

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

UNITED STATES SECTION

JOHN M. BERNAL
Commissioner
El Paso, Texas

ALTON L. GOFF
Chief
Yuma, Arizona Hydro Office

MEXICAN SECTION

J. ARTURO HERRERA SOLIS
Commissioner
Cd. Juarez, Chihuahua

FRANCISCO A. BERNAL
Area Subdirector
Mexicali, Baja California

WESTERN WATER BULLETIN 1998

**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

1998

CONTENTS

Foreword and Acknowledgments	4
General Hydrologic Conditions for 1998	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	85
---	----------------	----

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
Cottonwood Creek below Morena Dam, California	59
Cottonwood Creek above Barrett Dam, California	60
Diversions from Cottonwood Creek - Dulzura Conduit below Barrett Dam, California	61
Cottonwood Creek below Barrett Dam, California	62
Cottonwood Creek 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
Santa Cruz River near Nogales, Arizona	80
Sewage Influent, Nogales 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
Corrections to Previous Water Bulletins	85

FOREWORD

This bulletin is the thirty-ninth 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 1998.

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 1950.

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 1998 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 1998.

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 Morens 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>					
1	Millimeter	x	0.03937	=	Inch
1	Meter	x	3.28084	=	Feet
1	Kilometer	x	0.62137	=	Mile
<u>AREA</u>					
1	Square Meter	x	10.76391	=	Square Feet
1	Hectare	x	2.47105	=	Acre
1	Square Kilometer	x	0.38610	=	Square Mile
<u>VOLUME</u>					
1	Cubic Meter	x	35.31467	=	Cubic Feet
1,000	Cubic Meters	x	0.81071	=	Acre-Feet
<u>WEIGHT</u>					
1	Kilogram	x	2.20462	=	Pounds
1	Megagram	x	1.10231	=	Tons (2,000 lbs.)
<u>TEMPERATURE</u>					
	Degrees Celsius	x	1.8 + 32	=	Degrees Fahrenheit

GENERAL HYDROLOGIC CONDITIONS FOR 1998

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 1998. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 1998 measured at 3 index stations was 21 millimeters, compared to an average of 52 millimeters during the last 40 years (1959 to 1998).

The flow of the Colorado River reaching Imperial Dam was 11,156,827 thousand cubic meters, about 112% of the 64-year average (1935-1998) of 9,977,126 thousand cubic meters. At the Northerly International Boundary, the total flow of the river during 1998 was 5,658,077 thousand cubic meters, about 119% of the 1935-1998 average of 4,760,844 thousand cubic meters. At the Southerly International Boundary, the flow during 1998 was 2,933,107 thousand cubic meters, about 90% of the 1935-1998 average of 3,271,733 thousand cubic meters.

The total of all flows of the Colorado River entering Mexico in 1998 amounted to 5,960,469 thousand cubic meters, 111% of the 1935-1998 average of 5,350,440 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 limnophre 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 1998, other waters arrived at the Mexican points of diversion and amounted to 3,723,206 thousand cubic meters. These waters consisted mainly of excess waters released from reservoirs on the Colorado River. A maximum instantaneous flow of 426 cubic meters per second occurred in the Colorado River at the Northerly International Boundary station on February 17, 1998.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 33,208.4 million cubic meters, 94% of the usable capacity of 35,263.2 million cubic meters. The greater part (30,566.9 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 1998 due to drought or accident to the irrigation system.

The total reported area irrigated from waters of the Colorado River below Imperial Dam in 1998 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 1998, the temperatures at Barrett Dam, California (elevation 533.40 meters) in the upper portion of the basin in the United States averaged 16.6 degrees Celsius, which is the same as the 68-year mean. In the extreme upper portion of the basin in Mexico at El Pinal, Baja California (elevation 1349.96 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 19 degrees Celsius, about 2 degrees 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 725 millimeters, 160% of normal; and at Lower Otay Dam near the lower end of the basin, 570 millimeters, or 197% 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 497 millimeters, 211% of the 60-year average.

Runoff above Barrett and Rodriguez Reservoirs during 1998 was about 110% of normal. Above Morena Reservoir, the runoff was 31,259 thousand cubic meters, or about 234% of the 62-year 1937-1998 mean of 13,369 thousand cubic meters. Above Barrett Reservoir, the runoff was 48,121 thousand cubic meters, or about 274% of the 62-year 1937-1998 mean of 17,553 thousand cubic meters. At Rodriguez Reservoir, the runoff was 8,098 thousand cubic meters, or about 24% of the 61-year mean of 34,109 thousand cubic meters.

The flow of the Tijuana River at the international boundary was 98,073 thousand cubic meters during 1998.

WHITEWATER DRAW

During 1998, the average annual temperature over the watershed was 0.8 degree Celsius above normal, while the annual precipitation was 69% of normal. Runoff for the year at the gaging station near Douglas, Arizona, was 761 thousand cubic meters, or about 12% of average.

GENERAL HYDROLOGIC CONDITIONS FOR 1998

SAN PEDRO RIVER

During 1998, the average annual temperature was normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 89% of the 1961-1998 mean of 526 millimeters. The stream flow at the international boundary was 5,918 thousand cubic meters, 23% of the 1951-1998 average.

SANTA CRUZ

During 1998, the average annual temperature over the watershed was normal, 0.2 degree below the long term average. The annual precipitation was about 103% of the 60-year 1939-1998 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 9,876 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 1,897 thousand cubic meters. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 7,979 thousand cubic meters from the loop of the river lying in Mexico, or approximately 81% of the flow reaching the Nogales Station.

ALAMO AND NEW RIVERS

During 1998, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, was 22.7 degrees Celsius, 0.2 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 73-year average.

At El Centro, the precipitation was 47 millimeters, about 68% of the 68-year average; and in Mexicali, the annual precipitation was 43 millimeters, 52% of the 73-year average. The total flow of the New River at the international boundary in 1998 was 215,730 thousand cubic meters, which was about 150% of the 1943-1998 average.

SALTON SEA

During 1998, the average annual temperature around the Salton Sea was 0.2 degree Celsius below the long-term average, while the annual precipitation recorded at Brawley, California was approximately 174% of the long-term mean of 68 millimeters. The water surface of the Salton Sea dropped slightly during the year. The maximum stage, 69.160 below mean sea level, was recorded on April 26 through May 8, 1998, inclusive. The minimum stage, 69.495 meters below mean sea level, was recorded on October 12 through October 29, November 1 through November 5, November 7 through December 1 and December 19 through December 29, 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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.21	1.56	1.76	1.76	2.18	2.24	2.27	1.84	2.15	2.24	2.38	2.24
2	2.44	1.56	1.76	1.76	2.18	2.32	2.32	1.87	2.07	2.24	2.46	2.15
3	2.38	1.56	1.76	1.76	2.01	2.29	2.32	1.81	2.04	2.24	2.55	2.10
4	2.35	1.56	1.76	1.76	2.12	2.38	2.27	1.95	2.01	2.27	2.52	2.10
5	2.12	1.56	1.76	1.76	2.12	2.44	2.27	1.93	2.04	2.27	2.52	2.10
6	1.61	1.56	1.76	1.76	2.07	2.44	2.12	1.95	1.95	2.24	2.49	2.12
7	1.44	1.56	1.76	1.76	2.24	2.29	2.24	2.04	1.95	2.27	2.49	2.10
8	1.10	1.56	1.76	1.76	2.41	2.35	2.35	1.95	2.07	2.29	2.38	2.04
9	1.44	1.56	1.76	1.76	2.21	2.41	2.10	2.04	2.04	2.27	2.35	2.18
10	1.90	1.56	1.76	1.76	2.29	2.41	2.15	2.04	1.90	2.27	2.29	2.35
11	2.44	1.56	1.76	1.76	2.41	2.44	2.24	2.01	1.90	2.27	2.27	2.55
12	2.55	1.56	1.76	1.76	2.52	2.41	2.24	1.93	1.95	2.27	2.29	2.32
13	2.29	1.56	1.76	1.76	2.78	2.24	2.12	1.93	2.12	2.27	2.32	2.35
14	2.61	1.56	1.76	1.76	2.32	2.24	2.01	1.93	2.29	2.29	2.32	2.32
15	1.53	1.56	1.76	1.76	2.18	2.27	1.93	1.95	2.32	2.27	2.32	2.38
16	1.53	1.56	1.76	1.76	2.24	2.21	1.93	1.95	2.38	2.27	2.29	2.38
17	1.53	1.56	1.76	1.76	2.18	2.32	1.93	1.90	2.41	2.29	2.29	2.38
18	1.53	1.56	1.76	2.52	2.18	2.35	1.93	1.73	2.35	2.29	2.29	2.24
19	1.33	1.56	1.76	2.61	2.18	2.35	1.93	1.70	2.32	2.29	2.29	2.15
20	1.53	1.56	1.76	2.46	2.10	2.32	1.98	1.78	2.32	2.29	2.32	2.24
21	1.53	1.56	1.76	1.93	2.10	2.38	1.98	1.78	2.32	2.29	2.29	2.15
22	1.53	1.56	1.76	1.87	2.15	2.29	2.04	1.73	2.41	2.27	2.35	2.04
23	1.53	1.56	1.76	1.87	2.21	2.35	1.95	1.73	2.27	2.27	2.29	2.01
24	1.53	1.56	1.76	1.78	2.35	2.38	2.01	2.04	2.21	2.27	2.29	1.98
25	1.53	1.56	1.76	1.78	2.32	2.32	1.95	2.01	2.21	2.29	2.29	2.04
26	1.53	1.56	1.76	1.84	2.27	2.29	1.95	1.93	2.21	2.29	2.44	1.98
27	1.53	1.56	1.76	1.93	2.12	2.35	1.84	1.93	2.24	2.27	2.44	2.01
28	1.53	1.56	1.76	1.90	2.35	2.21	1.90	2.15	2.24	2.24	2.32	2.04
29	1.53	1.56	1.76	1.84	2.27	2.18	1.81	2.41	2.24	2.29	2.27	1.98
30	1.53	1.56	1.76	1.78	2.35	2.24	1.84	2.10	2.24	2.27	2.24	1.98
31	1.53	1.56	1.76	1.76	2.29	2.29	1.98	2.04	2.24	2.41	2.24	1.98
Sum	54.89	43.68	54.56	56.03	69.70	69.71	63.90	60.08	65.17	70.56	70.65	66.98

Current Year 1998

Period 1937-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second					Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		Average	Total	Average	Maximum	Minimum	
				Day	φ Low						
Jan.			14	2.61	1	1.10	1.77	4,742	4,134	5,896	711
Feb.			1	1.56	1	1.56	1.56	3,774	3,827	5,493	456
Mar.			1	1.76	1	1.76	1.76	4,714	4,715	6,617	1,005
April			19	2.61	1	1.76	1.87	4,841	4,724	6,476	940
May			13	2.78	3	2.01	2.25	6,022	4,911	6,895	804
June			15	2.44	29	2.18	2.32	6,023	4,729	6,883	717
July			8	2.35	29	1.81	2.06	5,521	4,986	8,079	662
Aug.			28	2.41	19	1.70	1.94	5,191	4,985	8,400	698
Sept.			117	2.41	110	1.90	2.17	5,631	4,740	7,672	721
Oct.			31	2.41	1	2.24	2.28	6,096	4,996	7,080	843
Nov.			3	2.55	111	2.27	2.36	6,104	4,696	7,367	806
Dec.			11	2.55	124	1.98	2.16	5,787	4,480	6,241	783
Yearly				2.78		1.10	2.04	64,446	55,923	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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	27.5	36.8	12.1	3.82	3.06	2.52	2.38	2.55	15.2	7.39	14.6	19.7
2	34.8	27.8	15.0	4.53	2.15	2.80	2.58	3.09	15.4	7.45	12.6	18.7
3	33.7	9.49	13.7	4.64	2.58	2.86	1.98	3.12	14.8	7.39	9.88	17.3
4	34.6	12.1	13.3	5.81	2.49	3.23	2.75	2.72	12.2	7.59	8.67	16.5
5	34.3	12.9	8.55	6.26	2.01	3.29	2.97	2.83	12.0	8.61	10.6	17.0
6	32.6	11.7	5.81	3.77	2.15	2.75	1.95	2.66	11.9	6.97	9.69	22.5
7	32.3	11.3	8.52	3.57	1.67	3.40	1.93	3.17	10.7	5.35	10.9	23.4
8	31.2	12.2	12.8	10.1	1.67	3.14	2.32	2.72	12.2	4.56	14.7	22.0
9	31.4	12.4	13.3	10.4	2.44	2.55	1.50	2.80	8.98	4.76	15.8	20.6
10	32.3	10.1	9.29	21.7	3.54	2.18	1.30	2.41	5.52	4.76	10.4	13.0
11	34.8	6.74	6.91	28.2	3.12	2.66	.96	2.55	5.66	6.74	8.47	10.3
12	34.6	5.24	5.75	28.3	3.51	2.75	1.59	2.58	7.36	7.56	12.1	14.0
13	33.1	3.82	6.29	27.2	3.29	3.17	2.44	2.75	10.2	5.78	12.3	19.5
14	32.9	7.76	11.8	21.4	1.90	3.34	2.18	2.12	8.98	6.17	13.8	22.8
15	31.4	11.9	18.9	2.89	2.58	3.03	1.02	2.58	7.36	5.35	15.8	20.3
16	33.1	13.1	21.7	1.50	2.55	3.00	1.90	2.86	10.2	4.98	13.8	19.4
17	34.0	13.7	17.0	2.24	2.52	5.64	1.25	2.66	12.7	5.15	12.5	12.2
18	39.1	13.9	16.6	2.69	1.95	2.52	1.64	2.49	12.7	8.98	12.0	11.9
19	38.5	12.3	10.8	3.26	2.69	2.44	.28	2.07	12.8	10.1	11.5	15.9
20	37.4	9.40	10.6	3.96	1.36	3.40	.28	2.66	13.7	8.69	12.9	18.3
21	34.6	10.8	12.0	2.80	1.93	3.20	.28	3.29	12.7	7.00	13.8	19.3
22	36.8	13.3	14.7	3.20	1.67	2.49	.28	1.42	11.1	6.20	16.7	13.0
23	36.0	13.1	9.88	3.74	2.55	1.76	3.12	3.74	9.15	7.39	14.7	13.5
24	37.7	12.0	3.03	3.91	3.06	2.07	2.72	15.1	8.78	7.05	12.1	20.5
25	40.8	7.99	3.14	3.17	2.86	1.98	2.52	14.5	8.81	9.66	12.9	24.6
26	39.1	7.84	4.16	2.89	2.95	2.63	3.20	13.7	11.8	10.3	19.4	22.2
27	37.4	6.34	4.93	2.49	2.69	2.89	2.55	13.5	14.8	7.56	16.7	21.1
28	35.1	5.15	4.81	2.89	2.32	2.97	3.12	18.5	12.9	6.83	14.5	18.9
29	35.1		4.73	3.51	2.10	2.32	2.52	27.8	9.74	7.65	19.7	16.3
30	35.1		4.22	3.14	2.04	1.78	2.55	18.7	8.24	7.62	19.4	15.9
31	35.1		4.19		2.35		2.32	14.4		9.71		19.5
Sum	1,076.4	331.17	308.51	227.98	75.75	84.76	60.38	198.04	328.58	221.30	402.91	560.1

Current Year 1998

Period 1935-1998

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.			25	40.8	1	27.5	34.7	93,001	54,731	136,546	550
Feb.			1	36.8	13	3.82	11.8	28,613	44,891	109,952	444
Mar.			16	21.7	24	3.03	9.95	26,655	44,471	111,248	440
April			12	28.3	16	1.50	7.60	19,697	44,105	106,795	402
May			10	3.54	20	1.36	2.44	6,545	52,204	108,892	411
June			17	5.64	23	1.76	2.83	7,323	45,766	107,263	422
July			26	3.20	119	.28	1.95	5,217	42,599	112,518	455
Aug.			29	27.8	22	1.42	6.39	17,111	45,923	110,878	455
Sept.			2	15.4	10	5.52	11.0	28,389	51,086	103,193	440
Oct.			26	10.3	8	4.56	7.14	19,120	45,655	111,075	699
Nov.			29	19.7	11	8.47	13.4	34,811	46,169	125,198	882
Dec.			25	24.6	11	10.3	18.1	48,393	53,341	134,203	570
Yearly				40.8		0.28	10.6	334,875	570,941	1,286,335	8,226

φ Mean daily

1 And other days

09-5211.00 COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY
AT YUMA, ARIZONA - DISCHARGES

DESCRIPTION: Water-stage recorder located in California on the right bank of the river, 305 meters downstream from the mouth of the Yuma Main Canal Wasteway, 1.0 kilometers downstream from the abandoned gaging station on the Colorado River at Yuma, 8.4 kilometers downstream from the mouth of the Gila River, 31.5 kilometers downstream from Imperial Dam, and 10.3 kilometers upstream from the northerly international boundary. Zero of the gage is 31.09 meters above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on current meter measurements and a continuous record of gage heights. Computations by shifting control methods. Records obtained and furnished by U. S. Geological Survey. Records available: October 1963 through 1998. 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	42.2	213	231	173	47.9	25.6	26.4	26.1	45.0	23.5	54.1	99.1
2	54.1	197	237	177	39.4	25.8	30.9	27.6	34.3	22.9	51.3	97.1
3	56.9	201	238	173	27.8	25.8	24.2	27.0	32.3	20.8	47.9	94.6
4	65.4	241	195	148	35.7	30.6	22.1	32.3	28.9	23.3	59.2	90.9
5	68.0	246	160	144	33.7	39.4	23.6	33.7	30.9	18.6	60.0	89.2
6	62.6	242	148	154	25.4	39.4	22.3	35.7	28.6	18.8	58.1	96.3
7	59.2	229	114	164	46.7	27.5	28.9	36.5	27.0	29.2	56.6	95.7
8	54.4	232	77.9	171	63.7	25.7	39.6	36.5	33.1	28.0	43.0	93.2
9	58.6	228	71.6	157	30.0	26.1	26.5	41.1	32.6	26.2	40.8	91.8
10	70.2	230	65.1	159	40.5	23.8	22.5	41.9	21.2	24.8	33.1	87.8
11	85.5	226	63.2	176	65.1	23.8	26.5	41.6	21.5	24.2	32.9	92.0
12	88.6	210	64.0	180	77.3	23.8	28.9	36.0	23.3	26.4	36.5	107
13	80.1	217	66.3	181	81.6	23.7	21.9	36.2	30.9	25.5	35.4	122
14	90.6	227	97.4	186	46.7	24.0	26.1	35.7	51.0	27.1	35.1	141
15	103	238	193	131	27.1	23.9	22.9	35.4	55.2	24.4	37.1	120
16	116	234	230	105	26.4	24.0	22.1	35.4	60.6	26.3	35.1	134
17	126	233	232	82.7	25.7	26.9	21.6	34.6	63.2	25.9	33.4	130
18	139	246	230	82.1	24.6	23.2	22.1	26.1	58.1	27.1	35.7	127
19	138	238	222	81.8	25.1	22.2	21.3	21.9	53.0	28.6	37.1	121
20	140	218	214	71.4	24.2	23.8	22.1	21.5	53.8	29.7	37.9	118
21	142	206	217	52.4	25.5	25.0	21.6	21.2	53.5	28.9	36.6	118
22	162	218	226	41.1	24.6	24.1	19.9	19.2	60.9	25.9	39.8	105
23	175	223	225	34.6	26.6	23.2	22.7	20.5	41.1	27.4	37.4	108
24	181	227	196	30.3	38.8	23.6	24.0	34.0	32.0	28.6	37.1	137
25	197	228	197	29.7	39.4	24.4	23.5	32.6	26.5	29.7	35.7	203
26	197	226	199	30.0	35.1	24.0	23.7	31.2	26.9	30.6	76.5	207
27	186	224	179	27.3	26.1	24.4	23.1	30.9	29.7	28.1	98.6	155
28	192	224	181	25.9	25.3	24.2	23.7	43.3	27.4	28.2	84.4	144
29	189		187	27.7	24.9	26.2	22.7	66.3	25.7	30.9	98.6	134
30	192		180	32.0	33.4	23.7	24.2	39.1	24.3	32.6	98.8	139
31	206		169	30.3	30.3		30.3	35.1		45.3		154
Sum	3,717.4	6,322	5,303.5	3,228.0	1,144.6	771.8	761.9	1,036.2	1,132.5	837.5	1,503.8	3,751.7

Current Year 1998

Period 1951-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		Total		Average	Maximum	Minimum	
				Day	φ Low						
Jan.			31	206	1	42.2	120	321,183	273,287	1,317,479	36,828
Feb.			5	246	2	197	226	546,221	223,582	1,228,624	41,083
Mar.			3	238	11	63.2	171	458,222	245,997	1,610,496	42,683
April			14	186	28	25.9	108	278,899	219,963	1,119,312	41,552
May			13	81.6	20	24.2	36.9	98,893	218,072	1,065,554	43,373
June			15	39.4	19	22.2	25.7	66,684	213,101	1,113,679	36,996
July			8	39.6	22	19.9	24.6	65,828	240,821	2,013,773	37,956
Aug.			29	66.3	22	19.2	33.4	89,528	245,957	2,073,958	41,457
Sept.			17	63.2	10	21.2	37.8	97,848	221,721	1,669,785	53,264
Oct.			31	45.3	5	18.6	27.0	72,360	188,907	1,789,911	43,129
Nov.			30	98.8	11	32.9	50.1	129,928	191,747	1,292,035	42,965
Dec.			26	207	10	87.8	121	324,147	226,125	1,374,775	40,733
Yearly				246		18.6	80.9	2,549,741	2,709,280	13,065,596	633,707

φ Mean daily

1 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 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.250	5.900	6.090	5.205	4.085	3.655	3.670	3.635	3.990	3.620	4.065	4.735
2	4.615	5.820	6.005	5.225	3.955	3.660	3.750	3.665	3.820	3.605	4.020	4.725
3	4.730	5.840	5.855	5.200	3.760	3.660	3.625	3.655	3.785	3.555	3.965	4.705
4	4.835	6.030	5.600	5.040	3.895	3.745	3.585	3.750	3.730	3.605	4.140	4.670
5	4.865	6.065	5.395	5.010	3.855	3.905	3.615	3.785	3.775	3.510	4.155	4.665
6	4.805	6.070	5.310	5.080	3.710	3.905	3.585	3.815	3.745	3.505	4.125	4.780
7	4.745	6.025	5.065	5.140	4.050	3.690	3.715	3.835	3.720	3.705	4.105	4.780
8	4.640	6.060	4.735	5.180	4.290	3.655	3.910	3.835	3.830	3.680	3.895	4.760
9	4.750	6.065	4.655	5.095	3.790	3.665	3.665	3.915	3.820	3.640	3.860	4.745
10	4.890	6.095	4.570	5.110	3.955	3.620	3.590	3.930	3.625	3.615	3.735	4.680
11	5.055	6.095	4.540	5.215	4.305	3.620	3.665	3.925	3.640	3.605	3.730	4.745
12	5.085	5.990	4.540	5.235	4.445	3.620	3.705	3.830	3.685	3.640	3.790	4.980
13	5.000	6.095	4.530	5.245	4.490	3.615	3.575	3.835	3.830	3.625	3.775	5.170
14	5.100	6.165	4.840	5.270	4.030	3.625	3.655	3.820	4.145	3.655	3.770	5.355
15	5.210	6.240	5.480	4.915	3.725	3.620	3.590	3.820	4.210	3.600	3.800	5.185
16	5.315	6.240	5.670	4.715	3.710	3.625	3.575	3.820	4.265	3.635	3.765	5.325
17	5.385	6.255	5.655	4.515	3.690	3.680	3.565	3.805	4.290	3.625	3.740	5.295
18	5.475	6.330	5.635	4.510	3.670	3.605	3.570	3.650	4.220	3.650	3.775	5.275
19	5.465	6.295	5.585	4.505	3.675	3.585	3.555	3.570	4.150	3.675	3.800	5.195
20	5.485	6.185	5.530	4.385	3.660	3.620	3.570	3.565	4.155	3.695	3.815	5.150
21	5.490	6.115	5.545	4.150	3.680	3.640	3.560	3.560	4.150	3.680	3.800	5.155
22	5.625	6.180	5.585	3.995	3.660	3.625	3.525	3.525	4.240	3.620	3.840	4.935
23	5.700	6.195	5.570	3.885	3.695	3.605	3.580	3.550	3.955	3.650	3.805	4.990
24	5.730	6.220	5.400	3.815	3.910	3.615	3.605	3.800	3.805	3.675	3.800	5.320
25	5.820	6.210	5.395	3.805	3.915	3.630	3.595	3.780	3.705	3.690	3.775	5.750
26	5.815	6.175	5.400	3.810	3.845	3.620	3.600	3.755	3.705	3.705	4.390	5.770
27	5.760	6.120	5.280	3.755	3.675	3.630	3.585	3.750	3.760	3.660	4.690	5.460
28	5.790	6.065	5.280	3.730	3.660	3.625	3.595	3.950	3.710	3.655	4.530	6.000
29	5.775		5.315	3.765	3.650	3.665	3.575	4.285	3.675	3.705	4.710	5.325
30	5.790		5.265	3.830	3.800	3.620	3.605	3.830	3.640	3.730	4.720	5.360
31	5.865		5.190		3.745		3.715	3.830		3.930		5.460
Avg.	5.255	6.110	5.305	4.610	3.870	3.655	3.620	3.775	3.895	3.650	3.995	5.110

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 1998. 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.42	1.25	1.08	1.25	1.16	1.33	1.16	1.30	1.10	1.81	1.78	1.78
2	1.42	1.19	1.08	1.27	1.16	1.36	1.13	1.30	1.19	1.81	1.78	1.78
3	1.42	1.08	1.02	1.27	1.16	1.36	1.13	1.30	1.22	1.81	1.78	1.78
4	1.42	1.02	1.02	1.27	1.16	1.36	1.13	1.30	1.22	1.81	1.78	1.78
5	1.42	1.08	1.08	1.27	1.16	1.36	1.13	1.30	1.22	1.81	1.78	1.78
6	1.42	1.08	1.08	1.27	1.16	1.36	1.13	1.30	1.22	1.76	1.78	1.78
7	1.42	1.08	1.08	1.27	1.16	1.33	1.13	1.30	1.22	1.81	1.78	1.78
8	1.33	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.87	1.78	1.78
9	1.16	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.93	1.78	1.78
10	1.16	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
11	1.16	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
12	1.16	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
13	1.16	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
14	1.16	1.08	1.08	1.22	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
15	1.16	1.08	1.08	1.25	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.78
16	1.22	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.87
17	1.33	1.08	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.95	1.78	1.87
18	1.33	1.13	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.90	1.78	1.87
19	1.33	1.16	1.08	1.27	1.16	1.27	1.13	1.30	1.22	1.76	1.78	1.87
20	1.39	1.16	1.08	1.27	1.27	1.27	1.13	1.30	1.22	1.73	1.78	1.87
21	1.42	1.16	1.08	1.27	1.36	1.27	1.13	1.30	1.22	1.84	1.78	1.87
22	1.42	1.16	1.08	1.27	1.36	1.27	1.13	1.30	1.19	1.95	1.78	1.73
23	1.42	1.16	1.13	1.27	1.36	1.27	1.13	1.30	1.13	1.95	1.78	1.70
24	1.42	1.10	1.16	1.27	1.36	1.27	1.13	1.30	1.19	1.95	1.78	1.81
25	1.42	1.08	1.16	1.27	1.36	1.27	1.13	1.30	1.22	1.95	1.78	1.87
26	1.42	1.08	1.16	1.27	1.36	1.27	1.13	1.30	1.22	1.95	1.78	1.87
27	1.30	1.08	1.16	1.27	1.36	1.27	1.13	1.30	1.22	1.87	1.78	1.87
28	1.25	1.08	1.16	1.27	1.36	1.27	1.13	1.30	1.22	1.78	1.78	1.87
29	1.25		1.16	1.27	1.36	1.27	1.19	1.30	1.22	1.78	1.78	1.81
30	1.25		1.19	1.27	1.30	1.27	1.30	1.30	1.22	1.78	1.78	1.78
31	1.25		1.16	1.27	1.27		1.27	1.30		1.64		1.87
Sum		30.93		38.01		38.67		40.30		57.85		56.10
	40.81		34.08		38.12		35.43		36.30		53.40	
Current Year 1998										Period 1971-1998		
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	1.42	1	1.16	1.32	3,526	2,784	7,204	0	
Feb.			1	1.25	4	1.02	1.10	2,672	2,646	5,958	0	
Mar.			30	1.19	3	1.02	1.10	2,945	3,024	6,698	4.9	
April			1	1.27	14	1.22	1.27	3,284	2,930	6,315	299	
May			1	1.36	1	1.16	1.23	3,294	2,874	6,085	0	
June			1	1.36	8	1.27	1.29	3,341	2,637	5,955	0	
July			30	1.30	2	1.13	1.14	3,061	2,863	6,796	613	
Aug.			1	1.30	1	1.30	1.30	3,482	2,996	7,401	222	
Sept.			1	1.22	1	1.10	1.21	3,136	2,945	7,253	0	
Oct.			1	1.95	31	1.64	1.87	4,998	3,034	6,611	194	
Nov.			1	1.78	1	1.78	1.78	4,614	3,121	6,525	386	
Dec.			1	1.87	23	1.70	1.81	4,847	3,332	7,364	0	
Yearly				1.95		1.02	1.37	43,200	35,186	72,381	2,162	

φ Mean daily

1 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 1998.

