34.0		78.4		22.4
Sum	1,542.7	903.8	898.9	868.5	797.0	1,074.6	727.3	899.3	965.6	1,591.6	1,932.0	972.6

Current Year 1999

Period 1951-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		Day		Total	Average	Maximum	Minimum
				φ High	φ Low						
Jan.			1	192	123	21.4	49.8	133,289	270,430	1,317,479	36,828
Feb.			! 6	72.5	13	20.7	32.3	78,088	220,613	1,228,424	41,083
Mar.			2	58.6	24	21.5	29.0	77,665	242,562	1,610,496	42,683
April			7	45.9	14	23.0	29.0	75,038	217,005	1,119,312	41,552
May			4	47.3	31	20.2	25.7	68,861	215,027	1,065,554	43,373
June			10	94.9	6	19.7	35.8	92,845	210,647	1,113,679	36,996
July			! 7	30.3	9	18.4	23.5	62,839	237,188	2,013,773	37,956
Aug.			25	46.2	7	18.1	29.0	77,700	242,524	2,073,958	41,457
Sept.			28	58.6	3	24.2	32.2	83,428	218,899	1,669,785	53,264
Oct.			28	140	15	24.6	51.3	137,514	187,858	1,789,911	43,129
Nov.			7	79.6	10	56.6	64.4	166,925	191,241	1,292,035	42,965
Dec.			! 3	64.6	28	19.7	31.4	84,033	223,225	1,374,775	40,733
Yearly				192		18.1	36.1	1,138,225	2,677,219	13,065,596	633,707

φ Mean daily

! And other days

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

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.685	3.845	3.830	3.525	3.660	3.435	3.410	3.535	3.625	3.605	4.380	4.170
2	5.405	3.610	4.125	3.650	3.650	3.440	3.410	3.480	3.595	3.515	4.310	4.170
3	4.985	3.665	3.925	3.775	3.710	3.435	3.425	3.505	3.500	3.535	4.310	4.185
4	4.460	3.660	3.620	3.600	3.960	3.445	3.435	3.580	3.655	3.550	4.375	4.175
5	3.855	3.970	3.550	3.515	3.665	3.435	3.480	3.680	3.705	3.565	4.325	4.180
6	3.835	4.415	3.540	3.700	3.580	3.415	3.415	3.495	3.720	3.570	4.315	4.175
7	3.850	4.315	3.580	3.915	3.565	3.940	3.610	3.405	3.710	3.540	4.400	3.700
8	3.870	4.405	3.640	3.670	3.520	4.620	3.430	3.430	3.680	3.515	4.345	3.470
9	3.925	4.130	3.535	3.525	3.540	4.750	3.375	3.420	3.685	3.535	4.120	3.440
10	4.305	3.980	3.535	3.540	3.510	4.815	3.395	3.425	3.660	3.555	4.085	3.445
11	4.510	3.560	3.515	3.635	3.535	4.530	3.415	3.440	3.665	3.570	4.085	3.450
12	4.300	3.505	3.525	3.535	3.475	4.255	3.415	3.450	3.690	3.665	4.110	3.430
13	4.165	3.485	3.530	3.535	3.485	4.195	3.520	3.455	3.660	4.300	4.105	3.415
14	4.135	3.545	3.665	3.490	3.485	4.150	3.495	3.475	3.625	3.610	4.140	3.390
15	4.210	3.610	3.805	3.505	3.475	3.730	3.480	3.465	3.575	3.515	4.135	3.365
16	4.235	3.515	3.700	3.640	3.540	3.500	3.465	3.580	3.535	3.525	4.095	3.355
17	4.020	3.515	3.625	3.605	3.595	3.475	3.450	3.580	3.545	3.565	4.095	3.360
18	3.920	3.565	3.580	3.595	3.565	3.470	3.480	3.795	3.570	3.575	4.120	3.355
19	3.800	3.670	3.515	3.580	3.585	3.465	3.625	3.690	3.600	3.565	4.140	3.370
20	3.660	3.510	3.570	3.585	3.485	3.480	3.580	3.710	3.615	3.535	4.135	3.400
21	3.580	3.515	3.680	3.580	3.460	3.445	3.560	3.675	3.615	4.080	4.175	3.775
22	3.550	3.565	3.540	3.585	3.445	3.440	3.485	3.665	3.620	4.300	4.150	3.430
23	3.525	3.505	3.515	3.560	3.440	3.445	3.480	3.695	3.640	4.330	4.090	3.410
24	3.540	3.500	3.455	3.585	3.510	3.450	3.470	3.805	3.665	4.370	4.115	3.410
25	3.520	3.495	3.480	3.610	3.580	3.415	3.460	3.910	3.660	4.390	4.170	3.445
26	3.540	3.495	3.500	3.595	3.525	3.430	3.460	3.805	3.640	4.695	4.115	3.400
27	3.555	3.525	3.525	3.605	3.455	3.440	3.605	3.745	3.585	5.140	4.080	3.355
28	3.540	3.565	3.525	3.630	3.445	3.435	3.500	3.665	4.125	5.195	4.150	3.345
29	3.535		3.520	3.680	3.455	3.415	3.570	3.660	3.635	4.860	4.235	3.360
30	3.525		3.505	3.680	3.445	3.410	3.625	3.690	3.560	4.385	4.180	3.350
31	3.695		3.515		3.430		3.570	3.680		4.380		3.400
Avg.	4.010	3.700	3.600	3.610	3.540	3.710	3.485	3.600	3.645	3.935	4.185	3.570

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 1999. 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.87	1.78	1.50	1.67	1.67	1.90	1.78	1.78	1.16	1.05	0.96	0.91
2	1.87	1.93	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	.96	.91
3	1.87	1.93	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	.99	.91
4	1.87	1.90	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	1.02	.91
5	1.87	1.84	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	1.02	.91
6	1.87	1.84	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	1.02	.91
7	1.87	1.84	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	1.02	.91
8	1.87	1.84	1.50	1.67	1.67	1.90	1.78	1.78	1.22	1.05	.96	.91
9	1.87	1.90	1.50	1.67	1.67	1.87	1.78	1.78	1.22	1.05	.93	.91
10	1.87	1.93	1.50	1.67	1.67	1.81	1.78	1.78	1.22	1.05	.93	.91
11	1.87	1.81	1.50	1.67	1.67	1.81	1.78	1.78	1.22	1.05	.93	.91
12	1.87	1.64	1.50	1.67	1.76	1.81	1.78	1.78	1.22	1.05	.93	.91
13	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.78	1.22	1.05	.93	.91
14	1.90	1.64	1.50	1.67	1.84	1.81	1.78	1.78	1.22	1.05	.93	.99
15	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.78	1.16	1.05	.93	1.05
16	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.78	1.05	1.05	.91	1.05
17	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.78	1.05	1.05	.91	1.05
18	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.73	1.05	1.05	.91	1.05
19	1.87	1.64	1.50	1.67	1.84	1.81	1.78	1.67	1.05	1.05	.91	1.05
20	1.98	1.64	1.50	1.67	1.84	1.81	1.78	1.67	1.05	1.05	.91	1.05
21	2.04	1.64	1.50	1.67	1.84	1.81	1.78	1.67	1.05	1.05	.91	1.05
22	2.04	1.64	1.50	1.67	1.84	1.81	1.78	1.67	1.05	1.05	.91	1.02
23	2.04	1.64	1.50	1.67	1.84	1.81	1.78	1.67	.93	1.05	.91	.91
24	2.04	1.64	1.59	1.67	1.84	1.81	1.78	1.67	.88	1.05	.91	.91
25	2.04	1.64	1.67	1.67	1.84	1.81	1.78	1.67	.88	1.05	.91	.91
26	2.04	1.61	1.67	1.67	1.84	1.81	1.78	1.67	.88	1.05	.91	.91
27	2.04	1.50	1.67	1.67	1.84	1.81	1.78	1.67	.88	1.05	.91	.91
28	2.04	1.50	1.67	1.67	1.73	1.81	1.78	1.67	.88	1.05	.91	.91
29	2.04		1.67	1.67	1.67	1.73	1.78	1.42	.96	1.05	.91	1.02
30	2.04		1.67	1.67	1.67	1.76	1.78	1.42	1.05	1.05	.91	1.10
31	2.04		1.67	1.67	1.67		1.78	1.56		1.05		1.10
Sum	59.98	48.11	47.78	50.10	54.47	54.95	55.18	53.09	32.87	32.55	28.11	29.87

Current Year 1999

Period 1971-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters				
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum	
												Day
Jan.			121	2.04	1	1.87	1.93	5,182	2,867	7,204	0	
Feb.			1	2	1.93	127	1.50	1.72	4,157	2,698	5,958	0
Mar.			125	1.67	1	1.50	1.54	4,128	3,062	6,698	4.9	
April			1	1	1.67	1	1.67	1.67	4,329	2,978	6,315	299
May			113	1.84	1	1.67	1.76	4,706	2,938	6,085	0	
June			1	1	1.90	29	1.73	1.83	4,748	2,710	5,955	0
July			1	1	1.78	1	1.78	1.78	4,768	2,928	6,796	613
Aug.			1	1	1.78	129	1.42	1.71	4,587	3,051	7,401	222
Sept.			1	2	1.22	124	.88	1.10	2,840	2,941	7,253	0
Oct.			1	1	1.05	1	1.05	1.05	2,812	3,027	6,611	194
Nov.			1	4	1.02	116	.91	.94	2,429	3,097	6,525	386
Dec.			130	1.10	1	1	.91	.96	2,581	3,306	7,364	0
Yearly				2.04		0.88	1.50		47,267	35,603	72,381	2,162

φ Mean daily

! And other days

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

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

RECORDS: Records are furnished by the U. S. Geological Survey from current meter measurements during the year. Records available: May 1948 through 1999.

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, 0.85 CMS on December 15, 1999; minimum no flow several days in February 1966.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND - 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.34	0.37	0.34	0.34	0.28	0.34	0.31	0.31	0.31	0.37	0.45	0.54
2	.40	.37	.34	.34	.28	.34	.34	.31	.31	.37	.45	.54
3	.42	.37	.34	.34	.28	.31	.34	.31	.31	.37	.42	.57
4	.45	.37	.34	.37	.28	.31	.34	.31	.34	.40	.42	.59
5	.51	.37	.34	.37	.27	.28	.34	.31	.34	.40	.42	.62
6	.54	.34	.34	.40	.26	.28	.31	.31	.34	.40	.45	.62
7	.59	.34	.31	.37	.26	.27	.31	.31	.34	.40	.45	.65
8	.62	.31	.31	.37	.27	.27	.31	.31	.34	.40	.45	.68
9	.57	.31	.31	.34	.27	.27	.31	.31	.34	.40	.48	.71
10	.54	.28	.28	.34	.27	.28	.31	.31	.34	.40	.48	.74
11	.48	.28	.28	.31	.28	.28	.31	.31	.34	.40	.48	.74
12	.42	.28	.28	.31	.28	.28	.31	.34	.34	.40	.51	.76
13	.40	.31	.28	.31	.28	.28	.28	.34	.34	.40	.51	.79
14	.34	.31	.28	.31	.28	.28	.28	.34	.34	.40	.51	.82
15	.34	.31	.28	.31	.31	.28	.28	.34	.34	.40	.54	.85
16	.34	.31	.27	.31	.31	.31	.28	.34	.34	.40	.54	.85
17	.34	.31	.27	.28	.31	.31	.31	.34	.34	.40	.54	.85
18	.34	.31	.27	.28	.31	.31	.31	.34	.34	.40	.54	.85
19	.34	.31	.27	.28	.31	.31	.31	.34	.34	.40	.54	.82
20	.34	.31	.27	.28	.31	.31	.31	.34	.34	.40	.54	.82
21	.34	.34	.27	.28	.31	.31	.31	.34	.34	.40	.54	.79
22	.34	.34	.26	.28	.31	.28	.31	.34	.34	.40	.54	.79
23	.34	.34	.26	.28	.31	.28	.31	.34	.34	.42	.54	.76
24	.34	.34	.26	.28	.31	.28	.31	.34	.34	.42	.54	.76
25	.34	.34	.27	.28	.34	.28	.31	.34	.34	.42	.54	.76
26	.34	.34	.28	.28	.34	.28	.31	.34	.34	.42	.54	.74
27	.34	.34	.28	.28	.34	.28	.31	.34	.34	.42	.54	.74
28	.34	.34	.28	.28	.34	.28	.31	.34	.37	.42	.54	.71
29	.34	.31	.28	.34	.28	.31	.34	.37	.45	.54	.54	.71
30	.34	.31	.28	.34	.28	.31	.31	.37	.45	.54	.54	.68
31	.37		.31	.34			.31	.31		.45		.68
Sum	12.43	9.19	9.09	9.36	9.32	8.73	9.61	10.15	10.20	12.58	15.12	22.53

Current Year 1999

Period 1948-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		Day		Total	Average	Maximum	Minimum
				φ High	φ Low						
Jan.			8	0.62	1	0.34	0.40	1,074	488	1,109	48.5
Feb.			1	.37	10	.28	.33	794	417	920	50.0
Mar.			1	.34	122	.26	.29	785	491	1,052	77.3
April			6	.40	117	.28	.31	809	494	1,233	82.4
May			125	.34	1	.26	.30	805	517	1,192	71.9
June			1	.34	1	.27	.29	754	515	1,270	83.1
July			1	.34	113	.28	.31	830	580	1,554	89.8
Aug.			112	.34	1	.31	.33	877	640	1,665	91.0
Sept.			128	.37	1	.31	.34	881	652	1,690	66.1
Oct.			129	.45	1	.37	.41	1,087	726	1,505	68.2
Nov.			115	.54	3	.42	.50	1,306	674	1,530	71.2
Dec.			115	.85	1	.54	.73	1,947	585	12,295	52.1
Yearly				0.85		0.26	0.38	11,949	6,779	15,331	955

φ Mean daily

! And other days

09-5270.00 PILOT KNOB POWER PLANT AND WASTEWAY
NEAR PILOT KNOB, CALIFORNIA

DESCRIPTION: The Pilot Knob Power Plant and Wasteway is located on the All-American Canal, 33.5 kilometers downstream from the intake at Imperial Dam, 9.7 kilometers west of Yuma, about 1.6 kilometers north of the northerly international boundary and empties into the old Alamo Canal in the United States and thence into the Colorado River through Rockwood gates, about 1.6 kilometers upstream from the northerly international boundary. Water-stage recorder is located in forebay on right bank of the All-American Canal, 168 meters upstream from wasteway gates and 549 meters from the entrance to the power plant. Datum of gage is 45.72 meters above mean sea level. Tailrace gage is on left bank, 207 meters downstream from power plant with automatic recording equipment in control house. All bypass gates are equipped with calibrated openings which are read on all gate changes. Datum of tailrace gage is at mean sea level; elevation of sill of wasteway gates is 45.07 meters, U. S. C. & G. S. datum. Prior to October 1956, this station was published as "Pilot Knob Wasteway near Pilot Knob, California."

RECORDS: Daily discharge is computed from flowmeter equipment and head and openings on wasteway gates or from head and gate opening on wicket and wasteway gates. Records furnished by the U. S. Geological Survey. Records available: July 1944 through 1999. 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	226	25.9	41.3	64.0	43.0	47.0	61.5	43.9	0	147	93.2	68.0
2	227	28.1	51.0	76.7	38.2	47.3	59.8	49.8	9.77	171	85.5	71.1
3	227	26.1	51.3	144	35.4	45.6	59.5	56.1	51.0	177	68.9	88.1
4	220	26.5	53.0	166	54.1	46.7	58.1	49.0	64.6	139	59.8	86.9
5	190	23.8	54.4	88.1	74.8	43.9	56.4	42.2	59.2	142	56.9	107
6	211	26.9	54.4	69.1	46.7	44.7	59.8	49.0	44.2	146	69.4	57.2
7	205	23.0	53.8	69.1	45.6	28.6	48.7	54.1	56.6	129	77.9	29.7
8	209	23.1	51.5	57.2	48.1	3.29	57.5	46.4	49.8	106	49.8	29.2
9	219	33.1	56.4	62.0	48.1	0	74.2	41.3	37.7	118	59.2	28.3
10	227	35.7	59.8	63.4	40.2	0	95.4	41.9	65.1	138	58.9	28.3
11	227	41.1	59.8	51.3	41.1	15.2	120	34.3	92.6	93.5	49.6	28.3
12	221	44.2	57.8	58.1	42.5	22.5	87.2	34.0	70.5	64.9	64.6	28.3
13	227	51.0	57.8	58.6	40.5	22.5	100	26.9	73.6	56.6	74.4	39.1
14	227	49.8	56.6	60.3	37.4	22.5	117	26.9	91.8	103	108	45.9
15	227	45.3	53.0	60.3	40.2	36.2	103	26.9	66.0	107	66.7	34.6
16	226	56.1	57.8	51.5	76.2	41.9	64.0	22.7	88.1	126	66.0	43.6
17	217	62.3	61.5	57.5	51.3	46.7	54.7	22.5	95.7	166	68.3	47.9
18	96.0	60.6	57.5	59.2	42.8	45.0	55.2	0	112	151	61.5	48.1
19	51.3	53.5	60.3	58.9	39.9	42.2	49.8	0	117	154	78.2	48.1
20	58.6	64.9	59.2	59.2	47.9	42.2	48.4	0	104	144	85.0	45.3
21	64.3	64.3	47.9	58.6	49.3	49.8	49.0	0	105	106	98.1	38.5
22	29.2	60.6	58.9	58.6	49.6	47.0	52.4	0	105	118	58.1	33.7
23	27.6	64.9	61.7	59.2	49.6	47.0	52.1	0	131	131	42.2	45.6
24	27.4	64.9	69.1	58.3	46.7	47.0	52.7	0	163	129	64.0	39.6
25	26.9	64.0	67.4	56.4	46.7	49.6	53.0	0	191	93.2	98.6	39.6
26	23.9	62.9	65.4	57.8	46.2	57.5	53.2	0	183	59.7	75.0	39.6
27	23.9	62.3	65.1	58.1	49.6	49.3	44.2	0	155	32.3	98.5	36.2
28	24.0	60.9	65.1	56.9	53.5	48.4	51.0	0	146	48.4	111	34.3
29	24.0		61.2	53.5	53.8	49.6	62.9	0	170	109	59.6	28.3
30	25.7		63.2	56.6	53.8	53.5	93.7	0	152	140	73.1	29.2
31	23.9		66.3		49.8		90.6	0		154		33.7
Sum		1,305.8	1,799.5	2,008.5	1,482.6	1,142.69	2,085.0	667.9	2,850.27	3,699.6	2,178.8	1,401.3
	4,259.7											

Current Year 1999

Period 1944-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters				
	High	Low	φ High		φ Low			Total	Average	Maximum	Minimum	
			Day		Day							
Jan.			1	2	227	126	23.9	137	368,038	114,895	643,620	0
Feb.			120		64.9	7	23.0	46.6	112,821	92,399	579,127	0
Mar.			24		69.1	1	41.3	58.0	155,477	146,154	501,939	0
April			4		166	11	51.3	67.0	173,534	152,747	447,013	0
May			16		76.2	3	35.4	47.8	128,097	76,517	454,461	0
June			26		57.5	1	9	0	98,728	115,871	501,523	0
July			11		120	27	44.2	67.3	180,144	165,483	512,385	0
Aug.			3		56.1	1	18	0	57,707	162,464	498,782	0
Sept.			25		191	1	0	95.0	246,263	102,330	591,679	0
Oct.			3		177	27	32.3	119	319,645	72,997	617,269	0
Nov.			28		111	23	42.2	72.6	188,248	71,216	609,196	0
Dec.			5		107	1	9	28.3	121,072	109,662	700,894	0
Yearly					227		0	68.2	2,149,774	1,382,735	6,000,505	0

φ Mean daily

! And other days

09-5220.00 COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

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

RECORDS: Based on 211 current meter measurements during the year, 118 by the United States Section, 92 by the Mexican Section of the Commission, 1 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 1999; daily discharge records available January 1, 1950 through 1999.

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 1999 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	410	74.2	90.5	91.7	82.9	72.6	80.7	76.2	36.6	173	174	133
2	396	61.1	114	106	76.5	72.2	80.7	74.9	45.6	189	160	136
3	354	61.9	109	168	76.2	72.4	81.4	82.9	78.5	196	147	150
4	310	61.9	91.0	177	97.8	72.7	80.2	80.0	98.3	168	145	150
5	232	76.0	86.7	117	106	71.6	81.0	76.8	101	166	143	170
6	236	107	85.9	108	77.5	70.6	81.3	73.9	98.2	170	151	134
7	237	99.5	87.3	117	76.5	77.3	81.0	73.7	119	157	159	84.7
8	236	104	91.0	101	75.4	94.7	81.9	70.0	96.5	135	145	60.3
9	248	103	88.1	92.3	76.5	99.8	91.7	65.1	83.2	145	126	60.6
10	275	98.2	89.4	93.2	72.5	105	113	65.5	102	161	129	60.8
11	291	73.2	89.4	91.3	72.6	101	134	59.6	113	128	129	61.3
12	283	73.0	89.3	84.6	71.9	92.9	116	59.0	99.0	103	138	60.7
13	273	79.8	89.4	85.0	70.8	91.1	128	51.4	108	140	144	62.5
14	269	81.9	94.0	85.5	67.9	88.7	141	51.5	118	146	172	65.1
15	272	82.3	102	86.1	68.2	80.5	133	51.0	114	146	143	56.8
16	275	84.2	101	86.9	95.7	71.8	93.8	52.4	122	156	138	57.1
17	255	89.2	98.8	89.8	82.8	73.8	80.5	52.1	124	187	139	68.3
18	145	91.2	94.6	91.2	75.5	74.0	79.8	42.8	128	177	137	69.5
19	98.1	92.8	92.3	90.4	74.0	71.2	85.9	39.4	130	178	149	69.7
20	91.0	93.1	92.3	90.8	75.6	71.0	79.1	40.8	128	171	152	70.4
21	93.3	92.3	89.6	90.2	75.9	74.1	78.1	39.2	143	166	163	91.0
22	59.0	91.6	88.1	91.0	75.6	74.1	78.5	38.8	148	188	133	59.2
23	56.7	92.1	88.9	89.9	75.7	73.2	78.6	39.2	169	202	120	64.8
24	57.1	92.3	93.0	90.9	76.3	73.4	78.6	42.9	182	204	132	64.5
25	55.6	91.0	93.4	90.0	79.4	73.2	77.8	49.7	190	178	160	66.2
26	53.5	90.8	92.7	89.3	78.2	78.5	77.8	45.5	186	164	139	66.0
27	54.3	91.6	93.5	90.6	76.5	71.0	78.8	42.3	179	168	154	64.5
28	53.7	93.1	93.8	90.8	78.3	69.8	78.4	39.7	183	185	171	57.7
29	53.6	89.5	89.5	91.8	78.6	69.0	91.3	38.8	184	221	133	52.4
30	54.1	90.5	93.7	93.7	78.6	72.2	124	39.7	178	215	139	53.4
31	60.2	92.7	92.7	76.0	76.0	72.2	121	39.5	178	231	139	57.6
Sum	5,837.2	2,422.3	2,881.7	2,961.0	2,421.9	2,353.4	2,886.9	1,694.3	3,784.9	5,314	4,364	2,476.1

Current Year 1999

Period 1935-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High		Low		Total	Average	Maximum	Minimum
				Day	Day						
Jan.	35.400	31.885	1	417	25	51.8	188	504,334	497,219	2,027,841	39,348
Feb.	32.505	31.930	6	117	3	55.9	86.5	209,287	425,529	1,705,506	74,502
Mar.	32.555	32.200	2	122	1	83.7	93.0	248,979	455,194	1,642,378	23,930
April	33.070	32.215	4	185	12	82.7	98.7	255,830	374,503	1,322,616	0
May	32.600	32.030	4	126	14	65.8	78.1	209,252	356,623	1,419,735	88,077
June	32.510	32.075	11	116	29	68.5	78.4	203,334	355,698	1,629,906	10,485
July	32.845	32.145	14	152	19	73.6	93.1	249,428	377,962	2,303,937	30,097
Aug.	32.305	31.740	3	90.6	30	35.3	54.7	146,388	387,207	2,485,718	54,026
Sept.	34.000	31.750	28	196	1	35.4	126	327,015	344,622	2,286,076	66,424
Oct.	33.995	32.315	31	236	12	61.3	171	459,130	332,899	2,417,702	52,985
Nov.	33.910	32.705	1	223	8	106	145	377,050	368,575	1,889,976	51,070
Dec.	33.645	32.700	5	182	15	49.3	79.9	213,935	463,937	2,259,735	51,806
Yearly	35.400	31.740		417		35.3	108	3,403,962	4,739,968	19,033,104	890,696