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, 0.76 CMS on November 12, 1992; minimum no flow several days in February 1966.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.23	0.31	0.31	0.34	0.37	0.31	0.34	0.34	0.34	0.45	0.57	0.40
2	.25	.31	.31	.34	.37	.31	.34	.34	.34	.45	.57	.37
3	.27	.31	.31	.34	.37	.31	.31	.34	.34	.48	.54	.37
4	.28	.34	.34	.34	.37	.31	.31	.37	.34	.48	.54	.37
5	.31	.34	.34	.34	.37	.31	.31	.37	.34	.48	.54	.37
6	.34	.34	.34	.34	.37	.31	.28	.37	.34	.51	.51	.37
7	.34	.34	.34	.34	.37	.31	.28	.34	.34	.51	.51	.37
8	.37	.34	.34	.34	.40	.31	.28	.34	.34	.51	.51	.37
9	.40	.34	.37	.34	.40	.31	.28	.34	.34	.54	.51	.37
10	.40	.34	.37	.34	.40	.31	.28	.34	.34	.54	.48	.37
11	.42	.34	.37	.34	.40	.31	.28	.34	.34	.54	.48	.37
12	.45	.34	.37	.34	.42	.31	.27	.34	.34	.54	.48	.37
13	.45	.34	.37	.34	.42	.31	.27	.34	.34	.54	.48	.37
14	.42	.34	.37	.34	.42	.31	.27	.34	.34	.57	.45	.37
15	.42	.34	.37	.34	.42	.28	.27	.34	.37	.57	.45	.37
16	.42	.34	.37	.34	.45	.28	.27	.34	.37	.57	.45	.37
17	.40	.31	.37	.34	.45	.28	.28	.34	.37	.57	.45	.37
18	.40	.31	.37	.34	.45	.28	.28	.34	.37	.57	.42	.37
19	.40	.31	.37	.34	.45	.28	.28	.34	.37	.59	.42	.37
20	.37	.31	.37	.34	.48	.31	.28	.34	.37	.59	.42	.37
21	.37	.31	.37	.37	.45	.31	.28	.34	.40	.59	.42	.37
22	.37	.31	.37	.37	.45	.31	.31	.34	.40	.59	.42	.37
23	.37	.31	.37	.37	.42	.31	.31	.34	.40	.59	.42	.37
24	.34	.31	.34	.37	.42	.31	.31	.34	.40	.62	.40	.37
25	.34	.28	.34	.37	.40	.31	.31	.34	.40	.62	.40	.37
26	.34	.28	.34	.37	.40	.31	.31	.34	.42	.62	.40	.34
27	.31	.31	.34	.37	.37	.31	.31	.34	.42	.62	.40	.34
28	.31	.31	.34	.37	.37	.31	.31	.34	.42	.59	.40	.34
29	.31	.31	.34	.37	.34	.31	.34	.34	.42	.59	.40	.34
30	.31	.31	.34	.37	.34	.34	.34	.34	.45	.59	.40	.34
31	.31	.31	.34	.34	.34	.34	.34	.34	.34	.57	.40	.34
Sum	11.02	9.01	10.90	10.50	12.45	9.18	9.23	10.65	11.11	17.19	13.84	11.32

Current Year 1998

Period 1948-1998

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	Day	Day					
Jan.			112	0.45	1	0.23	0.36	952	476	1,109	48.5
Feb.			14	.34	125	.28	.32	778	410	920	50.0
Mar.			19	.37	111	.31	.35	942	488	1,052	77.3
April			121	.37	111	.34	.35	907	485	1,233	82.4
May			20	.48	129	.34	.40	1,076	512	1,192	71.9
June			30	.34	115	.28	.31	793	511	1,270	83.1
July			11	.34	112	.27	.30	797	576	1,554	89.8
Aug.			14	.37	111	.34	.34	918	636	1,665	91.0
Sept.			30	.45	111	.34	.37	960	647	1,690	66.1
Oct.			124	.62	111	.45	.55	1,485	719	1,505	68.2
Nov.			11	.57	124	.40	.46	1,196	662	1,530	71.2
Dec.			1	.40	126	.34	.37	978	558	1,295	52.1
Yearly				0.62		0.23	0.37	11,782	6,680	15,331	955

φ Mean daily

1 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 1998. 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	54.7	140	118	22.8	22.4	63.2	64.9	57.2	0	108	83.0	176
2	161	97.4	87.5	22.8	23.7	60.6	58.1	47.9	0	116	83.3	176
3	168	139	66.3	22.8	35.4	61.7	65.4	47.9	0	129	79.3	184
4	203	161	28.9	13.8	77.3	58.3	69.4	41.3	0	88.4	84.7	193
5	197	162	28.6	0	74.2	58.1	66.8	35.7	34.6	62.3	84.7	179
6	192	161	49.8	0	79.0	60.0	69.7	37.1	40.2	68.3	88.4	204
7	180	144	125	0	48.4	65.7	64.0	35.7	59.2	62.6	95.4	174
8	184	167	176	0	39.6	69.7	52.7	35.7	83.4	53.8	121	176
9	201	160	135	0	41.3	63.4	62.9	34.8	90.9	61.2	113	194
10	215	176	111	8.18	33.7	62.6	69.4	32.0	99.4	71.6	123	207
11	227	176	102	56.9	31.7	63.2	66.0	35.7	144	85.8	117	211
12	219	168	101	134	37.1	63.4	61.7	39.6	174	71.1	119	223
13	199	185	120	32.4	38.2	63.7	72.8	60.0	182	81.6	118	226
14	215	187	127	24.8	45.3	63.7	65.4	35.4	182	71.1	108	223
15	221	193	99.1	23.4	60.0	66.0	72.2	35.1	169	64.0	120	212
16	227	180	63.8	23.5	96.0	65.7	70.8	34.6	167	51.8	119	217
17	223	197	73.9	23.5	85.5	64.0	70.8	30.6	155	49.8	130	210
18	225	199	54.7	23.5	77.0	66.6	70.8	30.0	144	80.4	137	212
19	208	187	40.8	29.2	79.6	69.1	71.4	35.1	133	77.3	137	214
20	191	177	34.3	29.5	74.2	69.1	72.8	36.0	125	85.0	138	224
21	181	164	41.9	30.9	70.2	67.4	72.8	28.6	103	83.8	149	210
22	171	185	58.6	29.5	66.8	68.3	73.6	22.7	124	63.7	160	204
23	162	181	26.7	39.9	63.4	70.0	73.6	22.7	140	77.0	141	217
24	176	189	22.3	43.6	57.5	70.5	70.0	0	121	84.7	132	226
25	188	161	22.3	41.9	50.1	69.1	69.4	0	114	96.6	134	226
26	137	130	22.3	42.5	59.8	68.3	69.4	0	108	97.7	148	227
27	125	118	22.4	36.2	64.9	64.9	68.0	0	100	96.6	142	227
28	124	125	31.5	33.4	63.4	65.4	66.8	0	85.0	100	148	220
29	99.7		42.5	30.9	65.1	62.9	66.6	0	93.7	96.6	179	218
30	97.1		23.9	30.3	64.6	66.3	67.4	0	104	83.5	168	221
31	114		22.5		68.8		57.5	0		75.0		227
Sum	5,485.5	4,609.4	2,079.6	850.18	1,794.2	1,950.9	2,093.1	851.4	3,075.4	2,494.3	3,699.8	6,458

Current Year 1998

Period 1944-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	φ High		Average	Total	Average	Maximum	Minimum	
				Day	φ Low						
Jan.			111	227	1	54.7	177	473,947	110,293	643,620	0
Feb.			18	199	2	97.4	165	398,252	92,028	579,127	0
Mar.			8	176	124	22.3	67.1	179,677	145,983	204,939	0
April			12	134	1	5	0	28.3	73,456	152,369	447,013
May			16	96.0	1	22.4	57.9	155,019	75,580	454,461	0
June			24	70.5	5	58.1	65.0	168,558	116,182	501,523	0
July			122	73.6	8	52.7	67.5	180,844	165,216	512,385	0
Aug.			13	60.0	124	0	27.5	73,561	164,369	498,782	0
Sept.			113	182	1	1	103	265,715	99,713	591,679	0
Oct.			3	129	17	49.8	80.5	215,508	68,512	617,269	0
Nov.			29	179	3	79.3	123	319,663	69,088	609,196	0
Dec.			126	227	7	174	208	557,971	109,454	700,894	0
Yearly				227		0	97.1	3,062,171	1,368,789	6,000,305	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 Westway, 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 1998; daily discharge records available January 1, 1950 through 1998.

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 1998 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	80.6	365	339	210	69.8	91.1	90.8	91.8	51.7	139	127	275
2	209	323	318	211	67.5	86.1	90.0	83.4	43.4	145	141	275
3	233	339	299	212	64.7	86.7	90.0	82.7	43.9	157	143	280
4	251	372	255	171	120	87.7	90.8	80.5	43.0	124	154	286
5	253	376	231	138	124	99.3	89.8	73.1	70.8	86.7	154	275
6	246	376	219	140	115	102	91.8	76.4	74.8	88.9	155	300
7	250	362	235	153	97.9	89.8	92.6	76.3	91.0	91.3	160	279
8	258	374	237	170	109	104	93.8	75.7	120	84.8	171	274
9	276	373	209	160	81.8	96.0	91.9	78.6	148	86.7	162	286
10	295	400	179	161	79.1	91.7	92.3	80.2	130	98.6	160	293
11	315	402	161	199	83.7	91.6	91.2	83.0	171	109	152	300
12	316	392	160	259	111	91.3	91.5	81.3	195	104	156	335
13	296	401	178	193	133	91.2	97.4	101	208	114	154	351
14	311	408	206	185	120	91.5	95.0	75.6	221	103	149	365
15	325	419	259	152	95.9	94.0	96.6	74.6	222	93.5	155	336
16	335	409	291	127	179	93.1	95.4	73.9	222	85.8	159	369
17	339	418	317	101	144	94.6	94.2	68.3	216	82.4	162	361
18	346	426	299	98.0	103	93.3	94.9	59.4	206	105	174	358
19	336	415	280	99.2	105	93.9	94.9	59.5	192	108	175	355
20	323	405	269	95.2	105	95.0	97.0	60.0	184	112	176	359
21	314	385	274	73.7	96.4	94.6	96.0	52.2	162	115	183	346
22	311	403	289	71.2	93.2	94.3	94.2	47.1	180	99.4	197	311
23	329	404	263	73.4	93.4	94.6	97.5	46.5	184	105	180	316
24	337	408	229	74.1	102	95.2	94.8	43.3	160	116	176	358
25	356	390	220	73.7	94.7	97.4	93.4	42.0	141	123	165	395
26	321	353	220	73.3	102	95.5	93.6	41.3	134	133	209	405
27	299	335	207	69.4	93.5	91.7	95.8	41.1	128	125	240	381
28	299	331	210	68.3	90.8	92.4	93.9	47.0	124	128	232	365
29	280	331	239	68.3	91.6	91.8	92.1	68.9	123	129	266	349
30	300	332	232	72.2	99.0	91.0	93.3	48.0	136	120	260	345
31	322		212		102		93.0	43.1		118		363
Sum	9,061.6	10,764	7,536	3,952.0	3,167.0	2,802.4	2,899.5	2,055.8	4,325.6	3,430.1	5,247	10,246

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.	35.980	32.285	25	365	1	38.8	292	782,922	497,107	2,027,841	39,348
Feb.	36.190	35.385	117	426	2	315	384	930,010	428,908	1,705,506	74,502
Mar.	35.495	33.330	1	342	11	157	243	651,110	458,416	1,642,378	23,930
April	34.640	32.305	12	272	28	66.8	132	341,453	376,358	1,322,616	0
May	33.400	32.345	16	199	3	60.0	102	273,629	358,926	1,419,735	88,077
June	32.835	32.455	7	119	7	80.6	93.4	242,127	358,079	1,629,906	10,485
July	32.580	32.380	20	106	2	86.0	93.5	250,517	379,970	2,303,937	30,097
Aug.	32.630	31.810	13	109	27	39.9	66.3	177,621	390,970	2,485,718	54,026
Sept.	34.585	31.835	15	230	4	41.6	144	373,732	344,897	2,286,076	66,424
Oct.	33.470	32.220	3	168	5	76.0	111	296,361	330,926	2,417,702	52,985
Nov.	34.745	32.720	30	271	1	122	175	453,341	368,443	1,889,976	51,070
Dec.	35.570	34.535	26	411	5	265	331	885,254	467,844	2,259,735	51,806
Yearly	36.190	31.810		426		38.8	179	5,658,077	4,760,844	19,033,104	890,696

1 And other days

09-5220.01 COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.205	35.685	35.415	33.890	32.295	32.425	32.325	32.195	31.770	32.910	32.630	34.625
2	35.105	35.385	35.260	33.890	32.230	32.385	32.320	32.125	31.640	32.895	32.835	34.630
3	35.325	35.530	35.120	33.900	32.175	32.390	32.315	32.115	31.650	32.945	32.875	34.690
4	35.490	35.865	34.690	33.275	32.565	32.400	32.320	32.095	31.640	32.655	33.035	34.760
5	35.520	35.910	34.350	32.785	32.840	32.505	32.310	32.025	31.990	32.245	33.035	34.625
6	35.450	35.920	34.155	32.660	32.595	32.530	32.325	32.055	32.055	32.220	33.035	34.865
7	35.325	35.800	34.400	32.845	32.400	32.410	32.355	32.055	32.275	32.250	33.115	34.670
8	35.145	35.895	34.425	33.120	32.480	32.465	32.375	32.045	32.995	32.165	33.265	34.620
9	35.300	35.895	34.025	32.995	32.360	32.395	32.355	32.065	33.605	32.190	33.255	34.745
10	35.465	35.950	33.600	33.050	32.350	32.355	32.350	32.095	33.205	32.385	33.230	34.810
11	35.635	35.970	33.335	33.655	32.415	32.355	32.335	32.115	33.665	32.535	33.120	34.860
12	35.640	35.905	33.320	34.465	32.500	32.350	32.335	32.100	33.995	32.470	33.175	35.115
13	35.470	35.955	33.545	33.635	32.675	32.350	32.350	32.335	34.175	32.535	33.150	35.230
14	35.615	36.010	33.900	33.540	32.605	32.350	32.330	32.035	34.375	32.365	33.080	35.335
15	35.740	36.085	34.505	32.885	32.490	32.380	32.345	32.025	34.395	32.235	33.135	35.165
16	35.820	36.015	34.740	32.645	33.170	32.370	32.335	32.015	34.400	32.120	33.225	35.315
17	35.850	36.075	34.940	32.465	32.895	32.380	32.325	31.960	34.315	32.060	33.285	35.265
18	35.905	36.120	34.795	32.425	32.740	32.370	32.325	31.860	34.175	32.360	33.495	35.240
19	35.825	36.050	34.650	32.440	32.760	32.375	32.325	31.865	33.955	32.440	33.505	35.225
20	35.720	35.980	34.565	32.385	32.535	32.385	32.345	31.870	33.845	32.485	33.515	35.245
21	35.650	35.840	34.610	32.220	32.465	32.385	32.330	31.760	33.520	32.540	33.605	35.160
22	35.615	35.965	34.720	32.185	32.455	32.390	32.310	31.680	33.775	32.220	33.765	34.870
23	35.615	35.975	34.525	32.200	32.465	32.395	32.340	31.665	33.835	32.285	33.615	34.870
24	35.665	35.935	34.165	32.205	32.540	32.400	32.315	31.625	33.500	32.450	33.500	35.145
25	35.820	35.880	34.030	32.220	32.480	32.390	32.300	31.600	33.220	32.525	33.360	35.395
26	35.540	35.620	34.035	32.240	32.525	32.375	32.305	31.605	33.115	32.690	33.915	35.470
27	35.370	35.485	33.855	32.190	32.480	32.335	32.285	31.595	33.015	32.595	34.295	35.320
28	35.370	35.450	33.875	32.155	32.460	32.335	32.275	31.675	32.720	32.645	34.175	35.210
29	35.215		34.290	32.180	32.460	32.330	32.260	31.980	32.700	32.665	34.650	35.100
30	35.220		34.230	32.225	32.505	32.320	32.265	31.720	32.875	32.535	34.585	35.065
31	35.375		33.915		32.515		32.265	31.640		32.485		35.180
Avg.	35.450	35.860	34.320	32.830	32.530	32.385	32.320	31.920	33.215	32.455	33.415	35.025

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 1998 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.56	0.21	0.13	0	0.01	0.01	0	0.04	0.22	0.09	0.07
2	.04	.03	.18	.04	.10	.01	.01	0	.08	.08	.01	.02
3	.04	.07	.07	.04	.02	0	0	0	.09	.19	.09	.01
4	.03	.10	.11	0	.02	.07	0	0	.01	.11	0	.11
5	.04	.07	.01	0	.01	.11	.01	.08	.09	.01	.25	.07
6	.10	.01	0	0	0	.07	.01	.01	.01	.08	.05	.03
7	.14	.02	.07	.09	.01	.05	0	.02	.11	.07	.18	0
8	.09	.07	0	.14	.01	.04	0	.02	.08	.65	.20	.01
9	.30	.01	.03	.04	.01	.01	0	.02	.24	.37	.24	.02
10	.18	.08	.04	.06	.01	.01	.01	.04	.09	.07	.04	.01
11	.05	.33	.06	.14	.04	.02	.13	.02	.02	.09	.12	.06
12	.06	.05	.10	.05	0	.01	.04	0	.18	.16	.03	.24
13	.14	.07	.06	.04	.06	.07	.03	0	.11	.26	.06	.13
14	.16	.01	.03	.03	.04	.08	.01	0	.11	.15	.12	.28
15	.04	0	.03	.06	.05	.09	.05	.09	.33	.03	.16	.31
16	.04	0	.01	.03	0	.18	.06	.03	.19	.19	.01	.13
17	.06	.01	.10	0	.01	.11	.06	.03	.25	.28	.02	.18
18	.05	.01	.05	0	.01	.04	.06	.05	.05	.14	.01	.24
19	.07	.01	.11	.09	0	.02	.13	.04	.01	.09	.12	.03
20	.38	.14	.12	.02	.26	.01	.03	.04	.03	.24	.06	.01
21	.01	.04	0	.02	.04	.09	.01	.04	.01	.14	.03	.12
22	.08	.06	0	.07	0	0	.01	.02	.01	.19	.05	.01
23	.09	0	0	.13	0	.03	.01	.04	0	.15	.13	0
24	.11	0	0	.01	.09	.10	.08	.04	.04	.22	.07	.07
25	.09	.16	.06	.09	0	.01	.12	.02	.03	.13	0	.02
26	.11	.05	.12	.04	0	.04	.05	.03	.10	.12	.02	.05
27	.11	.27	.02	.02	.07	.02	.01	.02	.09	.01	.17	.06
28	.03	.07	.17	0	.12	.04	.01	.07	0	.12	.12	.05
29	.07	.21	0	.15	.03	.03	.01	.01	.05	.08	.14	.30
30	.11	.18	0	.01	.03	.01	.06	.04	.11	.01	.07	.02
31	.25	.18	.18	.01	.01	0	.07	.07	.23	.04	.04	.04
Sum	3.08	2.30	2.33	1.38	1.15	1.40	1.04	0.89	2.56	4.88	2.66	2.70

Current Year 1998

Period 1935-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High		Low		Total	Average	Maximum	Minimum
				Day	Low						
Jan.	0.730	0	9	1.51	1 3	0	0.10	266	185	1,127	0
Feb.	.830	0	11	1.83	1 6	0	.08	199	165	493	7.4
Mar.	.545	0	26	.97	1 1	0	.08	201	175	638	0
April	.410	0	25	.63	1 2	0	.05	119	170	524	20.6
May	.680	0	2	.92	1 1	0	.04	99.4	171	543	39.1
June	.340	0	115	.47	1 3	0	.05	121	153	734	22.5
July	.460	0	11	.75	1 2	0	.03	89.9	144	636	0
Aug.	.380	0	5	.56	1 1	0	.03	76.9	119	761	0
Sept.	.535	0	7	.94	1 1	0	.09	221	129	570	0
Oct.	.770	.010	8	1.63	27	0	.16	422	173	604	0
Nov.	.490	0	9	.82	125	0	.09	230	185	570	11.1
Dec.	.580	0	18	1.06	1 7	0	.09	233	204	730	16.9
Yearly	0.830	0		1.83		0	0.07	2,278	1,973	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 1998.

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 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.230	35.510	35.230	33.710	31.610	31.850	31.790	31.720	31.390	31.950	32.040	34.360
2	35.090	35.230	35.090	33.720	31.640	31.780	31.780	31.650	31.240	32.030	32.430	34.370
3	35.270	35.370	34.940	33.730	31.640	31.800	31.780	31.640	31.270	32.280	32.580	34.410
4	35.460	35.690	34.530	33.030	32.180	31.830	31.780	31.650	31.280	31.780	32.780	34.470
5	35.450	35.730	34.180	32.280	32.510	31.870	31.790	31.540	31.550	31.400	32.800	34.360
6	35.380	35.740	34.010	32.210	32.060	31.930	31.800	31.570	31.610	31.820	32.800	34.580
7	35.230	35.620	34.250	32.580	31.790	31.830	31.810	31.570	31.500	31.920	32.880	34.410
8	35.070	35.710	34.270	32.980	31.960	31.870	31.820	31.560	31.750	31.800	33.040	34.350
9	35.220	35.700	33.870	32.730	31.720	31.820	31.800	31.580	31.110	31.830	33.040	34.480
10	35.390	35.760	33.410	32.790	31.700	31.780	31.800	31.630	31.950	31.860	33.000	34.540
11	35.550	35.770	33.120	33.580	31.820	31.780	31.790	31.670	32.200	31.930	32.880	34.590
12	35.550	35.710	33.100	34.240	31.840	31.780	31.780	31.640	33.250	32.090	32.930	34.840
13	35.380	35.760	33.350	33.280	32.080	31.780	31.810	31.820	33.660	32.210	32.910	34.960
14	35.510	35.810	33.720	33.040	31.890	31.770	31.790	31.610	33.650	32.140	32.830	35.050
15	35.630	35.870	34.330	32.430	31.650	31.790	31.790	31.600	33.660	31.840	32.900	34.850
16	35.700	35.810	34.550	31.990	32.570	31.800	31.780	31.590	33.660	31.530	33.000	34.950
17	35.730	35.870	34.730	31.750	32.140	31.810	31.770	31.550	33.580	31.470	33.010	34.910
18	35.780	35.910	34.600	31.830	32.050	31.800	31.770	31.450	33.440	31.700	33.210	34.880
19	35.710	35.850	34.460	31.870	32.040	31.810	31.780	31.450	33.210	31.760	33.220	34.870
20	35.590	35.770	34.370	31.780	31.680	31.810	31.790	31.460	33.100	31.810	33.240	34.880
21	35.520	35.650	34.400	31.550	31.680	31.820	31.790	31.380	32.750	31.790	33.340	34.790
22	35.490	35.770	34.510	31.460	31.720	31.820	31.770	31.330	32.990	31.680	33.530	34.550
23	35.490	35.770	34.300	31.580	31.710	31.820	31.790	31.290	33.070	31.810	33.310	34.570
24	35.540	35.790	33.940	31.720	31.760	31.820	31.780	31.260	32.700	31.910	33.240	34.850
25	35.680	35.680	33.810	31.730	31.720	31.820	31.770	31.180	32.380	31.970	33.060	35.090
26	35.420	35.450	33.810	31.730	31.800	31.810	31.770	31.160	32.270	32.120	33.640	34.170
27	35.240	35.320	33.620	31.640	31.770	31.770	31.770	31.150	32.110	31.980	34.040	35.030
28	35.230	35.280	33.680	31.560	31.780	31.780	31.740	31.230	31.700	32.060	33.910	34.930
29	35.080		34.110	31.500	31.820	31.790	31.740	31.490	31.610	32.110	34.370	34.810
30	35.080		34.010	31.470	31.840	31.790	31.750	31.340	31.880	31.890	34.310	34.770
31	35.230		33.730		31.820		31.770	31.280		31.740		34.890
Avg.	35.350	35.675	34.130	32.385	31.870	31.810	31.780	31.485	32.375	31.880	33.140	34.695

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 1998. 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 1998, 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.8	142	108	126	69.8	91.1	90.8	91.8	51.7	78.8	78.5	72.8
2	38.0	118	104	121	67.6	86.1	90.0	83.4	43.5	79.8	76.2	73.3
3	41.0	124	115	124	64.7	86.7	90.0	82.7	44.0	78.4	71.0	71.4
4	52.0	94.0	174	115	90.3	87.8	90.8	80.5	43.0	76.1	69.3	71.9
5	39.0	91.0	115	138	90.8	96.9	89.8	73.2	70.9	66.3	71.4	71.7
6	38.0	91.0	120	120	97.9	101	91.8	76.4	74.8	81.7	71.1	70.9
7	67.0	81.0	96.0	119	97.9	87.2	92.6	76.3	64.8	76.4	73.9	70.3
8	107	90.0	95.0	124	95.2	104	93.8	75.7	59.7	70.0	74.2	68.7
9	93.0	90.0	120	118	64.6	96.0	91.9	78.6	47.2	78.3	72.7	70.7
10	81.0	104	147	124	79.1	91.7	92.3	80.2	49.7	65.7	73.2	71.1
11	79.0	101	115	125	83.7	91.6	91.3	83.0	62.0	62.1	73.8	71.9
12	79.0	100	113	131	111	91.3	91.5	81.3	67.9	60.8	73.2	74.6
13	81.0	98.0	105	134	77.5	91.3	97.4	71.0	70.1	63.8	70.8	76.2
14	78.0	100	89.0	120	85.2	91.6	95.0	75.6	71.1	62.9	71.8	77.5
15	60.0	104	66.0	117	83.1	94.1	96.7	74.7	71.3	68.8	70.8	75.4
16	61.0	101	124	106	118	93.3	95.5	73.9	71.2	68.6	71.0	74.5
17	61.0	105	114	98.0	111	94.7	94.3	68.3	71.3	67.7	71.0	75.1
18	63.0	108	105	98.7	79.4	93.3	95.0	59.5	69.1	72.6	65.0	75.5
19	71.0	103	107	99.3	86.6	93.9	95.0	59.5	71.0	65.5	66.1	74.8
20	81.0	113	112	95.2	92.7	95.0	97.0	60.0	73.0	70.2	66.1	76.8
21	84.0	129	122	73.7	84.0	94.7	96.0	52.2	74.4	67.0	71.0	79.1
22	85.0	113	134	71.3	93.2	94.3	94.2	47.1	76.0	67.3	72.1	78.3
23	91.0	102	121	73.5	93.4	94.6	97.5	46.5	74.0	81.4	72.1	78.4
24	85.0	83.0	122	74.1	102	95.3	94.9	43.3	75.8	78.9	72.1	79.7
25	83.0	89.0	130	73.8	94.7	97.4	93.5	42.0	74.6	77.8	69.8	79.8
26	85.0	124	131	73.3	102	95.5	93.7	41.3	75.0	78.4	72.0	81.2
27	85.0	101	130	69.4	93.6	91.7	95.8	41.1	77.3	76.3	73.2	73.4
28	91.0	82.0	133	68.3	90.9	92.4	93.9	47.1	77.2	76.5	73.1	71.7
29	102		129	68.3	91.8	91.8	92.1	59.1	74.9	76.3	71.1	73.7
30	111		120	72.2	99.0	91.0	93.4	48.0	76.2	74.6	71.1	77.5
31	111		126		102		93.0	43.2		76.1		78.6
Sum	2,316.8	2,881.0	3,642.0	3,071.1	2,792.7	2,797.3	2,900.5	2,016.5	2,002.7	2,245.1	2,148.7	2,316.5

Current Year 1998

Period 1950-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	φ High		Average	Total	Average	Maximum	Minimum	
				Day	φ Low						
Jan.			130	111	1	33.8	74.7	200,172	114,408	275,305	1,192
Feb.			1	142	7	81.0	103	248,918	122,099	292,464	11,387
Mar.			4	174	15	66.0	117	314,669	236,683	435,370	120,761
April			5	138	128	68.3	102	265,343	255,519	404,698	189,700
May			16	118	9	64.6	90.1	241,289	146,432	286,174	81,665
June			8	104	2	86.1	93.2	241,687	197,197	332,588	117,400
July			23	97.5	5	89.8	93.6	250,603	263,334	439,171	145,135
Aug.			1	91.8	27	41.1	65.0	174,226	254,709	420,673	113,219
Sept.			23	77.3	4	43.0	66.8	173,033	156,838	336,960	66,156
Oct.			6	81.7	12	60.8	72.4	193,977	91,498	280,817	12,894
Nov.			1	78.5	18	65.0	71.6	185,648	83,446	258,388	9,271
Dec.			26	81.2	8	68.7	74.7	200,146	114,694	247,899	10,886
Yearly				174		33.8	85.3	2,689,711	2,039,939	3,451,533	1,569,404

φ Mean daily

I And other days

09-5220.31 INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	30.830	31.600	31.620	31.750	31.430	31.830	31.770	31.690	31.350	31.410	31.610	31.560
2	30.830	31.620	31.630	31.730	31.460	31.760	31.760	31.620	31.200	31.410	31.540	31.550
3	30.830	31.540	31.660	31.740	31.280	31.780	31.760	31.610	31.230	31.390	31.560	31.550
4	30.880	31.520	31.710	31.740	31.730	31.810	31.760	31.620	31.240	31.370	31.560	31.560
5	30.930	31.480	31.690	31.730	31.590	31.850	31.770	31.510	31.510	31.100	31.560	31.540
6	30.970	31.520	31.720	31.770	31.590	31.910	31.780	31.540	31.580	31.750	31.550	31.560
7	31.070	31.490	31.710	31.790	31.590	31.800	31.790	31.540	31.510	31.880	31.560	31.550
8	31.190	31.490	31.720	31.790	31.600	31.850	31.800	31.530	31.340	31.760	31.560	31.540
9	31.190	31.510	31.730	31.780	31.450	31.800	31.790	31.550	31.210	31.770	31.550	31.540
10	31.200	31.500	31.750	31.790	31.440	31.760	31.780	31.600	31.300	31.740	31.550	31.540
11	31.210	31.510	31.770	31.790	31.580	31.760	31.770	31.640	31.360	31.810	31.550	31.550
12	31.200	31.490	31.740	31.740	31.780	31.760	31.760	31.620	31.410	31.360	31.550	31.550
13	31.210	31.500	31.780	31.690	31.730	31.760	31.790	31.790	31.410	31.400	31.550	31.540
14	31.210	31.510	31.850	31.710	31.600	31.750	31.760	31.580	31.410	31.420	31.550	31.560
15	31.220	31.520	31.830	31.700	31.610	31.770	31.770	31.570	31.410	31.440	31.550	31.530
16	31.200	31.520	31.830	31.660	31.600	31.780	31.760	31.560	31.400	31.450	31.530	31.510
17	31.210	31.520	31.830	31.540	31.610	31.790	31.750	31.520	31.390	31.450	31.550	31.510
18	31.220	31.530	31.770	31.620	31.630	31.780	31.750	31.420	31.370	31.480	31.560	31.510
19	31.240	31.510	31.780	31.680	31.650	31.790	31.760	31.420	31.390	31.430	31.550	31.510
20	31.270	31.510	31.790	31.600	31.670	31.790	31.770	31.430	31.390	31.480	31.550	31.530
21	31.240	31.500	31.820	31.350	31.660	31.800	31.770	31.350	31.390	31.450	31.560	31.520
22	31.250	31.510	31.820	31.250	31.700	31.800	31.740	31.300	31.400	31.500	31.550	31.530
23	31.320	31.530	31.810	31.390	31.690	31.800	31.770	31.260	31.390	31.650	31.540	31.530
24	31.360	31.510	31.820	31.540	31.740	31.800	31.760	31.230	31.400	31.580	31.540	31.520
25	31.380	31.450	31.820	31.550	31.710	31.800	31.750	31.150	31.380	31.620	31.540	31.520
26	31.360	31.440	31.830	31.550	31.780	31.790	31.740	31.130	31.400	31.600	31.560	31.510
27	31.380	31.520	31.800	31.460	31.750	31.750	31.740	31.120	31.400	31.600	31.560	31.470
28	31.440	31.570	31.840	31.380	31.760	31.760	31.710	31.200	31.370	31.590	31.550	31.470
29	31.470		31.790	31.320	31.800	31.770	31.710	31.450	31.390	31.600	31.540	31.480
30	31.490		31.730	31.290	31.820	31.770	31.720	31.300	31.400	31.570	31.550	31.490
31	31.560		31.730		31.800		31.740	31.240		31.610		31.490
Avg.	31.205	31.515	31.765	31.615	31.640	31.790	31.760	31.455	31.380	31.540	31.555	31.525

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 1998.

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 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.110	35.460	35.180	33.690	30.500	30.500	30.500	30.500	30.500	31.910	32.010	34.340
2	34.990	35.180	35.070	33.690	30.500	30.500	30.500	30.500	30.500	32.000	32.370	34.350
3	35.190	35.330	34.930	33.700	30.500	30.500	30.500	30.500	30.500	32.250	32.550	34.390
4	35.360	35.660	34.510	32.340	31.290	30.500	30.500	30.500	30.500	31.760	32.760	34.460
5	35.370	35.690	34.170	30.500	32.460	30.500	30.500	30.500	30.500	31.310	32.750	34.340
6	35.300	35.700	33.970	30.500	31.950	30.500	30.500	30.500	30.500	31.430	32.770	34.560
7	35.160	35.590	34.220	31.660	30.500	30.500	30.500	30.500	30.500	31.390	32.860	34.390
8	34.980	35.670	34.250	32.900	30.500	30.500	30.500	30.500	31.270	31.340	33.020	34.330
9	35.130	35.670	33.860	32.320	30.500	30.500	30.500	30.500	31.890	31.380	33.020	34.460
10	35.300	35.720	33.400	32.050	30.500	30.500	30.500	30.500	31.450	31.360	32.970	34.520
11	35.470	35.730	33.110	33.360	30.500	30.500	30.500	30.500	32.640	31.360	32.850	34.570
12	35.500	35.670	33.090	34.260	30.500	30.500	30.500	30.500	33.200	31.980	32.910	34.820
13	35.350	35.720	33.320	33.330	31.390	30.500	30.500	30.500	33.410	32.120	32.880	34.930
14	35.470	35.770	33.690	33.150	31.370	30.500	30.500	30.500	33.600	32.050	32.800	35.030
15	35.590	35.830	34.300	32.440	30.500	30.500	30.500	30.500	33.610	31.780	32.870	34.830
16	35.670	35.770	34.530	31.770	31.890	30.500	30.500	30.500	33.610	31.490	32.980	34.930
17	35.700	35.820	34.730	30.500	32.100	30.500	30.500	30.500	33.530	31.430	33.000	34.890
18	35.750	35.870	34.590	30.500	31.930	30.500	30.500	30.500	33.390	31.640	33.190	34.860
19	35.670	35.810	34.440	30.500	31.990	30.500	30.500	30.500	33.160	31.690	33.200	34.850
20	35.400	35.730	34.340	30.500	31.640	30.500	30.500	30.500	33.050	31.740	33.220	34.860
21	35.480	35.600	34.380	30.500	31.220	30.500	30.500	30.500	32.720	31.710	33.320	34.770
22	35.450	35.710	34.480	30.500	30.500	30.500	30.500	30.500	32.940	31.130	33.510	34.530
23	35.450	35.720	34.290	30.500	30.500	30.500	30.500	30.500	33.020	30.540	33.290	34.550
24	35.500	35.730	33.930	30.500	30.500	30.500	30.500	30.500	32.650	30.650	33.220	34.830
25	35.640	35.630	33.790	30.500	30.500	30.500	30.500	30.500	32.330	30.730	33.040	35.070
26	35.380	35.390	33.790	30.500	30.500	30.500	30.500	30.500	32.190	31.470	33.620	35.150
27	35.210	35.260	33.600	30.500	30.500	30.500	30.500	30.500	32.060	31.970	34.020	35.010
28	35.200	35.220	33.630	30.500	30.500	30.500	30.500	30.500	31.660	32.050	33.890	34.900
29	35.050		34.070	30.500	30.500	30.500	30.500	30.500	31.580	32.100	34.350	34.770
30	35.040		34.000	30.500	30.500	30.500	30.500	30.500	31.860	31.880	34.300	34.730
31	35.190		33.710	30.500	30.500	30.500	30.500	30.500		31.710		34.850
Avg.	35.290	35.630	34.110	31.620	30.945	30.500	30.500	30.500	32.145	31.590	33.115	34.705

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 1998.

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 1998 --- 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 1998

Period 1966-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	0	0	1 1	0	1 1	0	0	7,346	23,088	0	
Feb.	0	0	1 1	0	1 1	0	0	5,647	20,959	0	
Mar.	0	0	1 1	0	1 1	0	0	3,985	22,827	0	
April	0	0	1 1	0	1 1	0	0	3,569	22,944	0	
May	0	0	1 1	0	1 1	0	0	5,380	23,548	0	
June	0	0	1 1	0	1 1	0	0	4,234	23,135	0	
July	0	0	1 1	0	1 1	0	0	3,888	23,370	0	
Aug.	0	0	1 1	0	1 1	0	0	3,953	23,668	0	
Sept.	0	0	1 1	0	1 1	0	0	5,556	22,787	0	
Oct.	0	0	1 1	0	1 1	0	0	7,820	23,683	0	
Nov.	0	0	1 1	0	1 1	0	0	7,414	22,792	0	
Dec.	0	0	1 1	0	1 1	0	0	6,818	23,585	0	
Yearly	0	0		0		0	0	65,610	264,928	0	

1 And other days

09-5325.00 ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. This wasteway is located in Arizona, 6.9 kilometers downstream from the northerly international boundary and 5.1 kilometers downstream from Morelos Diversion Dam. It is the largest of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limnographic 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 1998, 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.49	0.07	0.27	0.09	0.01	0.36	0.01	0.01	0.01	0.86	0.39	0.18
2	.31	.15	.32	.01	.01	.01	.01	.01	.01	.18	.39	.11
3	.22	.02	.11	.01	.01	.01	.01	.01	.14	.01	.39	.19
4	.01	.33	.02	.37	.01	.08	.01	.03	.15	.63	.38	.01
5	.02	.05	.01	.01	.01	.04	.20	.01	.01	.50	.20	.01
6	.01	.14	.08	.01	.01	.04	.02	.01	.01	.02	.30	.20
7	.27	.49	.28	.01	.33	.36	.02	.24	.02	.02	.29	.19
8	.01	1.10	.01	.01	.16	.02	.01	.01	.01	.34	.90	.23
9	.02	.37	.01	.27	.01	.03	.01	1.08	.01	.31	.60	.02
10	.02	.02	.12	.23	.08	.02	.01	.34	.01	.50	.01	.19
11	.05	.02	.01	.01	.14	.02	.18	.02	.01	1.01	.88	.66
12	.14	.02	.06	.10	.02	.02	.09	.02	.16	.60	.82	.02
13	.02	.01	.13	.01	.20	.02	.01	.33	.31	.50	.34	.46
14	.02	.07	.13	.09	.01	.05	.01	.01	.43	.48	.10	.36
15	.02	.65	.03	.16	.01	.38	.14	.01	.01	.29	.51	.22
16	.02	.01	.01	.04	.04	.02	.06	.01	.12	.23	.16	.59
17	.03	.02	.02	.03	.22	.06	.01	.01	.60	.31	.15	.19
18	.03	.01	.01	.02	.01	.05	.01	.02	.38	.58	.61	.55
19	.05	.01	.01	.02	.01	.04	.12	.01	.02	.80	1.26	.83
20	.02	.01	.19	.14	.55	.02	.04	.01	.31	.08	.65	.55
21	.03	.11	.15	.01	.15	.28	.01	.01	.46	.72	.11	.43
22	.02	.04	.09	.01	.70	.13	.01	.22	.44	.77	.11	.02
23	.02	.02	.01	0	.76	.02	.13	.62	.16	.01	.01	.29
24	.49	.01	.01	.19	.02	.35	.54	.10	.69	.49	.01	.44
25	.76	.01	.01	.56	.13	.01	.01	.01	.45	.54	.01	.53
26	.40	.01	.69	.01	.05	.01	.01	.01	.67	.55	.52	.17
27	.02	.01	.43	.01	.01	.28	.01	.10	.01	.44	.49	.68
28	.01	.01	.01	.03	.01	.15	.01	.54	.05	.44	.11	.83
29	.01	.01	.01	.06	.01	.02	.01	.02	.14	.44	.89	.02
30	.01	.01	.01	.01	.25	.02	.01	.02	.21	.44	.02	.32
31	.01	.08	.08	.01	.85	.01	.01	.06	.06	.44	.02	.17
Sum		3.79		2.53		2.92		3.91		13.53		9.66
	3.56		3.33		4.79		1.74		6.01		11.61	

Month	Current Year 1998						Period 1935-1998					
	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters					
	High	Low	Day	High	Day	Low	Average	Total	Average	Maximum	Minimum	
Jan.	0.355	0.015	3	1.85	1	4	0.01	0.11	308	2,633	11,804	0
Feb.	.405	.010	114	1.94	1	1	.01	.14	327	2,156	10,398	17.9
Mar.	.760	.010	14	3.61	1	1	.01	.11	288	2,032	7,685	51.8
April	.465	.005	112	2.07	1	8	0	.08	219	1,871	7,771	0
May	.475	.005	30	2.09	1	6	0	.15	414	2,207	11,496	10.2
June	.380	.015	1	1.93	1	2	.01	.10	252	2,091	9,177	13.0
July	.585	.005	19	2.39	1	4	0	.06	150	2,120	10,263	11.2
Aug.	.625	.010	31	2.68	1	1	.01	.13	338	1,836	12,014	18.1
Sept.	.560	.015	26	2.26	1	1	.01	.20	519	1,332	7,574	7.4
Oct.	.515	.015	11	2.17	1	3	.01	.44	1,169	1,842	7,006	14.7
Nov.	.630	.010	18	2.71	1	17	.01	.39	1,003	2,231	10,139	23.2
Dec.	.615	0	11	2.60	30	0	0	.31	835	2,886	11,632	51.8
Yearly	0.760	0		3.61		0	0	0.18	5,822	25,237	102,255	707

! And other days

09-5221.00 COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

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

RECORDS: Mean daily gage heights based on continuous water-stage records. Records available: Continuous record of gage heights, November 1947 through 1998; 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, 33.155 meters on June 28, 1983; minimum mean daily gage height, 28.645 meters on September 13, 1988 and other days since that time.

MEAN DAILY GAGE HEIGHT IN METERS 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	30.655	33.465	33.245	31.790	29.205	28.595	28.215	28.425	28.385	30.860	30.535	32.560
2	32.060	33.210	33.115	31.785	29.430	28.625	28.090	28.425	28.375	30.910	30.420	32.565
3	32.230	33.280	32.995	31.825	29.530	28.620	28.090	28.425	28.375	31.125	30.445	32.610
4	32.270	33.610	32.630	30.925	29.930	28.620	28.090	28.430	28.390	30.715	30.435	32.675
5	32.195	33.655	32.335	30.735	30.580	28.970	28.110	28.425	28.620	29.830	30.345	32.545
6	32.015	33.670	32.145	30.780	30.210	28.595	28.085	28.420	28.395	29.625	30.270	32.760
7	31.795	33.575	32.340	30.920	29.510	28.610	28.370	28.455	29.835	29.755	30.250	32.610
8	31.495	33.645	32.370	31.150	29.980	28.925	28.480	28.405	30.795	29.815	30.275	32.530
9	31.530	33.660	32.070	31.020	29.505	28.570	28.480	28.530	31.580	29.800	30.240	32.645
10	31.575	33.695	31.660	30.890	29.270	28.560	28.485	28.570	31.095	30.310	30.335	32.705
11	31.630	33.710	31.385	31.410	29.420	28.555	28.500	28.400	31.530	30.460	30.545	32.745
12	31.530	33.655	31.360	32.295	29.575	28.550	28.480	28.400	31.865	30.450	30.475	32.950
13	32.400	33.695	31.520	31.515	30.010	28.545	28.460	28.835	32.045	30.505	30.520	33.075
14	33.420	33.755	31.815	31.275	30.150	28.540	28.455	28.405	32.225	30.350	30.545	33.175
15	33.530	33.825	32.335	30.820	29.655	28.580	28.470	28.390	32.260	30.200	30.540	33.020
16	33.605	33.755	32.565	30.510	30.845	28.535	28.455	28.385	32.255	30.320	30.400	33.090
17	33.645	33.795	32.765	30.080	30.525	28.535	28.445	28.385	32.195	30.595	30.915	33.075
18	33.695	33.840	32.650	29.830	30.340	28.530	28.445	28.385	32.070	30.120	31.500	33.045
19	33.635	33.790	32.520	29.700	30.365	28.525	28.470	28.390	31.875	30.150	31.515	33.055
20	33.535	33.735	32.425	29.645	29.945	28.520	28.465	28.390	31.755	30.400	31.520	33.115
21	33.455	33.605	32.450	29.545	29.730	28.540	28.450	28.390	31.490	30.585	31.610	33.080
22	33.420	33.705	32.530	29.460	29.205	28.525	28.445	28.410	31.625	29.925	31.790	32.895
23	33.425	33.715	32.400	29.430	29.185	28.500	28.455	28.485	31.765	29.570	31.625	32.910
24	33.460	33.735	32.075	29.435	29.150	28.535	28.515	28.400	31.460	30.355	31.595	33.165
25	33.605	33.660	31.905	29.455	29.145	28.495	28.435	28.385	31.170	30.490	31.420	33.380
26	33.395	33.435	31.910	29.375	28.985	28.490	28.430	28.385	31.090	30.365	31.885	33.435
27	33.225	33.320	31.755	29.325	28.620	28.530	28.430	28.385	30.960	30.515	32.290	33.255
28	33.420	33.280	31.720	29.270	28.585	28.510	28.430	28.455	30.675	30.580	32.195	33.125
29	33.090		32.135	29.240	28.585	28.485	28.430	29.060	30.565	30.630	32.605	33.000
30	33.060		32.125	29.205	28.825	28.490	28.425	28.425	30.785	30.470	32.550	32.945
31	33.180		31.820	29.165	29.165		28.425	28.410		30.240		33.050
Avg.	32.740	33.625	32.225	30.420	29.585	28.575	28.385	28.455	30.850	30.325	31.055	32.930

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 1998, obtained by the United States Section; monthly discharge, March 1939 through 1950, by Bureau of Reclamation.

REMARKS: This wasteway was completed and flow began March 14, 1939. Since May 13, 1944, waste water from the West Main Canal which previously discharged across the southerly land boundary has been returned to the Colorado River through this wasteway. The West Main Canal Wasteway was completed in February of 1971, and the waste water from the West Main Canal is normally discharged across the southerly land boundary.