! And other days

09-5220.01 COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	35.275	31.835	32.030	32.110	32.000	31.850	31.990	31.975	31.440	33.480	33.465	33.260
2	35.185	31.690	32.240	32.195	31.930	31.850	31.995	31.945	31.520	33.565	33.335	33.280
3	34.910	31.705	32.220	32.655	31.930	31.860	31.995	32.035	31.940	33.610	33.165	33.355
4	34.550	31.710	32.030	32.760	32.095	31.855	31.985	32.000	32.165	33.455	33.145	33.360
5	33.745	31.860	31.985	32.260	32.170	31.850	31.990	31.965	32.155	33.435	33.115	33.470
6	33.825	32.130	31.975	32.175	31.920	31.835	31.995	31.930	32.185	33.460	33.220	33.265
7	33.840	32.050	31.995	32.235	31.910	31.915	31.985	31.920	32.690	33.385	33.335	32.885
8	33.830	32.090	32.040	32.110	31.900	32.080	31.985	31.885	32.710	33.255	33.170	32.805
9	33.960	32.095	32.005	32.045	31.920	32.125	32.070	31.820	32.645	33.315	33.160	32.820
10	34.255	32.090	32.020	32.055	31.845	32.180	32.270	31.840	32.820	33.410	33.200	32.830
11	34.430	31.835	32.020	32.065	31.840	32.145	32.440	31.765	33.035	33.225	33.205	32.860
12	34.330	31.830	32.020	32.010	31.835	32.080	32.350	31.750	32.705	32.945	33.285	32.830
13	34.210	31.905	32.020	32.015	31.825	32.075	32.415	31.635	33.085	33.300	33.325	32.915
14	34.160	31.930	32.075	32.005	31.795	32.055	32.510	31.630	33.285	33.330	33.485	32.950
15	34.185	31.935	32.180	32.010	31.805	31.960	32.460	31.620	33.090	33.330	33.325	32.555
16	34.225	31.975	32.155	32.020	32.050	31.850	32.140	31.640	33.250	33.385	33.300	32.270
17	34.005	32.025	32.120	32.055	31.955	31.875	32.005	31.650	33.290	33.545	33.510	32.525
18	32.765	32.045	32.080	32.080	31.880	31.885	31.990	31.545	33.360	33.495	33.290	32.565
19	32.085	32.055	32.055	32.070	31.875	31.855	32.070	31.485	33.400	33.505	33.365	32.575
20	32.030	32.060	32.070	32.075	31.895	31.855	31.985	31.510	33.365	33.470	33.395	32.590
21	32.055	32.050	32.065	32.070	31.895	31.900	31.970	31.485	33.335	33.440	33.465	32.945
22	31.690	32.040	32.065	32.080	31.885	31.900	31.975	31.485	33.335	33.560	33.250	32.250
23	31.665	32.050	32.075	32.070	31.890	31.875	31.975	31.495	33.430	33.630	33.085	32.990
24	31.665	32.050	32.120	32.080	31.900	31.880	31.975	31.540	33.570	33.645	33.215	33.030
25	31.635	32.035	32.125	32.075	31.940	31.880	31.965	31.620	33.725	33.515	33.410	33.060
26	31.600	32.035	32.120	32.065	31.925	31.970	31.970	31.570	33.665	33.430	33.285	33.060
27	31.615	32.040	32.130	32.080	31.900	31.910	31.990	31.525	33.535	33.460	33.375	33.005
28	31.610	32.060	32.130	32.085	31.925	31.890	31.985	31.470	33.600	33.550	33.475	32.880
29	31.610		32.080	32.100	31.925	31.855	32.085	31.450	33.635	33.755	33.245	32.675
30	31.615		32.095	32.175	31.925	31.885	32.350	31.475	33.500	33.720	33.285	32.780
31	31.690		32.120	32.100	31.890		32.350	31.485		33.820		32.895
Avg.	33.170	31.970	32.080	32.130	31.915	31.935	32.105	31.680	32.980	33.465	33.290	32.890

09-5318.50 COOPER WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging regulatory waste water from the Cooper Canal to the Colorado River. This wasteway is located 0.8 kilometer downstream from the northerly international boundary and 1.0 kilometer upstream from Morelos Diversion Dam. Prior to July 14, 1971, the wasteway was located 0.6 kilometer downstream from Morelos Diversion Dam. This wasteway discharges waste water from the Valley Division of the Yuma Project in the United States into the Colorado River. Since July 14, 1971, zero of the gage is 35.86 meters above mean sea level, U. S. C. & G. S. datum.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge March 1950 through 1999 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.28	0.01	0	0.02	0	0	0	0	0	0.01	0	0
2	.05	0	0	0	0	0	0	0	0	.01	0	0
3	.07	.12	0	0	0	0	0	0	0	.13	.06	.08
4	.01	.16	.04	0	0	0	0	0	0	.21	.08	.15
5	.16	.09	.13	0	0	0	0	0	0	.09	.12	.03
6	.20	.08	.06	0	.06	0	.06	0	.10	0	0	0
7	.01	.08	0	0	.04	0	.03	0	.02	.18	.08	0
8	0	.05	0	0	.06	.24	.03	0	.01	.11	.17	0
9	0	.07	0	0	.24	.02	.03	0	0	.08	.01	0
10	.01	.01	.01	.04	.01	.01	.01	0	.02	.11	.01	.13
11	.04	.06	.07	.06	0	.01	0	0	.08	.18	.08	.04
12	.10	.10	.03	0	0	.04	0	0	.06	.26	.01	.01
13	.06	.09	0	.06	.01	.01	0	0	.06	.20	.06	.01
14	.25	.14	0	.01	0	.04	0	0	.14	.19	.07	.13
15	.05	.12	.02	.03	0	.01	0	0	0	.07	.01	.12
16	.01	.13	.10	.03	0	0	0	0	.03	.12	.01	.14
17	.02	.03	.03	0	.11	0	0	0	.14	.10	0	.01
18	.01	.08	0	0	.08	0	0	0	.01	.20	0	.02
19	.09	0	0	0	.07	0	0	0	0	.18	0	.07
20	.03	.04	0	0	.02	.08	0	.16	0	.07	.02	.01
21	.04	.03	0	.01	.01	.09	0	.01	0	.02	.02	.12
22	.06	.11	0	.07	0	.08	0	.01	.06	.05	.01	0
23	.24	.08	0	.09	0	0	0	0	.34	.11	.14	.01
24	.01	.04	.12	0	.01	.01	0	0	.06	.04	.13	.03
25	.09	.10	.08	0	.05	.01	0	.10	.02	.01	.01	0
26	.12	.12	.01	0	.08	.01	0	.02	.02	0	.01	0
27	0	.10	0	0	.01	.06	0	0	.01	0	0	0
28	0	.01	.02	0	.13	0	.03	0	.01	0	.03	.02
29	0	0	0	0	0	0	.02	0	.01	0	.02	.15
30	.01	0	0	0	0	0	.01	0	.01	0	.01	.02
31	.28	0	.03	0	0	0	.01	0	0	0	0	.17
Sum	2.30	2.05	0.75	0.42	0.99	0.72	0.23	0.30	1.21	2.73	1.17	1.47

Current Year 1999 Period 1935-1999

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.	0.655	0	23	1.28	7	0	0.07	199	185	1,127	0
Feb.	.645	0	27	1.25	1	0	.07	177	165	493	7.4
Mar.	.600	0	24	1.12	1	0	.02	64.8	173	638	0
April	.370	0	23	.54	1	0	.01	36.3	168	524	20.6
May	.610	0	9	1.14	1	0	.03	85.5	169	543	39.1
June	.655	0	8	1.28	1	0	.02	62.2	151	734	22.5
July	.430	0	6	.68	1	0	.01	19.9	142	636	0
Aug.	.800	0	20	1.73	1	0	.01	25.9	117	761	0
Sept.	.505	0	14	.86	1	0	.04	105	128	570	0
Oct.	.455	0	22	.74	1	0	.09	236	174	604	0
Nov.	.595	0	8	1.10	1	0	.04	101	184	570	11.1
Dec.	.420	0	15	.65	1	0	.05	127	203	730	16.9
Yearly	0.800	0		1.73		0	0.04	1,240	1,959	5,551	787

! And other days

09-5220.21 COLORADO RIVER IMMEDIATELY ABOVE MORELOS DAM - STAGES

DESCRIPTION: Water-stage recorder located on the right bank of the Colorado River in Mexico attached to the upstream abutment of the gates of the Intake Canal at Morelos Dam, 1.8 kilometers downstream from the northerly international boundary, and about 12.1 kilometers downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 0.05 meter below mean sea level.

RECORDS: Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage height records November 8, 1950 to June 3, 1951; a continuous record of gage heights June 4, 1951 through 1999.

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 18, 1998; minimum mean daily elevation above mean sea level, 30.94 meters on February 17, 1957.

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	34.970	31.550	31.760	31.780	31.690	31.530	31.610	31.640	31.390	33.290	33.300	33.130
2	34.900	31.440	31.860	31.810	31.620	31.530	31.650	31.640	31.400	33.350	33.190	33.140
3	34.630	31.450	31.920	31.970	31.620	31.540	31.650	31.710	31.670	33.370	33.020	33.210
4	34.300	31.440	31.740	32.090	31.650	31.520	31.630	31.660	31.730	33.370	33.000	33.210
5	33.510	31.580	31.690	31.900	31.600	31.540	31.640	31.610	31.780	33.260	32.980	33.280
6	33.510	31.680	31.680	31.800	31.670	31.530	31.630	31.560	31.800	33.270	33.090	33.130
7	33.550	31.670	31.690	31.770	31.580	31.580	31.600	31.570	32.360	33.220	33.190	32.780
8	33.510	31.670	31.740	31.760	31.580	31.640	31.600	31.570	32.490	33.100	33.040	32.730
9	33.650	31.720	31.710	31.740	31.580	31.610	31.660	31.500	32.490	33.150	33.050	32.750
10	33.920	31.790	31.710	31.740	31.540	31.650	31.750	31.520	32.620	33.220	33.090	32.760
11	34.140	31.560	31.720	31.750	31.500	31.650	31.790	31.500	32.810	33.070	33.110	32.790
12	34.050	31.550	31.730	31.700	31.510	31.670	32.060	31.460	32.490	32.900	33.180	32.760
13	33.920	31.620	31.720	31.700	31.480	31.690	31.810	31.370	32.920	33.230	33.210	32.840
14	33.870	31.650	31.770	31.690	31.470	31.670	31.870	31.370	33.150	33.250	33.240	32.870
15	33.890	31.660	31.860	31.690	31.480	31.600	31.850	31.370	32.970	33.250	33.210	32.440
16	33.930	31.690	31.830	31.710	31.540	31.490	31.700	31.380	33.120	33.300	33.180	32.120
17	33.720	31.750	31.800	31.730	31.530	31.500	31.630	31.380	33.160	33.400	33.180	32.400
18	32.100	31.770	31.760	31.760	31.520	31.540	31.610	31.340	33.230	33.470	33.170	32.450
19	31.570	31.780	31.740	31.750	31.520	31.510	31.720	31.280	33.270	33.360	33.180	32.660
20	31.670	31.800	31.750	31.750	31.550	31.480	31.620	31.290	33.240	33.340	33.240	32.470
21	31.690	31.790	31.740	31.750	31.560	31.520	31.610	31.270	33.190	33.320	33.280	32.800
22	31.420	31.770	31.740	31.770	31.560	31.540	31.620	31.270	33.190	33.400	33.120	32.120
23	31.410	31.770	31.740	31.750	31.570	31.510	31.610	31.280	33.260	33.440	32.970	32.910
24	31.400	31.780	31.790	31.760	31.580	31.500	31.610	31.290	33.370	33.350	33.090	32.970
25	31.350	31.760	31.800	31.760	31.610	31.500	31.590	31.380	33.470	33.370	33.250	32.990
26	31.310	31.760	31.800	31.750	31.590	31.560	31.600	31.390	33.430	33.320	33.150	32.980
27	31.330	31.770	31.800	31.760	31.580	31.530	31.620	31.390	33.330	33.340	33.220	32.970
28	31.330	31.780	31.810	31.770	31.590	31.500	31.600	31.390	33.370	33.400	33.280	32.920
29	31.340		31.760	31.770	31.600	31.460	31.650	31.390	33.400	33.530	33.120	32.720
30	31.350		31.760	31.780	31.600	31.500	31.630	31.390	33.310	33.490	33.150	32.820
31	31.420		31.780		31.570		31.690	31.390		33.580		32.940
Avg.	32.860	31.680	31.765	31.775	31.570	31.555	31.675	31.435	32.780	33.315	33.150	32.800

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 1999. 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 1999, 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	78.4	72.8	90.5	91.7	82.9	72.6	80.7	76.2	36.6	61.2	58.2	83.2
2	76.6	60.3	101	96.7	76.5	72.2	80.7	74.9	38.9	60.9	55.0	82.4
3	73.8	60.9	104	106	76.2	72.4	81.4	82.9	64.7	62.2	55.0	82.4
4	70.6	61.3	91.0	101	85.1	72.7	80.2	80.0	89.6	60.2	63.2	83.5
5	68.9	74.1	86.7	105	79.5	71.6	81.0	76.8	96.4	59.3	62.3	83.5
6	73.8	86.8	85.9	102	76.8	70.6	81.4	73.9	85.6	59.4	65.4	83.3
7	70.6	84.8	87.3	99.3	76.3	77.3	81.0	73.7	74.5	58.2	63.2	75.3
8	69.6	95.9	91.0	92.3	75.5	84.8	81.9	70.0	74.7	58.8	66.7	60.3
9	72.0	88.3	88.1	92.3	76.7	84.3	91.7	65.1	74.2	59.1	65.8	60.6
10	71.5	94.8	89.4	93.2	72.5	86.5	91.2	65.5	70.2	60.7	67.0	60.9
11	71.5	73.2	89.4	91.3	72.6	88.6	94.0	59.6	77.8	61.2	67.0	61.3
12	69.1	73.0	89.3	84.6	71.9	90.5	99.3	59.0	63.9	57.5	67.5	60.7
13	71.8	79.8	89.4	85.0	70.8	91.1	99.3	51.4	65.8	64.5	66.8	62.5
14	71.3	81.9	94.0	85.5	67.9	88.7	103	51.5	63.1	63.4	68.6	63.2
15	73.1	82.3	102	86.1	67.3	80.5	104	51.0	57.8	62.0	70.2	56.9
16	73.8	84.3	101	86.9	73.7	71.8	91.9	52.4	54.1	65.4	66.2	57.2
17	72.4	89.2	98.8	89.8	74.9	73.8	80.5	52.1	52.6	67.9	66.2	68.3
18	69.4	91.2	94.6	91.2	75.6	74.0	79.8	42.8	54.2	67.1	66.7	68.6
19	72.7	92.8	92.3	90.4	74.1	71.2	85.9	39.4	50.5	66.9	69.4	68.4
20	80.9	93.1	92.3	90.8	75.6	71.1	79.1	41.0	49.2	68.4	74.7	67.8
21	83.0	92.6	89.6	90.2	75.9	74.2	78.1	39.8	57.0	64.2	74.4	59.1
22	59.7	91.3	88.1	91.0	75.6	74.2	78.5	38.8	60.1	60.2	74.5	59.2
23	56.7	92.1	88.9	89.9	75.7	73.2	78.6	39.2	63.8	64.5	80.7	64.8
24	57.1	92.3	93.0	90.9	76.3	73.4	78.6	42.9	65.9	64.4	82.5	64.5
25	54.9	91.0	93.4	90.0	79.4	73.2	77.8	49.8	65.2	61.7	85.5	66.2
26	52.3	90.8	92.7	89.3	78.3	78.5	77.8	45.5	66.3	62.5	84.3	66.0
27	53.1	91.6	93.5	90.6	76.5	71.1	78.8	42.3	65.6	63.2	85.7	64.5
28	52.6	93.1	93.8	90.8	78.4	69.8	78.4	39.7	65.1	64.4	85.9	57.7
29	52.0		89.5	91.8	78.6	69.0	73.6	36.8	65.5	60.4	82.6	52.4
30	52.7		90.5	93.7	78.6	72.2	76.4	39.7	62.7	61.0	83.5	53.5
31	58.7		92.7		76.0		81.2	39.5		61.9		57.8
Sum	2,084.6	2,355.6	2,863.7	2,769.3	2,351.7	2,295.1	2,605.8	1,692.6	1,931.6	1,932.7	2,124.7	2,088.0

Current Year 1999

Period 1950-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	φ High		φ Low		Average	Total	Average	Maximum	Minimum
			Day	φ	Day	φ					
Jan.			21	83.7	29	52.0	67.2	180,109	115,749	275,305	1,192
Feb.			8	95.9	2	60.3	84.1	203,524	123,761	292,464	11,387
Mar.			3	104	6	85.9	92.4	247,424	236,903	435,370	120,761
April			3	106	12	84.6	92.3	239,268	255,188	404,698	189,700
May			4	85.1	15	67.3	75.9	203,187	148,590	286,174	81,665
June			13	91.1	29	69.0	76.5	198,297	197,220	332,588	117,400
July			15	104	29	73.6	84.1	225,141	262,555	439,171	145,135
Aug.			3	82.9	29	36.8	54.6	146,241	252,496	420,673	113,219
Sept.			5	96.4	1	36.6	64.4	166,890	157,043	336,960	66,156
Oct.			20	68.4	12	57.5	62.3	166,985	93,039	280,817	12,894
Nov.			28	85.9	1	55.0	70.8	183,574	85,449	258,388	9,271
Dec.			21	91.1	29	52.5	67.4	180,403	116,008	247,899	10,886
Yearly				106		36.6	74.2	2,341,043	2,046,084	3,451,533	1,569,404

φ Mean daily

! And other days

09-5220.31 INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.490	31.520	31.700	31.720	31.650	31.500	31.560	31.490	31.340	31.230	31.290	31.620
2	31.500	31.410	31.800	31.750	31.580	31.500	31.600	31.490	31.358	31.230	31.270	31.610
3	31.480	31.420	31.850	31.810	31.580	31.510	31.590	31.600	31.620	31.230	31.310	31.620
4	31.470	31.410	31.680	31.760	31.610	31.490	31.570	31.560	31.670	31.230	31.420	31.610
5	31.480	31.550	31.630	31.750	31.580	31.510	31.580	31.510	31.730	31.210	31.400	31.640
6	31.500	31.650	31.620	31.770	31.540	31.500	31.580	31.490	31.610	31.210	31.420	31.630
7	31.480	31.640	31.630	31.750	31.540	31.550	31.550	31.490	31.470	31.210	31.430	31.550
8	31.480	31.640	31.670	31.730	31.540	31.600	31.560	31.480	31.430	31.190	31.450	31.410
9	31.480	31.690	31.650	31.700	31.540	31.560	31.610	31.410	31.400	31.180	31.460	31.410
10	31.490	31.750	31.650	31.700	31.500	31.600	31.690	31.430	31.330	31.180	31.430	31.390
11	31.480	31.520	31.660	31.710	31.460	31.590	31.720	31.410	31.360	31.160	31.440	31.390
12	31.480	31.510	31.670	31.660	31.480	31.620	31.760	31.370	31.330	31.180	31.460	31.400
13	31.500	31.580	31.660	31.660	31.450	31.640	31.760	31.320	31.310	31.267	31.450	31.490
14	31.490	31.610	31.710	31.650	31.440	31.620	31.820	31.320	31.340	31.250	31.480	31.550
15	31.500	31.610	31.800	31.640	31.450	31.560	31.800	31.320	31.380	31.250	31.470	31.500
16	31.510	31.640	31.780	31.670	31.510	31.450	31.660	31.330	31.400	31.250	31.460	31.470
17	31.490	31.700	31.740	31.700	31.500	31.450	31.560	31.330	31.400	31.250	31.460	31.460
18	31.480	31.720	31.700	31.720	31.500	31.480	31.540	31.290	31.400	31.260	31.470	31.540
19	31.520	31.730	31.680	31.710	31.490	31.460	31.620	31.230	31.400	31.260	31.500	31.550
20	31.620	31.740	31.690	31.710	31.520	31.430	31.520	31.240	31.330	31.260	31.540	31.530
21	31.660	31.730	31.680	31.710	31.530	31.470	31.510	31.220	31.250	31.210	31.540	31.580
22	31.400	31.710	31.680	31.730	31.520	31.490	31.510	31.220	31.250	31.200	31.580	31.380
23	31.390	31.710	31.680	31.710	31.530	31.460	31.510	31.230	31.250	31.240	31.650	31.300
24	31.380	31.720	31.730	31.720	31.540	31.450	31.500	31.230	31.250	31.300	31.650	31.290
25	31.330	31.700	31.740	31.710	31.570	31.450	31.490	31.340	31.260	31.280	31.660	31.300
26	31.290	31.700	31.740	31.710	31.550	31.520	31.500	31.340	31.260	31.270	31.670	31.300
27	31.310	31.710	31.740	31.720	31.530	31.490	31.520	31.340	31.260	31.290	31.660	31.290
28	31.310	31.720	31.750	31.730	31.550	31.460	31.510	31.340	31.270	31.290	31.640	31.300
29	31.320		31.700	31.730	31.560	31.420	31.550	31.340	31.270	31.270	31.620	31.290
30	31.320		31.700	31.740	31.560	31.460	31.570	31.340	31.230	31.300	31.630	31.300
31	31.400		31.720		31.530		31.590	31.340	31.300	31.300		31.310
Avg.	31.455	31.635	31.705	31.715	31.530	31.510	31.595	31.365	31.370	31.240	31.495	31.450

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 1999.

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 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	34.930	30.500	30.500	30.500	30.500	30.500	30.500	30.530	30.500	32.360	32.490	30.480
2	34.860	30.500	31.270	30.610	30.500	30.500	30.500	30.500	30.500	32.580	32.230	30.490
3	34.590	30.500	30.630	31.060	30.500	30.500	30.500	30.500	30.510	32.710	31.790	30.560
4	34.270	30.500	30.500	31.180	30.660	30.500	30.500	30.500	30.610	32.270	31.530	30.560
5	33.480	30.500	30.500	30.900	30.710	30.500	30.500	30.500	30.690	32.200	31.380	30.630
6	33.490	30.650	30.500	30.590	30.470	30.500	30.500	30.500	30.560	32.270	31.570	30.530
7	33.520	30.630	30.500	30.950	30.490	30.500	30.500	30.500	30.710	32.030	31.820	30.500
8	33.490	30.630	30.500	30.680	30.500	30.810	30.500	30.500	31.310	31.540	31.210	30.500
9	33.630	30.710	30.500	30.500	30.500	30.950	30.530	30.500	31.400	31.720	31.050	30.500
10	33.900	30.860	30.500	30.500	30.500	31.990	30.690	30.500	32.380	32.030	31.030	30.500
11	34.110	30.500	30.500	30.500	30.500	30.980	30.720	30.500	32.770	31.450	31.020	30.500
12	34.030	30.500	30.500	30.500	30.500	30.890	30.690	30.500	32.450	31.010	31.080	30.500
13	33.900	30.500	30.500	30.500	30.500	30.500	30.720	30.500	32.340	30.990	31.110	30.500
14	33.850	30.500	30.500	30.500	30.500	30.500	30.710	30.500	31.150	31.520	31.400	30.500
15	33.870	30.500	30.500	30.500	30.500	30.500	30.780	30.500	30.970	31.430	30.690	30.500
16	33.910	30.500	30.500	30.500	30.820	30.500	30.540	30.500	31.120	31.700	30.520	30.500
17	33.700	30.500	30.500	30.500	31.000	30.500	30.500	30.500	31.160	32.440	30.520	30.500
18	32.060	30.500	30.500	30.500	30.540	30.500	30.500	30.500	31.230	32.260	30.520	30.500
19	31.110	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.270	32.250	30.570	30.500
20	30.550	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.230	32.140	30.590	30.500
21	30.560	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.190	31.980	30.640	30.500
22	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.190	32.490	30.470	30.500
23	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	31.800	32.710	30.320	30.500
24	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	32.590	32.750	30.440	30.500
25	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	32.970	32.330	30.600	30.500
26	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	32.910	32.000	30.510	30.500
27	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	32.590	32.110	30.580	30.500
28	30.500	30.500	30.500	30.500	30.500	30.500	30.500	30.500	32.640	32.410	30.640	30.500
29	30.500	30.500	30.500	30.500	30.500	30.500	30.570	30.500	32.820	33.050	30.480	30.500
30	30.500	30.500	30.500	30.500	30.500	30.500	30.750	30.500	32.460	33.960	30.500	30.500
31	30.500	30.500	30.500	30.500	30.500	30.500	30.860	30.500	32.120	32.120	30.500	30.500
Avg.	32.480	30.535	30.530	30.580	30.540	30.605	30.565	30.500	31.600	32.155	30.975	30.510

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 1999.