EXTREMES: Prior to January 1951, maximum monthly discharge 3,528 TCM in January 1946; minimum monthly discharge, 150 TCM in September 1950. Since January 1, 1951, maximum instantaneous discharge, 2.89 CMS on January 24, 1954, at a maximum gage height of 29.095 meters (old datum); minimum instantaneous discharge, zero during a part of most months.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.63	0	0	0	0	0	0	0	0	0.31	0	0.21
2	.51	0	0	0	0	0	0	0	0	.42	0	.16
3	.67	0	0	0	0	0	0	0	0	.06	0	.22
4	.16	0	0	0	.18	0	0	0	0	.83	.11	.29
5	.26	0	0	0	.44	0	0	0	.24	.29	.14	.46
6	.14	0	0	0	.20	0	0	0	.10	.39	0	.24
7	.01	0	0	0	.40	0	0	0	.29	.33	0	.18
8	.01	0	0	0	.48	0	0	0	.17	.48	.49	.33
9	.01	0	0	0	.38	0	0	0	0	.17	.19	.19
10	.01	0	0	0	.20	0	0	0	0	.67	.15	.14
11	0	0	0	0	.32	0	0	0	0	.44	.11	.45
12	0	0	0	0	.09	0	0	0	0	.08	.47	.21
13	0	0	0	0	.09	0	0	0	0	.17	.13	.17
14	0	0	0	0	0	0	0	0	0	.31	.31	.35
15	0	0	0	0	0	0	0	0	0	.45	.18	.02
16	0	0	0	0	0	0	0	0	0	.29	.47	.12
17	0	0	0	0	0	0	0	0	0	.12	.23	.02
18	0	0	0	0	0	0	0	0	0	.47	.40	.36
19	0	0	0	0	0	0	0	0	0	.37	.38	.15
20	0	0	0	0	0	0	0	0	0	.40	.31	.36
21	0	0	0	0	0	0	0	0	0	.25	.20	.25
22	0	0	0	0	0	0	0	0	.19	.63	.14	.03
23	0	0	0	0	0	0	0	0	.33	.34	.08	.01
24	0	0	0	0	0	0	0	0	.26	.19	.24	.47
25	0	0	0	0	0	0	0	0	.15	.25	.05	.21
26	0	0	0	0	0	0	0	0	.43	.16	.29	0
27	0	0	0	0	0	0	0	0	.40	0	.21	.01
28	0	0	0	0	0	0	0	0	.19	0	.03	.06
29	0	0	0	0	0	0	0	0	.10	.03	.32	.40
30	0	0	0	0	0	0	0	0	.24	.14	.37	.24
31	0	0	0	0	0	0	0	0	0	0	.15	.15
Sum	2.41	0	0	0	2.78	0	0	0	3.09	9.02	6.00	6.46

Current Year 1998

Period 1939-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High		Day		Total	Average	Maximum	Minimum
				High	Low						
Jan.	0.480	0	3	0.95	110	0	0.08	208	644	3,528	0
Feb.	0	0	1	0	1	0	0	0	550	3,096	0
Mar.	0	0	1	0	1	0	0	0	501	2,048	0
April	0	0	1	0	1	0	0	0	535	2,393	0
May	.500	0	7	1.01	1	0	.09	240	652	3,047	0
June	0	0	1	0	1	0	0	0	571	2,899	0
July	0	0	1	0	1	0	0	0	495	2,405	0
Aug.	0	0	1	0	1	0	0	0	517	3,121	0
Sept.	.490	0	22	.97	1	0	.10	267	466	2,689	0
Oct.	.635	0	4	1.48	126	0	.29	779	591	2,590	0
Nov.	.570	0	30	1.25	1	0	.20	518	712	2,936	0
Dec.	.535	0	4	1.12	123	0	.21	558	745	3,306	0
Yearly	0.635	0		1.48		0	0.08	2,570	6,979	30,060	0

! And other days

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

DESCRIPTION: Water-stage recorder and control weir located about 91 meters north of the international boundary near San Luis, Arizona and 2.4 kilometers east of the Colorado River. From September 28, 1977 to April 6, 1978, recorder was moved west 31 meters to a temporary bypass channel. On April 7, 1978, recorder was moved back to 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 1998. 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.40	0.09	0.09	0.28	0.39	0.33	0.21	0.16	0.13	0.48	0.13	0.28
2	.42	.13	.24	.34	.11	.03	.39	.17	.18	.22	.82	.42
3	.11	.35	.26	.30	.44	.14	.10	.14	.33	.23	.36	.33
4	.40	.43	.36	.37	.51	.13	.31	.18	.41	.06	.05	.22
5	.80	.60	.44	.16	.45	.16	.36	.70	.31	.38	.13	.05
6	.23	.17	.49	.13	.15	.16	.09	.57	.01	.13	.39	.26
7	.18	.22	.16	.09	.13	.32	.02	.31	.16	.13	.15	.11
8	.11	.71	.50	.26	.28	.31	.28	.55	.10	.23	.45	.03
9	.06	.58	.12	.57	.12	.09	.22	.68	.28	.42	.47	.26
10	.04	.11	.02	.05	.68	.25	.14	.71	.06	.12	.05	.15
11	.09	.02	.06	.29	.05	.01	.64	.04	.01	.05	.14	.47
12	.42	.32	.15	.71	.23	.13	.12	.42	.01	.46	.75	.17
13	.21	.28	.11	.30	.09	.09	.27	.19	.20	.20	.36	.38
14	.27	.09	.50	.24	.12	.51	.24	.35	0	.13	.56	.21
15	.05	.55	.23	.18	.09	.12	.30	.22	.08	.18	.52	.15
16	.10	.70	.10	.31	.13	.04	.57	.25	.35	.01	.45	.02
17	.22	.59	.06	.16	.23	.01	.06	.31	.02	.11	.27	.02
18	.12	.47	.57	.27	.48	.07	.35	.02	.09	.29	.39	.22
19	.59	.23	.34	.35	.26	.01	.04	.11	.27	.23	.35	.38
20	.15	.28	.47	.12	.11	.07	.16	.09	.25	.13	.31	.45
21	.67	.34	.55	.14	.13	.25	.17	.60	.16	.19	.35	.33
22	.21	.29	.63	.20	.05	.26	.10	.34	.47	.19	.41	.16
23	.36	.66	.39	.06	.26	.35	.18	.35	.11	.11	.45	.29
24	.21	.09	.32	.18	.03	.49	.30	.29	.11	.01	.06	.25
25	.14	.03	.35	.11	.43	.12	.16	.38	.45	.16	.12	.27
26	0	.22	.43	.10	.06	.07	.12	.17	.13	.22	.44	.11
27	.02	.08	.16	.29	.01	.01	.30	.18	.32	.30	.54	.22
28	.09	.04	.11	.20	.11	0	.45	.45	.32	.70	.59	.41
29	.34	.04	.24	.03	.38	.14	.31	.44	.14	.42	.66	.12
30	.16	.04	.24	.26	.40	.36	.39	.17	.10	.25	.47	.12
31	.04	.04	.41	.12	.42	.12	.55	0	.53	.53	.12	.28
Sum	7.21	8.67	9.10	7.05	7.33	5.03	7.90	9.54	5.56	7.25	11.19	7.14

Current Year 1998

Period 1935-1998

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.	0.355	0	5	0.94	1 8	0	0.23	623	1,128	4,144	111
Feb.	.335	0	8	.87	1 11	0	.31	749	943	3,910	164
Mar.	.315	0	19	.79	1 3	0	.29	786	1,073	3,602	175
April	.340	0	9	.89	1 6	0	.24	609	1,046	3,910	165
May	.355	0	4	.93	1 4	0	.24	633	1,179	3,750	281
June	.325	0	14	.83	1 1	0	.17	435	974	4,515	157
July	.325	0	11	.82	1 7	0	.25	683	1,045	4,428	210
Aug.	.370	0	10	.99	1 4	0	.31	824	1,087	4,885	196
Sept.	.360	0	19	.95	1 1	0	.19	480	1,027	3,910	0
Oct.	.345	0	28	.90	1 1	0	.23	626	1,078	4,046	0
Nov.	.360	0	12	.96	1 4	0	.37	967	1,173	4,404	0
Dec.	.315	0	11	.79	1 7	0	.23	617	1,146	3,799	51.0
Yearly	0.370	0		0.99		0	0.25	8,032	12,899	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 1998.

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 2/2 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.47	3.30	3.63	3.61	4.08	4.04	3.38	3.11	3.60	4.49	5.61	5.36
2	3.10	2.77	3.99	3.88	4.65	3.89	3.47	3.71	3.79	4.22	5.12	4.71
3	3.18	3.13	3.58	4.22	4.96	3.83	3.55	3.69	3.91	4.12	4.87	4.88
4	3.83	4.15	3.15	4.46	4.78	4.26	4.06	3.16	4.17	3.97	4.96	4.90
5	3.83	5.55	3.27	3.82	4.31	4.20	3.52	3.39	4.64	5.10	4.92	4.77
6	4.46	5.23	3.50	3.88	4.03	3.94	3.37	3.27	3.88	4.26	4.68	4.56
7	3.99	5.54	3.50	4.12	4.39	3.79	3.60	3.78	3.57	4.77	4.99	4.42
8	3.70	5.00	3.72	4.14	4.27	3.93	3.24	3.41	3.60	4.39	5.22	4.09
9	4.03	5.58	3.67	4.45	4.38	3.83	3.52	3.32	3.71	4.45	5.07	4.12
10	4.40	5.18	3.50	3.85	4.40	4.07	3.30	3.50	3.65	5.18	4.81	3.94
11	4.04	5.27	3.50	4.14	3.47	3.59	3.74	3.46	3.90	4.62	4.66	4.36
12	4.97	5.39	3.67	4.35	3.98	3.76	4.01	3.29	3.99	5.29	5.19	5.33
13	4.91	5.39	3.82	3.65	4.23	3.62	3.71	3.01	3.92	4.97	4.85	5.00
14	4.35	5.57	4.08	3.53	4.09	3.58	3.38	2.90	5.37	4.79	4.80	4.58
15	3.29	4.75	4.43	3.62	4.19	3.56	3.51	3.07	3.87	5.28	4.90	4.07
16	4.32	3.93	3.77	3.84	4.39	3.87	3.46	3.39	4.05	5.08	4.80	3.72
17	4.45	4.65	3.36	3.91	4.67	3.78	3.33	3.14	3.77	5.12	5.02	4.03
18	4.23	5.39	3.64	4.13	4.25	3.62	3.41	3.02	3.70	5.08	5.13	4.87
19	4.19	4.22	3.43	4.11	3.94	3.59	3.35	2.94	4.53	4.66	5.19	5.13
20	4.22	3.44	3.52	3.74	4.13	3.54	3.10	2.95	4.30	4.33	5.07	5.10
21	3.78	3.69	3.50	3.74	4.09	3.72	2.92	3.51	4.35	5.28	4.97	4.84
22	3.23	3.84	4.16	3.99	4.31	4.00	2.96	3.11	4.60	4.80	5.55	4.59
23	2.76	3.57	4.44	3.89	4.65	3.56	2.92	3.52	4.46	4.81	5.08	4.51
24	3.74	2.37	4.55	2.72	4.18	3.87	3.04	3.36	4.87	4.71	4.59	5.61
25	2.98	3.43	3.93	2.84	4.25	3.65	3.15	3.31	4.59	5.22	4.93	5.03
26	3.55	3.54	4.24	3.01	4.09	3.63	3.29	3.71	4.56	5.21	5.02	4.05
27	3.46	3.58	4.00	3.18	3.93	3.92	3.16	3.43	4.15	5.10	4.81	4.34
28	3.26	3.51	4.22	2.63	3.89	3.67	3.15	3.21	4.34	4.80	5.11	4.77
29	3.36		4.43	3.16	3.90	3.85	3.13	3.39	5.18	5.51	5.29	4.16
30	3.58		3.88	2.83	3.92	3.89	3.21	3.36	5.39	5.16	5.32	4.48
31	3.57		3.81		4.08		3.24	3.71		5.23		4.40
Sum	118.23	120.96	117.89	111.44	130.88	114.05	104.18	103.13	126.41	150.00	150.53	142.72

Current Year 1998

Period 1935-1998

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.			16	8.45	115	0	3.81	10,215	9,333	13,819	2,146
Feb.			4	6.87	13	0	4.32	10,451	9,012	14,787	2,023
Mar.			24	6.06	1	1.33	3.80	10,186	10,323	15,332	2,393
April			19	6.06	12	1.50	3.71	9,628	10,244	14,666	2,368
May			26	8.23	11	1.49	4.22	11,308	10,538	16,208	2,405
June			22	6.14	13	2.01	3.80	9,854	9,687	14,851	2,825
July			15	6.20	24	.63	3.36	9,001	9,574	14,715	3,121
Aug.			2	6.07	4	0	3.33	8,910	9,567	14,752	3,158
Sept.			14	6.49	8	.21	4.21	10,922	9,659	14,269	2,812
Oct.			26	6.43	16	0	4.84	12,960	11,184	15,277	3,626
Nov.			19	6.19	19	0	5.02	13,006	10,737	14,814	3,454
Dec.			2	6.12	30	1.99	4.60	12,331	10,105	14,160	3,022
Yearly				8.45		0	4.08	128,772	119,959	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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.34	0.30	0.54	0.21	0.23	0.41	0.30	0.22	0.15	0.51	0.05
2	.01	.54	.05	.45	.22	.32	.08	.28	.08	.20	.56	.03
3	.05	.16	.20	.42	.66	.13	.19	.28	.30	.08	.49	.03
4	.02	.20	.25	.41	.44	.17	.16	.48	.75	.05	.31	.03
5	.02	.02	.32	.46	.02	.32	.30	.42	.36	.19	.14	.21
6	.20	.06	.13	.44	.02	.47	.26	.29	0	.22	.33	.13
7	.48	.03	.30	.12	.03	.35	.19	.40	.02	.16	.20	.09
8	.87	.41	.10	.27	.01	.10	.19	.38	.18	.28	.29	.13
9	.38	.44	.32	.61	0	.23	.05	.55	.24	.08	.11	.04
10	.18	.23	.17	.87	.16	.31	.26	.86	.11	.08	.14	.01
11	.08	.03	.41	.43	.03	.18	.18	.48	.47	.26	.06	.12
12	.39	.12	.40	.60	0	.26	.32	.17	.38	.05	.24	.03
13	.09	.19	.39	.34	.03	.19	.18	.70	.27	.06	.07	.02
14	.33	.54	.44	.38	.21	.21	.16	.63	.75	.22	.09	.03
15	.18	.58	.34	.09	.19	.16	.17	.62	.27	.12	.01	.01
16	.23	.30	.39	.27	.48	.06	.34	.69	.13	0	.06	.03
17	.46	.46	.14	.56	.84	.25	.27	.78	.46	0	.13	.01
18	.40	.35	.10	.62	.21	.35	.16	.69	.29	0	.21	.56
19	.33	.17	.29	.74	.08	.16	.34	.34	.05	.10	.20	.33
20	.24	.20	.47	.84	.05	.07	.36	.11	.06	0	.17	.03
21	.53	.36	.48	.41	.12	.52	.31	.09	.38	.03	.10	.07
22	.62	.29	.16	.49	.14	.13	.19	.27	.71	.07	.16	.05
23	.26	.17	.33	.72	.29	.18	.20	.65	.12	0	.03	0
24	.39	.44	.32	.55	.48	.27	.10	.52	.14	0	.13	.21
25	.69	.20	.25	.38	.67	.12	.04	.35	.07	.02	.07	.37
26	1.25	.12	.44	.59	.26	.02	.16	.07	.16	.25	.11	.21
27	.69	.01	.73	.58	.16	.08	.27	.67	.09	.21	.08	.20
28	.18	.16	.19	.27	.02	.33	.27	.52	.07	.06	.16	.12
29	.34	.29	.28	.28	.23	.30	.08	.13	.09	.37	.18	.08
30	.18	.18	.26	.33	.63	.43	.11	.50	.12	.28	.14	.01
31	.76	.51	.51	.24	.24		.39	.46		.14		.01
Sum	10.83	7.12	9.47	14.06	6.93	6.90	6.69	13.68	7.34	3.73	5.48	3.25

Current Year 1998

Period 1971-1998

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.	0.910	0.010	26	1.70	1 1	0	0.35	936	576	1,376	48.7
Feb.	.780	.020	14	1.20	1 11	0	.25	615	527	840	196
Mar.	.785	.025	27	1.22	1 6	0	.31	818	565	1,158	250
April	.790	.065	9	1.24	1 14	.01	.47	1,215	539	1,280	202
May	.785	0	1 3	1.22	1 8	0	.22	599	452	725	183
June	.740	.015	5	1.06	1 1	0	.23	596	424	699	55.8
July	.690	.025	31	.91	1 15	0	.22	578	440	763	77.3
Aug.	.795	.060	26	1.12	1 2	.01	.44	1,182	499	1,182	121
Sept.	.795	0	4	1.26	1 1	0	.24	634	503	947	234
Oct.	.670	0	29	.80	1 4	0	.12	322	518	1,135	164
Nov.	.790	.015	2	1.23	1 21	0	.18	473	455	845	32.3
Dec.	.690	.010	1 18	.91	1 2	0	.10	281	541	1,204	43.5
Yearly	0.910	0		1.70		0	0.26	8,249	6,039	8,934	3,179

1 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 1998.
 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.18	0.19	0.17	0.25	0.20	0.21	0.22	0.20	0.23	0.19	0.22
2	0	.19	.20	.22	.25	.19	.21	.23	.23	.21	.19	.22
3	0	.19	.20	.22	.25	.19	.21	.22	.22	.21	.19	.22
4	0	.19	.21	.22	.24	.19	.22	.22	.23	.22	.19	.22
5	0	.19	.21	.22	.24	.19	.22	.23	.23	.22	.19	.22
6	0	.19	.21	.22	.25	.19	.22	.22	.23	.20	.19	.22
7	0	.20	.21	.21	.24	.19	.23	.23	.23	.19	.19	.25
8	0	.20	.21	.21	.25	.19	.24	.23	.22	.19	.19	.22
9	0	.20	.22	.21	.24	.19	.24	.23	.22	.20	.19	.22
10	0	.20	.22	.21	.24	.19	.24	.23	.22	.20	.19	.22
11	0	.20	.22	.21	.24	.19	.24	.20	.22	.20	.19	.22
12	0	.20	.22	.21	.24	.19	.24	.20	.22	.20	.19	.21
13	0	.20	.22	.25	.24	.19	.24	.20	.22	.16	.19	.22
14	0	.20	.21	.27	.24	.19	.23	.19	.23	.19	.19	.23
15	0	.21	.21	.30	.24	.19	.24	.19	.22	.19	.19	.22
16	0	.21	.21	.30	.24	.20	.25	.19	.22	.19	.19	.22
17	0	.21	.21	.29	.17	.20	.25	.19	.22	.19	.19	.22
18	0	.22	.21	.30	.05	.20	.24	.21	.22	.19	.20	.23
19	0	.22	.21	.30	.19	.20	.23	.22	.22	.19	.20	.22
20	0	.21	.22	.29	.19	.20	.23	.24	.22	.20	.20	.22
21	.01	.22	.22	.27	.19	.20	.21	.22	.22	.21	.20	.22
22	.17	.22	.22	.25	.19	.20	.21	.22	.23	.21	.20	.21
23	.16	.21	.22	.25	.20	.20	.21	.22	.24	.21	.20	.21
24	.16	.20	.22	.25	.20	.20	.21	.22	.25	.21	.20	.21
25	.16	.20	.22	.25	.19	.22	.21	.22	.25	.21	.21	.21
26	.16	.20	.21	.25	.20	.22	.20	.22	.25	.21	.21	.21
27	.17	.20	.19	.25	.21	.21	.20	.22	.24	.21	.21	.21
28	.18	.20	.18	.25	.21	.21	.20	.22	.25	.21	.22	.21
29	.19		.19	.25	.21	.21	.22	.22	.25	.21	.21	.21
30	.21		.19	.21	.21	.21	.23	.23	.25	.21	.21	.21
31	.19		.15		.21		.23	.22		.21		.20
Sum	1.76	5.66	6.43	7.34	6.71	5.95	6.96	6.72	6.87	6.28	5.90	6.75
Current Year 1998									Period 1979-1998			
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.	0.125	0	26	0.32	11	0	0.06	152	824	3,406	0	
Feb.	.120	.085	18	.29	14	.17	.20	489	1,264	3,677	0	
Mar.	.120	.070	4	.29	31	.12	.21	556	1,288	4,717	0	
April	.140	.070	16	.39	1	.13	.24	634	1,443	4,265	0	
May	.125	0	2	.34	18	0	.22	580	1,355	4,269	0	
June	.120	.065	124	.30	11	.11	.20	514	1,306	4,272	0	
July	.125	.085	117	.30	29	.16	.22	601	1,514	5,868	0	
Aug.	.240	.060	20	.89	14	.09	.22	581	1,539	4,988	0	
Sept.	.145	.010	17	.40	8	0	.23	594	1,299	3,397	0	
Oct.	.135	.020	1	.35	13	.01	.20	543	893	3,344	0	
Nov.	.115	.090	28	.27	12	.18	.20	510	369	2,101	0	
Dec.	.150	.095	7	.42	24	.19	.22	583	835	3,654	0	
Yearly	0.240	0		0.89		0	0.20	6,337	13,949	38,461	201	

1 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 Mejerada 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 1997; 242 Lateral from November 1978 through 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.87	3.91	4.21	4.60	4.93	4.80	4.21	3.79	4.15	5.35	6.44	5.91
2	3.53	3.63	4.48	4.89	5.23	4.43	4.15	4.39	4.28	4.85	6.69	5.38
3	3.34	3.83	4.24	5.16	6.31	4.29	4.05	4.33	4.76	4.64	5.91	5.46
4	4.25	4.97	3.97	5.46	5.97	4.75	4.75	4.04	5.56	4.30	5.51	5.37
5	4.65	6.36	4.24	4.66	5.02	4.87	4.40	4.74	5.54	5.89	5.38	5.25
6	4.89	5.65	4.33	4.67	4.45	4.76	3.94	4.35	4.12	4.81	5.59	5.17
7	4.65	5.99	4.17	4.54	4.79	4.65	4.65	4.72	3.98	5.25	5.53	4.87
8	4.68	6.32	4.53	4.88	4.81	4.53	3.95	4.57	4.10	5.09	6.15	4.47
9	4.47	6.80	4.33	5.84	4.74	4.34	4.03	4.78	4.45	5.15	5.84	4.64
10	4.62	5.72	3.91	4.98	5.48	4.82	3.94	5.30	4.04	5.58	5.19	4.32
11	4.21	5.52	4.19	5.07	3.79	3.97	4.80	4.18	4.60	5.13	5.05	5.17
12	4.65	6.03	4.44	5.87	4.45	4.34	4.69	4.08	4.60	6.00	6.37	5.74
13	5.21	6.06	4.54	4.54	4.59	4.09	4.40	4.10	4.61	5.39	5.47	5.62
14	4.95	6.40	5.23	4.42	4.66	4.49	4.01	4.07	6.35	5.33	5.64	5.05
15	3.52	6.09	5.21	4.19	4.71	4.03	4.22	4.10	4.44	5.77	5.62	4.45
16	4.65	5.14	4.47	4.72	5.24	4.17	4.62	4.52	4.75	5.28	5.50	3.99
17	5.13	5.91	3.77	4.92	5.71	4.24	3.91	4.42	4.47	5.42	5.61	4.28
18	4.75	6.43	4.52	5.32	4.99	4.24	4.16	3.94	4.30	5.56	5.93	5.88
19	4.71	4.84	4.27	5.50	4.47	3.96	3.96	3.61	5.07	5.18	5.94	6.06
20	5.01	4.13	4.68	4.99	4.48	3.88	3.85	3.39	4.83	4.64	5.75	5.80
21	4.99	4.61	4.75	4.56	4.53	4.69	3.61	4.42	5.11	5.71	5.62	5.46
22	4.23	4.64	5.17	4.93	4.69	4.59	3.46	3.94	6.01	5.27	6.32	5.01
23	3.54	4.61	5.38	4.92	5.40	4.29	3.51	4.74	4.93	5.13	5.76	5.01
24	4.50	3.10	4.71	3.70	4.89	4.84	3.65	4.39	5.37	4.93	4.98	6.28
25	3.97	3.86	5.45	3.58	5.54	4.11	3.56	4.26	5.36	5.61	5.33	5.88
26	4.96	4.08	5.32	3.95	4.61	3.94	3.77	4.17	5.10	5.89	5.78	4.58
27	4.34	3.87	5.08	4.30	4.31	4.22	3.93	4.50	4.80	5.82	5.64	4.97
28	3.71	3.91	4.70	3.35	4.23	4.21	4.07	4.40	4.98	5.77	6.08	5.51
29	4.23		5.15	3.72	4.72	4.50	3.74	4.18	5.66	6.51	6.34	4.57
30	4.13		4.57	3.66	5.16	4.89	3.94	4.26	5.86	5.90	6.14	4.82
31	4.56		4.88		4.95		4.41	4.39		6.11		4.89
Sum	138.03	142.41	142.89	139.89	151.85	131.95	125.73	133.07	146.18	167.26	173.10	159.86

Current Year 1998

Period 1935-1998

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.			12	5.78	3	3.34	4.45	11,926	11,861	14,963	2,619
Feb.			9	6.80	24	3.10	5.09	12,304	11,746	15,998	2,495
Mar.			24	5.41	17	3.77	4.61	12,346	13,249	16,904	2,864
April			12	5.87	28	3.35	4.66	12,086	13,268	16,013	2,611
May			3	6.31	11	3.79	4.90	13,120	13,524	17,145	3,050
June			30	4.89	20	3.88	4.40	11,399	12,391	15,505	3,115
July			11	4.80	22	3.46	4.06	10,863	12,573	15,320	3,610
Aug.			10	5.30	20	3.39	4.29	11,497	12,692	15,612	3,687
Sept.			14	6.35	7	3.98	4.87	12,630	12,488	15,357	3,210
Oct.			29	6.51	4	4.30	5.40	14,451	13,673	17,143	4,248
Nov.			2	6.69	24	4.98	5.77	14,956	12,754	15,680	4,202
Dec.			24	6.28	16	3.99	5.16	13,812	12,627	14,863	3,562
Yearly				6.80		3.10	4.80	151,390	152,846	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 1998; continuous record of gage heights, January 1947 through 1993. From January 1, 1993 to February 4, 1993 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	47.9	195	248	92.3	2.89	5.92	0.79	0.21	0.35	61.5	39.6	196
2	109	209	242	89.1	2.80	2.79	.73	.20	.28	67.3	52.2	200
3	180	200	232	94.5	4.85	2.33	.70	.20	.24	84.8	61.9	203
4	189	223	208	76.9	5.47	2.15	.68	.19	.21	86.1	73.3	208
5	207	245	176	32.4	20.3	2.81	.66	.17	.37	26.2	77.0	211
6	213	255	140	23.5	18.4	3.26	.72	.15	1.39	19.4	79.1	207
7	181	258	155	23.7	14.0	2.03	.68	.14	3.48	13.6	83.6	210
8	168	257	166	32.5	10.4	3.45	.70	.18	14.1	21.0	90.5	219
9	180	270	158	38.9	14.4	2.61	.70	.20	45.2	17.9	105	214
10	190	274	107	26.3	7.27	2.01	.70	.45	44.8	29.5	95.4	222
11	203	284	68.5	42.9	6.85	1.87	.69	.83	62.2	36.0	93.0	235
12	214	289	48.7	98.7	9.58	1.76	.77	.30	91.3	68.6	90.5	248
13	231	287	52.0	104	10.7	1.70	.72	.33	114	52.6	90.9	264
14	227	292	85.9	51.2	23.2	1.62	.67	2.18	131	48.7	91.1	275
15	235	299	128	46.1	13.0	1.61	.60	.36	146	32.6	77.0	265
16	257	301	170	23.7	21.9	1.64	.57	.23	150	19.5	98.0	254
17	258	297	186	15.9	28.4	1.51	.51	.16	155	13.1	91.4	262
18	255	304	186	10.5	27.0	1.47	.47	.12	154	18.4	101	259
19	250	306	173	8.83	23.0	1.37	.42	.11	146	49.9	108	259
20	241	299	158	8.09	19.0	1.28	.46	.10	137	44.9	110	258
21	229	288	153	7.21	16.9	1.19	.45	.09	130	58.9	113	270
22	216	283	154	6.30	10.6	1.19	.42	.07	116	42.9	123	259
23	214	292	153	5.68	8.11	1.14	.39	.05	142	14.7	126	242
24	217	293	126	5.27	7.46	1.04	.38	.22	131	32.4	118	265
25	227	294	99.0	5.13	7.26	1.09	.50	.18	99.9	27.0	100	265
26	217	278	95.7	4.71	7.13	.98	.36	.13	89.0	58.4	113	282
27	197	261	90.8	4.15	4.26	.93	.33	.07	75.4	51.9	156	285
28	180	250	75.2	3.87	2.65	.96	.31	.05	62.0	52.2	166	276
29	178		102	3.55	2.27	.93	.30	1.45	39.6	57.5	173	269
30	175		122	3.16	2.03	.84	.28	2.98	49.4	55.7	197	261
31	179		101		9.97		.27	.59		30.2		263
Sum	6,264.9	7,583	4,359.8	989.05	362.05	55.48	16.93	12.69	2,331.22	1,293.4	3,093.5	7,586

Month	Current Year 1998						Period 1935-1998				
	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Day	Low		Total	Average	Maximum	Minimum
Jan.	25.135	23.200	17	258	1	47.9	202	541,287	413,446	2,062,379	0
Feb.	25.440	24.905	18	308	1	182	271	655,171	343,865	1,708,370	0
Mar.	25.050	23.595	1	249	13	46.4	141	376,687	288,212	1,458,432	0
April	24.475	22.495	13	121	30	2.96	33.0	85,454	187,736	947,722	0
May	23.440	22.360	17	33.8	31	1.89	11.7	31,281	251,629	1,430,837	0
June	22.790	22.195	1	13.0	30	.82	1.85	4,793	214,675	1,455,506	0
July	22.195	22.035	1	.82	31	.26	.55	1,463	184,712	1,821,962	0
Aug.	22.475	21.840	29	6.00	23	.04	.41	1,096	199,752	2,103,318	0
Sept.	24.690	21.970	17	156	4	.19	77.7	201,417	229,046	1,956,768	0
Oct.	23.875	22.840	3	97.0	7	10.0	41.7	111,750	265,491	2,144,909	0
Nov.	24.775	23.405	30	199	1	31.4	103	267,278	309,180	1,761,409	0
Dec.	25.395	24.740	27	288	1	194	245	655,430	383,989	2,268,370	0
Yearly	25.440	21.840		308		0.04	93.0	2,933,107	3,271,733	15,656,495	0

09-5222.01 COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page for Description)

MEAN DAILY GAGE HEIGHT IN METERS 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	23.555	25.000	25.040	24.160	22.490	22.520	22.195	22.035	22.065	23.690	23.500	24.750
2	24.015	25.080	24.990	24.125	22.490	22.385	22.185	22.035	22.030	23.705	23.605	24.780
3	24.490	24.975	24.915	24.185	22.570	22.350	22.180	22.035	22.005	23.805	23.680	24.800
4	24.560	25.120	24.745	23.995	22.595	22.335	22.175	22.025	21.985	23.790	23.775	24.835
5	24.675	25.250	24.515	23.415	23.085	22.385	22.175	22.005	22.050	23.270	23.820	24.855
6	24.710	25.290	24.260	23.185	23.025	22.425	22.180	21.980	22.180	23.125	23.840	24.830
7	24.500	25.280	24.350	23.195	22.875	22.320	22.175	21.965	22.290	22.950	23.870	24.915
8	24.410	25.235	24.420	23.440	22.750	22.425	22.170	21.990	23.030	23.165	23.925	24.850
9	24.495	25.300	24.360	23.560	22.885	22.380	22.160	21.995	23.695	23.070	24.035	24.875
10	24.560	25.295	24.015	23.270	22.635	22.320	22.155	22.075	23.745	23.280	23.970	24.935
11	24.645	25.330	23.745	23.600	22.615	22.305	22.150	22.135	23.905	23.365	23.955	25.030
12	24.720	25.330	23.610	24.235	22.705	22.295	22.155	22.055	24.150	23.555	23.940	25.120
13	24.830	25.315	23.640	24.290	22.745	22.290	22.145	22.040	24.345	23.450	23.950	25.235
14	24.805	25.350	23.890	23.715	23.150	22.280	22.140	22.255	24.490	23.420	23.955	25.315
15	24.865	25.395	24.205	23.610	22.825	22.280	22.135	22.110	24.605	23.295	23.860	25.245
16	25.040	25.405	24.525	23.200	23.095	22.280	22.130	22.060	24.645	23.090	24.020	25.165
17	25.070	25.380	24.665	22.955	23.295	22.270	22.125	22.020	24.675	22.925	23.970	25.220
18	25.080	25.420	24.700	22.775	23.260	22.265	22.120	21.990	24.645	23.055	24.055	25.200
19	25.080	25.430	24.625	22.715	23.140	22.260	22.110	21.975	24.555	23.440	24.110	25.200
20	25.045	25.390	24.540	22.690	23.015	22.250	22.115	21.960	24.455	23.425	24.125	25.195
21	24.990	25.325	24.525	22.660	22.945	22.240	22.115	21.935	24.380	23.510	24.145	25.280
22	24.930	25.290	24.560	22.625	22.730	22.240	22.105	21.905	24.250	23.410	24.220	25.200
23	24.945	25.350	24.585	22.600	22.640	22.235	22.100	21.860	24.415	22.975	24.245	25.085
24	25.000	25.360	24.395	22.585	22.615	22.225	22.095	22.035	24.315	23.300	24.180	25.100
25	25.120	25.360	24.195	22.580	22.600	22.230	22.120	22.010	24.060	23.280	24.050	25.245
26	25.075	25.255	24.185	22.565	22.595	22.215	22.085	21.955	23.960	23.545	24.145	25.360
27	24.960	25.135	24.145	22.545	22.480	22.210	22.070	21.880	23.845	23.525	24.455	25.380
28	24.860	25.060	24.015	22.535	22.405	22.215	22.065	21.850	23.735	23.540	24.530	25.325
29	24.865		24.240	22.520	22.385	22.210	22.055	22.045	23.555	23.580	24.580	25.270
30	24.865		24.410	22.505	22.370	22.200	22.050	22.290	23.620	23.585	24.755	25.215
31	24.880		24.230		22.670		22.040	22.115		23.370		25.230
Avg.	24.760	25.275	24.365	23.200	22.765	22.295	22.130	22.020	23.655	23.370	24.040	25.100

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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.01	6.23	6.65	4.09	3.65	3.79	4.01	2.79	2.79	5.91	4.74	5.22
2	4.99	6.19	6.55	4.22	1.10	3.79	3.85	2.78	2.83	5.93	4.73	5.20
3	4.38	6.23	6.58	2.75	.52	3.83	3.69	2.75	2.72	5.79	4.80	5.03
4	5.53	6.24	6.60	2.52	.55	4.23	3.77	3.12	2.89	5.84	5.03	5.10
5	5.06	6.09	6.59	2.51	2.49	4.53	3.66	3.26	3.26	5.88	5.25	5.24
6	3.64	6.32	6.56	2.44	2.37	4.52	3.67	3.14	2.71	5.60	5.22	5.35
7	2.60	6.30	6.55	2.48	.74	4.33	3.69	3.29	3.30	5.66	5.34	5.41
8	2.70	6.27	6.49	2.41	1.71	4.30	3.74	3.28	3.15	6.05	5.51	5.54
9	3.63	6.26	6.41	2.45	4.05	4.31	3.67	3.11	3.09	6.41	5.56	5.51
10	4.01	6.20	6.35	2.56	4.13	4.48	3.57	3.20	3.32	5.80	5.37	5.62
11	4.35	6.36	6.28	2.51	4.18	4.44	3.51	3.14	3.81	5.88	5.39	5.50
12	4.22	6.43	4.33	2.47	4.20	4.47	3.56	3.00	3.46	5.80	5.38	5.56
13	3.48	6.49	4.26	2.53	4.22	4.53	3.18	3.08	3.59	5.90	5.52	5.66
14	3.66	6.69	4.26	2.50	4.29	4.41	3.30	3.06	4.03	6.18	5.29	5.43
15	6.01	6.67	4.43	2.56	4.24	4.40	3.15	3.05	4.07	6.78	5.21	5.31
16	6.21	6.66	4.88	2.51	4.21	4.49	3.19	3.04	4.02	6.23	5.16	5.36
17	5.93	6.62	5.28	2.48	4.19	4.41	3.22	3.11	3.64	6.10	5.27	5.52
18	5.71	6.94	5.27	2.56	4.04	4.33	3.06	3.06	3.72	6.09	5.37	5.33
19	5.89	6.69	5.09	3.21	3.96	4.23	3.02	2.99	3.72	6.01	5.35	5.26
20	5.88	6.59	4.83	3.20	4.04	4.30	2.92	2.95	3.89	5.42	5.40	5.33
21	5.27	6.58	4.82	3.72	3.76	4.38	2.97	2.97	4.01	5.50	5.28	5.11
22	5.10	6.54	4.76	3.90	3.82	3.94	2.95	3.00	4.02	5.61	5.54	5.12
23	5.36	6.53	4.76	4.01	4.03	3.72	2.89	3.01	3.92	5.65	5.55	5.27
24	5.29	6.54	4.54	4.22	4.14	3.78	2.88	2.99	3.85	4.41	5.63	5.26
25	5.17	6.68	4.07	4.14	4.13	3.86	2.52	2.81	4.12	4.49	5.50	5.28
26	5.15	6.74	4.08	3.85	4.04	3.84	2.57	2.89	5.34	4.58	5.42	4.92
27	5.15	6.72	3.92	3.91	3.98	3.89	2.57	2.92	5.17	4.59	5.40	4.91
28	5.25	6.70	3.97	3.97	3.96	3.86	2.57	3.13	5.39	4.69	5.39	4.89
29	5.38		4.34	4.06	4.00	3.83	2.77	3.27	5.39	4.74	5.63	4.95
30	5.38		4.30	4.02	3.84	3.92	3.02	2.81	5.63	4.85	5.63	4.92
31	6.11		3.93		3.82		2.80	2.70		4.75		4.97
Sum		181.50		94.76		125.14		93.70		173.12		162.98
	151.50		161.73		106.40		98.94		114.85		159.60	

Current Year 1998

Period 1977-1998

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.	0.650	0.325	4	7.17	8	2.30	4.89	13,090	14,210	21,638	7,412
Feb.	.650	.565	18	7.26	3	5.74	6.48	15,682	13,917	18,374	8,506
Mar.	.620	.445	1	6.70	28	3.75	5.22	13,973	15,205	21,496	11,420
April	.500	.310	2	4.54	3	2.03	3.16	8,187	13,763	20,613	3,445
May	.495	.085	9	4.59	8	.23	3.43	9,193	14,039	20,732	5,215
June	.500	.430	16	4.65	24	3.61	4.17	10,812	12,823	19,842	2,227
July	.460	.260	1	4.09	24	1.47	3.19	8,548	13,249	22,235	3,718
Aug.	.460	.345	4	3.81	31	2.55	3.02	8,096	13,155	22,444	3,656
Sept.	.565	.335	30	5.76	6	2.42	3.83	9,925	12,336	23,538	51.4
Oct.	.655	.450	15	7.30	24	3.91	5.58	14,958	13,376	23,600	23.9
Nov.	.570	.500	124	5.79	1	4.65	5.32	13,789	12,098	20,944	59.2
Dec.	.565	.500	110	5.77	3	4.76	5.26	14,081	13,031	22,518	138
Yearly	0.655	0.085		7.30		0.23	4.45	140,332	161,202	222,488	75,784

1 And other days

09-5350.00 WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

DESCRIPTION: Water-stage recorder and cableway located on the left bank of the canal wasteway immediately upstream from where it discharges into the Colorado River, 1.0 kilometer downstream from the wasteway gates on the Central Feeder Canal on the right bank of the Colorado River, 27 kilometers downstream from Morelos Dam, and 250 meters south of the junction of the Mexicali-San Luis and Algodones-Pescaderos highways.

RECORDS: Data obtained and computed by the Colorado River Irrigation District 14 of the National Water Commission and furnished by the Mexican Section of the Commission. Records shown in table below are waste returns to the Colorado River. Records available: April 1956 through 1998.

REMARKS: The Colorado River Irrigation District 14 transports water for irrigation of land on the left bank of the Colorado River by the Central Feeder Canal to a point called Kilometer 27. At this point, flows may be returned to the river through the wasteway or diverted to the Bacanora-Monumentos Canal system through the Sanchez Mejorada Siphon, which was placed in operation on June 28, 1963. As part of the rehabilitation works, started in 1968, of the Colorado River Irrigation District, the Canal de Conexion was enlarged and lined, and is now known as the Central Feeder Canal.

MONTHLY DISCHARGE IN THOUSAND CUBIC METERS

MONTH	CURRENT YEAR 1998	PERIOD 1956 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	4,239	11,150	85,761	0
February	14,686	6,166	50,898	0
March	23,841	8,756	72,049	0
April	20,845	13,863	85,372	0
May	29,854	13,552	99,576	0
June	10,138	11,577	61,705	0
July	0	11,773	56,912	0
August	2,468	17,481	132,183	0
September	35,383	14,924	83,943	0
October	47,405	13,636	136,198	0
November	46,850	13,317	122,170	0
December	40,548	11,678	86,607	0
Yearly	276,257	153,178	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 1998.

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 1998	PERIOD 1964 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	428	1,791	10,541	0
February	2,670	1,433	12,035	0
March	1,477	772	5,932	0
April	1,469	412	5,555	0
May	933	1,358	14,246	0
June	527	804	8,585	0
July	0	660	9,114	0
August	0	1,117	17,765	0
September	3,645	2,293	16,855	0
October	6,972	4,631	28,669	0
November	5,892	2,851	25,263	0
December	1,071	2,265	13,380	0
Yearly	25,084	19,324	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 HEAD (Capacity 32,267)		LAKE MOHAVE (Capacity 2,233)		HAVASU LAKE (Capacity 764)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 35,263)	
	1998	Average 1935-1998	1998	Average 1951-1998	1998	Average 1939-1998	1998	Estimated Average
Jan.	30,920.9	23,171.2	2,074.2	2,053.0	675.7	683.3	33,670.8	25,907.5
Feb.	30,854.3	23,031.5	2,045.0	2,065.8	708.4	686.7	33,607.7	25,784.0
Mar.	30,893.7	22,768.6	2,042.6	2,069.9	668.5	701.5	33,604.8	25,540.0
April	30,606.3	22,791.9	2,131.0	2,057.9	717.1	737.5	33,454.4	25,587.3
May	30,390.5	23,500.6	2,144.3	2,127.4	759.3	744.8	33,294.1	26,372.8
June	30,433.7	24,593.3	2,091.0	2,022.8	685.8	739.4	33,210.5	27,355.5
July	30,548.4	24,746.6	2,075.9	1,886.5	721.7	726.3	33,346.0	27,359.4
Aug.	30,901.1	24,554.9	2,102.0	1,836.7	726.4	710.5	33,729.5	27,102.1
Sept.	30,992.4	24,343.5	2,133.1	1,799.7	697.3	703.0	33,822.8	26,846.2
Oct.	31,179.9	24,128.0	2,034.6	1,795.8	660.8	698.7	33,875.3	26,622.5
Nov.	30,994.9	23,974.4	1,987.4	1,867.6	699.1	688.5	33,681.4	26,530.5
Dec.	30,566.9	23,801.1	1,892.4	1,976.3	749.1	688.7	33,208.4	26,466.1
Avg.	30,773.6	23,783.8	2,062.8	1,963.3	705.8	709.1	33,542.1	26,456.2
Max.	31,179.9	24,746.6	2,144.3	2,127.4	759.3	744.8	33,875.3	27,359.4
Min.	30,390.5	22,768.6	1,892.4	1,795.8	660.8	683.3	33,208.4	25,540.0

SUSPENDED SILT - 1998

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.	8	1110	263	0.0050	June	11	0810	93.1	0.0078	Nov.	12	0920	158	0.0074
	14	0925	309	0.0069		18	0820	94.1	0.0078		19	0905	176	0.0023
	21	0830	316	0.0070		25	0730	101	0.0068		27	1130	242	0.0059
	28	0815	298	0.0067		July	2	0745	88.2		0.0088	Dec.	3	0955
Feb.	5	1000	376	0.0106	9		0755	91.4	0.0042	9	1015		287	0.0052
	11	0930	401	0.0124	16	0730	94.4	0.0063	17	1140	363	0.0217		
	19	0840	419	0.0102	23	0800	95.2	0.0091	24	0920	347	0.0059		
Mar.	25	0915	399	0.0024	30	0740	95.0	0.0054	30	0930	3432	0.0199		
	5	0900	241	0.0143	Aug.	6	1045	78.7	0.0052					
	12	0725	158	0.0076		13	0905	102	0.0089					
	19	0810	295	0.0153	20	0725	60.2	0.0059						
Apr.	27	0840	207	0.0118	27	0645	41.4	0.0105						
	2	0840	208	0.0104	Sept.	4	0750	43.4	0.0037					
	9	0820	158	0.0244		10	0805	123	0.0068					
	17	0909	126	0.0572	17	0610	209	0.0091						
	23	0910	72.7	0.0375	24	0825	171	0.0051						
30	0835	59.1	0.0253	Oct.	1	0935	141	0.0105						
May	7	0800	110		0.0355	8	0720	84.8	0.0163					
	13	0811	115		0.0368	15	0800	96.1	0.0100					
	21	0805	98.2	0.0395	22	0800	101	0.0053						
June	28	0750	89.0	0.0122	29	0845	129	0.0034						
	4	0755	85.5	0.0207	Nov.	5	0800	155	0.0028					

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 1998	Period 1952 - 1998		
								Average	Maximum	Minimum
Jan.	200,172,000	10,003	5	0.0050	0.0067	0.0029	7.35	1.20	62.6	0.30
Feb.	245,918,000	8,145	4	0.0033	0.0047	0.0010	5.98	1.37	127.8	1.10
Mar.	314,669,000	15,518	4	0.0049	0.0132	0.0029	11.4	5.54	605.2	3.32
April	265,343,000	16,742	5	0.0063	0.0133	0.0020	12.3	5.95	856.8	4.49
May	241,246,000	109,348	4	0.0453	0.1774	0.0015	80.3	2.13	318.2	1.36
June	241,687,000	9,213	4	0.0038	0.0053	0.0038	6.77	3.30	256.6	2.53
July	250,603,000	9,548	5	0.0038	0.0056	0.0026	7.01	4.38	192.3	4.14
Aug.	174,226,000	4,948	4	0.0028	0.0045	0.0028	3.63	3.80	166.9	4.02
Sept.	173,033,000	2,741	4	0.0022	0.0052	0.0005	2.74	1.77	79.8	1.78
Oct.	193,977,000	8,362	5	0.0043	0.0105	0.0011	6.14	0.93	124.0	0.40
Nov.	185,648,000	4,799	4	0.0026	0.0058	0.0005	3.52	0.95	165.2	0.30
Dec.	200,146,000	7,573	5	0.0038	0.0053	0.0038	5.56	0.95	54.4	0.84
Year	2,686,668,000	206,940	53	0.0073	0.1774	0.0005	152.7	32.3	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	Date	Time	Stream-flow, Momentary	Gravimetric Percent
	Std.	CMS			Std.	CMS			Std.	CMS	
Jan.	15	1210	238	Mar.	12	1205	48.0				
	29	1205	188		Sept.17	1145	151				
Feb.	12	1215	288	Nov.	5	1200	78.7				
	26	1215	284		Dec. 10	1230	223				

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

CHEMICAL ANALYSES OF WATER SAMPLES
1998

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

1998	Time	Streamflow	Specific	pH	Hardness,	Hardness,	Calcium	Magnesium
Date	Standard	Momentary	Conductance		Total	Noncarbonate	ion (Ca),	ion (Mg),
		CMS	Microsiemens/ cm	Units	(as CaCO ₃)	(CaCO ₃)	Dissolved	Dissolved
					mg/L	mg/L	mg/L	mg/L
Jan. 5	0900	257	1,090	8.2	355.53	218.53	82.0	36.3
20	1100	330	1,080	8.2	373.06	236.06	84.4	39.1
Feb. 2	0830	320	1,060	8.2	347.60	208.60	78.2	36.7
17	0800	412	1,060	8.3	346.53	210.53	79.1	35.9
Mar. 2	0900	320	1,070	8.2	310.92	173.92	77.2	28.4
16	0800	278	1,040	8.1	331.92	195.92	82.6	30.2
April 6	0900	147	1,200	8.2	331.24	180.24	82.0	30.4
20	0830	102	1,340	8.1	350.33	189.33	87.0	32.0
May 4	1000	118	1,250	8.3	339.25	188.25	84.7	30.7
18	0800	91.5	1,300	8.3	374.12	215.12	95.7	32.5
June 1	0830	91.1	1,280	8.2	380.47	217.47	97.8	32.8
15	0715	90.3	1,250	8.0	343.78	185.78	86.5	30.7
July 6	0930	94.7	1,210	8.3	336.69	183.69	84.2	30.4
20	0700	99.5	1,220	8.3	336.38	182.38	84.7	30.0
Aug. 3	0800	84.4	1,250	8.2	323.28	164.28	83.3	27.7
17	0730	69.0	1,320	8.2	343.58	179.58	85.6	31.2
Sept. 8	1230	108	1,190	8.2	319.99	169.99	80.0	28.9
21	0730	163	1,120	8.2	314.66	168.66	78.2	28.7
Oct. 5	0830	78.8	1,260	8.2	356.21	196.21	89.5	31.9
19	0800	111	1,180	8.1	340.10	186.10	84.9	30.8
Nov. 2	0800	126	1,150	8.2	336.74	184.74	84.4	30.3
16	0900	153	1,150	8.1	318.04	168.04	79.1	29.0
Dec. 7	0900	267	1,070	8.2	311.40	168.40	78.4	27.8
21	0900	350	1,040	8.0	311.12	172.12	78.1	27.9

1998	Sodium	Potassium	Sulfate	Chloride	Carbonate	Bicarbonate	Nitrate	Total
Date	ion (Na),	ion (K)	ion (SO ₄)	ion (Cl),	(as CO ₃)	(as HCO ₃)	(as NO ₃)	Solids
	Dissolved	Dissolved	Dissolved	Dissolved				Dissolved
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	(Calculated)
								mg/L
Jan. 5	107	2.8	262	101	N.D.	167	1.1	684
20	109	4.5	269	92	N.D.	167	1.0	691
Feb. 2	97	4.0	241	86	N.D.	170	1.0	636
17	99	4.1	248	89	N.D.	166	1.0	647
Mar. 2	102	4.1	251	93	N.D.	167	1.1	648
16	104	4.3	251	89	N.D.	166	1.3	653
April 6	124	4.3	273	112	N.D.	184	1.8	727
20	138	4.5	290	142	N.D.	196	1.5	802
May 4	130	4.4	280	128	N.D.	184	1.4	759
18	127	4.5	286	133	N.D.	194	1.5	786
June 1	109	4.7	299	115	N.D.	199	1.7	768
15	130	4.5	284	118	N.D.	193	1.3	761
July 6	120	4.5	325	108	N.D.	187	1.5	777
20	126	4.4	295	112	N.D.	188	1.6	758
Aug. 3	117	4.1	281	127	N.D.	194	1.5	749
17	142	4.4	317	137	N.D.	200	1.3	830
Sept. 8	119	4.5	294	112	N.D.	183	1.6	741
21	108	4.3	276	97	N.D.	178	1.0	692
Oct. 5	133	4.5	314	127	N.D.	195	0.9	810
19	117	4.1	321	113	N.D.	188	1.1	776
Nov. 2	117	4.4	296	106	N.D.	185	1.1	741
16	115	4.1	293	108	N.D.	183	1.2	730
Dec. 7	105	4.1	271	95	N.D.	174	1.1	678
21	99	4.2	265	91	N.D.	170	1.0	659