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 1999 --- 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 1999

Period 1966-1999

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	11	0	11	0	0	7,130	23,088	0	
Feb.	0	0	11	0	11	0	0	5,481	20,959	0	
Mar.	0	0	11	0	11	0	0	3,868	22,827	0	
April	0	0	11	0	11	0	0	3,464	22,944	0	
May	0	0	11	0	11	0	0	5,222	23,548	0	
June	0	0	11	0	11	0	0	4,110	23,135	0	
July	0	0	11	0	11	0	0	3,774	23,370	0	
Aug.	0	0	11	0	11	0	0	3,837	23,668	0	
Sept.	0	0	11	0	11	0	0	5,393	22,787	0	
Oct.	0	0	11	0	11	0	0	7,590	23,683	0	
Nov.	0	0	11	0	11	0	0	7,196	22,792	0	
Dec.	0	0	11	0	11	0	0	6,617	23,585	0	
Yearly	0	0		0		0	0	63,682	264,928	0	

! And other days

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 east side of levee at 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 west side of levee. This wasteway is located in Arizona, 29.8 kilometers downstream from the northerly international boundary, 28.0 kilometers downstream from Morelos Diversion Dam, and 3.5 kilometers upstream from the southerly international boundary. It is the farthest downstream of the two wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River. The elevation of the zero of the gage at the new location has not been determined.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1999, 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 southerly of boundary 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 1999 --- ANNUAL AND PERIOD SUMMARY

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.34	0	0	0	0	0	0	0	0.03	0	0.48	0.19
2	.24	0	0	.25	0	0	0	0	.03	0	.65	.03
3	.32	0	0	.41	0	0	0	0	0	0	.67	.13
4	.22	0	0	.40	0	0	0	0	0	0	.23	.21
5	.19	0	0	.12	0	0	0	0	0	0	.50	.22
6	.18	0	0	0	0	0	0	0	0	0	.29	.08
7	.18	0	0	0	0	0	0	0	0	0	.50	.03
8	.24	0	0	.17	0	0	0	0	0	0	.57	.06
9	.23	0	0	0	0	0	0	0	0	.03	.38	.25
10	.38	0	0	0	0	0	0	0	0	0	.22	.25
11	.14	0	0	0	0	0	0	0	0	.01	.30	.04
12	.16	0	0	0	0	0	0	0	0	0	.47	.14
13	0	0	0	0	0	0	0	0	0	0	.46	.30
14	.06	0	0	0	0	0	0	0	0	0	.38	.12
15	.48	0	0	0	0	0	0	0	0	0	.55	.24
16	.32	0	0	0	.12	0	0	0	0	0	.37	.16
17	.32	0	0	0	0	0	0	0	0	0	.40	0
18	.35	0	0	0	0	0	0	0	0	0	.27	0
19	.34	0	0	0	0	0	0	0	0	.26	.36	0
20	.09	0	0	0	0	0	0	0	.06	.73	.36	0
21	.03	0	0	0	0	0	0	0	.12	.55	.52	0
22	.03	0	0	0	0	0	0	0	0	.15	.44	0
23	0	0	0	0	0	0	0	0	0	.18	.12	0
24	0	0	0	0	0	0	0	0	0	.34	.01	0
25	0	0	0	0	0	0	0	0	0	.02	.18	0
26	0	0	0	0	0	0	0	0	0	.16	.61	0
27	0	0	0	0	0	0	0	0	0	.19	.36	0
28	0	0	0	0	0	0	0	0	0	.41	.28	0
29	0	0	0	0	0	0	0	.06	.06	0	.16	.25
30	0	0	0	0	0	0	0	.14	.17	.17	.24	.57
31	0	0	0	0	0	0	0	.05	.05	.17	.57	0
Sum	4.84	0	0	1.35	0.12	0	0.20	0.28	0.41	4.03	11.75	2.45

Current Year 1999

Period 1939-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
				Day							
Jan.	0.545	0	9	1.16	112	0	0.16	418	640	3,528	0
Feb.	0	0	11	0	11	0	0	0	541	3,096	0
Mar.	0	0	11	0	11	0	0	0	492	2,048	0
April	.480	0	20	1.44	19	0	.05	117	528	2,393	0
May	.380	0	16	.65	11	0	0	10.4	642	3,047	0
June	0	0	11	0	11	0	0	0	561	2,899	0
July	.265	0	29	.36	11	0	.01	17.3	487	2,405	0
Aug.	.425	0	29	.77	11	0	.01	24.2	509	3,121	0
Sept.	.510	0	20	1.04	12	0	.01	35.4	459	2,689	0
Oct.	.625	0	20	1.45	11	0	.13	348	587	2,590	0
Nov.	.645	0	17	1.53	124	0	.39	1,015	717	2,936	0
Dec.	.570	0	12	1.25	116	0	.38	212	736	3,306	0
Yearly	0.645	0		1.53		0	0.07	2,197	6,899	30,060	0

! And other days

09-5221.00 COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

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

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

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.135	28.920	28.335	28.240	28.110	27.945	27.885	28.080	27.855	31.035	31.245	30.195
2	33.100	28.635	28.910	28.575	28.065	27.940	27.880	27.955	27.845	31.235	31.010	30.490
3	32.865	28.620	28.515	30.180	28.080	27.925	27.880	27.890	27.855	31.340	30.670	30.420
4	32.635	28.630	28.355	29.900	28.690	27.915	27.920	27.875	28.675	30.965	30.495	30.270
5	31.765	28.610	28.365	28.915	29.555	27.910	27.885	27.885	28.060	30.905	30.410	30.495
6	31.740	29.465	28.315	28.135	28.440	27.910	27.880	27.855	27.960	30.970	30.425	29.965
7	31.735	29.340	28.335	27.630	28.250	27.935	27.890	27.885	28.735	30.800	30.480	29.340
8	31.730	29.400	28.345	28.100	28.085	28.605	27.880	27.905	28.925	30.375	30.980	28.895
9	31.860	29.175	28.305	28.265	28.055	28.810	28.020	27.875	28.290	30.515	30.120	28.735
10	32.170	28.740	28.305	28.210	28.040	28.745	28.995	27.835	29.330	30.740	29.975	28.620
11	32.460	28.445	28.300	28.185	28.065	28.885	29.440	27.835	30.115	30.285	29.780	28.510
12	32.325	28.425	28.285	28.165	28.020	28.465	28.705	27.830	29.725	29.725	30.025	28.410
13	31.835	28.415	28.285	28.165	28.020	28.105	29.450	27.820	29.650	29.960	30.160	28.410
14	31.375	28.405	28.310	28.140	28.025	28.010	30.130	27.845	30.150	30.260	30.790	28.310
15	31.020	28.390	28.490	28.130	28.015	27.960	29.900	27.820	29.695	30.210	30.260	28.210
16	30.675	28.415	28.295	28.120	29.060	27.940	28.120	27.875	29.960	30.400	30.090	28.180
17	30.055	28.375	28.280	28.130	28.780	27.960	27.940	27.815	30.125	31.070	30.070	28.165
18	30.020	28.370	28.275	28.120	28.275	27.925	27.945	27.830	30.325	30.955	30.025	28.170
19	29.730	28.370	28.275	28.175	28.045	27.955	27.940	27.815	30.475	30.965	30.230	28.175
20	29.325	28.375	28.320	28.090	28.025	27.920	27.905	27.860	30.490	30.865	30.305	28.165
21	29.405	28.360	28.285	28.080	28.080	27.990	27.890	27.855	30.430	30.820	30.535	28.485
22	28.970	28.360	28.265	28.070	28.015	27.910	27.870	27.810	30.435	31.230	29.815	28.155
23	28.905	28.355	28.255	28.065	28.030	27.910	27.870	27.835	30.735	31.410	29.245	28.575
24	28.845	28.340	28.250	28.065	28.000	27.905	27.915	27.820	31.205	31.465	29.575	28.645
25	28.790	28.345	28.245	28.060	27.995	27.980	27.920	27.845	31.575	31.120	30.090	28.725
26	28.740	28.330	28.245	28.055	27.970	27.940	27.875	27.800	31.495	30.795	29.840	28.735
27	28.700	28.335	28.255	28.065	27.965	27.895	27.855	27.805	31.235	30.855	29.925	28.655
28	28.685	28.340	28.255	28.065	27.985	27.925	27.855	27.845	31.235	31.075	30.455	28.425
29	28.675		28.250	28.065	27.990	27.900	28.215	27.820	31.465	31.610	29.875	28.140
30	28.670		28.250	28.075	27.955	27.945	29.630	27.830	31.120	31.585	29.950	28.125
31	28.665		28.225		27.995		29.650	27.825		31.725		28.440
Avg.	30.600	28.580	28.320	28.275	28.185	28.070	28.325	27.855	29.840	30.880	30.230	28.815

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 1999, 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.05	0.01	0.04	0.08	0.51	0.01	0.01	0.22	0.34	0.79	0.85	0.03
2	.04	.01	.01	.15	.02	.01	.01	.38	.43	.47	.44	.35
3	.21	.01	.01	.06	.19	.01	.01	.01	.46	1.17	.72	.01
4	.24	.21	.14	.06	.02	.01	.36	.04	.02	.44	.26	.01
5	.02	.01	.36	.05	.01	.02	.05	.16	.02	.70	.83	.52
6	.04	.02	.01	.03	.01	.02	.02	.01	.02	.01	.17	.29
7	.41	.41	.42	.11	.01	.24	.11	.34	.74	.02	.01	.28
8	.66	.03	.41	.31	.17	.02	.03	.69	.31	.76	.38	.01
9	.12	.04	.01	.13	.01	.02	.08	.38	.64	.85	.09	0
10	.55	.42	.01	.01	.02	.17	.38	.02	.38	.28	.01	0
11	.30	.02	.01	.01	.38	.42	.02	.01	.04	.06	.17	.01
12	.04	.01	.01	.01	.01	.43	.01	.02	.01	.07	.18	.07
13	.36	.02	.01	.20	.01	1.04	.03	.02	.01	.05	.24	.49
14	.10	.03	.32	0	.01	.42	.04	.25	.01	.45	.28	.49
15	.02	.04	.27	.01	.01	.15	.01	.03	.01	.27	.88	.66
16	.02	.26	.01	.01	.30	.06	.29	.41	.33	.02	.36	.23
17	.06	.01	.01	.19	.32	.30	.27	.01	.58	.01	.26	.16
18	.33	.01	.01	.14	.41	.06	.49	.15	.37	.10	.01	.20
19	.03	.10	.10	.59	0	.42	.36	.07	1.30	.10	.01	.43
20	.14	.19	.54	.01	.07	.07	.13	.44	1.26	.02	.01	.26
21	.02	.01	.18	.01	.72	.66	.06	.48	.63	.31	.02	.21
22	.06	.03	.02	.01	.16	.01	.01	.02	.31	.04	.01	.05
23	.02	.08	.02	0	.43	.01	.02	.25	.37	.02	.01	.07
24	.02	.01	.01	0	.17	.02	.48	.20	.35	.11	.04	.17
25	.03	.12	.01	0	.19	.76	.57	.42	.35	.23	.23	.04
26	.02	.01	.01	0	.01	.39	.21	.07	.03	.02	.61	.41
27	.02	.01	.12	.01	.01	.02	.04	.07	.39	.02	.24	.20
28	.02	.13	.14	.01	.27	.32	.03	.36	.53	.02	.06	.09
29	.02	.12	.12	.01	.36	.09	.03	.23	.10	.08	.37	.07
30	.02	.17	.08	.06	.06	.49	.03	.29	.18	.23	.37	.02
31	.03	.01	.01	.37	.37	.69	.69	.37	.12	.12	.12	.63
Sum	4.02	2.26	3.52	2.29	5.24	6.67	4.88	6.42	10.50	7.84	8.12	6.46

Current Year 1999

Period 1935-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day			Total	Average	Maximum	Minimum
					Day	Low					
Jan.	0.520	0.020	14	2.18	113	0.01	0.13	347	2,598	11,804	0
Feb.	.855	.005	16	4.34	28	0	.08	195	2,126	10,398	17.9
Mar.	.330	.010	7	1.76	11	.01	.11	304	2,006	7,685	51.8
April	.555	.005	19	2.25	114	0	.08	198	1,845	7,771	0
May	.465	0	16	2.07	119	0	.17	453	2,180	11,496	10.2
June	.540	.010	21	2.22	121	.01	.22	576	2,068	9,177	13.0
July	.905	.010	16	4.76	11	.01	.16	422	2,093	10,263	11.2
Aug.	.975	.015	28	5.37	11	.01	.21	555	1,816	12,014	18.1
Sept.	.580	.015	19	2.36	15	.01	.35	907	1,326	7,574	7.4
Oct.	.720	.015	21	3.33	11	.01	.25	677	1,824	7,006	14.7
Nov.	.905	.005	1	4.76	4	0	.27	702	2,207	10,139	23.2
Dec.	.750	.005	31	3.56	19	0	.21	558	2,850	11,632	51.8
Yearly	0.975	0		5.37		0	0.19	5,894	24,939	102,255	707

! And other days

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

DESCRIPTION: Water-stage recorder and control weir located about 91 meters north of the international boundary near San Luis, Arizona and 2.4 kilometers east of the Colorado River. From September 28, 1977 to April 6, 1978, recorder was moved west 31 meters to a temporary bypass channel. On April 7, 1978, recorder was moved back to 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 1999. 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.47	0.08	0.75	0.50	0.28	0	0.20	0.55	0.02	0.04	0.21	0.38
2	.80	.02	.36	.62	.11	0	.10	.48	.02	.01	.25	.14
3	.70	.06	.18	.45	.31	0	.39	.29	.01	.12	.30	.26
4	.47	.24	.58	.26	.22	0	.40	.21	.06	.36	.31	.07
5	.06	.48	.34	.42	.11	.01	.61	.09	.04	.22	.39	.21
6	.01	.14	.36	.40	.22	.32	.49	.37	0	.31	.31	.43
7	.04	.21	.54	.36	.15	.07	.38	.40	0	.07	.23	.20
8	.56	.04	.34	.14	.11	.09	.23	.35	.04	.14	.18	.03
9	.55	.24	.35	.08	.11	0	.28	.13	.07	0	.10	.21
10	.66	.30	.30	.26	.28	0	.29	.27	.02	.12	.35	.24
11	.58	.45	.22	.20	.61	.32	.12	.51	.36	.07	.05	.12
12	.24	.27	.08	.29	.30	.06	.47	.39	.29	.15	.29	.04
13	.32	.29	.07	.12	0	.31	.19	.38	.14	.12	.22	.10
14	.09	.55	.30	.05	0	.42	.53	.45	.17	.01	.31	.14
15	.26	.57	.26	.10	0	.15	.46	.15	.17	.25	.12	.13
16	.15	.27	.07	.30	.39	.27	.36	.07	0	.03	.11	.42
17	.52	.13	.17	.33	.53	.19	.25	.01	.20	.43	.38	.48
18	.85	.47	.39	.09	.45	.02	.35	.36	.03	.41	.35	.40
19	.22	.27	.30	.26	.47	.32	.37	.30	.17	.50	.17	.21
20	.48	.13	.39	.20	.06	.25	.15	.31	.16	.62	.06	.23
21	.23	.13	.43	.37	.38	.15	.10	.03	.06	.55	.37	.17
22	.48	.44	.09	.08	.29	.43	.04	.08	.05	.25	.09	.10
23	.34	.13	.01	.27	.35	.43	.07	0	.29	.39	0	.25
24	.51	.41	.31	0	.14	.20	.28	.01	.06	.50	.21	.19
25	.50	.30	.52	.14	0	.41	.33	.03	.26	.27	.05	.44
26	.31	.38	.44	.16	0	.29	.03	.17	.20	.21	.13	.49
27	.66	.11	.53	.25	0	.07	.32	.40	.12	.34	.15	.40
28	.43	.35	.45	.45	.37	.09	.32	.40	.02	.34	.31	.45
29	.41		.32	.25	.47	.18	.32	.19	.03	.63	.49	.35
30	.34		.49	.08	.39	.08	.25	.55	.10	.05	.25	.33
31	.15		.05		.29		.29	.23		.08		.11
Sum	12.39	7.46	9.99	7.48	7.39	5.13	8.97	8.16	3.16	7.59	6.74	7.72

Month	Current Year 1999						Period 1935-1999				
	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	18	0.95	6	0	0.40	1,070	1,127	4,144	111
Feb.	.285	0	28	.69	12	0	.27	645	938	3,910	164
Mar.	.330	0	1	.85	10	0	.32	863	1,070	3,602	175
April	.445	0	2	.83	1	0	.25	646	1,040	3,910	165
May	.330	0	18	.84	4	0	.24	638	1,170	3,750	281
June	.280	0	29	.67	1	0	.17	443	966	4,515	157
July	.310	0	24	.78	2	0	.29	775	1,041	4,428	210
Aug.	.300	0	30	.74	16	0	.26	705	1,081	4,885	196
Sept.	.295	0	11	.73	1	0	.11	273	1,016	3,910	0
Oct.	.350	0	17	.91	1	0	.24	656	1,071	4,066	0
Nov.	.355	0	18	.93	8	0	.22	582	1,164	4,404	0
Dec.	.360	0	30	.96	4	0	.25	667	1,139	3,799	51.0
Yearly	0.445	0		0.96		0	0.25	7,963	12,823	47,255	3,733

! And other days

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

DESCRIPTION: Water-stage recorders located in the forebay and afterbay, with flow meters in the four discharge pipes at the Boundary Pumping Plant on the Main Drain about 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 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.51	3.79	4.06	4.02	3.87	4.42	3.63	3.35	3.37	4.78	5.52	5.02
2	4.16	4.11	3.49	5.03	4.12	4.48	3.62	2.75	3.36	4.83	5.68	4.98
3	4.39	4.03	3.35	4.08	4.44	4.03	3.99	3.03	3.37	4.90	5.65	5.30
4	4.71	4.08	3.25	3.82	4.19	4.15	3.64	2.84	4.22	4.83	5.22	4.68
5	3.93	4.10	3.38	3.60	4.19	4.33	3.24	3.52	4.22	4.62	5.13	4.58
6	3.95	3.37	3.96	3.20	4.09	4.37	3.26	3.22	3.59	5.25	5.67	4.64
7	4.37	3.74	4.07	3.62	3.88	4.20	3.31	3.04	3.61	5.36	5.59	4.41
8	4.32	3.68	3.68	3.93	4.09	3.89	3.51	3.94	3.69	5.72	6.03	4.22
9	4.32	3.35	3.32	3.87	4.48	4.26	3.67	3.53	4.10	5.58	5.47	4.22
10	4.07	3.50	3.66	3.69	4.56	3.87	4.14	3.16	3.74	5.17	5.38	4.63
11	4.34	3.44	3.87	3.41	4.79	3.75	4.23	3.34	4.02	5.43	5.38	4.94
12	4.24	3.26	4.28	3.92	4.28	3.66	4.12	3.64	4.11	5.44	5.06	4.83
13	4.20	3.84	4.11	3.65	4.06	3.75	3.81	3.17	5.00	5.50	5.37	4.58
14	4.83	3.60	3.94	3.88	4.14	3.94	3.89	3.84	4.19	5.30	5.84	4.45
15	4.44	3.79	3.41	3.65	4.82	3.61	4.03	3.63	3.63	5.62	5.76	4.64
16	4.55	3.41	3.40	3.74	5.26	3.74	3.79	3.64	4.55	5.63	5.37	4.28
17	4.58	3.48	3.37	3.63	4.89	3.82	3.83	2.64	4.27	5.84	5.31	5.04
18	4.48	3.82	3.27	4.10	4.29	3.53	3.56	3.73	4.70	5.88	4.97	4.86
19	4.35	4.50	3.08	4.08	4.14	3.47	3.62	3.81	4.65	5.72	5.51	4.92
20	4.61	4.25	3.56	3.91	4.06	3.94	3.53	3.80	5.08	5.67	5.23	4.45
21	4.42	4.60	3.52	4.33	4.52	4.03	3.29	3.95	4.88	5.79	5.36	4.32
22	4.15	3.78	4.30	3.85	4.85	3.38	3.52	3.92	4.21	5.85	5.29	5.07
23	4.33	3.80	3.75	4.52	4.65	3.45	3.55	3.65	5.54	5.70	5.12	4.34
24	4.18	3.71	3.59	4.54	5.15	3.56	3.56	3.21	4.96	5.91	4.91	5.03
25	3.61	4.00	3.42	4.38	4.72	3.38	3.55	3.05	4.99	5.94	5.25	4.19
26	3.73	4.22	3.98	4.24	4.90	3.43	4.21	3.28	4.58	6.02	5.06	3.84
27	4.29	4.09	4.07	4.36	4.81	3.66	3.82	3.36	5.21	6.02	4.95	4.12
28	3.66	3.92	4.47	4.07	4.50	3.58	3.49	3.25	4.91	5.78	4.84	3.54
29	4.24	3.80	3.80	3.50	4.19	3.46	5.49	3.65	4.40	5.14	5.04	3.69
30	3.58	3.89	3.89	3.50	4.91	3.56	3.80	3.45	4.79	4.93	4.70	4.71
31	3.74	3.97	3.97	4.21	4.21	3.60	3.60	3.71	3.71	5.43	5.43	4.19
Sum	131.28	107.26	115.27	118.12	138.05	114.70	116.30	106.10	129.94	169.58	159.66	140.71

Current Year 1999

Period 1935-1999

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.			126	6.12	6	1.93	4.23	11,343	9,364	13,819	2,146
Feb.			21	6.42	4	0	3.83	9,267	9,016	14,787	2,023
Mar.			24	6.09	110	0	3.72	9,959	10,318	15,332	2,393
April			14	6.12	2	0	3.94	10,206	10,239	14,666	2,368
May			18	6.26	18	0	4.45	11,928	10,559	16,208	2,405
June			8	6.20	8	1.48	3.82	9,910	9,690	14,851	2,825
July			29	9.73	28	1.20	3.75	10,048	9,582	14,715	3,121
Aug.			17	6.13	2	1.27	3.42	9,167	9,561	14,752	3,158
Sept.			14	6.07	22	0	4.33	11,227	9,683	14,269	2,812
Oct.			17	6.14	113	0	5.47	14,652	11,237	15,277	3,626
Nov.			17	8.23	117	0	5.32	13,795	10,784	14,814	3,454
Dec.			30	7.86	18	0	4.54	12,157	10,136	14,160	3,022
Yearly				9.73		0	4.24	133,659	120,169	171,922	33,353

! And other days

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

DESCRIPTION: Water-stage recorder located about 0.5 kilometer upstream from outlet to Yuma Main Drain, which is 53 meters upstream from East Main Canal Wasteway outlet and 0.6 kilometer west of San Luis, Arizona. Prior to August 1, 1975, the recorder was located about 46 meters upstream from outlet to Yuma Main Drain.

RECORDS: Wasteway discharges computed by United States Section of the Commission beginning February 23, 1971, from water-stage recorder and ratings as determined by current meter measurements. Records available: February 23, 1971 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.18	0.24	0.25	0.59	0.67	0.34	0.30	0.61	0.11	0.57	0.01	0.48
2	.13	.36	.11	.51	1.20	.32	.31	.86	.20	.63	.01	.08
3	.14	.11	.27	.01	.39	.46	.21	.16	.21	.42	.02	.76
4	.11	.48	.24	.32	.68	.52	.10	.07	.29	.66	.01	.01
5	.09	.23	.47	.72	.76	.40	.25	.40	.68	.48	.03	.20
6	.13	.16	.31	.30	.84	.49	.32	.18	.65	.31	.05	.16
7	.26	.25	.33	.59	.63	.30	.35	.74	.53	.59	.02	.01
8	.05	.14	.46	.50	.90	.11	.46	.62	.36	.20	.04	.03
9	.09	.19	.39	.08	1.00	.12	.24	.41	.59	.49	.01	.09
10	.23	.14	.06	.17	.75	.31	.41	.10	.44	.71	.02	.20
11	.09	.26	.06	.58	.67	.52	.55	.51	.66	.52	.03	.05
12	.14	.11	.48	.31	.77	.48	.49	.53	.18	.39	.03	.04
13	.75	.68	.79	.36	.35	.49	.26	.54	.64	.35	.07	.57
14	.70	.44	.52	.37	.41	.34	.10	.63	.21	.70	.04	.14
15	.33	.70	.19	.11	.45	.30	.23	.23	.14	.54	.02	.32
16	.33	.18	.21	.03	.37	.28	.07	.32	.32	.46	0	.11
17	.35	.65	.08	.15	.10	.52	.30	.02	.19	.39	.01	.30
18	.29	.50	.18	.69	.39	.41	.27	.15	.58	.55	.02	.14
19	.32	.17	.18	.50	.11	.32	.64	.52	.48	.09	.02	.24
20	.13	.42	.32	.38	.29	.25	.54	.81	.48	.05	.02	.24
21	.12	.21	.59	.42	.61	.42	.23	.61	.78	.04	.02	.12
22	.46	.22	.28	.62	.49	.46	.16	.19	.67	.02	.02	.39
23	.07	.12	.27	.34	.40	.22	.19	.12	.97	.04	.02	.30
24	.09	.09	.31	.65	.35	.76	.11	.37	.51	.04	.03	.12
25	.07	.21	.28	.87	.45	.52	.21	.45	.58	.03	.03	.46
26	.46	.21	.40	.63	.62	.23	.13	.14	.20	.02	.03	.58
27	.29	.08	.75	.13	.16	.12	.18	.09	.38	.07	.01	.53
28	.34	.26	.43	.35	.40	.19	.10	.14	.30	.12	.04	.20
29	.18		.30	.32	.49	.12	.20	0	.13	.05	.84	.10
30	.28		.18	.25	.49	.23	.05	.13	.60	.03	.65	.38
31	.48		.23		.54		.55	.07		0		.38
Sum	7.68	7.81	9.92	11.85	16.73	10.55	8.51	10.72	13.06	9.56	2.17	7.73

Current Year 1999

Period 1971-1999

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.	0.800	0.010	13	1.27	18	0	0.25	.664	579	1,376	48.7
Feb.	.845	.080	20	1.15	12	0	.28	675	532	840	196
Mar.	.810	.015	13	1.15	18	0	.32	857	576	1,158	250
April	.825	.015	24	1.35	13	0	.40	1,024	555	1,280	202
May	.900	.010	2	1.66	120	0	.54	1,445	487	1,445	183
June	.780	.015	21	1.21	19	0	.35	912	441	912	55.8
July	.810	.005	8	1.31	17	0	.27	735	450	763	77.3
Aug.	.795	.010	13	1.26	110	0	.35	926	514	1,182	121
Sept.	.910	.020	23	1.71	11	0	.44	1,128	525	1,128	234
Oct.	.795	.010	9	1.25	19	0	.31	826	529	1,135	164
Nov.	.785	0	29	1.22	11	0	.07	187	446	845	32.3
Dec.	.840	.015	3	1.42	12	0	.25	668	545	1,204	43.5
Yearly	0.910	0		1.71		0	0.32	10,047	6,179	10,047	3,179

! And other days

09-5345.50 242 WELL FIELD NEAR SAN LUIS, ARIZONA

DESCRIPTION: Water-stage recorder and 3.7 meter Parshall flume located 31 meters upstream from confluence of East Main Canal Wasteway, 34 meters north of the southerly land boundary, and 2.3 kilometers east of the Colorado River.

RECORDS: Based on current meter measurements and a continuous record of gage heights. The station is operated by the United States Section of the Commission. Records available: October 18, 1978 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.20	0.21	0.20	0.21	0.16	0.19	0.17	0.21	0.23	0.22	0	0
2	.20	.21	.20	.21	.15	.31	.18	.20	.23	.22	0	0
3	.20	.21	.20	.20	.07	.32	.18	.20	.23	.22	0	0
4	.21	.21	.20	.20	0	.19	.18	.20	.23	.22	0	0
5	.21	.21	.20	.20	0	.19	.18	.20	.23	.21	0	0
6	.21	.21	.20	.20	.07	.19	.18	.20	.23	.22	0	0
7	.21	.21	.20	.20	.18	.19	.18	.20	.23	.21	0	0
8	.21	.21	.20	.22	.18	.20	.19	.20	.23	.21	0	0
9	.21	.21	.20	.20	.18	.21	.20	.20	.23	.21	0	0
10	.22	.21	.20	.20	.18	.21	.20	.21	.23	.21	0	0
11	.21	.21	.20	.20	.18	.21	.19	.20	.23	.21	0	0
12	.21	.21	.20	.21	.18	.21	.19	.22	.23	.21	0	0
13	.22	.21	.20	.20	.18	.21	.19	.22	.23	.21	0	0
14	.22	.21	.20	.20	.18	.20	.20	.22	.23	.21	0	0
15	.22	.21	.20	.20	.18	.20	.20	.22	.23	.22	0	0
16	.22	.21	.11	.19	.19	.19	.20	.22	.23	.22	0	0
17	.22	.21	0	.19	.19	.19	.20	.22	.22	.21	0	0
18	.22	.21	0	.21	.19	.20	.19	.22	.23	.21	0	0
19	.22	.21	0	.13	.19	.20	.20	.22	.23	.16	0	0
20	.21	.21	0	0	.19	.20	.07	.22	.23	.01	0	0
21	.21	.21	0	0	.19	.20	0	.22	.23	0	0	0
22	.22	.21	.05	0	.19	.20	0	.22	.22	0	0	0
23	.22	.21	.19	0	.19	.20	.06	.22	.22	0	0	0
24	.22	.21	.20	0	.19	.20	.19	.22	.22	0	0	0
25	.22	.45	.20	0	.19	.20	.19	.22	.22	0	0	0
26	.22	.47	.20	.07	.19	.20	.19	.22	.22	0	0	0
27	.22	.22	.20	.15	.19	.20	.20	.21	.22	0	0	0
28	.22	.21	.20	.15	.19	.20	.21	.22	.22	0	0	0
29	.23	.20	.20	.15	.19	.19	.21	.22	.22	0	0	0
30	.22	.20	.20	.16	.19	.19	.20	.22	.22	0	0	0
31	.22	.20	.20	.19	.19	.20	.21	.22	.22	0	0	0
Sum	6.67	6.39	4.95	4.45	5.11	6.19	5.33	6.61	6.80	4.02	0	0

Current Year 1999

Period 1979-1999

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.	0.130	0.100	29	0.32	1	0.20	0.22	576	812	3,406	0
Feb.	.200	.085	125	.67	17	.16	.23	552	1,230	3,677	0
Mar.	.105	0	29	.23	17	0	.16	428	1,247	4,717	0
April	.140	0	8	.38	119	0	.15	384	1,392	4,265	0
May	.095	.005	119	.20	13	0	.16	442	1,312	4,269	0
June	.150	.070	12	.43	16	.11	.21	535	1,270	4,272	0
July	.105	0	28	.28	120	0	.17	461	1,464	5,868	0
Aug.	.105	.030	11	.27	11	.04	.21	571	1,493	4,988	0
Sept.	.100	.080	12	.25	12	.18	.23	588	1,265	3,397	0
Oct.	.100	0	3	.27	120	0	.13	347	867	3,344	0
Nov.	0	0	1	0	1	0	0	0	370	2,101	0
Dec.	0	0	1	0	1	0	0	0	795	3,654	0
Yearly	0.200	0		0.67		0	0.15	4,884	13,517	38,461	201

! And other days

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

DESCRIPTION: The tabulated data below are the combined flows of the East Main Canal Wasteway, West Main Canal Wasteway, 242 Lateral, and the Yuma Main Drain and represent the total water crossing the international land boundary into the Sanchez Mejordada Canal near San Luis, Arizona. The mean daily discharges are combined and rounded and the monthly volumes are obtained by adding the volumes of the four stations.