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 - 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,400	1,060	1,060	1,110	1,340	1,280	1,240	1,210	1,420	1,140	1,150	1,050
2	1,320	1,060	1,070	1,110	1,310	1,240	1,180	1,230	1,380	1,140	1,150	1,040
3	1,240	1,070	1,070	1,130	1,280	1,260	1,180	1,250	1,390	1,180	1,160	1,050
4	1,170	1,040	1,100	1,150	1,250	1,250	1,190	1,210	1,430	1,220	1,130	1,060
5	1,090	1,070	1,100	1,170	1,220	1,190	1,200	1,190	1,370	1,260	1,120	1,060
6	1,120	1,100	1,090	1,200	1,210	1,200	1,210	1,200	1,310	1,150	1,140	1,070
7	1,100	1,080	1,110	1,180	1,380	1,210	1,190	1,220	1,250	1,190	1,150	1,070
8	1,110	1,070	1,120	1,170	1,250	1,230	1,180	1,220	1,190	1,170	1,150	1,060
9	1,100	1,050	1,130	1,170	1,250	1,270	1,170	1,220	1,130	1,200	1,160	1,060
10	1,100	1,030	1,120	1,160	1,240	1,210	1,210	1,220	1,170	1,190	1,150	1,020
11	1,090	1,070	1,150	1,180	1,240	1,260	1,210	1,200	1,160	1,180	1,140	1,030
12	1,090	1,040	1,180	1,190	1,240	1,240	1,220	1,230	1,050	1,180	1,140	1,030
13	1,090	1,050	1,180	1,210	1,200	1,240	1,220	1,190	1,040	1,170	1,140	1,030
14	1,080	1,050	1,130	1,150	1,250	1,250	1,210	1,240	1,030	1,190	1,140	1,030
15	1,060	1,050	1,090	1,230	1,450	1,250	1,210	1,270	1,040	1,200	1,150	1,030
16	1,070	1,060	1,040	1,290	1,400	1,240	1,200	1,290	1,050	1,210	1,150	1,030
17	1,070	1,060	1,080	1,370	1,350	1,230	1,190	1,320	1,050	1,200	1,140	1,040
18	1,070	1,080	1,050	1,360	1,300	1,220	1,200	1,310	1,070	1,190	1,110	1,030
19	1,080	1,060	1,060	1,350	1,250	1,220	1,210	1,380	1,080	1,180	1,140	1,030
20	1,080	1,080	1,070	1,340	1,230	1,220	1,220	1,330	1,100	1,180	1,110	1,040
21	1,080	1,060	1,070	1,340	1,230	1,220	1,210	1,360	1,120	1,140	1,130	1,040
22	1,100	1,050	1,070	1,330	1,250	1,220	1,200	1,380	1,080	1,170	1,140	1,050
23	1,120	1,030	1,070	1,320	1,250	1,200	1,180	1,410	1,070	1,190	1,160	1,060
24	1,110	1,040	1,100	1,340	1,250	1,210	1,200	1,420	1,110	1,190	1,150	1,040
25	1,110	1,060	1,090	1,300	1,240	1,220	1,210	1,440	1,120	1,180	1,150	1,030
26	1,100	1,060	1,110	1,260	1,240	1,190	1,210	1,420	1,130	1,180	1,090	1,020
27	1,090	1,050	1,130	1,220	1,260	1,200	1,220	1,410	1,130	1,160	1,030	1,020
28	1,080	1,050	1,120	1,200	1,250	1,220	1,240	1,370	1,140	1,180	1,040	1,020
29	1,100		1,110	1,220	1,260	1,230	1,200	1,400	1,120	1,150	1,050	1,040
30	1,070		1,100	1,230	1,260	1,220	1,190	1,420	1,140	1,160	1,060	1,040
31	1,070		1,130		1,260		1,200	1,450		1,160		1,050

SPECIFIC CONDUCTANCE OF WATER SAMPLES

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,620	1,150	1,180	1,200	1,410	1,310	1,250	1,170	1,450	1,190	1,170	1,100
2	1,410	1,140	1,150	1,190	1,400	1,310	1,200	1,220	1,420	1,200	1,150	1,110
3	1,180	1,130	1,120	1,190	1,390	1,310	1,210	1,190	1,420	1,180	1,140	1,100
4	1,210	1,110	1,120	1,200	1,300	1,300	1,210	1,170	1,460	1,180	1,120	1,100
5	1,210	1,110	1,140	1,200	1,280	1,300	1,230	1,170	1,400	1,250	1,150	1,110
6	1,130	1,110	1,160	1,280	1,240	1,290	1,230	1,200	1,400	1,210	1,100	1,120
7	1,180	1,130	1,140	1,300	1,390	1,280	1,240	1,200	1,400	1,210	1,100	1,120
8	1,140	1,120	1,140	1,300	1,310	1,280	1,230	1,200	1,200	1,210	1,110	1,110
9	1,140	1,120	1,180	1,300	1,300	1,300	1,230	1,230	1,110	1,210	1,150	1,120
10	1,160	1,110	1,200	1,280	1,300	1,300	1,230	1,230	1,140	1,200	1,150	1,110
11	1,150	1,120	1,220	1,200	1,300	1,310	1,240	1,180	1,050	1,290	1,100	1,040
12	1,140	1,110	1,180	1,270	1,310	1,320	1,250	1,210	1,030	1,300	1,100	1,060
13	1,160	1,150	1,230	1,310	1,290	1,320	1,250	1,140	1,060	1,200	1,100	1,040
14	1,130	1,140	1,200	1,280	1,280	1,320	1,230	1,230	1,030	1,200	1,090	990
15	1,120	1,100	1,170	1,280	1,390	1,310	1,250	1,270	1,030	1,280	1,100	1,010
16	1,140	1,100	1,110	1,350	1,400	1,310	1,250	1,290	1,040	1,320	1,110	1,040
17	1,150	1,120	1,110	1,450	1,390	1,310	1,250	1,310	1,040	1,340	1,110	1,280
18	1,140	1,150	1,150	1,450	1,350	1,300	1,260	1,310	1,070	1,310	1,020	1,040
19	1,140	1,100	1,180	1,450	1,250	1,320	1,220	1,330	1,110	1,240	1,040	1,120
20	1,130	1,100	1,100	1,450	1,240	1,330	1,220	1,340	1,210	1,210	1,110	1,040
21	1,120	1,090	1,170	1,440	1,240	1,290	1,220	1,350	1,090	1,180	1,140	1,120
22	1,120	1,090	1,120	1,450	1,250	1,220	1,220	1,390	1,060	1,150	1,120	1,070
23	1,110	1,050	1,120	1,450	1,300	1,250	1,200	1,460	1,090	1,210	1,120	1,290
24	1,110	1,050	1,180	1,440	1,290	1,260	1,200	1,470	1,100	1,250	1,120	1,280
25	1,120	1,020	1,200	1,440	1,270	1,270	1,200	1,460	1,120	1,250	1,120	1,120
26	1,120	1,110	1,200	1,440	1,280	1,280	1,240	1,470	1,140	1,220	1,120	1,030
27	1,130	1,120	1,170	1,330	1,280	1,290	1,240	1,470	1,140	1,190	1,000	1,030
28	1,110	1,120	1,180	1,340	1,280	1,280	1,210	1,490	1,150	1,180	1,000	1,030
29	1,120		1,180	1,290	1,290	1,250	1,130	1,490	1,160	1,120	1,110	1,040
30	1,130		1,150	1,250	1,290	1,250	1,180	1,490	1,180	1,100	1,000	1,210
31	1,140		1,200		1,290			1,500		1,150		1,220

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY

SPECIFIC CONDUCTANCE OF WATER SAMPLES IN MICROSIEMENS/CM @ 25 DEG C - 1998

January		March		May		July		September		November	
5	3,500	2	3,650	4	3,320	1	3,790			10	3,860
13	3,570	10	3,780	19	4,460	14	3,990			17	3,870
21	3,440	17	3,740	26	4,340	21	4,220			24	4,020
February		April		June		August		October		December	
5	3,680	1	3,670	1	4,480			1	3,450	1	4,100
10	3,550	7	2,700	16	4,140			6	3,270	16	3,890
24	3,530	13	2,730					13	3,420	29	4,080
		21	4,450					27	3,560		

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	
	1998	Average 1931-1998	1998	Average 1931-1998	1998	Average 1931-1998	1998	Average 1931-1998	1998	Average 1978-1998
Jan.	4	10	2	11	7	13	1	11	8	30
Feb.	45	9	25	9	80	12	26	9	124	30
Mar.	19	7	11	6	#	10	12	7	30	29
April	0	2	0	2	0	3	1	7	7	5
May	0	1	0	0	1	1	1	1	1	3
June	#	0	#	0	#	1	#	1	0	0
July	T	1	0	2	1	5	9	6	4	10
Aug.	2	9	1	8	3	19	9	13	3	19
Sept.	44	8	2	8	7	10	48	11	11	11
Oct.	0	6	0	7	1	7	0	9	1	10
Nov.	T	4	1	5	4	7	4	5	2	13
Dec.	4	11	5	11	7	14	1	12	T	16
Yearly		68		69		102		92	191	176

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		El Centinela, Baja California		Delta, Baja California	
	1998	Average 1948-1998	1998	Average 1926-1998	1998	Average 1948-1998	1998	Average 1975-1998	1998	Average 1948-1998
Jan.	0	9	2	9	1	10	3	5	T	8
Feb.	3	5	21	6	19	6	29	7	13	6
Mar.	1	4	6	8	8	5	9	3	1	5
April	0	2	0	2	T	3	0	2	0	2
May	0	T	T	T	0	T	0	0	0	T
June	0	T	0	T	0	T	0	T	0	T
July	0	3	1	3	0	2	0	1	1	2
Aug.	T	9	12	10	0	6	0	4	3	7
Sept.	2	4	T	10	20	5	0	7	T	7
Oct.	0	6	0	9	0	6	0	5	0	7
Nov.	0	4	T	4	2	3	T	1	2	3
Dec.	0	9	1	18	1	8	T	8	T	11
Yearly	6	55	43	83	51	50	41	45	20	53

Month	San Felipe, Baja California		Riito, Sonora					
	1998	Average 1948-1998	1998	Average 1949-1998				
Jan.	0	6	0	6				
Feb.	6	5	10	5				
Mar.	7	3	0	3				
April	0	1	0	1				
May	2	1	0	T				
June	0	1	0	T				
July	0	3	13	2				
Aug.	0	10	0	6				
Sept.	0	18	0	9				
Oct.	0	5	0	7				
Nov.	0	5	0	4				
Dec.	0	10	15	11				
Yearly	15	71	38	60				

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 1998.

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	1978	S. A. R. H.
Los Algodones, Baja California	32° 42'	114° 44'	35.05	1948	S. A. R. H.
Mexicali, Baja California	32° 40'	115° 28'	3.96	1926	S. A. R. H.
Riito, Sonora	32° 13'	115° 01'	13.11	1959	S. A. R. H.
San Felipe, Baja California	31° 01'	114° 51'	21.95	1969	S. A. R. H.

* Not shown on rainfall map

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

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

Ministry of Agriculture and Hydraulic Resources

EVAPORATION 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	
	1998	Average 1931-1998
Jan.	78	99
Feb.	91	120
Mar.	177	184
April	229	252
May	240	323
June	#	359
July	383	384
Aug.	340	338
Sept.	258	267
Oct.	210	190
Nov.	159	125
Dec.	120	94
Yearly		2,735

IN MEXICO

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		Riito, Sonora		San Felipe, Baja California	
	1998	Average 1949-1998	1998	Average 1926-1998	1998	Average 1959-1998	1998	Average 1962-1998	1998	Average 1952-1998
Jan.	68	106	47	64	#	83	#	76	94	119
Feb.	64	128	62	132	#	101	#	98	162	140
Mar.	129	182	103	147	#	150	#	146	193	169
April	214	252	161	197	#	205	#	187	250	198
May	212	313	210	267	#	269	#	256	255	240
June	181	338	262	293	#	305	#	286	260	256
July	255	350	264	298	#	290	#	315	267	284
Aug.	279	309	243	257	#	251	#	266	281	271
Sept.	209	256	183	204	#	206	#	215	198	236
Oct.	168	203	160	146	#	147	#	153	#	206
Nov.	96	131	92	86	#	109	#	95	#	152
Dec.	75	107	74	60	#	78	#	77	#	122
Yearly	1,950	2,685	1,861	2,090		2,226		2,246		2,538

Month	Delta, Baja California								
	1998	Average 1948-1998							
Jan.	63	85							
Feb.	71	108							
Mar.	137	154							
April	212	209							
May	238	253							
June	294	279							
July	313	290							
Aug.	308	264							
Sept.	229	222							
Oct.	173	157							
Nov.	101	104							
Dec.	67	155							
Yearly	2,206	2,038							

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			
	1998				1998				1998			
	Mean	Max.	Min.	Average 1931-98	Mean	Max.	Min.	Average 1931-98	Mean	Max.	Min.	Average 1931-98
Jan.	12.8	26.1	1.7	11.6	13.4	25.0	1.7	11.9	13.8	26.7	0.0	12.3
Feb.	12.9	24.4	3.3	14.2	13.8	24.4	3.9	14.1	14.3	23.9	5.0	14.7
Mar.	#	#	#	17.4	16.6	35.0	2.8	16.9	17.0	33.3	3.9	17.4
April	19.2	38.3	5.0	21.4	18.6	37.2	5.0	20.5	19.2	37.8	5.6	21.1
May	23.8	37.8	12.8	25.5	23.0	37.8	10.6	24.4	23.0	36.1	10.6	25.1
June	#	#	#	29.9	#	#	#	28.8	#	#	#	29.4
July	35.0	48.9	21.1	33.6	33.9	48.3	20.6	32.7	33.8	47.8	20.6	33.1
Aug.	35.3	47.2	22.2	32.9	34.4	46.7	23.3	32.5	34.4	47.2	19.4	33.0
Sept.	30.1	44.4	15.6	29.5	30.1	43.9	16.1	29.5	30.3	44.4	13.9	30.1
Oct.	22.1	36.1	3.3	22.9	22.5	36.1	8.3	23.1	22.9	36.7	8.3	23.9
Nov.	15.6	28.3	2.8	15.7	#	28.9	4.4	16.3	16.9	29.4	2.8	16.9
Dec.	11.4	26.7	-2.2	11.7	#	23.9	-2.2	12.4	12.3	28.3	-3.9	12.7
Yearly				22.2				21.9				22.5

Month	El Centro, California				Bullhead City, Arizona							
	1998				1998							
	Mean	Max.	Min.	Average 1931-98	Mean	Max.	Min.	Average 1978-98				
Jan.	14.2	25.6	2.2	12.5	12.8	23.9	1.1	12.2				
Feb.	14.8	24.4	6.1	14.7	13.2	25.0	4.4	14.8				
Mar.	17.3	33.3	5.0	17.5	17.6	35.6	3.9	17.9				
April	19.6	36.7	6.7	21.1	19.4	38.3	4.4	22.3				
May	23.3	35.6	11.1	25.2	24.6	37.8	10.6	27.2				
June	#	#	#	29.6	30.1	47.2	16.1	32.3				
July	34.4	47.8	22.2	33.2	36.4	52.2	22.2	35.2				
Aug.	34.6	46.7	22.2	32.9	36.4	48.3	21.7	34.7				
Sept.	30.2	43.3	15.6	29.9	31.2	43.3	16.7	30.6				
Oct.	23.0	36.1	8.9	23.8	23.3	36.7	10.6	23.9				
Nov.	17.5	28.9	6.1	16.9	16.5	27.8	3.9	16.6				
Dec.	13.5	29.4	-1.7	12.7	13.2	25.0	2.8	11.9				
Yearly				22.5	22.9	52.2	1.1	23.3				

IN MEXICO

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	1998		1948-1998		1998		1926-1998		1998		1948-1998	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	26	3	31	-5	23	2	34	-7	33	-2	45	-9
Feb.	23	6	35	-2	23	7	34	-5	30	-2	37	-6
Mar.	37	4	38	0	34	6	38	-1	45	0	45	-4
April	43	7	43	3	39	7	41	1	46	2	48	-9
May	38	12	47	6	37	12	47	6	44	8	51	1
June	46	15	52	11	48	14	49	9	50	10	57	6
July	48	21	50	13	49	23	48	13	50	17	56	7
Aug.	47	23	49	16	47	21	49	12	50	19	54	8
Sept.	46	17	50	10	44	18	50	8	50	12	57	4
Oct.	38	9	44	0	36	13	44	0	45	6	48	0
Nov.	30	7	38	-3	29	8	40	-2	36	1	46	0
Dec.	26	0	32	-5	27	2	32	-5	28	0	36	-5
Yearly	48	0	52	-5	49	2	50	-7	50	-2	57	-9

Missing Data

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

1998

The total drainage area within the Colorado River basin is about 637,100 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	18,240
Reservation Division	5,388
Yuma Mesa	6,725
Yuma Aux. Project Unit "B" (Yuma Mesa)	868
South Gila Valley	3,902
North Gila Valley	2,666
Wellton-Mohawk	23,553
Coachella Valley	25,360
Imperial Valley	186,662
Warren Act	35
Non-Project lands adjacent to Colorado River	4,455
Total in United States	277,854
IN MEXICO:	
San Luis Valley, R. C., Sonora	19,515
Mexicali Valley	104,354
Total in Mexico	123,869
Total in United States and Mexico	401,723

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 1998. 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.04	0.07	0.07	0.04	0.06	0.06	0.05	0.06	0.04	0.05	0.07	0.06
2	.04	.08	.06	.05	.06	.05	.04	.06	.04	.05	.07	.06
3	.05	.08	.07	.05	.08	.04	.04	.06	.04	.05	.07	.06
4	.05	.09	.07	.05	.08	.05	.05	.06	.05	.05	.06	.06
5	.05	.08	.09	.05	.08	.06	.07	.05	.05	.05	.06	.06
6	.05	.07	.08	.06	.08	.06	.06	.06	.05	.05	.06	.06
7	.05	.07	.10	.08	.08	.06	.07	.05	.05	.05	.07	.06
8	.05	.07	.10	.07	.08	.05	.05	.05	.05	.05	.07	.06
9	.05	.07	.10	.06	.07	.04	.05	.05	.05	.05	.07	.06
10	.05	.06	.09	.06	.07	.04	.07	.05	.06	.05	.07	.06
11	.05	.06	.07	.06	.06	.04	.05	.05	.05	.05	.07	.06
12	.05	.06	.07	.05	.06	.05	.05	.05	.05	.05	.06	.06
13	.05	.07	.08	.05	.06	.07	.06	.05	.05	.05	.06	.07
14	.05	.06	.09	.05	.06	.07	.07	.05	.05	.05	.06	.07
15	.05	.07	.08	.05	.06	.06	.05	.05	.04	.05	.06	.07
16	.05	.06	.06	.05	.06	.06	.06	.05	.04	.05	.06	.08
17	.05	.06	.06	.05	.06	.05	.06	.05	.03	.05	.06	.07
18	.05	.06	.06	.05	.06	.05	.06	.06	.03	.05	.06	.07
19	.05	.06	.07	.05	.05	.04	.06	.06	.04	.05	.06	.07
20	.05	.06	.07	.04	.06	.05	.06	.06	.04	.05	.06	.07
21	.06	.06	.06	.05	.07	.04	.06	.05	.07	.05	.06	.07
22	.06	.06	.06	.05	.06	.05	.05	.04	.06	.05	.06	.07
23	.06	.06	.05	.06	.06	.06	.06	.04	.05	.05	.06	.07
24	.05	.05	.04	.05	.05	.05	.05	.04	.05	.05	.06	.07
25	.06	.06	.04	.05	.04	.05	.05	.04	.05	.05	.06	.07
26	.06	.06	.04	.05	.05	.06	.05	.04	.04	.05	.06	.07
27	.07	.06	.04	.05	.05	.06	.05	.03	.04	.05	.06	.07
28	.07	.06	.04	.05	.06	.07	.05	.04	.05	.06	.06	.07
29	.06		.04	.05	.05	.08	.05	.04	.07	.06	.07	.07
30	.07		.04	.05	.06	.08	.06	.04	.05	.06	.08	.08
31	.08		.04		.07		.06	.04		.06		.07
Sum	1.68	1.83	2.03	1.58	1.95	1.63	1.71	1.52	1.43	1.59	1.91	2.07

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Volume-Thousand Cubic Meters				
	High	Low	Day	φ High		φ Low	Average	Total	Average	Maximum	Minimum
				Day	φ						
Jan.	0.135	0.080	31	0.08	1	0.04	0.05	145	334	3,441	0
Feb.	.145	.105	4	.09	24	.05	.07	158	307	3,481	0
Mar.	.160	.080	1	.10	124	.04	.07	175	350	3,890	0
April	.140	.085	7	.08	1	.04	.05	137	366	2,741	0
May	.145	.090	1	.08	25	.04	.06	168	300	2,219	0
June	.135	.080	129	.08	1	.04	.05	141	284	2,080	0
July	.130	.080	1	.07	1	.04	.06	148	268	2,112	72.8
Aug.	.120	.080	1	.06	27	.03	.05	131	309	2,062	81.0
Sept.	.120	.075	121	.07	117	.03	.05	124	287	1,734	103
Oct.	.115	.095	128	.06	1	.05	.05	137	301	2,276	0
Nov.	.135	.110	30	.08	1	.04	.06	165	314	2,566	6.0
Dec.	.135	.115	116	.08	1	.06	.07	179	303	2,080	0
Yearly	0.160	0.075		0.10		0.03	0.06	1,808	3,723	27,317	1,318

φ Mean daily 1 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 1998.

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.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.36	6.32	7.62	10.2	7.31	5.95	6.09	6.12	5.55	5.24	6.03	5.58
2	7.16	6.40	7.48	10.3	6.77	5.95	5.98	5.98	5.75	5.27	5.61	5.98
3	7.00	7.19	7.73	9.97	6.34	6.26	5.78	5.92	5.72	5.24	5.61	6.34
4	6.97	8.07	7.82	9.49	6.32	6.03	5.66	6.06	5.78	5.24	5.52	6.15
5	7.08	8.78	7.93	9.29	6.32	5.98	5.49	6.20	5.66	5.24	5.52	5.86
6	6.88	10.2	8.01	9.23	6.51	5.95	5.49	6.00	5.44	5.24	5.75	6.06
7	6.63	10.2	7.73	9.12	6.51	5.69	5.66	5.86	5.47	5.24	6.17	6.43
8	6.51	11.0	7.82	9.29	6.29	5.64	5.72	5.69	5.32	5.18	6.12	6.37
9	6.26	10.5	7.93	9.29	6.46	6.03	5.69	5.98	5.61	5.24	5.78	6.34
10	6.09	10.6	8.86	9.23	6.26	6.37	5.78	6.17	6.23	5.84	5.81	6.54
11	6.32	10.1	9.57	9.09	6.32	6.85	5.72	6.46	6.51	5.52	5.72	6.29
12	7.11	9.20	9.91	8.89	6.34	6.63	5.61	6.68	6.63	5.52	6.15	5.64
13	8.01	8.50	9.43	9.09	6.37	6.54	5.75	7.31	5.49	5.61	5.92	5.47
14	8.86	8.55	9.06	10.4	6.15	6.29	5.92	7.84	6.12	5.47	5.89	6.40
15	8.95	9.60	9.26	10.6	6.37	6.20	6.20	8.18	5.64	5.41	5.64	6.03
16	8.44	8.58	9.80	10.5	6.49	5.86	6.54	8.21	5.15	5.30	5.64	5.52
17	8.16	8.86	10.7	9.97	6.37	5.78	6.20	8.33	4.98	5.18	5.92	5.47
18	7.56	9.66	11.2	9.74	6.60	5.92	6.12	8.41	4.98	5.24	6.17	5.27
19	7.50	9.66	12.0	9.46	6.88	6.12	5.95	8.10	4.98	5.38	6.26	5.27
20	7.50	9.09	11.1	9.29	6.77	6.09	5.89	8.30	5.10	5.41	6.23	6.09
21	7.22	8.55	10.5	9.43	6.68	5.95	6.15	8.27	4.98	5.13	5.75	5.72
22	7.02	8.58	10.2	9.52	6.57	5.92	6.34	8.16	4.98	5.32	5.58	5.89
23	6.80	8.61	9.86	9.15	6.49	6.00	6.40	7.99	5.38	5.38	5.58	5.64
24	6.71	8.61	9.54	8.44	6.40	6.03	6.46	7.65	5.52	5.41	5.55	5.58
25	6.60	8.41	9.20	7.70	6.29	6.06	6.37	7.33	5.18	5.47	5.35	5.58
26	6.49	8.13	9.20	7.16	6.03	5.98	6.20	7.16	4.76	5.44	5.30	6.23
27	6.29	7.90	9.06	7.11	6.09	5.86	5.92	7.00	4.76	5.52	5.13	6.74
28	6.20	7.67	8.84	7.36	6.06	5.83	5.75	6.49	4.98	5.49	5.13	7.28
29	6.26		8.84	7.70	6.29	6.15	5.66	5.98	5.38	5.66	5.01	7.33
30	6.43		9.52	7.70	6.17	6.12	5.78	5.92	5.24	5.92	5.41	7.16
31	6.43		9.94		5.86		6.00	5.83		6.32		6.97
Sum	218.80	247.52	285.66	273.71	198.68	182.03	184.27	215.58	163.27	166.87	171.25	189.22

Current Year 1998

Period 1943-1998

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.	12.105	12.445	15	8.95	10	6.09	7.06	18,904	13,030	27,387	2,160
Feb.	11.890	12.420	8	11.0	1	6.32	8.84	21,386	11,674	26,416	1,552
Mar.	11.775	12.275	19	12.0	2	7.48	9.21	24,681	13,316	31,213	1,243
April	11.925	12.320	15	10.6	27	7.11	9.12	23,649	13,470	34,066	1,715
May	12.295	12.470	1	7.31	31	5.86	6.41	17,166	12,345	29,710	776
June	12.350	12.510	11	6.85	8	5.64	6.07	15,727	10,319	25,024	1,341
July	12.385	12.525	16	6.54	15	5.49	5.94	15,921	10,761	28,368	1,008
Aug.	12.165	12.500	18	8.41	8	5.69	6.95	18,626	12,335	34,066	1,405
Sept.	12.380	12.625	12	6.63	126	4.76	5.44	14,107	11,618	29,251	2,214
Oct.	12.420	12.615	31	6.32	10	4.84	5.38	14,418	11,444	28,072	2,567
Nov.	12.425	12.590	19	6.26	29	5.01	5.71	14,796	10,791	25,310	3,063
Dec.	12.295	12.555	29	7.33	118	5.27	6.10	16,349	12,775	28,104	2,175
Yearly	11.775	12.625		12.0		4.76	6.84	215,730	143,878	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 1998 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 1998.

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 1998.

MEAN DAILY DISCHARGE IN CUBIC METERS PER SECOND 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.01	0.01	0.03	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.03
2	.01	.01	.02	.01	.03	.03	.03	.04	.04	.04	.05	.02
3	.03	.01	.02	.02	.02	.03	.03	.04	.04	.03	.05	.03
4	.02	.01	.02	.02	.03	.03	.03	.04	.04	.04	.05	.03
5	.01	.02	.02	.01	.01	.03	.03	.04	.04	.04	.03	.03
6	.02	.02	.02	.02	.03	.03	.04	.04	.04	.04	.02	.03
7	.02	.03	.02	.02	.03	.03	.03	.04	.04	.05	.03	.03
8	.02	.02	.01	0	.03	.04	.03	.03	.04	.04	.05	.03
9	.02	.02	.02	.02	.03	.03	.04	.04	.04	.04	.06	.02
10	.01	.01	.02	.02	.01	.03	.03	.04	.04	.03	.07	.03
11	.01	.01	.02	.01	.03	.03	.03	.04	.03	.04	.07	.03
12	.02	.02	.01	.02	.03	.03	.03	.04	.04	.03	.06	0
13	.02	.01	.02	.02	.02	.03	.03	.04	.04	.04	.03	.03
14	.02	.02	.03	.02	.02	.03	.03	.04	.04	.05	.01	.03
15	.01	.02	.01	.03	.02	.03	.03	.03	.04	.05	.03	.02
16	.01	.02	.03	.02	.02	.03	.04	.05	.03	.04	.02	.03
17	.01	.02	.02	0	.01	.03	.03	.05	.04	.03	.03	.02
18	.01	.02	.01	.01	.02	.03	.03	.05	.04	.05	.02	.02
19	.02	.02	.02	.01	.01	.03	.03	.05	.02	.04	.02	.03
20	.02	.03	.02	.02	.02	.03	.03	.05	.05	.05	.01	.01
21	.01	.02	.01	.02	.03	.04	.04	.03	.04	.04	0	.04
22	.02	.01	.01	.02	.02	.03	.03	.03	.04	.05	.02	.03
23	.03	.02	.02	.03	.02	.04	.03	.04	.04	.04	.02	.02
24	.02	.04	.02	.04	.01	.03	.04	.04	.04	.03	.03	.01
25	.02	.01	.02	0	.02	.03	.03	.04	.04	.04	.03	.02
26	.03	0	.03	.01	.03	.04	.04	.04	.03	.04	.03	.01
27	.03	0	.03	.03	.02	.02	.04	.04	.05	.04	.03	.03
28	.02	0	.02	.03	.03	.03	.04	.04	.04	0	.03	.03
29	.02	.01	.02	.03	.03	.03	.04	.03	.04	0	.03	.03
30	.01	.03	.02	.02	.02	.04	.05	.05	.04	0	.03	.03
31	.02	.01	.01	.02	.02	.02	.05	.05	.04	0	.03	.03
Sum	0.55	0.45	0.58	0.55	0.69	0.94	1.07	1.26	1.17	1.09	1.00	0.78

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.			123	0.03	1	0.01	0.02	47.5	151	641	0
Feb.			24	.04	126	0	.02	38.9	101	384	0
Mar.			114	.03	1	.01	.02	50.1	189	1,074	0
April			24	.04	1	0	.02	47.5	182	532	0
May			1	.03	1	.01	.02	59.6	196	537	53.6
June			1	.04	27	.02	.03	91.2	221	504	25.9
July			130	.05	1	.03	.03	92.4	221	651	0
Aug.			116	.05	1	.03	.04	109	239	735	48.4
Sept.			120	.05	116	.02	.04	101	225	677	44.1
Oct.			1	.05	128	0	.04	94.2	210	625	46.7
Nov.			10	.07	21	0	.03	86.4	185	622	32.8
Dec.			21	.04	12	0	.03	67.4	171	737	8.6
Yearly				0.07		0	0.03	875	2,251	6,610	550

φ Mean daily 1 And other days

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

DESCRIPTION: During 1998 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 1998.

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 1998	PERIOD 1956 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	604	1,027	10,803	7.8
February	2,389	837	8,981	7.8
March	2,284	712	5,506	26.8
April	2,259	602	3,940	19.9
May	246	424	3,174	11.2
June	181	451	6,994	0
July	92.4	628	12,644	0
August	109	626	5,103	0
September	101	513	3,966	25.9
October	861	643	4,285	10.4
November	858	656	4,668	0
December	1,171	784	10,720	0
Yearly	11,155	8,350	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 1998. 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 1998 was 69.16 meters below mean sea level. Minimum elevation during 1998 was 69.495 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 - 1998

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.435	69.495	69.465
2	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.435	69.495	69.465
3	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.465	69.495	69.465
4	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.465	69.495	69.465
5	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.465	69.495	69.465
6	69.465	69.370	69.280	69.220	69.160	69.190	69.250	69.280	69.310	69.465	69.465	69.465
7	69.465	69.340	69.280	69.220	69.160	69.220	69.250	69.280	69.340	69.465	69.495	69.465
8	69.465	69.340	69.280	69.220	69.160	69.220	69.250	69.280	69.340	69.465	69.495	69.465
9	69.465	69.340	69.280	69.220	69.190	69.220	69.250	69.280	69.340	69.465	69.495	69.465
10	69.465	69.340	69.280	69.220	69.190	69.220	69.250	69.280	69.340	69.465	69.495	69.465
11	69.435	69.340	69.280	69.220	69.190	69.220	69.250	69.280	69.340	69.465	69.495	69.465
12	69.435	69.340	69.280	69.220	69.190	69.220	69.250	69.280	69.340	69.495	69.495	69.465
13	69.435	69.310	69.250	69.220	69.190	69.220	69.250	69.280	69.340	69.495	69.495	69.465
14	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.280	69.370	69.495	69.495	69.465
15	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.280	69.370	69.495	69.495	69.465
16	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.280	69.370	69.495	69.495	69.465
17	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.280	69.370	69.495	69.495	69.465
18	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.310	69.370	69.495	69.495	69.465
19	69.435	69.310	69.250	69.190	69.190	69.220	69.250	69.310	69.370	69.495	69.495	69.495
20	69.435	69.310	69.220	69.190	69.190	69.220	69.250	69.310	69.370	69.495	69.495	69.495
21	69.405	69.310	69.220	69.190	69.190	69.250	69.250	69.310	69.405	69.495	69.495	69.495
22	69.405	69.310	69.220	69.190	69.190	69.250	69.250	69.310	69.405	69.495	69.495	69.495
23	69.405	69.310	69.220	69.190	69.190	69.250	69.250	69.310	69.405	69.495	69.495	69.495
24	69.405	69.310	69.220	69.190	69.190	69.250	69.250	69.310	69.405	69.495	69.495	69.495
25	69.405	69.310	69.220	69.190	69.190	69.250	69.250	69.310	69.405	69.495	69.495	69.495
26	69.405	69.310	69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.495	69.495	69.495
27	69.405	69.310	69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.495	69.495	69.495
28	69.405	69.310	69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.495	69.495	69.495
29	69.370		69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.495	69.495	69.495
30	69.370		69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.465	69.495	69.465
31	69.370		69.220	69.160	69.190	69.250	69.250	69.310	69.435	69.465	69.495	69.465
Avg.	69.430	69.330	69.250	69.200	69.180	69.225	69.250	69.295	69.370	69.480	69.495	69.475

Month	Current Year 1998		Period 1935-1998		
	Extreme Elevation Meters		Elevation Meters		
	High	Low	# Average	# Maximum	! Minimum
Jan.	69.370	69.465	71.460	69.280	75.990
Feb.	69.310	69.370	71.370	69.190	75.830
Mar.	69.220	69.280	71.285	69.130	75.770
April	69.160	69.220	71.230	69.100	75.800
May	69.160	69.190	71.225	69.100	75.740
June	69.190	69.250	71.270	69.160	75.830
July	69.250	69.250	71.320	69.220	75.930
Aug.	69.280	69.310	71.360	69.250	76.020
Sept.	69.310	69.435	71.440	69.280	76.020
Oct.	69.435	69.495	71.470	69.310	76.140
Nov.	69.465	69.495	71.480	69.340	76.200
Dec.	69.465	69.495	71.445	69.340	76.080
Yearly	69.160	69.495	71.365	69.100	76.200

Area and Capacity Table		
Elevation	Area	Capacity
Meters Below M.S.L.	Hectares	Million Cubic Meters
84.640	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

Ⓐ 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

1998	Time	*Streamflow Momentary	Water Temperature	PH	Oxygen Dissolved (DO)	Specific Conductance	Turbidity
Date	Std.	CMS	Deg C	Units	mg/L	Microsiemens/cm	NTU
Jan. 27	0700	6.15	14.4	7.5	2.0	3,580	9.4
Feb. 18	0700	7.00	15.2	7.4	3.4	4,250	7.4
Mar. 30	0700	9.43	16.5	6.8	3.3	3,580	11.5
Apr. 28	0700	7.31	22.7	7.5	2.6	4,280	11.0
May 29	0700	6.29	23.5	7.3	1.6	3,990	12.0
June 22	0700	5.89	26.7	7.5	2.0	4,210	14.0
July 24	0700	N.R.	30.9	7.6	0.4	4,130	12.0
Aug. 26	0700	N.R.	31.5	7.4	0.7	3,600	12.5
Sept. 29	0700	N.R.	24.2	7.5	2.6	4,040	11.1
Oct. 27	0700	N.R.	20.4	7.5	0.0	2,700	13.0
Nov. 17	0700	N.R.	16.8	7.6	0.0	2,910	21.0
Dec. 8	0700	N.R.	11.8	7.5	0.0	1,640	21.0

* Flow provided by the California Regional Water Quality Control Board
N.R. - None Reported

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	Jan. 27, 1998	Feb. 18, 1998	Mar. 30, 1998	Apr. 28, 1998	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	5.0 ug/L	4.0 ug/L	4.0 ug/L	5.0 ug/L	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.A.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	0.01 mg/L	0.01 mg/L	N.D.	N.D.	0.002 mg/L
MBAS	1.27 mg/L	0.56 mg/L	0.07 mg/L	0.086 mg/L	0.025 mg/L
Zinc	N.D.	N.D.	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	0.02 mg/L	0.02	0.01 mg/L
Total Phosphate(P04-P)	2.48 mg/L	1.10 mg/L	1.55 mg/L	1.38 mg/L	0.01 mg/L
Nitrate (NO3-N)	0.7 mg/L	0.4 mg/L	0.40 mg/L	1.30	0.20 mg/L
Nitrite (NO2-N)	0.1 mg/L	0.1 mg/L	0.10 mg/L	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	6.5 mg/L	4.7 mg/L	4.80 mg/L	5.20 mg/L	0.05 mg/L
Total Dissolved Solids	2,470 mg/L	2,510 mg/L	2,400 mg/L	2,990 mg/L	---
Total Suspended Solids	36.0 mg/L	99.0 mg/L	47.0 mg/L	45.0 mg/L	---
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	---

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	May 29, 1998	June 22, 1998	July 24, 1998	Aug. 26, 1998	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	7.0 ug/L	5.0 ug/L	7.0 ug/L	N.D.	2.0 ug/L
Boron	N.A.	N.A.	N.A.	N.A.	0.1 mg/L
Cadmium	N.D.	N.D.	N.D.	N.D.	1.0 ug/L
Chromium	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Copper	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Lead	N.D.	N.D.	N.D.	N.D.	10.0 ug/L
Phenol	0.008mg/L	0.017 mg/L	0.008 mg/L	0.002 mg/L	0.002 mg/L
MBAS	0.176mg/L	0.145 mg/L	0.246 mg/L	0.883 mg/L	0.025 mg/L
Zinc	N.D.	N.D.	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(P04-P)	2.36 mg/L	1.78 mg/L	1.71 mg/L	1.49 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D. mg/L	N.D. mg/L	0.20 mg/L	N.D.	0.20 mg/L
Nitrite (NO2-N)	N.D. mg/L	N.D. mg/L	0.10 mg/L	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	5.3 mg/L	3.5 mg/L	4.70 mg/L	2.90 mg/L	0.05 mg/L
Total Dissolved Solids	2,750 mg/L	3,160 mg/L	2,490 mg/L	2,250 mg/L	---
Total Suspended Solids	81.0 mg/L	67.0 mg/L	52.0 mg/L	54.0 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

NEW RIVER AT INTERNATIONAL BOUNDARY

SAMPLE TYPE	COMPOSITE	COMPOSITE	COMPOSITE	COMPOSITE	
DATE	Sept. 29 1998	Oct. 27, 1998	Nov. 17, 1998	Dec. 8, 1998	
PARAMETER	CONCENTRATION	CONCENTRATION	CONCENTRATION	CONCENTRATION	DETECTION LIMIT
Arsenic	N.D.	5.0 ug/L	4.0 ug/L	3.0 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	0.021mg/L	0.017 mg/L	0.024 mg/L	0.004 mg/L	0.002 mg/L
MBAS	0.229mg/L	1.024 mg/L	1.765 mg/L	1.52 mg/L	0.025 mg/L
Zinc	N.D.	N.D.	N.D.	N.D.	50.0 ug/L
Total Cyanide	N.D.	N.D.	N.D.	N.D.	0.01 mg/L
Total Phosphate(P04-P)	1.86 mg/L	1.85 mg/L	1.86 mg/L	1.92 mg/L	0.01 mg/L
Nitrate (NO3-N)	N.D.	0.2 mg/L	0.30 mg/L	0.60	0.20 mg/L
Nitrite (NO2-N)	N.D.	0.06 mg/L	0.05 mg/L	N.D.	0.03 mg/L
Ammonia (NH3-NH4-N)	3.9 mg/L	5.6 mg/L	6.40 mg/L	6.80 mg/L	0.05 mg/L
Total Dissolved Solids	2,340 mg/L	2,190 mg/L	2,230 mg/L	2,320 mg/L	---
Total Suspended Solids	14.0 mg/L	59.0 mg/L	72.0 mg/L	54.0 mg/L	---
Volatile Suspended Solids	N.A.	N.A.	N.A.	N.A.	---

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

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 1998.

ALAMO RIVER

1998	Time	Water Temperature	pH	Oxygen Dissolved (DO)	Conductance Microsiemens/cm	Coliform Fecal Colonies/100 mL	Flow CMS
Date	Std.	Deg C	Units	mg/L			
Feb. 25	0910	14.4	7.6	5.9	5,000	2,150	0.06
Apr. 23	0800	22.3	7.6	5.0	5,020	1,730	0.04
May 27	0820	20.7	7.7	5.6	4,890	230	0.28
June 24	0800	23.7	7.6	5.9	4,740	580	0.06
July 22	0825	29.8	7.4	2.0	3,820	2,400	0.23
Aug. 24	1205	29.8	7.2	0.6	4,430	1,580	0.01
Sept. 23	0750	24.5	7.3	4.2	3,830	967	0.14
Oct. 21	0800	18.7	7.7	6.0	4,510	80	0.04
Nov. 24	1115	14.5	7.7	9.5	4,700	100	0.11
Dec. 28	0915	9.2	7.7	5.5	4,190	420	0.14

NEW RIVER

1998	Time	**Streamflow Momentary	Water Temperature	pH	Oxygen Dissolved (DO)	Specific Conductance	Fecal Coliform
Date	Std.	CMS	Deg C	Units	mg/L	Microsiemens/cm	Colonies/100 mL
Jan. 7	0855	6.94	12.2	7.6	2.5	3,820	650,000
Feb. 11	0805	11.0	15.4	7.4	1.4	3,190	753,000
Feb. 25	0945	9.12	15.2	7.5	1.8	3,720	280,000
Mar. 11	0915	9.06	16.6	7.4	1.8	3,840	270,000
Mar. 25	0915	9.83	21.4	7.3	0.9	4,140	350,000
April 8	0830	10.2	16.4	7.6	2.4	3,850	250,000
April 23	0830	9.88	23.0	7.4	0.7	3,940	410,000
May 6	0825	7.73	23.0	7.4	1.2	4,720	480,000
May 27	0925	6.60	22.0	7.6	0.7	4,560	1,500,000
June 10	0900	6.77	24.3	7.8	1.1	4,380	860,000
June 24	0840	6.46	25.2	7.4	1.0	4,540	1,000,000
July 8	0800	5.75	30.3	7.4	0.2	4,510	1,800,000
July 22	0910	6.57	30.1	7.4	0.2	4,410	2,300,000
Aug. 12	0855	7.05	30.7	7.4	0.7	4,280	900,000
Aug. 24	1130	8.64	31.6	7.5	1.6	3,710	590,000
Sept. 9	0800	6.14	30.2	7.6	0.3	4,500	2,150,000
Sept. 23	0845	5.18	25.5	7.3	0.8	3,970	1,600,000
Oct. 7	0835	5.75	21.1	7.2	1.9	3,540	520,000
Oct. 21	0840	5.58	19.7	7.6	1.7	3,670	410,000
Nov. 12	0925	6.60	15.4	7.6	3.1	3,750	410,000
Nov. 24	1150	6.17	15.7	7.5	1.5	3,730	1,350,000
Dec. 9	0800	6.66	10.6	7.5	4.4	3,740	900,000
Dec. 28	1000	8.95	10.6	7.6	6.6	3,230	290,000

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 - 1998

January		March		May		July		September		November	
7	3,900	4	4,200	6	5,700	1	4,800	2	4,700	4	4,600
14	4,600	11	4,800	13	4,600	15	4,500	16	4,600	11	4,100
21	5,100	25	5,200	19	5,100	22	4,900	23	4,700	18	4,100
28	4,800			22	4,500	29	4,700	29	4,700		
February		April		June		August		October		December	
4	4,600	8	4,500	3	4,200	5	5,000	7	4,500	2	4,700
11	4,600	15	4,700	9	4,200	12	5,100	14	4,200	9	4,100
18	4,200	22	4,200	17	4,300	19	3,800	28	4,200	16	4,000
25	3,800	29	5,300			26	4,300			23	4,600
										30	3,600

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 1998.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1998 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 1998	PERIOD 1937 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	4,747	1,251	20,362	0
February	6,012	2,680	41,407	9.9
March	4,639	3,625	55,845	23.8
April	8,993	2,108	28,530	4.1
May	3,792	1,055	18,642	0
June	1,773	595	10,173	0
July	521	357	7,651	0
August	63.0	283	8,916	0
September	0	195	6,331	0
October	0	170	4,817	0
November	182	283	5,633	0
December	537	770	9,472	5.4
Yearly	31,259	13,369	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 1998.

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 1998	PERIOD 1937 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	397	301	2,583	0
February	350	1,035	19,644	0
March	528	2,023	55,615	0
April	511	1,529	28,159	0
May	438	846	18,100	0
June	529	642	9,260	0
July	552	394	6,236	0
August	552	378	7,937	0
September	552	421	7,253	0
October	528	263	4,639	0
November	511	295	5,071	0
December	438	531	9,099	0
Yearly	5,886	8,658	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 1998. 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 1998	PERIOD 1937 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	0	1,537	29,627	0
February	11,513	3,458	67,539	9.4
March	8,463	5,929	62,041	17.4
April	17,709	2,898	26,680	12.6
May	6,077	1,301	10,509	0
June	2,336	580	4,818	0
July	744	343	5,042	0
August	227	206	4,472	0
September	0	209	3,858	0
October	71.0	120	796	0
November	389	264	2,519	0
December	592	708	6,845	2.1
Yearly	48,121	17,553	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 1998.

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, 1998, 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.05	0	0	0	0.94	0.82	0.78	1.29	0	1.20	0	1.18
2	1.04	0	0	0	.97	.82	.78	1.25	0	1.20	0	1.16
3	1.05	0	0	0	.97	.84	.77	1.28	0	1.20	.21	1.16
4	1.07	0	0	0	.94	.85	.77	1.25	0	1.20	.74	1.16
5	1.05	0	0	0	.97	.87	.75	1.28	0	1.20	1.18	0
6	1.08	0	0	0	.94	.82	.75	1.28	0	1.20	1.20	0
7	1.05	0	0	0	.92	.82	.77	1.26	0	1.20	1.18	0
8	1.17	0	0	0	.92	.82	.77	1.28	0	1.20	1.20	0
9	1.17	0	0	0	.93	.82	.77	1.28	0	1.20	1.18	0
10	1.18	0	0	0	.93	0	.77	1.26	0	1.32	1.17	0
11	1.18	0	0	0	.92	0	1.07	1.28	0	1.21	1.18	0
12	1.18	0	0	0	.92	.81	1.07	1.28	0	1.20	1.17	0
13	1.17	0	0	0	.92	.78	1.07	1.28	0	1.20	1.18	0
14	1.17	0	0	0	.91	.78	1.07	1.28	0	1.21	1.20	0
15	1.18	0	0	0	.91	.78	1.07	1.26	0	1.20	1.18	.18
16	1.18	0	0	0	.87	.77	1.07	1.26	0	1.20	1.18	.70
17	1.00	0	0	0	.87	.77	1.07	1.28	0	1.36	1.18	0
18	1.00	0	0	0	.86	.78	1.07	1.26	.52	1.21	1.18	0
19	1.02	0	0	0	.85	.78	1.07	1.26	.25	1.20	1.20	0
20	1.03	0	0	0	.86	.78	1.07	1.26	.24	1.20	1.17	.47
21	1.00	0	0	0	.86	.78	1.07	1.26	.24	0	1.20	.45
22	1.03	0	0	0	.86	.77	1.07	1.28	0	0	1.18	.89
23	1.03	0	0	.75	.86	.77	1.07	1.24	.33	.35	1.18	1.16
24	1.00	0	0	1.22	.85	.77	1.28	1.25	.87	.61	1.18	1.14
25	.99	0	0	1.21	.85	.77	1.28	1.26	.95	.61	1.18	1.14
26	.99	0	0	1.22	.85	.77	1.30	1.22	1.25	.60	1.18	1.16
27	1.00	0	0	1.21	.85	.77	1.29	0	1.20	1.17	1.18	1.17
28	.99	0	0	1.18	.87	.75	1.30	0	1.20	1.20	1.18	1.17
29	.99	0	0	1.17	.87	.77	1.30	1.04	1.20	0	1.17	1.14
30	.99	0	0	1.14	.85	.78	1.28	0	1.21	0	1.17	1.17
31	0	0	0		.86		1.28	0	0	0	1.17	1.17
Sum	32.03	0	0	9.10	27.75	22.21	31.90	33.96	9.46	28.85	31.68	17.77

Current Year 1998

Period 1937-1998

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.			110	1.18	31	0	1.03	2,767	547	2,899	0
Feb.			11	0	11	0	0	0	552	2,883	0
Mar.			11	0	11	0	0	0	811	7,639	0
April			124	1.22	11	0	.30	786	1,024	5,016	0
May			12	.97	119	.85	.90	2,398	1,165	3,750	0
June			5	.87	110	0	.74	1,919	1,216	4,611	0
July			126	1.30	15	.75	1.03	2,756	1,093	4,974	0
Aug.			1	1.29	127	0	1.10	2,934	1,031	4,741	0
Sept.			26	1.25	11	0	.32	817	809	2,862	0
Oct.			17	1.36	121	0	.93	2,493	689	3,235	0
Nov.			16	1.20	11	0	1.06	2,737	729	3,404	0
Dec.			1	1.18	15	0	.57	1,535	638	2,843	0
Yearly				1.36		0	0.67	21,142	10,304	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 1998. 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 1998	PERIOD 1937 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	0	437	10,114	0
February	0.7	2,265	86,736	0
March	1.9	4,626	111,775	0
April	2,459	2,327	45,417	0
May	0	1,043	28,287	0
June	3.2	480	13,503	0
July	3.0	246	5,311	0
August	3.0	159	4,206	0
September	3.0	58.5	1,554	0
October	3.0	49.4	1,530	0
November	3.0	153	5,100	0
December	3.7	200	6,058	0
Yearly	2,484	12,044	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 1998.