RECORDS: Records obtained and computed by the United States Section of the Commission. Records available: February 23, 1971 through 1999; 242 Lateral from November 1978 through 1999.

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

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.36	4.32	5.26	5.32	4.98	4.95	4.30	4.72	3.73	5.61	5.74	5.88
2	5.29	4.70	4.16	6.37	5.58	5.11	4.21	4.29	3.81	5.69	5.94	5.20
3	5.43	4.41	4.00	4.74	5.21	4.81	4.77	3.68	3.82	5.66	5.97	6.32
4	5.50	5.01	4.27	4.60	5.09	4.86	4.32	3.32	4.80	6.07	5.54	4.76
5	4.29	5.02	4.39	4.94	5.06	4.93	4.28	4.21	5.17	5.53	5.55	4.99
6	4.30	3.88	4.83	4.10	5.22	5.37	4.25	3.97	4.47	6.09	6.03	5.23
7	4.88	4.41	5.14	4.77	4.84	4.76	4.22	4.38	4.37	6.23	5.84	4.62
8	5.14	4.07	4.68	4.79	5.28	4.29	4.39	5.11	4.32	6.27	6.25	4.28
9	5.17	3.99	4.26	4.23	5.77	4.59	4.39	4.27	4.99	6.28	5.58	4.52
10	5.18	4.15	4.22	4.32	5.77	4.39	5.04	3.74	4.43	6.21	5.75	5.07
11	5.22	4.36	4.35	4.39	6.25	4.80	5.09	4.56	5.27	6.23	5.46	5.11
12	4.83	3.85	5.04	4.73	5.53	4.41	5.27	4.78	4.81	6.19	5.38	4.91
13	5.49	5.02	5.17	4.33	4.59	4.76	4.45	4.31	6.01	6.18	5.66	5.25
14	5.84	4.80	4.96	4.50	4.73	4.90	4.72	5.14	4.80	6.22	6.19	4.73
15	5.25	5.27	4.06	4.06	5.45	4.26	4.92	4.23	4.17	6.63	5.90	5.09
16	5.25	4.07	3.79	4.26	6.21	4.48	4.42	4.25	5.10	6.34	5.48	4.81
17	5.67	4.47	3.62	4.30	5.71	4.72	4.58	2.89	4.88	6.87	5.70	5.82
18	5.84	5.00	3.84	5.09	5.32	4.16	4.37	4.46	5.54	7.05	5.34	5.40
19	5.11	5.15	3.56	4.97	4.91	4.31	4.83	4.85	5.53	6.47	5.70	5.37
20	5.43	5.01	4.27	4.49	4.60	4.64	4.29	5.14	5.95	6.35	5.31	4.92
21	4.98	5.15	4.54	5.12	5.70	4.80	3.62	4.81	5.95	6.38	5.48	4.61
22	5.31	4.65	4.72	4.55	5.82	4.47	3.72	4.41	5.15	6.12	5.70	5.56
23	4.96	4.26	4.22	5.13	5.59	4.30	3.87	3.99	7.02	6.13	5.14	4.89
24	5.00	4.42	4.41	5.19	5.83	4.72	4.14	3.81	5.75	6.45	5.15	5.34
25	4.40	4.96	4.42	5.39	5.36	4.51	4.28	3.75	6.05	6.24	5.33	5.09
26	4.72	5.28	5.02	5.10	5.71	4.15	4.56	3.81	5.20	6.25	5.22	4.91
27	5.46	4.50	5.55	4.89	5.16	4.05	4.52	4.06	5.93	6.43	5.11	5.05
28	4.65	4.74	5.55	5.02	5.46	4.06	4.12	4.01	5.45	6.24	5.19	4.19
29	5.06		4.62	4.22	5.34	3.95	6.22	4.06	4.78	5.82	6.37	4.14
30	4.42		4.76	3.99	5.98	4.06	4.30	4.35	5.71	5.01	5.60	5.42
31	4.59		4.45		5.23		4.65	4.23		5.51		4.68
Sum	158.02	128.92	140.13	141.90	167.28	136.57	139.11	131.59	152.96	190.75	168.57	156.16

Current Year 1999

Period 1935-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			114	5.84	5	4.29	5.10	13,653	11,882	14,963	2,619
Feb.			26	5.28	12	3.85	4.60	11,139	11,716	15,998	2,495
Mar.			127	5.55	19	3.56	4.52	12,107	13,211	16,904	2,864
April			2	6.37	30	3.99	4.73	12,260	13,226	16,013	2,611
May			11	6.25	13	4.59	5.40	14,453	13,528	17,145	3,050
June			6	5.37	29	3.95	4.55	11,800	12,367	15,505	3,115
July			29	6.22	21	3.62	4.49	12,019	12,537	15,320	3,610
Aug.			114	5.14	17	2.89	4.24	11,369	12,649	15,612	3,687
Sept.			23	7.02	1	3.73	5.10	13,216	12,489	15,357	3,210
Oct.			18	7.05	30	5.01	6.15	16,481	13,704	17,143	4,248
Nov.			29	6.37	27	5.11	5.62	14,564	12,764	15,680	4,202
Dec.			3	6.32	29	4.14	5.04	13,492	12,615	14,863	3,562
Yearly				7.05		2.89	4.96	156,553	152,688	183,801	39,274

φ Mean daily

! And other days

09-5222.00 COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

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

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 1999; 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.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	271	6.82	3.11	1.70	1.85	1.18	0.87	13.2	0.55	105	171	51.2
2	278	5.80	3.55	1.85	1.86	.96	.61	3.05	.60	111	139	55.9
3	268	4.51	8.81	35.2	1.52	.86	.56	1.54	.54	125	119	63.1
4	253	4.42	3.54	120	1.42	.81	.55	.81	5.18	118	89.8	80.1
5	211	4.41	3.24	73.9	21.5	.81	.65	.54	4.93	99.9	71.9	90.7
6	172	8.54	3.05	8.66	13.0	.80	.54	.42	2.71	108	78.0	91.9
7	183	23.8	2.87	12.5	5.44	.80	.50	.35	3.01	107	88.8	24.1
8	177	18.6	2.69	11.5	3.35	1.91	.51	.33	14.0	78.5	75.9	8.70
9	187	19.4	2.52	3.72	2.34	10.8	.49	.33	8.85	77.5	64.0	7.33
10	200	11.0	2.33	3.12	1.87	14.0	6.71	.29	10.7	90.6	51.4	6.93
11	224	4.84	2.15	2.83	1.76	14.6	13.4	.24	31.1	92.3	43.7	6.32
12	233	4.19	2.08	2.68	1.74	10.9	23.1	.22	33.4	52.6	42.3	5.99
13	229	4.02	2.07	2.57	1.44	5.56	12.9	.21	24.9	30.0	57.5	5.46
14	224	3.93	2.05	2.48	1.34	3.72	15.5	.19	31.4	71.0	99.4	6.46
15	225	3.84	2.17	2.37	1.23	2.56	23.1	.19	33.9	67.6	94.7	5.84
16	232	3.76	2.70	2.27	3.62	1.86	9.60	.18	27.6	72.1	63.4	5.86
17	230	3.71	2.02	2.22	17.6	1.64	3.50	.20	42.6	113	57.0	5.52
18	184	3.55	1.94	2.23	5.96	1.58	2.10	.18	55.0	132	56.6	5.56
19	47.5	3.47	1.91	2.24	3.95	1.37	1.60	.19	67.3	126	63.5	5.62
20	16.7	3.39	1.94	2.28	2.03	1.44	1.19	.20	80.2	119	78.7	5.69
21	22.4	3.31	1.97	2.09	1.64	1.24	.84	.23	65.2	93.1	92.4	6.26
22	11.6	3.23	1.92	2.07	1.59	1.59	.68	.25	61.6	119	72.1	9.12
23	8.16	3.16	1.85	2.01	1.29	1.16	.53	.22	69.1	140	26.7	7.04
24	7.30	3.14	1.82	2.01	1.27	1.11	.46	.29	102	148	24.7	11.8
25	6.63	3.14	1.79	1.98	1.08	1.12	.54	.41	121	142	70.1	12.1
26	5.98	3.14	1.79	1.96	.98	1.43	.58	.53	127	115	72.9	13.4
27	5.40	3.14	1.78	1.93	.82	1.30	.45	.41	117	101	64.1	14.0
28	4.83	3.14	1.79	1.90	.79	1.06	.41	.41	93.7	127	104	10.9
29	4.31		1.80	1.87	.87	1.21	.51	.57	128	155	78.4	9.22
30	3.96		1.78	1.88	.84	1.17	14.6	.54	113	176	50.8	7.20
31	3.61		1.75		.75		28.2	.55		175		7.95
Sum	4,129.38	171.40	76.78	316.02	106.94	90.55	165.78	27.27	1,476.07	3,387.2	2,261.8	647.27

Current Year 1999

Period 1935-1999

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.	25.360	22.470	2	282	31	3.44	133	356,778	412,574	2,062,379	0
Feb.	23.185	22.255	7	28.7	123	3.14	6.12	14,809	338,803	1,708,370	0
Mar.	22.785	22.105	3	13.4	31	1.71	2.48	6,634	283,880	1,458,432	0
April	23.880	22.065	4	132	1	1.64	10.5	27,304	185,268	947,722	0
May	23.135	22.025	5	27.8	31	.70	3.45	9,240	247,900	1,430,837	0
June	22.780	21.970	11	15.3	6	.76	3.02	7,824	211,493	1,455,506	0
July	23.245	21.945	12	35.3	28	.37	5.35	14,323	182,091	1,821,962	0
Aug.	23.165	21.770	1	29.6	116	.17	1.88	2,356	196,715	2,103,318	0
Sept.	24.425	21.895	26	135	12	.48	49.2	127,532	227,848	1,956,768	0
Oct.	24.495	22.835	31	181	13	16.4	109	292,654	265,909	2,144,909	0
Nov.	24.515	22.935	1	185	23	19.3	75.4	195,420	307,429	1,761,409	0
Dec.	23.860	22.285	6	117	13	4.84	20.9	55,924	378,942	2,268,370	0
Yearly	25.360	21.770		282		0.17	35.2	1,110,798	3,238,488	15,656,495	0

! And other days

09-5222.01 COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	25.290	22.560	22.255	22.105	22.075	22.040	21.985	22.640	21.905	24.130	24.400	23.390
2	25.335	22.525	22.295	22.140	22.090	22.025	21.965	22.145	21.910	24.165	24.150	23.430
3	25.270	22.435	22.625	22.960	22.080	22.015	21.960	22.050	21.905	24.270	23.995	23.480
4	25.155	22.425	22.340	23.810	22.075	22.010	21.955	21.995	22.210	24.180	23.765	23.600
5	24.860	22.425	22.305	23.465	22.065	22.010	21.970	21.965	22.215	24.000	23.625	23.675
6	24.575	22.585	22.285	23.555	22.655	22.010	21.960	21.945	22.070	24.050	23.670	23.680
7	24.655	23.090	22.270	22.715	22.325	22.010	21.955	21.915	22.090	24.030	23.750	23.015
8	24.605	22.965	22.250	22.705	22.190	22.080	21.955	21.905	22.740	23.765	23.650	22.495
9	24.660	22.990	22.230	22.340	22.130	22.585	21.955	21.900	22.455	23.740	23.560	22.420
10	24.735	22.730	22.210	22.245	22.100	22.730	22.335	21.875	22.545	23.835	23.460	22.400
11	24.885	22.470	22.190	22.205	22.095	22.755	22.695	21.850	23.340	23.835	23.385	22.370
12	24.930	22.395	22.180	22.180	22.095	22.580	22.975	21.830	23.405	23.500	23.360	22.360
13	24.880	22.375	22.180	22.165	22.075	22.270	22.635	21.815	23.215	23.185	23.500	22.335
14	24.825	22.360	22.175	22.150	22.070	22.155	22.780	21.805	23.350	23.630	23.825	22.400
15	24.825	22.350	22.200	22.135	22.065	22.075	23.015	21.800	23.395	23.600	23.785	22.350
16	24.850	22.340	22.270	22.125	22.195	22.025	22.520	21.785	23.270	23.640	23.540	22.340
17	24.820	22.330	22.170	22.115	22.845	22.010	22.175	21.800	23.545	23.965	23.490	22.310
18	24.480	22.310	22.155	22.115	22.340	22.005	22.085	21.785	23.665	24.115	23.485	22.305
19	23.455	22.300	22.150	22.120	22.225	21.995	22.055	21.790	23.780	24.065	23.535	22.305
20	22.950	22.290	22.155	22.125	22.110	22.000	22.030	21.790	23.905	24.010	23.645	22.300
21	23.100	22.275	22.160	22.100	22.085	21.985	22.005	21.810	23.760	23.805	23.745	22.325
22	22.770	22.265	22.150	22.095	22.085	22.010	21.990	21.825	23.725	24.015	23.585	22.460
23	22.650	22.255	22.135	22.090	22.065	21.980	21.975	21.800	23.800	24.170	23.120	22.350
24	22.615	22.255	22.130	22.090	22.065	21.975	21.965	21.840	24.115	24.240	23.085	22.580
25	22.585	22.255	22.125	22.085	22.055	21.975	21.980	21.890	24.290	24.190	23.555	22.590
26	22.560	22.255	22.125	22.080	22.045	21.995	21.985	21.915	24.355	23.985	23.575	22.640
27	22.540	22.255	22.120	22.075	22.035	21.990	21.970	21.890	24.255	23.875	23.505	22.655
28	22.520	22.255	22.125	22.070	22.030	21.970	21.960	21.885	24.035	24.075	23.790	22.510
29	22.500		22.125	22.070	22.040	21.985	21.980	21.915	24.355	24.290	23.600	22.430
30	22.490		22.120	22.070	22.035	21.980	22.665	21.905	24.215	24.455	23.400	22.330
31	22.475		22.115		22.030		23.130		21.905	24.450		22.365
Avg.	23.965	22.440	22.205	22.345	22.175	22.110	22.210	21.900	23.260	23.975	23.620	22.650

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 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.06	4.48	4.75	4.11	3.76	2.44	2.96	2.66	1.99	2.58	0.12	0.22
2	4.87	4.43	4.63	4.25	3.60	2.48	3.04	2.70	2.05	2.77	.10	.22
3	4.79	4.27	4.64	4.42	3.61	2.48	3.12	2.66	2.07	2.76	.09	.20
4	4.69	4.10	4.87	4.11	3.61	3.55	3.00	2.71	2.05	3.40	.09	.20
5	4.62	4.16	4.49	4.15	3.70	3.82	3.04	2.70	2.06	3.15	.09	.20
6	4.89	4.34	4.62	4.37	3.61	3.83	2.95	2.79	2.07	2.93	.09	.33
7	5.11	4.15	4.74	4.40	3.64	3.85	3.08	2.79	2.19	2.86	.09	3.30
8	5.08	4.09	4.29	4.56	3.60	3.80	3.14	2.82	2.31	2.90	.09	3.49
9	4.97	4.05	4.10	4.33	3.72	3.46	3.04	2.85	2.53	2.60	.09	3.42
10	5.09	4.07	4.10	4.23	3.61	3.37	2.95	3.37	2.36	2.40	.10	3.45
11	5.08	4.09	4.10	4.24	3.58	3.13	2.90	3.71	2.51	2.25	.09	3.79
12	5.08	4.20	4.23	4.50	3.59	3.05	2.89	3.13	2.78	2.35	.10	3.88
13	5.16	4.20	4.27	4.49	3.66	3.08	2.92	3.17	2.90	2.82	.10	3.58
14	5.29	4.06	4.13	4.49	3.74	3.29	2.89	2.94	2.71	2.87	.10	3.45
15	5.27	4.06	4.08	4.14	3.62	3.72	2.43	3.00	2.37	3.09	.10	3.36
16	5.27	3.97	4.12	3.91	2.39	3.13	2.47	2.99	2.34	2.99	.12	3.54
17	5.25	4.23	4.07	4.08	2.58	3.49	2.40	2.95	2.34	2.91	.12	3.58
18	5.20	4.21	4.16	4.09	2.53	3.33	2.41	2.92	2.06	2.92	.10	3.62
19	5.13	4.25	4.23	4.13	2.56	3.08	2.60	2.95	2.07	2.95	.11	3.51
20	5.08	4.32	4.42	3.99	2.44	2.99	2.65	2.61	2.21	3.25	.12	3.41
21	4.93	4.24	4.38	4.01	2.58	3.07	2.69	3.03	2.28	2.78	.12	3.37
22	5.22	4.14	4.34	4.01	2.54	3.10	2.87	3.13	2.15	.37	.11	3.52
23	5.12	4.03	4.41	3.93	2.38	2.77	2.87	3.09	2.30	.13	.11	3.60
24	5.13	3.96	4.47	4.02	2.33	2.78	2.94	3.02	2.26	.09	.13	3.61
25	5.10	4.08	4.29	4.13	2.31	2.92	2.99	3.03	2.31	.09	.18	3.85
26	4.79	4.47	4.31	4.00	2.28	2.91	2.98	3.13	2.46	.22	.18	3.71
27	4.68	4.50	4.28	3.87	2.37	2.85	3.07	3.09	2.58	.20	.19	3.71
28	4.64	4.76	4.23	3.90	2.39	3.09	2.93	2.89	2.64	.09	.19	3.72
29	4.41		4.21	3.69	2.40	2.93	3.15	2.53	2.50	.08	.19	3.64
30	4.58		4.10	3.75	2.41	2.90	2.88	2.34	2.46	.08	.20	3.60
31	4.65		4.18		2.39		2.64	2.27		.41		3.57
Sum	154.23	117.91	134.24	124.30	93.53	94.69	88.89	89.97	69.91	61.29	3.61	90.65

Current Year 1999								Period 1977-1999			
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second					Volume-Thousand Cubic Meters			
	High	Low	Day	High	Low		Average	Total	Average	Maximum	Minimum
					Day	Low					
Jan.	0.545	0.475	14	5.35	29	4.32	4.98	13,325	14,170	21,638	7,412
Feb.	.505	.440	28	4.87	24	3.86	4.21	10,187	13,748	18,374	8,506
Mar.	.540	.460	4	5.35	11	4.01	4.33	11,598	15,041	21,496	11,420
April	.615	.430	13	6.30	29	3.61	4.14	10,740	13,625	20,613	3,445
May	.450	.245	1	3.95	16	1.49	3.02	8,081	13,768	20,732	5,215
June	.595	.325	14	6.11	1	2.36	3.16	8,181	12,612	19,842	2,227
July	.430	.330	8	3.44	17	2.26	2.87	7,680	13,007	22,235	3,718
Aug.	.575	.290	10	6.03	31	2.07	2.90	7,773	12,921	22,444	3,656
Sept.	.385	.275	13	3.11	18	1.86	2.33	6,040	12,062	23,538	51.4
Oct.	.595	.030	4	6.08	25	.04	1.98	5,295	13,024	23,600	23.9
Nov.	.080	.035	27	.25	4	.06	.12	312	11,585	20,944	59.2
Dec.	.450	.065	12	4.08	3	.17	2.92	7,832	12,805	22,518	138
Yearly	0.615	0.030		6.30		0.04	3.08	97,044	158,368	222,488	75,784

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 1999.

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

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 1999	PERIOD 1964 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	24,179	11,460	85,761	0
February	8,942	6,232	50,898	0
March	4,097	8,645	72,049	0
April	9,973	13,772	85,372	0
May	11,140	13,497	99,576	0
June	1,240	11,337	61,705	0
July	1,421	11,532	56,912	0
August	3,535	17,149	132,183	0
September	36,581	15,439	83,943	0
October	16,666	13,708	136,198	0
November	0	13,000	122,170	0
December	6,534	11,556	86,607	0
Yearly	124,308	152,474	628,347	0

09-5365.00 WASTEWAY TO COLORADO RIVER AT KILOMETER 38 IN MEXICO

DESCRIPTION: Wasteway to the Colorado River on the left bank of new Barrote Canal at old dam and bridge at Kilometer 18+251 (old Kilometer 38+000). The wasteway is located in the Colonia Bojorquez 1.3 kilometers upstream from the Sonora-Baja California railroad bridge, 5.9 kilometers downstream from the Miguel C. Rodriguez gaging station, and 45 kilometers downstream from the southerly international boundary.

RECORDS: The records are computed by the National Water Commission and are based upon gate openings. Records available: January 1964 through 1999.

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 1999	PERIOD 1964 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	765	1,791	10,541	0
February	392	1,402	12,035	0
March	69.1	751	5,932	0
April	0	401	5,555	0
May	1,659	1,366	14,246	0
June	0	780	8,585	0
July	0	641	9,114	0
August	0	1,084	17,765	0
September	0	2,225	16,855	0
October	2,130	4,558	28,669	0
November	2,113	2,830	25,263	0
December	1,348	2,238	13,380	0
Yearly	8,476	19,022	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 32,267)		LAKE MOHAVE (Capacity 2,233)		HAVASU LAKE (Capacity 764)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 35,263)	
	1999	Average 1935-1999	1999	Average 1951-1999	1999	Average 1939-1999	1999	Estimated Average
Jan.	30,634.7	23,286.0	2,031.9	2,052.6	658.3	682.9	33,324.9	26,021.5
Feb.	30,712.4	23,149.7	2,068.7	2,065.9	643.0	686.0	33,424.1	25,901.6
Mar.	30,420.1	22,886.3	2,069.2	2,069.9	667.3	700.9	33,156.6	25,657.1
April	29,870.0	22,900.8	2,059.7	2,057.9	719.2	737.2	32,648.9	25,695.9
May	29,604.8	23,594.5	2,105.9	2,127.4	740.7	744.7	32,451.4	26,466.2
June	29,427.1	24,667.7	2,087.7	2,024.1	744.7	739.5	32,259.5	27,431.3
July	29,588.7	24,821.1	2,092.6	1,890.7	724.2	726.3	32,405.5	27,438.1
Aug.	29,858.9	24,636.5	2,110.7	1,842.3	745.9	711.1	32,715.5	27,189.9
Sept.	30,333.7	24,435.7	1,868.4	1,801.1	720.8	703.3	32,922.9	26,940.1
Oct.	30,487.9	24,225.9	1,710.8	1,794.0	687.4	698.5	32,886.1	26,718.4
Nov.	30,576.7	24,076.0	1,808.3	1,866.4	682.1	688.3	33,067.1	26,630.7
Dec.	30,833.3	23,909.3	1,957.5	1,975.9	672.5	688.4	33,463.3	26,573.6
Avg.	30,195.7	23,882.5	1,997.6	1,964.0	700.5	708.9	32,893.8	26,555.4
Max.	30,833.3	! 34,266.1	2,110.7	! 2,230.1	745.9	! 849.5	33,463.3	! 35,934.1
Min.	29,427.1	* 13,231.5	1,710.8	!!!1,462.9	643.0	!! 94.9	32,259.5	!!!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 - 1999

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

Date	Time	Stream-flow, Momentary		Gravimetric Percent	Date	Time	Stream-flow, Momentary		Gravimetric Percent	Date	Time	Stream-flow, Momentary		Gravimetric Percent
		Std.	CMS				Std.	CMS				Std.	CMS	
Jan.	6	0725	230	0.0092	June	10	0730	105	0.0111	Sept.	30	0910	182	0.0084
	15	0925	269	0.0068		17	0728	74.1	0.0028		Oct.	7	0745	161
Feb.	21	0845	89.1	0.0038	July	1	0645	80.8	0.0028	Nov.	4	0748	134	0.0070
	28	0840	54.0	0.0050		24	0800	74.1	0.0043		14	0640	138	0.0033
Mar.	4	0820	63.1	0.0045	Aug.	3	0745	83.1	0.0173	Dec.	2	0808	134	0.0032
	11	0855	71.1	0.0055		6	0825	83.5	0.0025		9	0851	77.7	0.0031
Apr.	18	0820	95.9	0.0087	Sept.	2	0635	38.0	0.0052	May	6	0815	77.2	0.0026
	25	0845	90.1	0.0060		12	0750	59.4	0.0030		13	0730	72.4	0.0046
May	4	0825	91.2	0.0063	Oct.	28	1035	120	0.0025	June	3	0740	73.3	0.0018
	11	0935	89.4	0.0061		29	0720	79.9	0.0049		27	0810	76.6	0.0016
June	18	0733	88.9	0.0057	Nov.	4	0748	134	0.0070	July	1	0645	80.8	0.0028
	25	0734	93.2	0.0294		18	0745	117	0.0007		21	0755	159	0.0036
July	31	0735	92.6	0.0113	Dec.	30	0825	64.9	0.0020	Aug.	8	0640	84.6	0.0070
	8	0720	110	0.0104		1	0645	80.8	0.0044		11	0855	71.1	0.0055
Aug.	15	0750	90.6	0.0045	Jan.	6	0725	230	0.0092	Feb.	21	0845	89.1	0.0038
	22	0850	91.1	0.0030		12	0750	59.4	0.0030		28	0840	54.0	0.0050
Sept.	29	0804	92.6	0.0035	Mar.	4	0820	63.1	0.0045	Apr.	18	0820	95.9	0.0087
	6	0815	77.2	0.0026		11	0855	71.1	0.0055		25	0845	90.1	0.0060
Oct.	13	0730	72.4	0.0046	Apr.	15	0750	90.6	0.0045	May	4	0825	91.2	0.0063
	20	0810	76.3	0.0018		22	0850	91.1	0.0030		11	0935	89.4	0.0061
Nov.	27	0810	76.6	0.0016	May	29	0804	92.6	0.0035	June	18	0733	88.9	0.0057
	3	0740	73.3	0.0018		6	0815	77.2	0.0026		25	0734	93.2	0.0294
Dec.					June	23	0655	153	0.0405	Sept.	2	0635	38.0	0.0052

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

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

Month	Monthly Weight Megagrams		Number of Samples	Gravimetric Percentages			* Silt Volume - Thousand Cubic Meters			
	Water	Silt		Average	Maximum Sample	Minimum Sample	Total 1999	Period 1952 - 1999		
								Average	Maximum	Minimum
Jan.	180,109,000	49,647	4	0.0276	0.0955	0.0026	36.5	21.4	62.6	0.30
Feb.	203,524,000	5,523	4	0.0027	0.0037	0.0015	4.06	15.8	127.8	1.10
Mar.	247,424,000	3,565	4	0.0014	0.0038	0.0005	2.62	58.2	605.2	3.32
April	239,268,000	7,281	5	0.0041	0.0102	0.0005	7.28	63.5	856.8	4.49
May	203,187,000	10,871	4	0.0054	0.0152	0.0005	7.98	38.7	318.2	1.36
June	198,297,000	24,457	4	0.0123	0.0423	0.0005	18.0	38.2	256.6	2.53
July	225,141,000	68,858	5	0.0306	0.0811	0.0046	50.6	56.2	192.3	4.14
Aug.	146,241,000	4,929	4	0.0034	0.0070	0.0011	3.62	39.5	166.9	3.62
Sept.	166,890,000	3,474	5	0.0021	0.0045	0.0005	2.55	18.8	79.8	1.78
Oct.	166,985,000	4,384	4	0.0026	0.0084	0.0005	3.22	11.4	124.0	0.40
Nov.	183,574,000	5,121	4	0.0028	0.0077	0.0005	3.76	11.0	165.2	0.30
Dec.	180,403,000	6,542	5	0.0036	0.0102	0.0005	4.80	11.6	54.4	0.84
Year	2,341,043,000	194,652	52	0.0082	0.0955	0.0005	145.0	384.3	2,706.5	40.2

* Volume calculated at 1.362 megagrams per cubic meter

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

Date	Time	Stream-flow, Momentary		Gravimetric Percent	Date	Time	Stream-flow, Momentary		Gravimetric Percent
		Std.	CMS				Std.	CMS	
Jan. 7	1145	191	0.0154	Dec. 12	0752	6.87	0.0018		
Sept. 30	1130	125	0.0096						
Oct. 28	1035	120	0.0025						
Nov. 18	1128	70.7	0.0069						

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

CHEMICAL ANALYSES OF WATER SAMPLES
1999

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

1999	Time	Streamflow Momentary	Specific Conductance	pH	Hardness, Total (as CaCO ₃)	Hardness, Noncarbonate (CaCO ₃)	Calcium ion (Ca), Dissolved	Magnesium ion (Mg), Dissolved
Date	Standard	CMS	Microsiemens/cm	Units	mg/L	mg/L	mg/L	mg/L
Jan. 4	0900	328	1,110	8.2	327.48	177.48	82.5	29.2
19	0900	110	1,290	8.2	367.96	199.96	94.2	31.9
Feb. 1	0800	85.0	1,290	8.2	350.40	184.40	89.0	30.8
16	0900	84.8	1,380	8.1	379.81	206.81	95.8	33.8
Mar. 1	1120	92.7	1,250	8.2	349.66	197.66	88.7	30.8
15	0930	103	1,220	8.2	332.89	176.89	84.0	29.6
April 5	0800	121	1,220	8.2	342.90	184.90	87.0	30.2
19	0800	91.1	1,270	8.1	344.74	183.74	87.4	30.4
May 3	0800	76.3	1,220	8.2	332.42	175.42	84.3	29.3
17	0800	84.3	1,220	8.2	333.14	178.14	84.1	29.6
June 7	0815	72.6	1,390	8.1	385.68	216.68	98.3	33.7
21	0800	72.4	1,280	8.2	344.64	180.64	87.2	30.5
July 6	0800	85.5	1,180	8.2	314.99	160.99	79.5	28.0
19	0800	122	1,250	8.2	345.54	184.54	86.9	30.0
Aug. 2	0630	74.8	1,320	8.2	346.49	181.69	87.1	31.0
16	0800	49.4	1,440	8.2	368.69	195.89	93.0	32.8
Sept. 7	0730	106	1,240	8.2	339.24	182.24	85.2	30.4
20	0700	118	1,110	8.2	308.86	164.36	77.2	27.9
Oct. 4	0800	172	1,120	8.2	316.68	173.68	79.0	28.7
18	0800	176	1,110	8.3	302.46	158.46	74.0	28.3
Nov. 1	0855	177	1,210	8.2	314.43	164.43	78.1	28.7
12	1300	138	1,290	8.2	335.32	177.32	83.3	30.6
15	0800	139	1,280	8.2	344.59	186.59	86.0	31.2
22	0800	131	1,270	8.3	330.13	172.13	83.2	29.4
29	0745	135	1,260	8.2	330.34	172.34	82.3	30.0
Dec. 6	1000	135	1,250	8.2	315.51	157.51	77.2	29.5
20	0830	71.1	1,380	8.2	385.00	212.00	99.7	32.7

1999	Sodium ion (Na), Dissolved	Potassium ion (K) Dissolved	Sulfate ion (SO ₄) Dissolved	Chloride ion (Cl), Dissolved	Carbonate (as CO ₃)	Bicarbonate (as HCO ₃)	Nitrate (as NO ₃)	Total Solids Dissolved (Calculated)
Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan. 4	109	4.1	285	95	N.D.	183	1.1	706
19	136	4.4	323	134	N.D.	205	0.9	837
Feb. 1	133	3.9	324	124	N.D.	203	1.7	818
16	152	4.3	341	158	N.D.	211	1.7	902
Mar. 1	137	4.0	318	128	N.D.	185	1.6	810
15	123	4.0	292	122	N.D.	190	1.8	760
April 5	121	4.2	307	126	N.D.	193	1.6	783
19	129	4.2	309	137	N.D.	196	2.1	807
May 3	121	4.2	330	122	N.D.	192	1.6	790
17	123	4.2	326	123	N.D.	189	1.7	795
June 7	155	5.0	342	150	N.D.	206	1.7	900
21	127	4.4	306	130	N.D.	200	1.4	796
July 6	107	4.2	288	112	N.D.	188	1.7	723
19	126	4.5	303	121	N.D.	196	1.5	781
Aug. 2	143	4.6	328	131	N.D.	201	1.5	837
16	158	4.7	321	154	N.D.	211	2.2	884
Sept. 7	130	4.5	274	118	N.D.	192	1.7	750
20	108	4.2	256	104	N.D.	176	1.1	676
Oct. 4	112	4.4	255	101	N.D.	174	1.0	677
18	102	3.9	270	101	N.D.	176	1.2	677
Nov. 1	124	4.2	270	122	N.D.	183	1.5	730
12	140	4.4	286	132	N.D.	193	1.6	785
15	144	4.6	286	128	N.D.	193	1.6	788
22	134	4.2	288	131	N.D.	193	1.6	778
29	132	4.2	292	130	N.D.	193	1.9	779
Dec. 6	135	4.1	287	127	N.D.	193	1.8	768
20	146	4.3	314	149	N.D.	211	1.9	864

N.D. - Not Detected

SPECIFIC CONDUCTANCE OF WATER SAMPLES

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

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,060	1,290	1,250	1,210	1,190	1,240	1,160	1,240	1,420	1,100	1,210	1,280
2	1,080	1,420	1,190	1,210	1,200	1,250	1,180	1,320	1,430	1,110	1,180	1,260
3	1,090	1,430	1,170	1,210	1,220	1,240	1,180	1,230	1,330	1,110	1,190	1,270
4	1,110	1,400	1,290	1,210	1,220	1,240	1,180	1,210	1,310	1,120	1,220	1,260
5	1,120	1,420	1,290	1,220	1,120	1,280	1,180	1,220	1,280	1,110	1,260	1,260
6	1,120	1,370	1,280	1,230	1,250	1,320	1,180	1,220	1,260	1,090	1,280	1,250
7	1,170	1,320	1,260	1,180	1,230	1,390	1,250	1,240	1,240	1,100	1,290	1,290
8	1,110	1,270	1,250	1,170	1,230	1,110	1,190	1,260	1,220	1,150	1,310	1,450
9	1,090	1,280	1,270	1,280	1,230	1,110	1,180	1,280	1,220	1,150	1,320	1,500
10	1,060	1,280	1,260	1,300	1,230	1,060	1,160	1,240	1,210	1,140	1,260	1,470
11	1,040	1,360	1,260	1,320	1,250	1,130	1,160	1,250	1,200	1,140	1,270	1,470
12	1,090	1,460	1,270	1,340	1,170	1,160	1,140	1,290	1,190	1,140	1,280	1,470
13	1,070	1,440	1,240	1,250	1,210	1,190	1,110	1,320	1,180	1,120	1,280	1,470
14	1,070	1,420	1,200	1,220	1,240	1,220	1,110	1,360	1,120	1,090	1,280	1,430
15	1,070	1,410	1,220	1,220	1,230	1,180	1,130	1,400	1,150	1,110	1,280	1,420
16	1,120	1,380	1,190	1,190	1,230	1,190	1,230	1,440	1,090	1,110	1,260	1,430
17	1,180	1,380	1,170	1,210	1,220	1,240	1,240	1,300	1,130	1,110	1,270	1,410
18	1,230	1,260	1,190	1,240	1,250	1,250	1,240	1,360	1,120	1,110	1,260	1,400
19	1,290	1,280	1,250	1,270	1,260	1,250	1,250	1,380	1,110	1,100	1,250	1,390
20	1,380	1,300	1,250	1,190	1,210	1,260	1,230	1,410	1,110	1,100	1,250	1,380
21	1,360	1,330	1,250	1,190	1,230	1,280	1,230	1,420	1,050	1,180	1,260	1,290
22	1,460	1,350	1,250	1,190	1,240	1,230	1,210	1,440	1,080	1,120	1,260	1,360
23	1,480	1,250	1,250	1,190	1,250	1,230	1,230	1,450	1,090	1,140	1,310	1,350
24	1,510	1,260	1,210	1,190	1,260	1,230	1,220	1,370	1,060	1,160	1,290	1,410
25	1,530	1,280	1,200	1,180	1,210	1,250	1,210	1,320	1,060	1,180	1,280	1,480
26	1,540	1,240	1,210	1,180	1,220	1,250	1,200	1,300	1,050	1,170	1,270	1,540
27	1,450	1,250	1,230	1,160	1,250	1,260	1,220	1,400	1,050	1,100	1,270	1,600
28	1,440	1,270	1,250	1,180	1,240	1,260	1,190	1,410	1,040	1,130	1,250	1,550
29	1,490		1,270	1,160	1,240	1,190	1,170	1,420	1,040	1,180	1,260	1,450
30	1,410		1,200	1,170	1,240	1,190	1,110	1,430	1,110	1,190	1,250	1,440
31	1,340		1,210		1,240		1,180	1,430		1,200		1,420

SPECIFIC CONDUCTANCE OF WATER SAMPLES

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,030	1,380	1,500	1,350	1,310	1,280	1,210	1,420	1,500	1,250	1,300	1,100
2	1,080	1,460	1,190	1,320	1,300	1,280	1,200	1,470	1,400	1,210	1,300	1,100
3	1,040	1,460	1,170	1,300	1,320	1,310	1,220	1,450	1,350	1,250	1,300	1,100
4	1,120	1,440	1,250	1,300	1,300	1,310	1,240	1,260	1,200	1,260	1,300	1,110
5	1,120	1,500	1,290	1,300	1,310	1,320	1,240	1,280	1,350	1,210	1,300	1,100
6	1,120	1,310	1,270	1,310	1,310	1,350	1,240	1,270	1,400	1,210	1,300	1,110
7	1,100	1,290	1,490	1,300	1,310	1,350	1,360	1,320	1,200	1,210	1,350	1,140
8	1,100	1,310	1,450	1,300	1,300	1,200	1,350	1,340	1,200	1,250	1,300	1,240
9	1,100	1,320	1,290	1,400	1,300	1,190	1,360	1,320	1,300	1,260	1,350	1,340
10	1,100	1,290	1,220	1,400	1,300	1,110	1,290	1,270	1,200	1,280	1,340	1,350
11	1,100	1,470	1,230	1,400	1,320	1,140	1,280	1,300	1,100	1,280	1,310	1,340
12	1,100	1,480	1,240	1,400	1,300	1,180	1,300	1,330	1,250	1,280	1,340	1,340
13	1,100	1,650	1,380	1,300	1,300	1,190	1,300	1,400	1,250	1,300	1,350	1,350
14	1,100	1,520	1,410	1,310	1,300	1,250	1,300	1,420	1,100	1,300	1,360	1,290
15	1,100	1,520	1,240	1,320	1,300	1,250	1,250	1,500	1,100	1,310	1,360	1,280
16	1,150	1,360	1,280	1,300	1,320	1,250	1,250	1,520	1,100	1,280	1,350	1,220
17	1,250	1,530	1,300	1,300	1,310	1,250	1,280	1,380	1,100	1,300	1,360	1,250
18	1,380	1,210	1,200	1,300	1,310	1,260	1,380	1,400	1,100	1,250	1,350	1,290
19	1,300	1,270	1,200	1,320	1,300	1,270	1,400	1,500	1,100	1,260	1,300	1,290
20	1,380	1,340	1,200	1,310	1,300	1,270	1,380	1,500	1,100	1,280	1,320	1,290
21	1,350	1,510	1,200	1,310	1,320	1,300	1,380	1,520	1,000	1,290	1,330	1,280
22	1,510	1,490	1,350	1,300	1,280	1,300	1,360	1,550	1,000	1,260	1,310	1,290
23	1,500	1,190	1,200	1,320	1,300	1,290	1,350	1,570	1,100	1,260	1,320	1,290
24	1,640	1,220	1,200	1,320	1,310	1,250	1,360	1,500	1,100	1,300	1,360	1,300
25	1,610	1,220	1,210	1,300	1,300	1,280	1,360	1,400	1,100	1,300	1,350	1,340
26	1,600	1,220	1,200	1,280	1,300	1,280	1,380	1,400	1,100	1,300	1,360	1,360
27	1,490	1,230	1,280	1,250	1,320	1,280	1,380	1,420	1,100	1,290	1,360	1,420
28	1,510	1,490	1,280	1,260	1,320	1,280	1,320	1,500	1,100	1,250	1,330	1,450
29	1,540		1,260	1,250	1,300	1,210	1,320	1,580	1,100	1,250	1,320	1,450
30	1,460		1,200	1,250	1,310	1,220	1,250	1,500	1,100	1,250	1,300	1,450
31	1,380		1,270		1,320		1,280	1,500		1,250		1,420

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 1999

January	March	May	July	September	November
	23 1,820	3 1,920 18 1,290			9 1,280 18 1,320
February	April	June	August	October	December
	6 1,290 20 1,850	1 1,920	2 1,260	14 1,150	2 1,300 14 1,640

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 Citrus Station, Arizona		Bullhead City, Arizona	
	1999	Average 1931-1999	1999	Average 1931-1999	1999	Average 1931-1999	1999	Average 1931-1999	1999	Average 1978-1999
Jan.	0	10	0	11	1	12	#	11	6	29
Feb.	0	9	0	9	10	12	#	9	9	29
Mar.	0	7	0	6	0	10	#	7	T	28
April	0	2	8	2	27	3	#	7	13	5
May	0	1	0	0	0	1	#	1	0	3
June	0	0	0	0	0	1	1	1	4	0
July	0	1	#	2	20	5	10	6	3	9
Aug.	0	9	4	8	19	19	2	13	0	18
Sept.	10	8	16	8	4	10	7	11	11	11
Oct.	0	6	0	7	0	7	0	9	0	10
Nov.	0	4	0	4	#	7	0	5	0	12
Dec.	0	11	0	11	0	14	0	12	0	16
Yearly	10	68		68		101		92	46	170

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		El Centinela, Baja California		Delta, Baja California	
	1999	Average 1948-1999	1999	Average 1926-1999	1999	Average 1948-1999	1999	Average 1975-1999	1999	Average 1948-1999
Jan.	0	9	T	9	0	10	#	5	0	8
Feb.	2	5	5	8	6	6	#	7	6	6
Mar.	0	4	T	6	0	5	#	3	17	5
April	3	2	6	2	7	3	#	2	0	1
May	0	T	0	T	0	T	0	0	1	T
June	0	T	T	T	0	T	0	T	0	T
July	21	3	33	4	#	2	1	1	13	2
Aug.	T	8	1	9	#	6	0	4	0	6
Sept.	0	4	3	10	#	5	11	7	8	7
Oct.	0	5	0	8	#	6	0	5	0	7
Nov.	0	4	0	4	#	3	0	1	0	3
Dec.	0	9	0	17	#	8	1	8	0	11
Yearly	26	55	48	82		50		45	45	53

Month	San Felipe, Baja California		Riito, Sonora					
	1999	Average 1948-1999	1999	Average 1949-1999				
Jan.	#	6	0	6				
Feb.	#	5	9	5				
Mar.	#	3	0	3				
April	#	1	10	1				
May	#	1	0	T				
June	#	1	T	T				
July	8	3	8	3				
Aug.	T	9	0	6				
Sept.	4	18	9	9				
Oct.	0	4	0	7				
Nov.	0	5	0	4				
Dec.	0	9	0	10				
Yearly		71	36	59				

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 1999.

IN THE UNITED STATES

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

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	1975	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	1949	S. A. R. H.
San Felipe, Baja California	31° 01'	114° 51'	21.95	1948	S. A. R. H.

* Not shown on rainfall map

@ Elevation above mean sea level except Brawley and El Centro, which are elevations below mean sea level

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

Ministry of Agriculture and Hydraulic Resources

EVAPORATION IN THE COLORADO RIVER BASIN
IN MILLIMETERS

Tabulated below are records of evaporation observed at one station in Arizona, at five stations in Baja California, and at one station in Sonora. The station in the United States is operated by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Agriculture and Hydraulic Resources. The type of pan used at all these stations was the National Weather Service standard pan of 1.22 meters diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," in this bulletin.

IN THE UNITED STATES

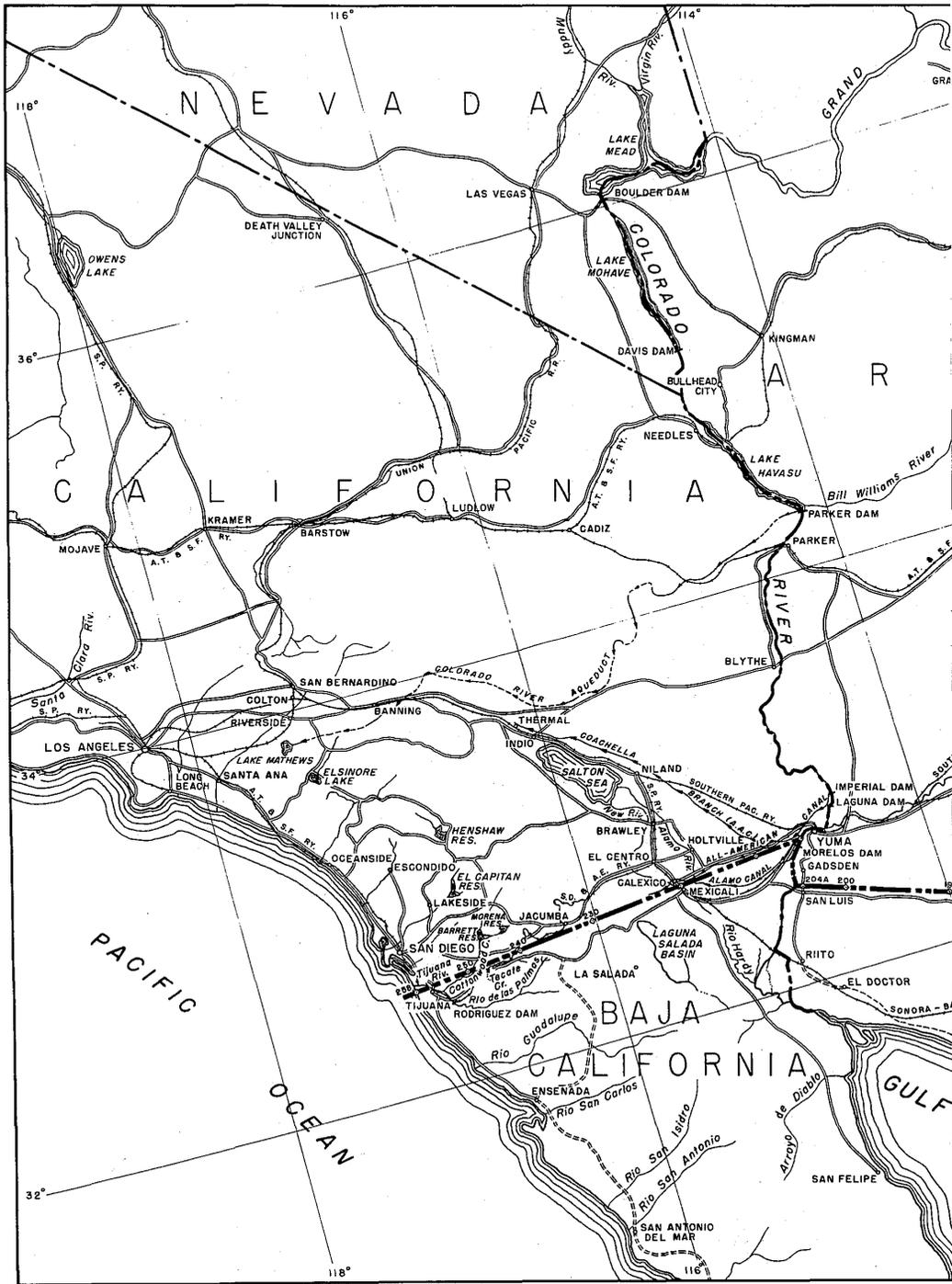
Month	Yuma Citrus Station, Arizona	
	1999	Average 1931-1999
Jan.	#	99
Feb.	#	120
Mar.	#	184
April	#	252
May	#	323
June	349	359
July	#	384
Aug.	189	336
Sept.	163	265
Oct.	127	189
Nov.	#	125
Dec.	#	94
Yearly		2,730

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		Riito, Sonora		San Felipe, Baja California	
	1999	Average 1948-1999	1999	Average 1926-1999	1999	Average 1948-1999	1999	Average 1949-1999	1999	Average 1948-1999
Jan.	79	105	69	64	#	83	#	76	#	119
Feb.	104	128	82	131	#	101	#	98	#	140
Mar.	163	181	129	147	#	150	#	146	#	169
April	200	250	171	197	#	205	#	187	#	198
May	200	310	219	266	#	269	#	256	#	240
June	244	336	225	292	#	305	#	286	#	256
July	187	345	256	297	#	290	#	315	8	274
Aug.	250	308	250	256	#	251	#	266	#	261
Sept.	267	256	173	203	#	206	#	215	4	227
Oct.	193	203	140	146	#	147	#	153	#	198
Nov.	184	133	68	85	#	109	#	95	#	146
Dec.	108	107	55	60	#	78	#	77	#	118
Yearly	2,179	2,670	2,670	2,086		2,226		2,246		2,398

Month	Delta, Baja California									
	1999	Average 1948-1999								
Jan.	69	85								
Feb.	107	108								
Mar.	145	153								
April	196	209								
May	270	254								
June	298	279								
July	289	290								
Aug.	253	263								
Sept.	215	222								
Oct.	206	158								
Nov.	128	105								
Dec.	103	153								
Yearly	2,279	2,048								

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 Citrus Station, Arizona				Brawley, California			
	1999				1999				1999			
	Mean	Max.	Min.	Average 1931-99	Mean	Max.	Min.	Average 1931-99	Mean	Max.	Min.	Average 1931-99
Jan.	13.0	25.0	0.6	11.6	#	#	#	11.9	13.8	26.7	-0.6	12.3
Feb.	14.4	29.4	1.1	14.2	#	#	#	14.1	14.9	29.4	1.1	14.7
Mar.	17.6	31.7	4.4	17.4	#	#	#	16.9	16.7	32.2	3.3	17.4
April	16.2	37.8	3.9	21.3	#	#	#	20.5	18.2	38.3	4.4	21.0
May	25.7	41.7	6.7	25.5	#	#	#	24.4	23.7	40.6	6.7	25.0
June	29.8	45.0	12.2	29.9	#	44.4	10.6	28.8	27.4	43.3	10.0	29.4
July	32.9	45.0	21.1	33.6	#	41.7	22.8	32.7	31.8	43.9	18.3	33.1
Aug.	#	46.1	14.4	32.9	#	43.9	18.9	32.5	31.8	44.4	17.2	32.9
Sept.	#	43.3	15.6	29.5	#	42.2	18.3	29.5	29.8	43.3	15.0	30.1
Oct.	23.8	38.9	7.8	22.9	#	40.6	11.7	23.1	25.1	40.6	8.3	23.9
Nov.	#	#	#	15.7	#	32.2	8.9	16.3	18.6	34.4	2.2	17.0
Dec.	11.3	27.2	-3.3	11.7	#	26.1	0.6	12.4	13.3	27.2	0.0	12.7
Yearly				22.2				21.9	22.1	44.4	-0.6	22.5

Month	El Centro, California				Bullhead City, Arizona							
	1999				1999							
	Mean	Max.	Min.	Average 1931-99	Mean	Max.	Min.	Average 1978-99				
Jan.	14.7	26.1	2.8	12.5	14.2	25.6	2.8	12.3				
Feb.	15.6	29.4	1.7	14.8	15.6	30.6	5.0	14.9				
Mar.	17.7	32.8	5.6	17.5	19.2	31.7	7.2	17.9				
April	18.7	37.8	5.6	21.0	19.9	38.9	5.6	22.2				
May	24.9	40.0	10.0	25.2	26.5	42.8	8.3	27.2				
June	29.1	44.4	12.2	29.6	31.3	46.7	13.3	32.2				
July	#	#	#	33.2	34.5	47.2	22.8	35.2				
Aug.	32.8	43.9	20.0	32.9	34.8	46.1	20.0	34.7				
Sept.	30.9	42.2	18.3	29.9	31.7	44.4	16.7	30.7				
Oct.	26.5	41.1	12.2	23.8	25.3	40.0	10.0	23.9				
Nov.	20.1	33.9	4.4	16.9	18.7	31.1	6.1	16.7				
Dec.	13.8	26.7	2.8	12.7	13.1	23.3	2.2	11.9				
Yearly				22.5	23.7	47.2	2.2	23.3				

IN MEXICO

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	1999		1948-1999		1999		1926-1999		1999		1948-1999	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	26	2	31	-5	25	5	34	-7	25	5	45	-9
Feb.	31	3	35	-2	30	3	34	-5	30	3	37	-6
Mar.	33	4	38	0	32	8	38	-1	32	8	45	-4
April	39	4	43	3	39	7	41	1	39	6	48	-9
May	42	8	47	6	43	10	47	6	45	4	51	1
June	46	13	52	11	46	12	49	9	43	5	57	6
July	46	20	50	13	44	23	48	13	#	#	56	7
Aug.	47	20	49	16	46	21	49	12	#	#	54	8
Sept.	45	17	50	10	44	17	50	8	#	#	57	4
Oct.	42	11	44	0	41	13	44	0	#	#	48	0
Nov.	33	4	38	-3	32	4	40	-2	#	#	46	0
Dec.	26	1	32	-5	25	4	32	-5	#	#	36	-5
Yearly	47	1	52	-5	46	3	50	-7			57	-9

Missing Data

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

1999

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	18,237
Reservation Division	5,324
Yuma Mesa	8,094
Yuma Aux. Project Unit "B" (Yuma Mesa)	851
South Gila Valley	3,902
North Gila Valley	2,544
Wellton-Mohawk	23,605
Coachella Valley	25,700
Imperial Valley	187,047
Warren Act	35
Non-Project lands adjacent to Colorado River	4,455
Total in United States	279,794
IN MEXICO:	
San Luis Valley, R. C., Sonora	26,667
Mexicali Valley	156,899
Total in Mexico	183,566
Total in United States and Mexico	463,360

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 1999. 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.07	0.07	0.05	0.06	0.09	0.07	0.06	0.05	0.04	0.06	0.06	0.08
2	.07	.07	.05	.06	.09	.07	.07	.06	.04	.06	.06	.08
3	.06	.07	.05	.07	.10	.07	.07	.06	.04	.06	.06	.08
4	.06	.06	.05	.08	.11	.09	.06	.06	.04	.06	.07	.08
5	.06	.06	.05	.07	.09	.08	.08	.05	.05	.05	.08	.07
6	.06	.06	.07	.07	.09	.07	.08	.04	.05	.06	.07	.07
7	.07	.06	.07	.08	.08	.09	.08	.04	.05	.05	.07	.07
8	.06	.06	.07	.09	.07	.09	.08	.05	.05	.05	.08	.08
9	.06	.06	.08	.09	.07	.07	.08	.05	.05	.05	.08	.08
10	.06	.06	.07	.10	.07	.07	.07	.04	.04	.05	.08	.08
11	.06	.06	.07	.08	.07	.07	.08	.04	.04	.05	.07	.08
12	.06	.06	.07	.08	.06	.07	.07	.06	.04	.06	.07	.08
13	.06	.06	.07	.08	.06	.06	.07	.06	.04	.06	.07	.08
14	.07	.06	.07	.08	.06	.07	.05	.05	.04	.06	.07	.08
15	.08	.06	.07	.07	.05	.07	.06	.05	.05	.06	.08	.08
16	.08	.07	.07	.07	.05	.08	.06	.05	.05	.07	.07	.08
17	.08	.07	.07	.07	.07	.06	.06	.05	.05	.07	.07	.08
18	.08	.06	.07	.07	.07	.06	.07	.04	.05	.07	.07	.08
19	.07	.07	.07	.07	.06	.06	.07	.04	.04	.07	.06	.08
20	.07	.09	.07	.08	.06	.06	.08	.04	.04	.07	.06	.08
21	.07	.10	.07	.07	.06	.08	.09	.06	.07	.07	.07	.08
22	.07	.09	.07	.06	.06	.08	.09	.05	.06	.06	.07	.07
23	.07	.07	.07	.06	.06	.06	.08	.06	.07	.05	.08	.07
24	.07	.07	.06	.06	.06	.06	.08	.06	.07	.06	.08	.07
25	.07	.07	.07	.07	.07	.06	.09	.06	.07	.06	.07	.07
26	.06	.09	.07	.08	.07	.05	.08	.06	.07	.07	.08	.07
27	.06	.08	.07	.08	.07	.05	.06	.05	.06	.07	.09	.08
28	.06	.07	.07	.07	.06	.05	.09	.04	.06	.06	.07	.08
29	.06	.06	.06	.08	.07	.06	.10	.04	.06	.07	.07	.08
30	.06	.07	.08	.08	.07	.06	.08	.04	.06	.07	.07	.08
31	.06	.06	.06	.08	.08	.06	.06	.05	.06	.06	.07	.08
Sum	2.05	1.93	2.05	2.23	2.21	2.02	2.31	1.55	1.51	1.88	2.15	2.40

Current Year 1999

Period 1943-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		φ Low		Total	Average	Maximum	Minimum
				Day	Day						
Jan.	0.145	0.115	15	0.08	13	0.06	0.07	177	332	3,441	0
Feb.	.145	.115	21	.10	14	.06	.07	167	304	3,481	0
Mar.	.140	.105	9	.08	11	.05	.07	177	347	3,890	0
April	.160	.115	10	.10	11	.06	.07	193	363	2,741	0
May	.170	.105	4	.11	15	.05	.07	191	298	2,219	0
June	.150	.100	4	.09	126	.05	.07	175	283	2,080	0
July	.170	.105	29	.10	14	.05	.07	200	267	2,112	72.8
Aug.	.130	.090	3	.07	16	.04	.05	134	306	2,062	81.0
Sept.	.130	.090	123	.07	11	.04	.05	130	284	1,734	103
Oct.	.130	.100	116	.07	15	.05	.06	162	299	2,276	0
Nov.	.145	.115	27	.09	11	.06	.07	186	312	2,566	6.0
Dec.	.145	.130	1	.08	15	.07	.08	207	301	2,080	0
Yearly	0.170	0.090		0.11		0.04	0.07	2,099	3,696	27,317	1,318

φ Mean daily

! And other days

10-2549.70 NEW RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder located on the left (west) bank of the river in the limits of the City of Calexico, California, 427 meters downstream (north) from the international land boundary between the United States and Mexico. Measurements are made from a foot bridge at the gage.

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 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.51	5.66	7.16	7.28	7.48	5.52	5.66	9.09	5.52	6.20	5.75	6.63
2	6.68	5.89	7.50	8.41	8.07	5.47	5.44	9.94	5.49	6.15	6.34	6.54
3	7.14	6.15	7.82	9.97	10.0	5.64	5.41	9.69	5.47	6.06	7.08	6.26
4	7.65	6.77	7.25	11.5	11.3	5.66	5.49	10.0	5.47	6.03	7.59	6.49
5	7.53	6.46	6.68	12.7	10.9	5.61	5.41	10.1	5.47	5.95	7.19	6.17
6	7.11	6.57	6.71	13.9	10.3	6.09	5.55	9.03	5.41	6.26	7.08	6.29
7	6.88	6.63	6.88	13.3	8.44	6.63	5.78	7.99	5.35	5.30	7.31	7.05
8	6.17	6.66	7.11	10.6	7.76	7.36	5.92	7.53	5.30	5.69	7.48	7.36
9	5.98	6.91	7.45	8.58	7.31	8.16	7.56	8.10	5.41	5.89	7.48	7.22
10	5.92	6.88	7.79	7.87	7.45	8.13	6.43	8.30	5.61	5.69	7.02	6.94
11	5.98	6.97	8.44	7.45	8.04	7.45	6.29	8.24	5.83	5.64	6.83	6.60
12	6.15	7.00	9.20	7.53	8.55	7.00	6.40	7.79	5.72	6.20	6.88	6.54
13	6.49	7.11	9.09	7.50	7.65	6.17	7.76	6.91	5.58	6.26	6.77	7.14
14	6.29	7.28	8.75	7.33	6.68	6.12	8.27	6.60	5.49	6.09	6.49	7.16
15	6.29	7.25	7.93	7.16	6.23	6.34	8.07	6.49	5.78	6.06	6.57	7.42
16	6.57	6.83	8.10	7.00	5.75	6.46	7.56	6.66	5.52	6.12	6.57	7.65
17	6.43	6.77	8.81	6.97	6.63	6.57	7.48	6.60	5.21	5.95	6.43	7.96
18	6.54	6.85	8.92	6.74	7.93	6.88	7.19	7.02	5.32	5.92	6.17	7.62
19	7.48	6.85	8.81	7.05	7.39	7.11	7.36	6.83	5.55	5.92	5.78	7.08
20	7.50	6.68	8.44	7.11	6.85	7.19	7.62	7.16	5.58	6.37	5.58	7.48
21	7.67	6.46	8.07	6.91	6.60	7.42	7.50	6.57	5.72	6.77	5.64	8.24
22	7.73	6.71	7.90	6.68	6.77	7.08	6.94	6.15	6.00	6.63	6.06	7.99
23	7.25	7.14	8.30	6.37	6.09	6.40	6.32	6.15	7.22	6.23	6.66	7.62
24	6.46	7.14	8.38	6.26	6.06	5.86	5.98	6.20	6.97	5.98	6.68	7.67
25	6.23	7.14	7.90	6.26	6.34	5.58	5.83	6.40	6.49	6.03	6.54	7.25
26	6.12	7.19	7.42	6.91	6.32	5.47	6.54	6.46	6.43	6.20	6.60	7.48
27	6.00	7.16	7.48	7.76	6.23	5.47	6.91	6.17	6.68	6.09	6.68	8.27
28	5.84	7.16	7.76	7.48	6.20	5.89	11.1	5.72	6.85	6.03	6.91	8.61
29	5.66		8.01	7.19	6.00	5.66	9.52	5.47	6.71	5.89	6.60	8.24
30	5.55		7.84	7.28	5.61	5.61	7.79	5.61	6.20	5.58	6.57	7.48
31	5.66		7.53		5.58		8.07	5.52		5.44		6.57
Sum	203.48	190.27	245.43	245.05	228.51	192.00	215.15	226.49	175.35	186.62	199.33	225.02

Current Year 1999

Period 1943-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	φ High		φ Low	Total		Average	Maximum	Minimum	
			Day								Day
Jan.	12.245	12.520	22	7.73	30	5.55	6.56	17,581	13,110	27,387	2,160
Feb.	12.300	12.500	14	7.28	1	5.66	6.80	16,439	11,758	26,416	1,552
Mar.	12.075	12.370	12	9.20	5	6.68	7.92	21,205	13,454	31,213	1,243
April	11.590	12.425	6	13.9	124	6.26	8.17	21,172	13,605	34,066	1,715
May	11.855	12.510	4	11.3	31	5.58	7.37	19,743	12,475	29,740	776
June	12.195	12.525	9	8.16	1	5.47	6.40	16,589	10,429	25,024	1,341
July	11.900	12.535	28	11.1	1	5.41	6.94	18,589	10,898	28,368	1,008
Aug.	11.980	12.525	5	10.1	29	5.47	7.31	19,569	12,462	34,066	1,405
Sept.	12.310	12.785	23	7.22	17	5.21	5.85	15,150	11,680	29,251	2,214
Oct.	12.360	12.530	21	6.77	7	5.30	6.02	16,124	11,527	28,072	2,567
Nov.	12.260	12.690	4	7.59	20	5.58	6.84	17,222	10,904	25,310	3,063
Dec.	12.145	12.435	28	8.61	5	6.17	7.26	19,442	12,892	28,104	2,175
Yearly	11.590	12.785		13.9		5.21	6.94	218,825	145,194	330,444	30,310

φ Mean daily

! And other days

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

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

RECORDS: During 1999 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 1999.

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 1999.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.03	0	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
2	0	.04	.02	.03	.02	.02	.03	.02	.03	.02	.03	.03
3	.04	.03	.03	.01	.03	.02	.03	.02	.03	.03	.03	.02
4	.03	.04	.05	.03	.02	.02	.03	.02	.03	.03	.03	.02
5	.03	0	0	.03	.02	.02	.02	.01	.03	.03	.03	.02
6	.03	.01	.02	.03	.02	.03	.03	.01	.01	.03	.02	.03
7	.03	.04	.04	.03	.02	.02	.03	.02	.03	.03	.03	.03
8	.02	.04	.03	.03	.02	.03	.02	.02	.03	.03	.03	.03
9	.02	.04	.03	.03	.02	.03	.02	.01	.03	.02	.03	.02
10	.03	.04	.03	.03	.02	.03	.03	.02	.03	.03	.03	.02
11	.03	.04	.03	.03	.02	.03	.02	.03	.03	.03	.03	.03
12	.03	.03	.03	.03	.02	0	.02	.01	.02	.03	.02	.01
13	.03	0	0	.03	.02	.03	.03	.01	.03	.03	.03	.03
14	.03	.03	.03	.03	.02	.03	.03	0	.03	.03	.03	.02
15	.03	.03	.03	.03	.02	.02	.02	.01	.03	.03	.03	.03
16	.01	.02	.03	.02	.02	.02	.02	.01	.02	.02	.03	.04
17	.02	.03	.03	.02	.02	.03	.02	.02	.03	.03	.03	.02
18	.03	.03	.03	.02	.02	.02	.02	.01	.02	.03	.04	.02
19	.03	.03	.03	.02	.02	.01	.02	.02	.03	.03	.04	.02
20	.02	0	.02	.03	.02	.03	.03	.01	.03	.03	.02	.04
21	.02	.03	.02	.03	.02	.02	.02	.01	.03	.03	.02	.03
22	.02	.02	.02	.03	.02	.03	.02	.02	.04	.02	.02	.03
23	.01	.02	.03	.03	.02	.03	.02	.01	.03	.02	.02	.02
24	.03	.02	.03	.03	.02	.03	.02	.02	.03	.03	.04	.02
25	.04	.03	.03	.03	.02	.03	.02	.02	.02	.03	.02	.02
26	.03	.02	.03	.02	.02	0	.02	.01	.03	.03	.03	.03
27	.04	0	.02	.02	.02	.03	.02	.01	.03	.03	.02	.04
28	.03	.03	.03	.03	.02	.03	.02	.01	.02	.03	.03	.04
29	.03		.03	.02	.02	.03	.01	.02	.03	.03	.02	.01
30	0		.02	.02	.02	.03	.02	.01	.03	.02	.03	.02
31	.03		.03		.02		.01	.02		.03		.02
Sum	0.78	0.72	0.78	0.80	0.63	0.72	0.69	0.46	0.84	0.87	0.84	0.79

Current Year 1999

Period 1968-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	φ High		φ Low			Total	Average	Maximum	Minimum
			Day		Day						
Jan.			! 3	0.04	1	0	0.03	67.4	149	641	0
Feb.			! 2	.04	! 5	0	.03	62.2	99.3	384	0
Mar.			7	.04	! 1	0	.03	67.4	185	1,074	0
April			! 1	.03	3	.01	.03	69.1	178	532	0
May			3	.03	! 1	.02	.02	54.4	192	537	53.6
June			! 6	.03	12	0	.02	62.2	176	504	25.9
July			! 2	.03	! 29	.01	.02	59.6	216	651	0
Aug.			! 11	.03	14	0	.01	39.7	233	735	39.7
Sept.			22	.04	! 1	.01	.03	72.6	220	677	44.1
Oct.			! 1	.03	! 1	.02	.03	75.2	206	625	46.7
Nov.			! 16	.04	! 6	.02	.03	72.6	182	622	32.8
Dec.			! 16	.04	! 12	.01	.03	68.3	168	737	8.6
Yearly				0.04		0	0.02	771	2,205	6,610	550

φ Mean daily

! And other days

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

DESCRIPTION: During 1999 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 1999.

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 1999	PERIOD 1956 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	551	1,017	10,803	7.8
February	746	835	8,981	7.8
March	881	716	5,506	26.8
April	1,335	619	3,940	19.9
May	859	433	3,174	11.2
June	84.2	442	6,994	0
July	935	635	12,644	0
August	891	632	5,103	0
September	854	520	3,966	25.9
October	950	650	4,285	10.4
November	532	653	4,668	0
December	268	773	10,720	0
Yearly	8,886	7,925	34,953	492

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 76.20 meters below mean sea level, U. S. C. & G. S. datum.

RECORDS: Records of water surface elevations available from November 1904 through 1999. 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 1999 was 69.220 meters below mean sea level. Minimum elevation during 1999 was 69.525 meters below mean sea level. Extremes for period of record: maximum elevation 59.71 below mean sea level February 10 to March 29, 1907; minimum elevation since 1906, 76.69 meters below mean sea level in November 1924.

MEAN DAILY WATER SURFACE ELEVATIONS IN METERS BELOW MEAN SEA LEVEL - 1999

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	69.465	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.435	69.435	69.495	69.525
2	69.465	69.405	69.310	69.280	69.250	69.250	69.280	69.340	69.435	69.435	69.495	69.525
3	69.465	69.405	69.310	69.280	69.250	69.250	69.280	69.340	69.435	69.435	69.525	69.525
4	69.465	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.435	69.495	69.525	69.525
5	69.465	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.435	69.495	69.525	69.525
6	69.465	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.465	69.495	69.525	69.525
7	69.465	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.465	69.495	69.525	69.525
8	69.435	69.370	69.310	69.280	69.250	69.250	69.280	69.340	69.465	69.495	69.525	69.525
9	69.435	69.370	69.310	69.280	69.250	69.250	69.280	69.370	69.465	69.495	69.525	69.525
10	69.435	69.370	69.310	69.280	69.250	69.250	69.280	69.370	69.465	69.495	69.525	69.525
11	69.435	69.370	69.310	69.280	69.250	69.250	69.280	69.370	69.465	69.495	69.525	69.525
12	69.435	69.370	69.310	69.280	69.220	69.250	69.280	69.370	69.465	69.495	69.525	69.525
13	69.435	69.370	69.310	69.280	69.220	69.250	69.280	69.370	69.465	69.525	69.525	69.525
14	69.435	69.370	69.310	69.250	69.220	69.250	69.280	69.370	69.465	69.525	69.525	69.525
15	69.435	69.370	69.310	69.250	69.220	69.250	69.280	69.405	69.465	69.525	69.525	69.525
16	69.435	69.370	69.280	69.250	69.220	69.250	69.280	69.405	69.465	69.525	69.525	69.525
17	69.435	69.370	69.280	69.250	69.220	69.250	69.280	69.405	69.465	69.525	69.525	69.525
18	69.435	69.370	69.280	69.250	69.220	69.250	69.280	69.405	69.465	69.525	69.525	69.525
19	69.435	69.340	69.280	69.250	69.220	69.250	69.280	69.405	69.465	69.525	69.525	69.525
20	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
21	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
22	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
23	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
24	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
25	69.405	69.340	69.280	69.250	69.220	69.250	69.310	69.405	69.465	69.525	69.525	69.525
26	69.405	69.340	69.280	69.250	69.220	69.280	69.310	69.405	69.465	69.525	69.525	69.525
27	69.405	69.340	69.280	69.250	69.220	69.280	69.310	69.405	69.465	69.525	69.525	69.525
28	69.405	69.310	69.280	69.250	69.220	69.280	69.310	69.405	69.465	69.525	69.525	69.525
29	69.405		69.280	69.250	69.220	69.280	69.310	69.405	69.465	69.495	69.525	69.525
30	69.405		69.280	69.250	69.220	69.280	69.310	69.405	69.465	69.495	69.525	69.525
31	69.405		69.280	69.250	69.220	69.280	69.340	69.405	69.465	69.495	69.525	69.525
Avg.	69.430	69.360	69.295	69.265	69.230	69.255	69.295	69.380	69.460	69.505	69.525	69.525

Month	Current Year 1999		Period 1935-1999		
	φ Extreme Elevation Meters		Elevation Meters		
	High	Low	# Average	# Maximum	! Minimum
Jan.	69.405	69.465	71.430	69.280	75.990
Feb.	69.310	69.405	71.335	69.190	75.830
Mar.	69.280	69.310	71.255	69.130	75.770
April	69.250	69.280	71.200	69.100	75.800
May	69.220	69.250	71.195	69.100	75.740
June	69.250	69.280	71.240	69.160	75.830
July	69.280	69.340	71.290	69.220	75.930
Aug.	69.340	69.405	71.345	69.250	76.020
Sept.	69.435	69.465	71.410	69.280	76.020
Oct.	69.465	69.525	71.435	69.310	76.140
Nov.	69.495	69.525	71.445	69.340	76.200
Dec.	69.525	69.525	71.415	69.340	76.080
Yearly	69.220	69.525	71.335	69.100	76.200

Area and Capacity Table		
Elevation	Area	Capacity
Meters Below M.S.L.	Hectares	Million Cubic Meters
	0	0
83.520	8,337	31.7
82.300	25,455	232.8
81.080	38,284	629.8
79.250	49,615	1,443.2
78.030	54,512	2,077.2
76.810	60,218	2,775.3
74.370	72,723	4,393.7
73.150	79,683	5,322.5
71.630	89,760	6,611.5
70.100	95,426	8,022.6
67.060	106,029	11,092.7
64.010	116,753	14,481.1
60.960	127,680	18,206.2

φ Mean daily

! Reading near first day of month

Mean monthly

CHEMICAL ANALYSIS OF WATER SAMPLES

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

NEW RIVER AT INTERNATIONAL BOUNDARY

1999 Date	Time Std.	*Streamflow Momentary CMS	Water Temperature Deg C	PH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Turbidity NTU
		Jan. 27	0700	6.00	13.2	7.6	0.0
Feb. 23	0700	7.05	16.4	7.4	0.0	2,050	12.0
Mar. 24	0700	8.30	18.4	7.4	0.0	2,150	12.0
Apr. 28	0900	7.42	21.5	7.4	0.7	3,870	15.0
June 22	0700	7.05	28.2	7.8	0.0	4,560	16.0
July 21	0700	7.45	27.0	7.8	2.0	4,000	11.0
Aug. 31	0700	5.41	30.2	7.5	0.0	4,370	18.0
Sept. 21	0700	5.44	28.6	7.6	0.8	3,510	20.0

* Flow provided by the California Regional Water Quality Control Board

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	Jan. 27, 1999	Feb. 23, 1999	Mar. 24, 1999	Apr. 28, 1999	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	5.0 ug/L	6.0 ug/L	6.0 ug/L	6.0 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Lead	10.0 ug/L	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	0.01 mg/L	0.02 mg/L	0.04 mg/L	N.D. mg/L	0.002 mg/L
MBAS	2.08 mg/L	1.28 mg/L	0.91 mg/L	1.27 mg/L	0.025 mg/L
Zinc	78.0 ug/L	N.D.	N.D.	113 ug/L	50.0 ug/L
Total Cyanide	N.D.	N.D.	0.01 mg/L	N.D.	0.01 mg/L
Total Phosphate(P04-P)	2.05 mg/L	1.80 mg/L	1.16 mg/L	2.55 mg/L	0.01 mg/L
Nitrate (NO3-N)	0.5 mg/L	0.50 mg/L	0.40 mg/L	N.D.	0.20 mg/L
Nitrite (NO2-N)	N.D. mg/L	0.07 mg/L	0.04 mg/L	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	8.5 mg/L	6.7 mg/L	5.70 mg/L	4.80 mg/L	0.05 mg/L
Total Dissolved Solids	2,570 mg/L	3,040 mg/L	2,630 mg/L	2,910 mg/L	---
Total Suspended Solids	233.0 mg/L	56.0 mg/L	33.0 mg/L	45.0 mg/L	---
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	---

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	June 22, 1999	July 21, 1999	Aug. 31, 1999	Sep. 21, 1999	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	6.0 ug/L	5.0 ug/L	5.0 ug/L	4.0 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	N.D.	0.002 mg/L	0.012 mg/L	0.003 mg/L	0.002 mg/L
MBAS	0.255mg/L	1.23 mg/L	1.36 mg/L	0.937 mg/L	0.025 mg/L
Zinc	68.0 ug/L	60.0 ug/L	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(P04-P)	1.66 mg/L	1.58 mg/L	2.15 mg/L	1.98 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D.	N.D.	N.D.	N.D.	0.20 mg/L
Nitrite (NO2-N)	N.D.	N.D.	N.D.	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	3.5 mg/L	4.0 mg/L	5.70 mg/L	5.60 mg/L	0.05 mg/L
Total Dissolved Solids	2,630 mg/L	2,620 mg/L	2,710 mg/L	2,350 mg/L	---
Total Suspended Solids	39.0 mg/L	28.0 mg/L	33.0 mg/L	38.0 mg/L	---
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	---

N.A. - Not Analyzed
N.D. - Not Detected

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 1999.

ALAMO RIVER

1999 Date	Time Std.	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Conductance Micro- siemens/cm	Coliform Fecal Colonies/ 100 mL	Flow CMS
Jan. 25	1030	13.0	7.8	8.5	4,420	500	0.08
Feb. 3	0850	13.8	8.0	10.2	4,850	500	0.07
Apr. 28	0825	19.5	7.8	7.1	4,590	1,500	0.07
May 20	1015	24.4	7.8	6.5	4,780	80	0.14
June 23	0710	27.3	7.8	6.1	4,460	367	0.06
July 21	0750	27.8	7.4	5.6	3,680	3,500	0.11
Aug. 28	0720	30.3	7.6	4.6	4,220	202	0.07
Sept. 22	0800	27.3	7.5	5.8	4,570	300	0.08
Oct. 27	0750	20.4	7.6	7.0	4,520	200	0.07
Nov. 23	0845	14.6	7.7	8.7	4,980	190	0.06
Dec. 29	0850	10.9	8.0	11.7	4,380	30	0.07

No sample collected for March

NEW RIVER

1999 Date	Time Std.	**Streamflow Momentary CMS	Water Temperature Deg C	pH Units	Oxygen Dissolved (DO) mg/L	Specific Conductance Microsiemens/cm	Fecal Coliform Colonies/ 100 mL
Jan. 6	0850	7.90	11.8	7.8	5.0	3,180	340,000
Jan. 25	1055	6.46	14.2	7.5	2.8	4,090	360,000
Feb. 3	1000	6.60	13.3	7.4	2.6	4,530	410,000
Feb. 18	0950	7.48	16.3	7.4	1.6	4,620	330,000
Mar. 3	0850	8.58	19.2	7.4	0.7	4,670	370,000
April 14	0835	8.21	19.2	7.6	1.2	5,000	340,000
April 28	0905	8.21	21.2	7.6	0.9	4,680	700,000
May 8	0735	11.9	21.8	7.5	1.2	3,390	360,000
May 20	1110	7.76	24.1	7.5	2.0	4,300	130,000
June 3	0805	6.03	21.6	7.6	1.2	5,080	1,000,000
June 23	0745	6.74	27.9	7.7	0.1	4,440	2,850,000
July 7	0810	6.17	29.2	7.7	0.1	5,060	2,850,000
July 21	0850	8.21	27.2	7.4	0.3	4,190	2,450,000
Aug. 4	0825	10.7	29.6	7.5	0.4	3,560	1,450,000
Aug. 26	0800	8.35	31.8	7.6	0.1	4,340	2,250,000
Aug. 8	0755	5.24	28.1	7.5	0.1	4,440	3,225,000
Sept. 22	0845	8.89	27.6	7.5	0.1	3,990	2,000,000
Oct. 6	0810	6.12	23.3	7.6	0.4	3,620	1,400,000
Oct. 27	0810	6.09	22.2	7.3	0.2	3,820	2,800,000
Nov. 3	0730	6.74	19.9	7.4	0.4	3,510	1,800,000
Nov. 23	0925	6.66	15.6	7.4	1.5	3,810	1,650,000
Dec. 8	0845	7.76	12.8	7.5	3.8	3,430	1,050,000
Dec. 29	0940	8.35	13.3	7.4	4.1	3,380	1,150,000

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

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 - 1999

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

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 1999.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1999 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 1999	PERIOD 1937 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	379	1,237	20,362	0
February	505	2,646	41,407	9.9
March	601	3,577	55,845	23.8
April	725	2,086	28,530	4.1
May	364	1,044	18,642	0
June	0	586	10,173	0
July	21.4	352	7,651	0
August	1.0	276	8,916	0
September	0	192	6,331	0
October	0	167	4,817	0
November	2.8	278	5,633	0
December	17.9	758	9,472	5.4
Yearly	2,617	13,199	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 1999.

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 1999	PERIOD 1937 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	438	303	2,583	0
February	350	1,024	19,644	0
March	387	1,997	55,615	0
April	424	1,511	28,159	0
May	357	838	18,100	0
June	365	637	9,260	0
July	454	395	6,236	0
August	454	379	7,937	0
September	439	422	7,253	0
October	454	266	4,639	0
November	439	298	5,071	0
December	454	530	9,099	0
Yearly	5,015	8,600	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 1999. 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 49.035 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 1999	PERIOD 1937 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	519	1,521	29,627	0
February	736	3,415	67,539	9.4
March	571	5,844	62,041	17.4
April	1,081	2,869	26,680	12.6
May	386	1,286	10,509	0
June	94.3	572	4,818	0
July	22.3	338	5,042	0
August	0	202	4,472	0
September	67.6	207	3,858	0
October	0	119	796	0
November	0	260	2,519	0
December	14.0	697	6,845	2.1
Yearly	3,491	17,330	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 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.17	0.64	0.92	0.69	0.75	0.73	0.72	0.72	1.17	0.87	0.87	0.78
2	1.17	.64	.92	.78	.75	.73	.71	.71	.99	.87	.85	.79
3	1.17	.64	.92	.75	.75	.73	.72	.70	.99	.87	.84	.78
4	1.17	.92	.93	.75	.74	.73	.72	.70	.99	.87	.86	.78
5	0	.92	.92	.78	.74	.72	.72	.70	.99	.87	.82	.78
6	0	.93	.92	.75	.75	.72	.71	.70	.99	.87	.84	.77
7	0	.93	.92	.75	.74	.73	.72	.70	.99	.86	.82	.78
8	0	.94	.92	.75	.75	.73	.72	.70	.99	.87	.82	.97
9	.30	.93	.93	.75	.75	.73	.71	.70	.97	.86	.81	.97
10	.59	.92	.93	.75	.75	.73	.71	.70	.97	.85	.82	.95
11	.59	1.02	.92	.77	.75	.73	.73	.70	.99	.86	.82	.91
12	1.07	.93	.92	.77	.75	.73	.73	.70	.99	.87	.82	.88
13	1.02	.93	.93	.75	.75	.73	.73	.70	.98	.85	.82	.82
14	1.02	.93	.93	.75	.75	.71	.73	.70	.98	.86	.82	.92
15	1.02	.93	.92	.75	.75	.73	.54	.70	.98	.86	.81	.93
16	1.03	.92	.93	.75	.75	.73	.57	.70	.98	.85	.80	.94
17	1.02	.92	.93	.75	.75	.73	.57	.70	.98	.84	.81	.92
18	1.03	.92	.93	.78	.73	.73	.59	.70	.98	.84	.80	.92
19	1.04	.92	.92	.75	.73	.70	.56	.70	.98	.82	.80	.91
20	1.03	.93	.91	.75	.75	.71	.56	.73	.98	.85	.82	.91
21	1.02	.94	.92	.77	.75	.75	.56	.84	.98	.84	.81	.91
22	0	.94	.93	.75	.73	.71	.57	.85	.99	.86	.81	1.04
23	0	.93	.93	.75	.75	.72	.72	.84	.87	.84	.80	1.04
24	0	.93	.93	.75	.75	.73	.72	.85	.87	.86	.78	1.04
25	0	.92	.92	.75	.74	.71	.70	.85	.87	.85	.79	1.00
26	.20	.92	.92	.75	.73	.72	.72	.85	.85	.84	.78	1.00
27	.40	.93	.91	.74	.75	.72	.72	1.16	.87	.85	.78	.98
28	.39	.93	.92	.75	.74	.71	.71	1.17	.87	.86	.78	.40
29	.39		.93	.75	.73	.72	.72	1.28	.87	.86	.78	.62
30	.64	0		.75	.73	.72	.70	1.16	.87	.86	.78	.94
31	.64	0	0		.73		.70	1.17		.94		.93
Sum	19.12	25.20	26.78	22.58	23.06	21.72	21.01	25.08	28.77	26.34	24.36	27.31

Current Year 1999

Period 1937-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			! 1		! 5	0	0.62	1,652	565	2,899	0
Feb.			11	1.02	! 1	.64	.90	2,177	578	2,883	0
Mar.			! 4	.93	! 30	0	.86	2,314	835	7,639	0
April			! 2	.78	1	.69	.75	1,951	1,039	5,016	0
May			! 1	.75	! 18	.73	.72	1,992	1,178	3,750	0
June			21	.75	19	.70	.74	1,877	1,226	4,611	0
July			! 11	.73	15	.54	.68	1,815	1,105	4,914	0
Aug.			29	1.28	! 3	.70	.81	2,167	1,049	4,761	0
Sept.			1	1.17	26	.85	.96	2,486	836	2,862	0
Oct.			31	.94	4	.59	.85	2,276	714	3,235	0
Nov.			1	.87	! 24	.78	.81	2,105	751	3,404	0
Dec.			! 22	1.04	28	.40	.88	2,360	665	2,843	0
Yearly				1.28		0	0.80	25,172	10,541	40,526	0

φ Mean daily

! And other days

11-0111.00 COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located about 4.0 kilometers downstream from Barrett Dam and 0.8 kilometer upstream from Rattlesnake Canyon for measuring Barrett Dam spills; and staff gage and control weir located immediately below the dam for measuring leakage. The elevation of the gage is about 305 meters (from topographic map).

RECORDS: Data furnished by the City of San Diego, California. Prior to January 1953, the records were furnished by the City of San Diego and reviewed and revised by the United States Section of the Commission. The recorder is to be operated only when Barrett Reservoir is near or above spillway level. Spillway discharges have occurred in May 1943, March, April 1979, January to May of 1980, April, December 1982, and the entire year of 1983, January to April 1993 and January to March 1995. Spillway discharges included in the period record below were computed by the City of San Diego from the head on the spillway crest, read on the reservoir gage, and applied to a broad-crested weir formula. Records available: January 1921 through 1999. 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 1999	PERIOD 1937 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	3.7	430	10,114	0
February	3.0	2,229	86,736	0
March	4.7	4,553	111,775	0
April	4.3	2,290	45,417	0
May	2.7	1,026	28,287	0
June	2.3	472	13,503	0
July	2.3	243	5,311	0
August	1.6	156	4,206	0
September	1.7	57.6	1,554	0
October	1.4	48.7	1,530	0
November	1.4	151	5,100	0
December	0.8	197	6,058	0
Yearly	29.9	11,853	254,099	0

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

DESCRIPTION: Water-stage recorder and cableway located 2.6 kilometers upstream from the international land boundary between the United States and Mexico, 1.3 kilometers upstream from the confluence with Tecate Creek, and 8.2 kilometers south of Dulzura, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the cableway, which is located 213 meters downstream from the gage. Zero of the gage is 173.555 meters above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on a continuous record of gage heights and current meter measurements or observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.03	0.06	0.05	0.15	0.03	0	0	0	0	0	0	0
2	.03	.05	.05	.27	.03	0	0	0	0	0	0	0
3	.03	.05	.04	.16	.03	0	0	0	0	0	0	0
4	.03	.12	.05	.18	.02	0	0	0	0	0	0	0
5	.03	.24	.05	.15	.02	0	0	0	0	0	0	0
6	.03	.19	.05	.11	.02	0	0	0	0	0	0	0
7	.03	.15	.05	.17	.02	0	0	0	0	0	0	0
8	.03	.13	.05	.15	.02	0	0	0	0	0	0	0
9	.09	.12	.04	.09	.02	0	0	0	0	0	0	0
10	.03	.11	.04	.06	.02	0	0	0	0	0	0	0
11	.03	.08	.06	.05	.01	0	0	0	0	0	0	0
12	.03	.07	.07	.14	.02	0	0	0	0	0	0	0
13	.03	.07	.05	.12	.01	0	0	0	0	0	0	0
14	.04	.07	.04	.08	.01	0	0	0	0	0	0	0
15	.04	.07	.05	.05	.01	0	0	0	0	0	0	0
16	.04	.07	.07	.02	.01	0	0	0	0	0	0	0
17	.04	.08	.05	.02	.02	0	0	0	0	0	0	0
18	.04	.08	.05	.02	.07	0	0	0	0	0	0	0
19	.04	.08	.04	.02	.01	0	0	0	0	0	0	0
20	.05	.07	.03	.01	0	0	0	0	0	0	0	0
21	.06	.07	.04	.02	0	0	0	0	0	0	0	0
22	.06	.07	.04	.01	.01	0	0	0	0	0	0	0
23	.05	.06	.03	.03	0	0	0	0	0	0	0	0
24	.05	.06	.03	.03	0	0	0	0	0	0	0	0
25	.13	.05	.04	.03	0	0	0	0	0	0	0	0
26	.18	.05	.07	.02	0	0	0	0	0	0	0	0
27	.25	.05	.05	.02	0	0	0	0	0	0	0	0
28	.15	.05	.04	.01	0	0	0	0	0	0	0	0
29	.07		.03	.05	0	0	0	0	0	0	0	0
30	.06		.02	.04	0	0	0	0	0	0	0	0
31	.06		.02		0	0	0	0	0	0	0	0
Sum	1.86	2.42	1.39	2.29	0.41	0	0	0	0	0	0	0

Current Year 1999

Period 1937-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			27	0.25	1	0.03	0.06	161	1,440	45,897	0
Feb.			5	.24	1	.05	.09	209	3,651	85,134	0
Mar.			112	.07	130	.02	.04	120	5,390	109,418	0
April			2	.27	120	.01	.08	198	2,656	49,635	0
May			18	.07	120	0	.01	35.4	970	22,439	0
June			1	0	1	0	0	0	338	7,301	0
July			1	0	1	0	0	0	108	3,599	0
Aug.			1	0	1	0	0	0	83.7	1,850	0
Sept.			1	0	1	0	0	0	81.7	4,209	0
Oct.			1	0	1	0	0	0	92.5	291	0
Nov.			1	0	1	0	0	0	55.8	1,378	0
Dec.			1	0	1	0	0	0	182	3,169	0
Yearly				0.27		0	0.02	723	15,049	220,556	0

φ Mean daily

! And other days

11-0125.00 CAMPO CREEK NEAR CAMPO, CALIFORNIA

DESCRIPTION: Water-stage recorder and broad-crested weir on left bank, 0.8 kilometer upstream from the international land boundary between the United States and Mexico, just upstream from the bridge on California State Highway 94, 5.6 kilometers southwest of Campo, California. Zero of gage is 664.135 meters above mean sea level, U. S. C. & G. S. datum.
 RECORDS: Based on current meter measurements and observation of no flow. Records obtained and furnished by the U. S. Geological Survey from October 1936 through 1999.
 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.13	0.15	0.14	0.23	0.16	0.02	0.01	0.01	0	0	0	0.01
2	.13	.16	.14	.45	.14	.02	.01	.01	0	0	0	.01
3	.13	.17	.14	.31	.12	.03	.01	.01	0	0	0	.01
4	.12	.21	.15	.40	.13	.04	.01	0	0	0	0	0
5	.12	.34	.15	.28	.11	.05	.01	0	0	0	0	0
6	.13	.28	.15	.22	.09	.04	.01	0	0	0	0	0
7	.13	.23	.15	.31	.08	.03	.01	0	0	0	0	.01
8	.13	.21	.16	.31	.08	.03	.01	0	0	0	0	.01
9	.12	.19	.15	.24	.07	.02	.01	0	0	0	0	.01
10	.13	.19	.15	.20	.07	.02	.01	.01	0	0	0	.01
11	.13	.18	.15	.18	.07	.02	.01	.01	0	0	0	.01
12	.14	.15	.18	.24	.07	.02	.01	0	0	0	0	.01
13	.14	.15	.15	.23	.06	.01	.01	0	0	0	0	.01
14	.14	.15	.15	.18	.06	.01	.01	0	0	0	0	.01
15	.14	.15	.15	.14	.06	.01	.01	0	0	0	0	.01
16	.15	.16	.17	.12	.05	.01	.01	0	0	0	0	.01
17	.15	.16	.17	.11	.05	.01	.01	0	0	0	0	.01
18	.15	.16	.15	.10	.05	.01	.01	0	0	0	0	.01
19	.15	.15	.15	.10	.04	.01	.01	0	0	0	0	.01
20	.18	.15	.14	.10	.04	.01	.01	0	0	0	0	.01
21	.23	.15	.14	.10	.04	.01	.01	0	0	0	0	.01
22	.19	.15	.14	.10	.04	.01	.01	0	0	0	0	.01
23	.17	.14	.13	.12	.04	.01	.01	0	0	0	0	.01
24	.17	.14	.14	.15	.04	.01	.01	0	0	0	0	.01
25	.20	.14	.13	.14	.03	.01	.01	0	0	0	0	.01
26	.28	.15	.16	.12	.03	.01	.01	0	0	0	0	.01
27	.40	.15	.16	.11	.02	.01	.01	0	0	0	0	.01
28	.25	.15	.15	.11	.02	.01	.01	0	0	0	0	.01
29	.18	.14	.16	.16	.02	.01	.01	0	0	0	0	.01
30	.15	.13	.18	.18	.02	.01	.01	0	0	0	0	.01
31	.15	.13	.13	.18	.02	.01	.01	0	0	0	0	.01
Sum	5.11	4.86	4.59	5.74	1.92	0.52	0.31	0.05	0	0	0	0.28

Current Year 1999								Period 1937-1999			
Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			27	0.40	14	0.12	0.16	442	437	10,581	0
Feb.			5	.34	123	.14	.17	420	561	5,288	0
Mar.			12	.18	123	.13	.15	397	899	11,597	0
April			2	.45	118	.10	.19	496	559	8,886	0
May			1	.16	127	.02	.06	166	272	3,956	0
June			5	.05	113	.01	.02	44.9	134	2,234	0
July			11	.01	11	.01	.01	26.8	72.7	1,525	0
Aug.			1	.01	14	0	0	4.3	66.4	2,008	0
Sept.			1	0	11	0	0	0	48.8	1,214	0
Oct.			1	0	11	0	0	0	61.0	1,084	0
Nov.			1	0	11	0	0	0	121	1,522	0
Dec.			1	.01	14	0	.01	24.2	207	1,953	0
Yearly				0.45		0	0.06	2,021	3,439	38,639	0

φ Mean daily

! And other days

11-0131.00 INFLOWS TO RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

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

RECORDS: Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall. Records obtained by the Ministry of Agriculture and Hydraulic Resources through May 1961; from June 1961 through March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano de Tijuana, Baja California, and from April 1966 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 1999. 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 92,370 TCM; at top of spillway gates 138 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 1999	PERIOD 1938 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	16.0	6,247	237,657	0
February	30.0	8,534	194,216	4.73
March	11.6	12,567	172,556	0
April	44.2	3,742	95,953	0
May	43.0	802	14,136	0
June	51.9	236	5,749	0
July	0	119	1,806	0
August	0	65.9	950	0
September	0	66.8	575	0
October	0	83.8	432	0
November	0	174	2,393	0
December	0	925	19,348	0
Yearly	197	33,562	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 National Water Commission. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1999.

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 1999	PERIOD 1938 - 1999		
		AVERAGE	MAXIMUM	MINIMUM
January	2,269	676	6,183	0
February	2,352	659	6,028	0
March	2,358	1,230	36,018	0
April	1,701	807	6,142	0
May	2,577	1,009	6,578	0
June	2,779	1,128	5,893	0
July	2,670	1,245	5,681	0
August	2,494	1,163	5,931	0
September	2,204	1,037	6,158	0
October	668	949	6,054	0
November	306	838	5,873	0
December	11.3	793	6,212	0
Yearly	22,389	11,535	94,980	0

11-0133.00 TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on top of north levee about 1.1 kilometers downstream (north) from boundary, 1.8 kilometers upstream from the new Dairy Mart Road bridge, and 2.3 kilometers west of the international gate at San Ysidro, California. Zero of the gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements, staff gage readings and record of gage heights. Records obtained and furnished by the United States Section of the Commission. Records available: May 1947 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.71	0.83	0.02	1.22	0.25	0	0	0	0	0	0.01	0
2	.62	.88	0	1.16	.07	0	0	0	0	0	0	0
3	.54	.94	.37	.82	.14	0	0	0	0	0	0	0
4	.58	1.26	.76	.83	.06	.35	0	0	0	0	0	.08
5	.58	.87	.75	.76	.02	.05	0	0	0	0	0	0
6	.57	.80	.68	.76	0	.24	0	0	0	0	0	0
7	.56	.86	.52	.96	0	.05	0	0	0	0	0	0
8	.60	.86	.43	.86	0	0	.16	0	0	0	0	0
9	.62	.86	.45	.83	0	0	.04	0	0	0	0	0
10	.62	.81	.49	.72	0	0	0	0	0	0	0	.19
11	.68	.66	.81	.68	0	0	0	0	0	0	0	.10
12	.70	.65	.74	1.33	0	0	0	0	0	0	0	0
13	.69	.68	.57	.90	0	0	0	0	0	0	0	0
14	.72	.67	.48	.84	0	0	.02	0	0	0	.15	0
15	.73	.71	.86	.81	0	0	.37	0	0	0	0	.08
16	.74	.73	.84	.66	0	0	0	0	0	0	.03	0
17	.73	.79	.73	.36	0	0	0	0	0	0	0	0
18	.73	.70	.44	.04	0	0	0	0	0	0	0	0
19	.58	.35	.53	0	0	0	0	0	0	0	.01	0
20	.53	.37	.51	.05	0	0	0	0	0	0	.01	0
21	.80	.32	.17	.19	0	0	0	0	.28	0	0	0
22	.68	.31	.18	.01	0	0	0	0	.16	0	0	0
23	.59	.30	.46	.14	0	0	0	0	.06	0	0	.04
24	.59	.53	.48	.30	0	0	0	0	0	0	0	0
25	1.15	.57	.54	.20	0	0	0	0	0	0	0	0
26	1.21	.60	.94	.01	0	0	0	0	0	0	0	0
27	1.51	.48	.77	.50	0	0	0	0	0	0	0	0
28	1.10	.04	.55	.58	0	0	0	0	0	0	0	0
29	.98		.34	.51	0	0	0	0	0	0	0	0
30	.83		.59	.33	0	0	0	0	0	0	0	0
31	.84		.74		0	0	0	0	0	0	0	.18
Sum	23.11	18.43	16.74	17.36	0.54	0.69	0.59	0	0.50	0	0.21	0.67

Current Year 1999

Period 1947-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	High		Low	Average	Total	Average	Maximum	Minimum
				Day	Day						
Jan.	12.570	11.755	27	2.25	19	0.27	0.75	1,997	9,356	297,879	0
Feb.	12.575	11.650	4	2.28	28	0	.66	1,592	14,662	388,951	0
Mar.	12.460	11.650	25	1.94	1	0	.54	1,446	17,461	362,019	0
April	12.645	11.650	1	2.94	118	0	.58	1,500	4,497	77,633	0
May	11.995	11.650	1	.77	3	0	.02	46.7	2,188	52,545	0
June	12.005	11.650	4	.79	1	0	.02	59.6	764	11,960	0
July	11.980	11.650	15	.75	1	0	.02	51.0	553	11,400	0
Aug.	11.650	11.650	1	0	1	0	0	0	660	21,083	0
Sept.	12.155	11.650	21	1.12	1	0	.02	43.2	321	5,142	0
Oct.	11.920	11.835	31	.18	1	0	0	0	611	6,859	0
Nov.	12.020	11.835	14	.34	1	0	.01	18.1	418	5,399	0
Dec.	12.445	11.835	31	1.18	1	0	.02	57.9	1,098	8,270	0
Yearly	12.645	11.650		2.94		0	0.22	6,812	52,589	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 Secretariat of Agriculture and Hydraulic Resources.

IN THOUSAND CUBIC METERS

Month	MORENA RESERVOIR, CALIFORNIA (Capacity 61,933)		BARRETT RESERVOIR, CALIFORNIA (Capacity 55,211)		RODRIGUEZ RESERVOIR, BAJA CALIFORNIA (Capacity 138,003)		TOTAL IN TIJUANA RIVER BASIN RESERVOIRS (Capacity 255,147)	
	1999	Average 1937-1999	1999	Average 1937-1999	1999	Average 1937-1999	1999	Average 1937-1999
Jan.	48,263	25,012	42,211	19,062	75,086	42,271	165,560	86,345
Feb.	48,421	26,403	41,405	20,102	69,160	44,802	158,986	91,307
Mar.	48,500	27,906	40,147	22,398	62,108	50,411	150,755	100,715
April	48,516	28,118	38,563	23,084	58,160	51,334	145,239	102,536
May	48,895	27,987	37,816	22,843	51,046	50,432	137,757	101,262
June	48,247	27,365	36,131	22,023	43,223	48,720	127,601	98,108
July	47,087	26,638	34,216	21,073	34,800	46,584	116,103	94,295
Aug.	45,599	25,949	32,332	20,067	26,128	44,470	104,059	90,486
Sept.	44,189	25,238	30,030	19,354	18,080	42,832	92,299	87,424
Oct.	42,855	24,750	27,637	18,697	15,700	41,197	86,192	84,644
Nov.	41,595	24,546	25,430	18,205	14,680	40,394	81,705	83,145
Dec.	40,707	24,626	23,520	18,416	14,620	40,229	78,847	83,271
Avg.	46,073	26,212	34,120	20,444	40,233	45,306	120,425	91,962
Max.	48,895	#! 76,069	42,211	*! 56,641	75,086	! 138,486	165,560	! 263,471
Min.	40,707	!! 12	23,520	!! 131	14,620	!! 0	78,847	!! 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	
	1999	Average 1906-1999	1999	Average 1907-1999	1999	Average 1951-1999	1999	Average 1950-1999	1999	Average 1900-1999
Jan.	65	100	43	91	#	#	35	93	42	80
Feb.	38	99	25	88	#	#	28	83	21	83
Mar.	34	91	19	82	#	#	29	81	16	74
April	125	42	79	38	#	#	120	38	84	34
May	5	15	1	13	#	#	0	10	T	12
June	17	4	8	2	#	#	10	1	12	2
July	6	9	0	3	#	#	37	14	#	12
Aug.	0	14	0	6	#	#	3	20	T	14
Sept.	11	11	26	7	#	#	0	12	4	9
Oct.	0	22	0	17	#	#	0	14	0	16
Nov.	2	40	0	37	#	#	0	42	T	34
Dec.	8	76	7	68	#	#	2	58	5	61
Yearly	311	523	208	452			273	466		431

Month	Chula Vista, California		Lower Otay Dam, California						
	1999	Average 1930-1999	1999	Average 1906-1999					
Jan.	58	49	57	57					
Feb.	13	46	16	47					
Mar.	23	44	28	56					
April	37	21	51	26					
May	0	5	0	10					
June	2	2	4	3					
July	11	1	11	1					
Aug.	0	2	0	3					
Sept.	0	5	6	6					
Oct.	0	9	0	10					
Nov.	0	28	0	31					
Dec.	0	39	14	38					
Yearly	144	251	187	288					

T Trace

IN MEXICO

Month	El Pinal, Baja California		El Hongo, Baja California		Ignacio Zaragoza, Baja California		Tecate, Baja California		El Carrizo, Baja California	
	1999	Average 1964-1999	1999	Average 1980-1999	1999	Average 1965-1999	1999	Average 1946-1999	1999	Average 1980-1999
Jan.	#	84	32	69	21	63	63	78	35	45
Feb.	#	90	18	69	0	73	28	57	17	52
Mar.	#	94	19	70	22	68	29	66	22	59
April	#	37	55	19	#	26	74	28	49	19
May	#	9	0	6	#	6	0	8	0	4
June	#	1	6	2	#	2	10	3	6	2
July	#	18	26	14	#	3	5	4	0	3
Aug.	#	23	13	18	#	7	0	5	0	2
Sept.	#	18	0	7	#	10	17	5	9	5
Oct.	#	16	0	11	#	14	0	12	0	14
Nov.	#	46	32	29	#	39	0	35	0	31
Dec.	#	71	#	34	#	48	18	50	10	32
Yearly	#	494		350		359	244	353	148	282

Missing record

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED
IN MILLIMETERS

IN MEXICO

	Valle de Palmas, Baja California		Rodriguez Dam, Baja California			
	1999	Average 1948-1999	1999	Average 1938-1999		
Jan.	35	45	27	45		
Feb.	14	39	18	43		
Mar.	27	41	25	44		
April	50	16	46	19		
May	0	4	0	4		
June	0	1	2	1		
July	1	2	1	1		
Aug.	0	5	0	3		
Sept.	0	6	12	6		
Oct.	0	9	0	9		
Nov.	0	20	0	23		
Dec.	3	28	10	38		
Yearly	130	206	141	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 1999.

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 1999, 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 1999, 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 1999, 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	
	1999	Average 1916-1999	1999	Average 1921-1999	1999	Average 1950-1999
Jan.	84	55	35	48	59	49
Feb.	52	54	42	53	37	57
Mar.	72	81	63	83	75	85
April	110	118	85	116	101	118
May	131	165	135	162	126	153
June	162	210	164	200	163	175
July	200	241	185	235	188	209
Aug.	219	224	189	222	186	197
Sept.	142	178	133	180	143	162
Oct.	148	125	114	127	153	118
Nov.	70	80	65	78	82	72
Dec.	48	57	53	49	78	54
Yearly	1,438	1,586	1,263	1,553	1,391	1,449

IN MEXICO

Month	Rodriguez Dam, Baja California		El Carrizo, Baja California	
	1999	Average 1938-1999	1999	Average 1980-1999
Jan.	74	101	127	135
Feb.	76	104	130	115
Mar.	77	110	119	140
April	120	140	162	182
May	157	150	219	219
June	168	190	252	269
July	190	214	293	297
Aug.	177	198	298	292
Sept.	120	165	198	240
Oct.	166	168	318	215
Nov.	81	108	155	156
Dec.	107	85	167	135
Yearly	1,513	1,699	2,438	2,375

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			
	1999			Average 1931- 1999	1999			Average 1951- 1999	1999			Average 1931- 1999
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	12.7	26.7	1.7	9.7	9.5	27.2	-4.4	8.7	13.5	26.7	3.9	12.1
Feb.	12.1	26.7	-1.1	10.8	9.6	28.3	-6.1	9.3	13.3	26.1	2.2	12.8
Mar.	12.7	28.3	2.2	12.1	9.3	28.9	-3.9	10.1	12.9	20.0	5.0	13.5
April	12.1	32.2	0	14.5	10.1	31.7	-5.0	12.2	14.4	31.7	4.4	15.0
May	16.1	31.1	3.9	17.1	14.9	32.8	-1.7	15.0	16.1	22.8	7.8	16.3
June	21.4	37.2	7.8	20.5	18.6	37.8	1.7	18.6	17.4	23.9	9.4	17.7
July	23.3	36.7	10.6	24.4	#	#	#	22.7	20.9	27.2	15.0	19.8
Aug.	25.1	40.6	10.6	24.7	21.7	40.0	2.8	22.9	20.7	27.2	15.0	20.8
Sept.	21.2	36.7	7.8	22.5	20.6	38.3	2.2	20.5	#	35.6	6.1	20.1
Oct.	20.6	37.2	5.6	18.1	16.9	36.1	0	16.0	#	34.4	10.6	17.7
Nov.	15.7	32.2	0.6	13.5	12.8	32.2	-5.6	11.5	15.9	26.7	5.0	14.9
Dec.	11.9	26.7	0.6	10.4	8.8	25.0	-5.6	8.8	14.1	26.1	3.9	12.7
Yearly	17.1	40.6	-1.1	16.5				14.7		35.6	2.2	16.1

IN MEXICO

Month	Rodriguez Dam, Baja California				El Hongo, Baja California				Ignacio Zaragoza, Baja California			
	1999		1938-1999		1999		1981-1999		1999		1965-1999	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	27	4	32	-3	26	-2	26	-9	23	-7	34	-8
Feb.	28	6	34	0	24	-3	27	-3	22	-8	32	-8
Mar.	25	5	38	0	26	-1	29	-2	25	-7	36	-7
April	34	3	40	2	31	2	33	-1	#	#	38	-4
May	28	7	39	3	40	1	40	1	#	#	40	-1
June	30	9	42	8	38	3	41	2	#	#	43	2
July	32	14	40	8	38	12	45	8	#	#	45	3
Aug.	33	14	41	10	36	8	41	3	#	#	45	5
Sept.	40	11	43	8	36	7	39	2	#	#	44	1
Oct.	38	10	42	1	36	9	37	0	#	#	40	-6
Nov.	33	7	37	-1	30	1	30	-2	#	#	34	-5
Dec.	28	4	34	-3	#	#	27	-8	#	#	33	-7
Yearly	40	3	43	-3			45	-9			45	-8

Month	Tecate, Baja California				El Carrizo, Baja California				Valle de Palmas, Baja California			
	1999		1946-1999		1999		1980-1999		1999		1948-1999	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	30	-2	38	-9	28	4	32	-1	31	0	33	-11
Feb.	27	0	38	-8	28	4	34	-2	30	0	37	-5
Mar.	28	0	36	-5	28	4	37	-4	32	0	38	-2
April	35	0	39	-2	35	3	41	3	37	0	41	-2
May	32	1	42	1	29	7	42	5	34	1	44	1
June	36	4	44	0	34	8	42	9	39	4	48	4
July	39	8	46	2	40	12	46	8	40	8	49	7
Aug.	40	10	47	1	43	11	45	5	43	8	48	5
Sept.	36	5	46	2	40	10	42	5	42	4	47	4
Oct.	40	7	41	-3	33	9	38	6	42	3	43	0
Nov.	37	1	37	-3	28	6	35	4	38	0	38	-7
Dec.	31	-2	36	-5	27	4	32	-3	25	-2	35	-6
Yearly	40	-2	47	-9	43	3	46	-4	43	-2	49	-11

Missing Record

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

1999

The total area within the Tijuana River basin is 4,484 square kilometers, as determined from the best available maps from both the United States and Mexico. The drainage areas shown below are tabulated according to their downstream sequence.

The irrigated areas, tabulated in downstream sequence, are from the most reliable sources available. Those in the United States were furnished by Mr. Art Letter, General Manager, Tia Juana Valley County Water District, or estimated from aerial photographs. Those in Mexico were furnished by the Ministry of Agriculture and Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana River basin in 1999 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 1999 in the Tijuana Irrigation District, Tijuana Valley, Baja California Mexico, from the Rodriguez Reservoir.



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. Records fair. Records available: August to October 1911 (gage heights and discharge measurements only), July to October 1912, January to June 1913, October 1913, December 1913 to June 1914, February to June 1915, October 1915 to September 1919, October 1919 to April 1922 (gage heights and discharge measurements only), July 1930 to December 1933, May 1935 to July 1947, October 1947 through 1999 (July 1954 to March 1955, monthly discharge only).

REMARKS: Diversions above this station are mainly by pumping from ground water for irrigation. Records show flow at the international boundary into Mexico.

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 1999 --- 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	0.99	0	0	0
2	0	0	0	0	0	0	0	0	5.78	0	0	0
3	0	0	0	0	0	0	0	0	.15	0	0	0
4	0	0	0	0	0	0	0	.08	.09	0	0	0
5	0	0	0	0	0	0	0	2.57	.05	0	0	0
6	0	0	0	0	0	0	.01	9.15	.02	0	0	0
7	0	0	0	0	0	0	4.30	3.09	.01	0	0	0
8	0	0	0	0	0	0	1.64	.03	0	0	0	0
9	0	0	0	0	0	0	0	2.38	0	0	0	0
10	0	0	0	0	0	0	.50	4.13	0	0	0	0
11	0	0	0	0	0	0	.08	1.92	0	0	0	0
12	0	0	0	0	0	0	0	1.73	0	0	0	0
13	0	0	0	0	0	0	0	.29	.01	0	0	0
14	0	0	0	0	0	0	.02	1.48	0	0	0	0
15	0	0	0	0	0	0	4.33	4.62	0	0	0	0
16	0	0	0	0	0	0	3.23	.43	0	0	0	0
17	0	0	0	0	0	0	.15	.19	0	0	0	0
18	0	0	0	0	0	0	.07	.12	0	0	0	0
19	0	0	0	0	0	0	.02	.06	0	0	0	0
20	0	0	0	0	0	0	.78	.14	0	0	0	0
21	0	0	0	0	0	0	1.66	.23	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	.95	0	0	0	0	0
24	0	0	0	0	0	0	1.75	0	0	0	0	0
25	0	0	0	0	0	0	1.78	0	0	0	0	0
26	0	0	0	0	0	0	.01	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	4.76	.14	0	0	0	0
29	0	0	0	0	0	0	1.18	.05	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	.01	0	0	0	0
Sum	0	0	0	0	0	0	27.41	32.84	7.10	0	0	0

Current Year 1999

Period 1936-1999

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.	1.380	1.380	1	0	1	0	0		41.2	556	0
Feb.	1.380	1.380	1	0	1	0	0	0	19.3	163	0
Mar.	1.380	1.380	1	0	1	0	0	0	24.5	364	0
April	1.380	1.380	1	0	1	0	0	0	17.9	213	0
May	1.380	1.380	1	0	1	0	0	0	12.7	170	0
June	1.380	1.380	1	0	1	0	0	0	121	1,961	0
July	2.450	1.380	7	8.81	1	0	.88	2,368	1,885	10,004	0
Aug.	2.620	1.380	6	12.8	1	0	1.06	2,837	3,049	17,861	0
Sept.	2.455	1.380	2	9.01	1	0	.24	613	802	3,910	0
Oct.	1.380	1.380	1	0	1	0	0	0	377	7,528	0
Nov.	1.380	1.380	1	0	1	0	0	0	48.4	714	0
Dec.	1.380	1.380	1	0	1	0	0	0	128	2,915	0
Yearly	2.620	1.380		12.8		0	0.18	5,818	6,524	27,533	0

1 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 1999.

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.

Month	Total Monthly Flows			Mean Daily Flows—Thousand Cubic Meters Per Day					
	Thousand Cubic Meters			Current Year 1999			Period 1952-1999		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	152	0	152	6.2	3.8	4.9	9.6	1.6	4.4
Feb.	137	0	137	6.4	3.1	4.9	17.7	2.1	4.4
Mar.	147	0	147	7.1	3.4	4.7	13.9	2.2	4.4
April	161	0	161	11.6	2.2	5.2	12.9	1.4	4.4
May	191	0	191	11.7	2.4	5.4	12.2	1.9	4.4
June	137	0	137	7.7	2.8	4.5	9.5	2.1	4.5
July	154	0	154	10.2	3.6	5.0	14.1	1.8	4.7
Aug.	160	0	160	9.2	2.9	5.1	10.2	1.4	4.8
Sept.	136	0	136	6.2	3.4	4.5	9.6	1.8	4.6
Oct.	149	0	149	8.2	2.2	4.8	12.0	2.2	4.5
Nov.	125	0	125	6.1	2.7	4.2	10.9	1.2	4.5
Dec.	124	0	124	6.6	1.7	4.0	12.6	1.7	4.5
Yearly	1,773	0	1,773	11.7	1.7	4.8	17.7	1.2	4.5

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 1999. Records obtained and furnished by U. S. Geological Survey prior to October 1, 1981 and from October 1, 1995 through 1999, 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 time 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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.02	0.04	0.01	0.01	0	0	0.34	0.31	0	0	0
2	.01	.02	.04	.02	0	0	0	1.53	.25	0	0	0
3	.01	.02	.04	.02	0	0	0	5.04	.13	0	0	0
4	.01	.02	.04	.02	0	0	.34	2.52	.03	0	0	0
5	.01	.02	.03	.03	0	0	.01	12.3	.01	0	0	0
6	.01	.02	.02	.03	0	0	5.64	6.60	.01	0	0	0
7	.01	.03	.02	.02	0	0	7.90	1.39	0	0	0	0
8	.01	.03	.02	.02	0	0	7.62	.65	0	0	0	0
9	.01	.02	.02	.02	0	0	7.76	1.93	0	0	0	0
10	.01	.03	.02	.01	0	0	13.1	9.12	0	0	0	0
11	.01	.02	.02	.01	0	0	3.12	1.39	0	0	0	.01
12	.01	.03	.02	.01	0	0	1.16	.45	0	0	0	.01
13	.01	.03	.02	.01	0	0	2.10	.31	0	0	0	.01
14	.01	.03	.02	.01	0	0	3.46	4.64	0	0	0	.02
15	.01	.03	.02	.01	0	0	3.54	.54	0	0	0	.02
16	.01	.03	.02	.01	0	0	10.3	.31	0	0	0	.02
17	.01	.03	.03	.01	0	0	5.32	.24	.01	0	0	.02
18	.01	.03	.03	.01	0	0	3.40	.20	0	0	0	.02
19	.01	.03	.02	.01	0	0	2.61	.68	10.6	0	0	.02
20	.01	.03	.02	.01	0	0	2.18	.10	3.54	0	0	.02
21	.01	.03	.02	.01	0	0	1.87	.06	.06	0	0	.02
22	.01	.03	.02	.01	0	0	1.22	.05	.05	0	0	.02
23	.01	.03	.02	.01	0	0	1.30	.05	.04	0	0	.02
24	.01	.03	.02	.01	0	0	1.87	.05	.03	0	0	.03
25	.01	.03	.01	.01	0	0	1.39	.05	.02	0	0	.03
26	.01	.03	.02	.01	0	0	1.56	.05	.01	0	0	.03
27	.01	.03	.02	.01	0	0	2.61	.07	0	0	0	.03
28	.01	.03	.02	.01	0	.19	6.57	.13	0	0	0	.03
29	.01	.02	.01	0	0	1.25	5.49	1.59	0	0	0	.03
30	.01	.02	.01	0	0	0	1.87	2.44	0	0	0	.03
31	.02	.01	.01	0	0	0	.62	.91	0	0	0	.03
Sum	0.32	0.76	0.71	0.40	0.01	1.44	105.93	55.73	15.10	0	0	0.47

Current Year 1999

Period 1951-1999

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.	0.770	0.740	31	0.02	8	0.01	0.01	27.6	2,384	35,987	3.2
Feb.	.795	.765	28	.04	2	.03	.03	65.7	1,000	8,343	3.7
Mar.	.805	.760	3	.04	31	.01	.02	61.3	871	9,129	16.4
April	.795	.740	5	.03	28	0	.01	34.6	203	1,282	0
May	.750	.595	1	.01	15	0	0	.9	66.4	502	0
June	1.560	.590	29	10.2	1	0	.05	124	143	1,716	0
July	2.480	.700	6	54.7	13	0	3.42	9,152	5,497	21,263	0
Aug.	2.165	.910	5	35.7	27	.04	1.80	4,815	8,629	44,860	204
Sept.	2.930	.975	19	91.2	110	0	.50	1,305	2,078	20,160	13.9
Oct.	1.105	.970	1	0	1	0	0	0	2,022	58,371	0
Nov.	.975	.975	1	0	1	0	0	0	661	19,006	0
Dec.	1.160	1.010	25	.03	1	0	.02	40.6	1,969	31,428	7.6
Yearly	2.930	0.590		91.2		0	0.50	15,627	25,523	77,448	5,427

! And other days

09-4800.00 SANTA CRUZ RIVER NEAR LOCHIEL, ARIZONA

DESCRIPTION: Water-stage recorder located in the United States near left bank on the downstream side of concrete bridge pier of county highway bridge, 4.0 kilometers northeast of Lochiel, Arizona, and 2.7 kilometers upstream from the international land boundary. The elevation of the zero of the gage has not been determined, but topographic maps indicate the elevation of the stream bed at the gage is about 1,408 meters.

RECORDS: Based on current meter measurements, observations of no flow, and a continuous record of gage heights. Records obtained and furnished by the U. S. Geological Survey. Records available: January 1949 through 1999.

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 1999 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.01	0.01	0.01	0.01	0	0	0	0.21	0.07	0.03	0.03
2	.01	.01	.01	.01	.01	0	0	.37	.20	.06	.03	.03
3	.01	.01	.01	.01	.01	0	0	.31	.20	.06	.03	.03
4	.01	.01	.01	.01	.01	0	0	.03	.20	.06	.03	.03
5	.01	.01	.01	.01	.01	0	0	0	.20	.06	.03	.03
6	.01	.01	.01	.01	.01	0	0	0	.20	.05	.03	.03
7	.01	.01	.01	.01	.01	0	.54	0	.20	.05	.03	.03
8	.01	.01	.01	.01	.01	0	.01	9.32	.20	.05	.03	.03
9	.01	.01	.01	.01	.01	0	3.54	2.24	.20	.05	.03	.03
10	.01	.01	.01	.01	.01	0	1.73	1.13	.27	.05	.03	.03
11	.01	.01	.01	.01	.01	0	.03	.71	.37	.05	.03	.03
12	.01	.01	.01	.01	.01	0	0	.48	.14	.04	.03	.03
13	.01	.01	.01	.01	.01	0	0	.37	.20	.04	.03	.03
14	.01	.01	.01	.01	.01	0	.01	.25	.27	.04	.03	.03
15	.01	.01	.01	.01	.01	0	0	.22	.16	.04	.03	.03
16	.01	.01	.01	.01	.01	0	0	.22	.11	.04	.03	.03
17	.01	.01	.01	.01	.01	0	.25	.22	.10	.04	.03	.03
18	.01	.01	.01	.01	0	0	.01	.22	.10	.05	.03	.03
19	.01	.01	.01	.01	0	0	2.72	.21	.18	.05	.03	.03
20	.01	.01	.01	.01	0	0	.02	.21	.27	.04	.03	.03
21	.01	.01	.01	.01	0	0	.01	.20	.08	.04	.03	.03
22	.01	.01	.01	.01	0	0	.02	.20	.17	.04	.03	.03
23	.01	.01	.01	.01	0	0	.24	.20	.31	.04	.03	.03
24	.01	.01	.01	.01	0	0	.02	.20	.13	.04	.03	.03
25	.01	.01	.01	.01	0	0	.01	.20	.10	.04	.03	.03
26	.01	.01	.01	.01	0	0	.01	.23	.09	.04	.03	.03
27	.01	.01	.01	.01	0	0	1.56	.22	.09	.03	.03	.03
28	.01	.01	.01	.01	0	0	20.4	.21	.08	.03	.03	.03
29	.01	.01	.01	.01	0	0	0	.31	.20	.07	.03	.03
30	.01	.01	.01	.01	0	0	0	.21	.07	.04	.03	.03
31	.01	.01	.01	.01	0	0	0	.21	.04	.04	.03	.03
Sum	0.31	0.28	0.31	0.30	0.17	0	31.44	18.79	5.17	1.40	0.90	0.93

Current Year 1999

Period 1949-1999

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High	Day	φ Low		Total	Average	Maximum	Minimum
Jan.			1	0.01	1	0.01	0.01	26.8	353	8,822	1.6
Feb.			1	.01	1	.01	.01	24.2	124	1,233	2.2
Mar.			1	.01	1	.01	.01	26.8	140	2,594	.9
April			1	.01	1	.01	.01	25.9	64.9	638	0
May			1	.01	18	0	.01	14.7	32.9	210	0
June			1	0	1	0	0	0	22.3	208	0
July			28	20.4	1	0	1.01	2,716	623	5,267	2.0
Aug.			8	9.32	1	0	.61	1,623	1,149	14,207	-1.1
Sept.			11	.37	29	.07	.17	447	358	3,249	0
Oct.			1	.07	127	.03	.05	121	322	5,837	0
Nov.			1	.03	1	.03	.03	77.8	74.5	497	0
Dec.			1	.03	1	.03	.03	80.4	132	1,348	0
Yearly				20.4		0	0.16	5,184	3,396	21,433	155

φ Mean daily ! And other days

WESTERN BOUNDARY WATER BULLETIN - 1999 - INTERNATIONAL BOUNDARY AND WATER COMMISSION

09-4805.00 SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 8.9 kilometers east of Nogales, Arizona, 1.3 kilometer downstream from the international boundary and 9.7 kilometers upstream from the Santa Cruz bridge on State Highway No. 82. Zero of gage is 1,128.54 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 1999.

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 1999.

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 1999 --- 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	7.73	0.28	0.04	0.05
2	0	0	0	0	0	0	0	0	3.06	.22	.04	.03
3	0	0	0	0	0	0	0	.12	1.50	.20	.04	.03
4	0	0	0	0	0	0	0	1.44	.82	.20	.04	.03
5	0	0	0	0	0	0	0	.01	.48	.18	.04	.03
6	0	0	0	0	0	0	0	.79	.34	.17	.04	.03
7	0	0	0	0	0	0	0	.01	.19	.14	.04	.03
8	0	0	0	0	0	0	0	0	.11	.13	.04	.03
9	0	0	0	0	0	0	0	8.04	.14	.11	.04	.03
10	0	0	0	0	0	0	0	12.5	.15	.13	.04	.03
11	0	0	0	0	0	0	0	3.62	.09	.14	.04	.03
12	0	0	0	0	0	0	0	.91	.16	.10	.04	.03
13	0	0	0	0	0	0	0	.12	.91	.08	.03	.03
14	0	0	0	0	0	0	0	.25	.88	.10	.03	.03
15	0	0	0	0	0	0	0	.20	.37	.10	.03	.03
16	0	0	0	0	0	0	0	.02	.18	.14	.03	.03
17	0	0	0	0	0	0	0	.19	.10	.08	.03	.03
18	0	0	0	0	0	0	0	0	.05	.08	.03	.03
19	0	0	0	0	0	0	0	0	3.68	.05	.03	.03
20	0	0	0	0	0	0	.01	0	.48	.05	.03	.03
21	0	0	0	0	0	0	0	0	.37	.05	.03	.03
22	0	0	0	0	0	0	.01	0	.28	.05	.02	.03
23	0	0	0	0	0	0	.11	0	1.27	.04	.02	.03
24	0	0	0	0	0	0	.01	0	1.30	.04	.02	.03
25	0	0	0	0	0	0	0	0	.71	.04	.02	.03
26	0	0	0	0	0	0	.79	0	.59	.04	.02	.03
27	0	0	0	0	0	0	1.10	.05	.48	.04	.02	.03
28	0	0	0	0	0	.37	3.65	13.7	.37	.04	.02	.03
29	0	0	0	0	0	0	8.07	12.0	.34	.04	.02	.03
30	0	0	0	0	0	0	.45	16.9	.31	.04	.02	.03
31	0	0	0	0	0	0	0	7.53		.04		.13
Sum	0	0	0	0	0	0.37	14.20	78.40	27.44	3.14	0.93	1.05

Current Year 1999

Period 1936-1999

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	1	0	0	0	2,952	37,352	0
Feb.			1	0	1	0	0	0	2,197	25,344	0
Mar.			1	0	1	0	0	0	1,908	24,145	0
April			1	0	1	0	0	0	575	4,263	0
May			1	0	1	0	0	0	138	1,272	0
June			28	.37	1	0	.01	32.0	94.1	1,787	0
July			29	8.07	1	0	.46	1,227	2,980	19,255	0
Aug.			30	16.9	1	0	2.53	6,774	6,316	56,481	12.1
Sept.			1	7.73	18	.05	.91	2,371	1,779	111,633	0
Oct.			1	.28	123	.04	.10	271	2,066	72,806	0
Nov.			1	.04	122	.02	.03	80.4	606	9,108	0
Dec.			31	.13	1	.03	.03	90.7	2,853	41,405	0
Yearly				16.9		0	0.34	10,846	24,444	108,071	1,662

φ Mean daily † And other days

SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: One 61-centimeter Marshall 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 1999.

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 1999			Period 1952-1999		
	U.S.	Mexico	Plant*	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	504	1,108	0	1,612	55.0	46.9	52.0	93.0	2.5	23.6
Feb.	438	1,015	0	1,453	54.1	46.6	51.9	80.4	2.5	24.2
Mar.	485	1,110	0	1,595	53.6	47.4	51.5	85.7	2.8	24.0
April	533	967	0	1,500	63.1	46.0	50.0	69.2	2.6	22.7
May	691	790	0	1,481	52.5	37.3	47.8	59.4	2.1	21.4
June	712	583	0	1,295	48.6	39.6	43.2	62.5	2.6	19.9
July	507	1,172	0	1,679	68.1	46.3	54.2	68.1	2.6	20.7
Aug.	683	1,044	0	1,727	67.3	49.8	55.7	75.6	2.8	22.5
Sept.	767	980	0	1,747	66.8	53.0	58.2	67.9	3.0	23.8
Oct.	959	1,171	0	2,130	73.2	67.0	71.0	76.3	2.6	24.0
Nov.	722	1,333	0	2,055	71.5	63.6	68.5	81.8	3.0	23.6
Dec.	662	1,092	0	1,754	59.7	51.8	56.6	75.9	1.3	23.7
Yearly	7,663	12,365	0	20,028	73.2	37.3	55.0	93.0	1.3	22.8

* 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. Two 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			
	1999	Average 1973-1999	1999	Average 1930-1999	1999	Average 1930-1999	1999	Average 1953-1999		
Jan.	0	43	T	32	T	33	0	30		
Feb.	2	38	1	29	0	29	0	23		
Mar.	10	33	8	23	1	25	0	23		
April	43	14	39	11	39	10	26	9		
May	0	8	0	4	0	5	0	6		
June	31	14	24	18	24	11	2	10		
July	147	117	150	104	157	109	181	115		
Aug.	212	106	104	106	105	106	77	106		
Sept.	83	58	41	44	34	45	45	41		
Oct.	0	31	0	25	0	27	0	31		
Nov.	0	24	0	21	0	21	0	17		
Dec.	T	41	1	36	1	38	0	38		
Yearly	528	527	368	453	361	459	331	449		

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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 1999.

IN THE UNITED STATES

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (Meters)	RECORD BEGAN	OBSERVER
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	I. B. & W. C.

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.

Month	Nogales Sanitation Plant - 9N		
	1999		
	Mean	Max.	Min.
Jan.	7.7	29.4	-8.9
Feb.	9.8	27.8	-8.3
Mar.	12.2	29.4	-4.4
April	13.3	32.2	-5.6
May	18.7	36.1	0.0
June	24.4	39.4	5.0
July	25.7	40.0	16.7
Aug.	25.5	37.8	14.4
Sept.	23.7	36.1	8.3
Oct.	18.4	36.1	2.8
Nov.	13.6	32.2	-7.8
Dec.	7.3	27.8	-8.3
Yearly	16.7	40.0	-8.9

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

1999

The drainage basin areas tabulated below are derived from the best available maps from both the United States and Mexico.

Data on irrigated areas in the Whitewater Draw Basin were furnished by the Soil Conservation Service at Douglas, Arizona and estimated from aerial photographs.

Designation of Areas	Drainage Basin-Square 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 Palominas, Arizona Gaging Station	238	*1,621	1,859	578	1,400	1,978
Whitewater Draw: Above Douglas, Arizona Gaging Station	2,650	0	2,650	8,634	0	8,634

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