REMARKS: Flow is largely controlled by Barrett and Morens 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.01	1.98	6.71	0.65	0.20	0.05	0	0	0	0	0.03
2	0	.01	1.70	5.30	.65	.18	.05	0	0	0	0	.03
3	0	.21	1.50	3.91	.65	.16	.05	0	0	0	0	.03
4	.01	1.39	1.30	3.29	.65	.17	.05	0	0	0	0	.02
5	.01	.74	1.08	2.80	.79	.17	.06	0	0	0	0	.05
6	0	.99	1.16	2.44	.96	.16	.05	0	0	0	0	.09
7	0	1.22	1.22	2.69	.93	.17	.04	0	0	0	0	.04
8	0	4.59	.88	2.24	.82	.20	.03	0	0	0	0	.03
9	.01	3.96	.71	1.81	.79	.20	.03	0	0	0	0	.02
10	.07	1.73	.65	1.61	.76	.31	.02	0	0	0	0	.02
11	.08	.99	.59	1.70	.71	.23	.02	0	0	0	0	.02
12	.06	.68	.54	4.56	.74	.25	.02	0	0	0	0	.02
13	.05	.57	.51	2.97	1.42	.20	.02	0	0	0	0	.02
14	.05	5.13	.65	2.44	1.16	.16	.02	0	0	0	0	.02
15	.04	10.3	.79	3.12	.82	.15	.02	0	0	0	0	.02
16	.05	3.85	.62	2.83	.68	.15	.01	0	0	0	0	.07
17	.05	6.40	.57	2.15	.59	.16	.01	0	0	0	0	.03
18	.03	4.47	.54	1.84	.51	.14	.01	0	0	0	0	.03
19	.04	2.83	.48	1.56	.42	.12	.01	0	0	0	0	.03
20	.03	3.46	.45	1.81	.40	.11	0	0	0	0	0	.04
21	.02	2.75	.42	4.56	.34	.10	.01	0	0	0	0	.04
22	.02	2.12	.40	5.13	.31	.09	.01	0	0	0	0	.04
23	.01	2.07	.40	4.56	.31	.08	.01	0	0	0	.01	.02
24	.01	7.48	.40	3.62	.28	.08	.01	0	0	0	0	.03
25	.01	5.86	.54	1.30	.31	.08	.01	0	0	0	0	.03
26	.01	3.91	1.42	1.10	.34	.07	0	0	0	0	0	.01
27	.01	3.12	1.33	.96	.31	.07	0	0	0	0	0	.01
28	.01	2.49	4.02	.85	.31	.07	0	0	0	0	0	.03
29	.02		8.64	.74	.28	.07	0	0	0	0	0	.06
30	.03		6.09	.68	.25	.06	0	0	0	0	0	.03
31	.01		3.96		.22		0	0	0	0	0	.04
Sum	0.74	83.33	45.54	81.28	18.36	4.36	0.62	0	0	0	0.17	1.06

Current Year 1998

Period 1937-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	φ High		Day		Total	Average	Maximum	Minimum
				Day	φ Low						
Jan.			11	0.08	1	0	0.02	63.9	1,461	45,897	0
Feb.			15	10.3	1	.01	2.98	7,200	3,707	85,134	0
Mar.			29	8.64	122	.40	1.47	3,935	5,475	109,418	0
April			1	6.71	30	.68	2.71	7,023	2,696	49,635	0
May			13	1.42	31	.22	.59	1,586	985	22,439	0
June			10	.31	30	.06	.15	377	344	7,301	0
July			5	.06	126	0	.02	53.6	110	3,599	0
Aug.			1	0	1	0	0	0	85.1	1,850	0
Sept.			1	0	1	0	0	0	83.0	4,209	0
Oct.			1	0	1	0	0	0	94.0	291	0
Nov.			29	.06	1	0	.01	14.7	36.7	1,378	0
Dec.			6	.09	1	.02	.03	91.6	185	3,169	0
Yearly				10.3		0	0.65	20,345	15,282	220,556	0

φ Mean daily 1 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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.03	0.40	1.50	0.37	0.19	0.07	0.03	0.02	0.02	0.02	0.12
2	.01	.03	.37	.99	.37	.17	.07	.03	.02	.02	.02	.13
3	.01	.08	.34	.76	.34	.16	.07	.03	.02	.02	.02	.12
4	.01	.54	.31	.68	.34	.18	.06	.03	.02	.02	.02	.11
5	.01	.24	.28	.65	.37	.18	.06	.02	.02	.02	.02	.13
6	.01	.22	.40	.65	.40	.18	.06	.02	.02	.02	.02	.21
7	.01	.37	.37	.68	.40	.17	.06	.02	.02	.02	.02	.25
8	.01	.88	.28	.62	.40	.21	.06	.02	.02	.02	.02	.15
9	.01	1.19	.25	.54	.42	.24	.06	.03	.02	.02	.03	.13
10	.01	.37	.22	.54	.42	.21	.06	.03	.02	.02	.02	.12
11	.01	.23	.20	.62	.42	.20	.05	.02	.02	.02	.02	.11
12	.01	.16	.19	1.33	.45	.22	.05	.02	.02	.02	.03	.11
13	.01	.14	.18	.82	.48	.21	.06	.02	.02	.02	.03	.11
14	.01	1.76	.31	.71	.42	.18	.06	.02	.02	.02	.04	.11
15	.01	4.62	.37	1.02	.42	.16	.06	.02	.02	.02	.04	.14
16	.01	.74	.28	.79	.40	.15	.05	.02	.02	.02	.05	.20
17	.01	.93	.28	.65	.37	.14	.05	.02	.02	.02	.05	.16
18	.01	.71	.24	.62	.34	.13	.04	.02	.02	.02	.05	.15
19	.01	.45	.20	.57	.34	.12	.04	.02	.02	.02	.05	.15
20	.02	.79	.19	.54	.31	.12	.05	.02	.02	.02	.05	.19
21	.02	.54	.19	.48	.31	.11	.06	.02	.02	.02	.05	.18
22	.01	.45	.18	.42	.31	.10	.06	.02	.02	.02	.06	.15
23	.01	.48	.18	.42	.28	.10	.05	.02	.02	.02	.06	.15
24	.01	1.98	.17	.42	.27	.09	.05	.02	.02	.02	.06	.14
25	.01	.99	.23	.42	.27	.09	.04	.02	.02	.02	.06	.13
26	.01	.62	.59	.42	.31	.08	.04	.02	.02	.02	.06	.14
27	.01	.51	.45	.40	.31	.08	.03	.02	.02	.02	.06	.14
28	.01	.45	2.18	.40	.28	.07	.03	.02	.02	.02	.07	.13
29	.02		3.06	.37	.25	.07	.03	.02	.02	.02	.11	.14
30	.04		1.36	.37	.23	.07	.03	.02	.02	.02	.12	.15
31	.03		.88		.20		.03	.02		.02		.15
Sum	0.39	20.50	15.13	19.40	10.80	4.38	1.59	0.68	0.60	0.62	1.33	4.50

Current Year 1998

Period 1937-1998

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.			30	0.04	1	0.01	0.01	33.7	437	10,581	0
Feb.			15	4.62	1	.03	.73	1,771	564	5,288	0
Mar.			29	3.06	24	.17	.49	1,307	908	11,587	0
April			1	1.50	129	.37	.65	1,676	560	8,886	0
May			13	.48	31	.20	.35	933	274	3,956	0
June			9	.24	128	.07	.15	378	136	2,234	0
July			1	.07	127	.03	.05	137	73.4	1,525	0
Aug.			1	.03	15	.02	.02	58.8	67.4	2,008	0
Sept.			1	.02	1	.02	.02	51.8	49.6	1,214	0
Oct.			1	.02	1	.02	.02	53.6	61.9	1,084	0
Nov.			30	.12	1	.02	.04	115	123	1,522	0
Dec.			7	.25	14	.11	.15	389	210	1,953	0
Yearly				4.62		0.01	0.22	6,904	3,464	38,639	0

φ Mean daily

1 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 1957 through 1998. 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 1998	PERIOD 1938 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	5.2	6,349	237,657	0
February	2,275	8,673	194,216	4.7
March	731	12,773	172,556	0
April	1,530	3,803	95,953	0
May	2,609	815	14,136	0
June	434	239	5,749	0
July	484	116	1,806	0
August	0	67	950	0
September	0	68	575	0
October	0	85	432	0
November	0	176	2,393	0
December	30.2	940	19,348	0
Yearly	8,098	34,109	381,515	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 1998.

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 1998	PERIOD 1938 - 1998		
		AVERAGE	MAXIMUM	MINIMUM
January	10.9	650	6,183	0
February	5.7	632	6,028	0
March	27.3	1,211	36,018	0
April	200	792	6,142	0
May	2,476	983	6,578	0
June	2,751	1,101	5,893	0
July	2,661	1,173	5,681	0
August	2,495	1,141	5,931	0
September	2,500	1,017	6,158	0
October	2,374	954	6,054	0
November	2,406	847	5,873	0
December	2,333	806	6,212	0
Yearly	20,240	11,159	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 1998. Missing records February 3 through March 9, March 20 through April 1, and April 10 through April 15, 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.04	3.85	7.87		2.56	1.47	0.85	0.56	0.36	0.32	0.41	0.76
2	4.16	3.50	2.12	12.8	2.28	1.43	.82	.58	.37	.31	.41	.80
3	4.17		2.14	12.6	2.24	1.41	.84	.50	.40	.36	.40	.72
4	5.96		2.12	13.0	2.25	1.38	.84	.60	.44	.38	.42	.73
5	4.00		2.15	13.7	2.41	1.40	.84	.55	.41	.33	.42	.88
6	2.44		8.81	45.3	2.76	1.36	.86	.47	.41	.33	.42	.93
7	3.05		33.5	33.2	2.47	1.32	.89	.47	.40	.37	.46	.73
8	4.09		3.52	21.2	2.46	1.35	.83	.45	.37	.32	.39	.73
9	6.26		2.09	9.23	2.47	1.36	.77	.52	.38	.37	.36	.73
10	7.59	0	2.04		2.37	1.33	.78	.61	.36	.36	.49	.73
11	5.45	2.02	15.8		2.32	1.27	.79	.58	.30	.36	.52	.73
12	4.62	9.98	8.57		2.76	1.22	.77	.58	.32	.39	.51	.73
13	4.80	9.98	5.64		3.02	1.21	.78	.57	.34	.34	.49	.73
14	4.28	10.0	8.36		2.64	1.21	.75	.54	.38	.42	.57	.73
15	4.49	10.2	6.55		2.42	1.17	.76	.46	.39	.42	.48	.75
16	4.99	9.99	6.16	13.4	2.31	1.16	.77	.50	.41	.42	.55	.82
17	4.14	9.70	6.08	2.68	2.22	1.13	.73	.51	.39	.42	.55	.74
18	4.20	7.51	5.74	4.29	2.13	1.11	.69	.51	.34	.42	.53	.73
19	4.35	7.54	5.38	6.06	2.03	1.07	.65	.50	.37	.41	.53	.75
20	3.73	7.68		8.05	1.95	1.04	.65	.47	.36	.41	.54	.84
21	3.63	7.82		8.83	1.94	1.02	.66	.43	.35	.42	.56	.79
22	3.74	9.31		9.10	1.88	1.00	.66	.47	.35	.42	.55	.65
23	3.68	25.0		8.84	1.78	.98	.62	.43	.28	.42	.60	.61
24	3.40	24.6		8.64	1.73	.98	.62	.42	.25	.43	.58	.74
25	3.27	17.1		7.81	1.69	.96	.64	.40	.24	.43	.50	.63
26	3.83	6.80		7.03	1.66	.94	.58	.40	.26	.43	.54	.73
27	3.93	7.20		6.69	1.64	.92	.58	.43	.26	.43	.59	.68
28	3.75	7.58		6.52	1.65	.91	.61	.40	.37	.43	.86	.58
29	4.63			6.39	1.60	.89	.63	.39	.40	.42	.78	.57
30	3.79			6.30	1.53	.89	.62	.41	.35	.51	.71	.57
31	4.25				1.50		.59	.42		.43		.66
Sum	132.71				66.67	34.89	22.47	15.13	10.61	12.23	16.12	22.50

Current Year 1998

Period 1947-1998

Month	Extreme Gage Meters		Extreme-Cubic Meters per Second				Average	Volume-Thousand Cubic Meters			
	High	Low	Day	High	Low	Total		Average	Maximum	Minimum	
											Day
Jan.	12.445	11.835	10	11.6	6	2.44	4.28	11,466	9,497	297,879	0
Feb.									14,913	388,951	0
Mar.									17,769	362,019	0
April									4,554	77,633	0
May	12.545	12.045	12	6.02	31	1.50	2.15	5,760	2,229	52,545	0
June	12.090	12.020	8	1.58	130	.89	1.16	3,014	777	11,960	0
July	12.095	11.835	7	.99	27	.44	.72	1,941	563	11,400	0
Aug.	12.700	12.095	9	3.72	29	.39	.49	1,307	673	21,083	0
Sept.	12.020	11.700	3	.47	25	.08	.35	917	327	5,142	0
Oct.	12.175	11.775	30	.60	1	.18	.39	1,057	419	6,859	0
Nov.	12.445	11.805	28	1.49	15	.27	.54	1,393	629	5,399	0
Dec.	12.430	11.750	6	1.75	19	.26	.73	1,944	1,118	8,270	0
Yearly								53,468		734,832	0

1 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)	
	1998	Average 1937-1998	1998	Average 1937-1998	1998	Average 1937-1998	1998	Average 1937-1998
Jan.	33,687	24,637	12,081	18,689	8,598	41,733	54,366	85,059
Feb.	31,618	26,048	11,796	19,758	70,800	44,403	114,214	90,209
Mar.	37,373	27,574	24,590	22,112	92,874	50,219	154,837	99,905
April	41,878	27,789	33,425	22,835	132,600	51,222	207,903	101,846
May	50,326	27,650	48,225	22,602	133,086	50,422	231,637	100,674
June	53,368	27,029	52,021	21,796	126,480	48,809	231,869	97,634
July	53,807	26,308	52,533	20,861	117,796	46,774	224,136	93,943
Aug.	52,726	25,632	50,442	19,870	110,070	44,765	213,238	90,267
Sept.	51,344	24,933	47,687	19,182	102,488	43,231	201,519	87,366
Oct.	49,728	24,458	47,002	18,553	95,300	41,609	192,030	84,620
Nov.	48,527	24,271	44,795	18,088	88,926	40,809	182,248	83,168
Dec.	48,243	24,366	42,801	18,334	81,870	40,642	172,914	83,342
Avg.	46,052	25,891	38,950	20,223	96,741	45,387	181,743	91,501
Max.	53,807	#1 76,069	52,533	*1 56,641	133,086	1 138,486	231,869	1 263,471
Min.	31,618	11 12	11,796	11 131	8,598	11 0	54,366	11 1,559

- # - March 31, 1941 - Prior to removal of spillway gates
 * - April 30, 1937 - Sandbags were placed on crest of spillway
 1 - Maximum end of month storage for period of record
 11 - 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		Sanday Ranch, California		Campo, California	
	1998	Average 1906-1998	1998	Average 1907-1998	1998	Average 1951-1998	1998	Average 1950-1998	1998	Average 1900-1998
Jan.	79	100	58	91	#	#	57	94	41	81
Feb.	377	99	315	89	#	#	360	84	263	84
Mar.	141	91	141	83	#	#	144	82	112	75
April	98	41	78	37	#	#	85	36	60	34
May	50	15	36	13	#	#	35	10	30	12
June	5	3	1	2	#	#	0	1	1	2
July	9	9	1	3	#	#	6	14	3	12
Aug.	32	14	7	6	#	#	31	21	5	14
Sept.	11	11	5	6	#	#	17	12	5	9
Oct.	2	22	2	18	#	#	0	14	1	16
Nov.	57	40	43	37	#	#	40	43	30	35
Dec.	56	77	39	69	#	#	57	60	36	62
Yearly	917	522	725	454			832	471	587	436

Month	Chula Vista, California		Lower Otay Dam, California						
	1998	Average 1930-1998	1998	Average 1906-1998					
Jan.	#	49	52	57					
Feb.	197	47	243	47					
Mar.	54	45	84	57					
April	42	20	64	25					
May	#	5	27	10					
June	#	2	3	3					
July	0	0	0	1					
Aug.	4	2	0	3					
Sept.	0	5	2	6					
Oct.	0	9	28	10					
Nov.	0	28	32	32					
Dec.	0	39	35	38					
Yearly		251	570	289					

T Trace

IN MEXICO

Month	El Pinal, Baja California		El Hongo, Baja California		Ignacio Zaragoza, Baja California		Tecate, Baja California		El Carrizo, Baja California	
	1998	Average 1964-1998	1998	Average 1980-1998	1998	Average 1965-1998	1998	Average 1946-1998	1998	Average 1980-1998
Jan.	#	84	35	71	56	65	54	78	31	46
Feb.	#	90	184	72	257	75	272	57	221	54
Mar.	#	94	99	73	115	70	132	67	61	62
April	#	37	38	17	22	26	63	27	34	18
May	#	9	25	7	45	6	35	8	19	4
June	#	1	1	2	1	2	6	3	0	1
July	#	18	19	13	0	3	1	4	0	4
Aug.	#	23	12	18	27	7	6	6	3	2
Sept.	#	18	3	7	4	10	2	5	3	4
Oct.	#	16	2	12	6	14	7	12	16	15
Nov.	#	46	32	31	26	39	52	36	25	33
Dec.	#	71	31	34	30	48	39	51	9	34
Yearly		494	481	360	589	370	669	355	422	292

Missing record

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED
IN MILLIMETERS

IN MEXICO

	Valle de Palmas, Baja California		Rodriguez Dam, Baja California			
	1998	Average 1948-1998	1998	Average 1938-1998		
Jan.	43	45	48	46		
Feb.	215	40	244	43		
Mar.	86	41	81	44		
April	31	15	38	18		
May	30	4	25	3		
June	0	1	1	T		
July	4	2	0	T		
Aug.	7	5	19	3		
Sept.	7	6	1	6		
Oct.	17	9	1	9		
Nov.	14	21	17	24		
Dec.	16	28	22	38		
Yearly	470	208	497	235		

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 1998.

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 1998, 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 1998, 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 1998, 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	
	1998	Average 1916-1998	1998	Average 1921-1998	1998	Average 1950-1998
Jan.	34	54	24	48	27	49
Feb.	109	54	33	53	18	57
Mar.	56	82	64	84	61	85
April	100	118	53	116	85	118
May	107	164	94	163	117	153
June	148	210	124	200	134	175
July	198	241	183	236	180	209
Aug.	195	224	178	222	169	197
Sept.	150	178	125	181	132	162
Oct.	103	125	97	127	95	118
Nov.	49	80	47	78	60	72
Dec.	44	57	31	49	40	54
Yearly	1,293	1,587	1,053	1,557	1,118	1,449

IN MEXICO

Month	Rodriguez Dam, Baja California		El Carrizo, Baja California	
	1998	Average 1938-1998	1998	Average 1980-1998
Jan.	35	101	67	135
Feb.	63	104	58	114
Mar.	72	111	96	141
April	101	140	146	183
May	109	130	154	219
June	139	190	193	271
July	190	214	270	297
Aug.	185	199	290	292
Sept.	127	166	185	243
Oct.	120	137	190	208
Nov.	66	109	121	156
Dec.	64	85	123	133
Yearly	1,271	1,703	1,893	2,369

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			
	1998			Average 1931- 1998	1998			Average 1951- 1998	1998			Average 1931- 1998
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	11.5	26.1	-1.7	9.7	9.4	25.6	-4.4	8.7	#	#	#	9.7
Feb.	10.1	23.9	1.7	10.7	7.6	19.4	-2.8	9.3	14.1	22.8	5.0	10.7
Mar.	13.1	28.3	0.0	12.1	10.1	28.3	-4.4	10.1	15.2	26.7	5.0	12.1
April	13.6	31.7	1.7	14.6	11.3	30.6	-2.8	12.3	14.9	23.9	7.2	14.6
May	13.6	27.2	6.1	17.2	12.8	28.3	-0.6	15.0	#	#	#	17.2
June	18.6	34.4	10.0	20.5	16.3	35.6	2.2	18.6	#	#	#	20.5
July	24.6	39.4	11.1	24.5	23.1	42.2	4.4	22.7	21.1	27.2	16.1	24.5
Aug.	25.9	40.6	10.0	24.7	25.2	41.7	5.0	22.9	23.0	32.2	16.7	24.7
Sept.	22.2	40.6	9.4	22.6	19.6	36.1	1.1	20.5	22.1	33.9	13.9	22.6
Oct.	18.6	32.2	6.7	18.1	14.6	36.7	-1.7	16.0	18.4	31.7	8.9	18.1
Nov.	15.4	28.9	3.9	13.5	10.8	28.3	-2.8	11.4	15.5	25.6	6.1	13.5
Dec.	12.2	26.1	-0.6	10.4	8.0	27.8	-6.7	8.7	12.9	28.3	1.1	10.4
Yearly	16.6	40.6	-1.7	16.6	14.1	42.2	-6.7	14.7	16.9	33.9	1.1	16.6

IN MEXICO

Month	Rodriguez Dam, Baja California				El Hongo, Baja California				Ignacio Zaragoza, Baja California			
	1998		1938-1998		1998		1981-1998		1998		1965-1998	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	26	3	32	-3	23	0	25	-9	23	-8	34	-8
Feb.	24	6	34	0	17	0	27	-1	17	-3	32	-6
Mar.	28	4	38	0	26	-2	29	-2	25	-6	36	-7
April	28	6	40	2	27	0	33	-1	28	1	38	-4
May	26	9	39	3	25	3	38	1	25	-1	40	-1
June	29	12	42	8	34	5	41	2	34	2	43	2
July	35	15	40	8	45	13	45	8	40	5	45	3
Aug.	37	15	41	10	40	16	41	3	40	6	45	5
Sept.	37	13	43	8	36	8	39	2	36	4	44	1
Oct.	33	10	42	1	31	3	37	0	29	-3	40	-6
Nov.	26	7	37	-1	27	2	30	-2	25	-5	34	-5
Dec.	29	2	34	-3	20	-4	27	-8	23	-4	33	-7
Yearly	37	2	43	-3	45	-4	45	-9	40	-8	45	-8

Month	Tecate, Baja California				El Carrizo, Baja California				Valle de Palmas, Baja California			
	1998		1946-1998		1998		1980-1998		1998		1948-1998	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	28	-1	38	-9	24	4	32	-1	29	0	33	-11
Feb.	30	1	38	-8	22	6	34	-2	22	0	37	-5
Mar.	28	0	36	-5	30	3	37	-4	30	0	38	-2
April	34	1	39	-2	33	4	41	3	35	1	41	-2
May	31	4	42	1	26	7	42	5	30	3	44	2
June	36	5	44	0	34	9	42	9	38	5	48	4
July	41	9	46	2	40	11	46	8	45	8	49	7
Aug.	44	11	47	1	43	11	45	5	47	8	48	5
Sept.	41	7	46	2	40	8	42	5	44	6	47	4
Oct.	33	5	41	-3	33	10	38	6	35	3	43	0
Nov.	27	1	36	-3	28	6	35	4	31	0	38	-7
Dec.	27	0	36	-5	27	2	32	-3	30	0	35	-6
Yearly	44	-1	47	-9	43	2	46	-4	47	0	49	-11

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

1998

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 1998 was by pumping from ground water.

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

(a) Data from Otay Water District, leased areas from IBWC irrigation and private landowners.

(b) There was no irrigation in 1998 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 1998 (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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	1.38	0	0	0	0
2	0	0	0	0	0	0	0	3.00	0	0	0	0
3	0	0	0	0	0	0	0	.01	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	.38	.05	0	0	0	0
7	0	0	0	0	0	0	.63	0	0	0	0	0
8	0	0	0	0	0	0	.57	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	.09	0	0	0	0
11	0	0	0	0	0	0	0	.18	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	.05	0	0	0	0
14	0	0	0	0	0	0	.61	.08	0	0	0	0
15	0	0	0	0	0	0	.11	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	.49	0	0	0	0	0
21	0	0	0	0	0	0	.20	0	0	0	0	0
22	0	0	0	0	0	0	.37	0	0	0	0	0
23	0	0	0	0	0	0	.22	0	0	0	0	0
24	0	0	0	0	0	0	.21	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	.01	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	.10	0	0	0	0	0
31	0	0	0	0	0	0	.05	0	0	0	0	0
Sum	0	0	0	0	0	0	3.96	4.84	0	0.01	0	0

Current Year 1998

Period 1936-1998

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	11	0	11	0	0	0	42.0	556	0
Feb.	1.380	1.380	11	0	11	0	0	0	20.0	163	0
Mar.	1.380	1.380	11	0	11	0	0	0	25.0	364	0
April	1.380	1.380	11	0	11	0	0	0	18.0	213	0
May	1.380	1.380	11	0	11	0	0	0	13.0	170	0
June	1.380	1.380	11	0	11	0	0	0	123	1,961	0
July	2.045	1.380	7	2.44	11	0	0	.13	342	1,875	10,004
Aug.	2.395	1.380	2	5.55	13	0	0	.16	418	3,053	17,861
Sept.	1.380	1.380	11	0	11	0	0	0	0	805	3,910
Oct.	1.485	1.380	28	.04	11	0	0	0	.9	389	7,328
Nov.	1.380	1.380	11	0	11	0	0	0	0	50.0	714
Dec.	1.380	1.380	11	0	11	0	0	0	0	132	2,915
Yearly	2.395	1.380		5.55		0	0.02	761	6,545	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 1998.

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 Treatment Plant is discharged through a closed conduit to Mexico.

Month	Total Monthly Flows			Mean Daily Flows—Thousand Cubic Meters Per Day					
	Thousand Cubic Meters			Current Year 1998			Period 1952-1998		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	148	0	148	6.5	3.4	4.8	9.6	1.6	4.4
Feb.	125	0	125	6.4	3.2	4.5	17.7	2.1	4.4
Mar.	136	0	136	6.0	3.1	4.4	13.9	2.2	4.4
April	134	0	134	6.5	2.7	4.5	12.9	1.4	4.4
May	128	0	128	5.8	2.9	4.1	12.2	1.9	4.4
June	138	0	138	5.8	3.1	4.6	9.5	2.1	4.5
July	147	0	147	7.0	3.4	4.8	14.1	1.8	4.7
Aug.	146	0	146	6.8	3.1	4.9	10.2	1.4	4.7
Sept.	142	0	142	5.8	3.8	4.7	9.6	1.8	4.6
Oct.	148	0	148	6.2	3.3	4.8	12.0	2.3	4.5
Nov.	146	0	146	6.0	3.5	4.9	10.9	1.2	4.5
Dec.	156	0	156	6.5	3.4	5.0	12.6	1.9	4.5
Yearly	1,694	0	1,694	7.0	2.7	4.7	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 1998. Records obtained and furnished by U. S. Geological Survey prior to October 1, 1981 and from October 1, 1981 through 1998, 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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.13	0.10	0.23	0.21	0.02	0	0	0.34	0.01	0	0	0.01
2	.12	.10	.22	.20	.02	0	0	.34	.01	0	0	.01
3	.12	.10	.22	.20	.02	0	0	.99	.01	0	0	.01
4	.12	.12	.21	.19	.02	0	0	5.13	.01	0	0	.01
5	.12	.12	.20	.19	.02	0	6.34	5.18	.62	0	0	.01
6	.11	.14	.20	.18	.01	0	7.00	2.35	.74	0	0	.01
7	.11	.12	.19	.16	.01	0	2.01	.82	.15	0	0	.01
8	.11	.12	.18	.14	.01	0	1.44	.71	.07	0	0	.01
9	.11	.13	.18	.13	.01	0	.18	.65	.05	0	0	.01
10	.11	.13	.17	.12	.01	0	.03	.65	.05	0	0	.01
11	.11	.17	.16	.10	.01	0	.01	.65	.05	0	0	.01
12	.11	.18	.15	.09	.01	0	.01	1.39	.05	0	0	.01
13	.11	.17	.15	.08	.01	0	0	1.19	.05	0	0	.01
14	.11	.17	.14	.07	.01	0	0	.62	.05	0	0	0
15	.11	.17	.14	.07	.01	0	0	.57	.05	0	0	0
16	.11	.57	.14	.06	.01	0	0	.54	.05	0	0	0
17	.11	.31	.13	.06	.01	0	0	1.53	.05	0	0	.01
18	.11	.65	.12	.06	.01	0	0	.62	.05	0	0	.01
19	.11	.68	.12	.05	.01	0	0	1.70	.05	0	0	.01
20	.11	.42	.12	.05	0	0	0	.40	.05	0	0	.01
21	.10	.48	.11	.05	0	0	0	.34	.05	0	0	.01
22	.10	.42	.11	.04	0	0	0	.28	.04	0	0	.01
23	.10	.34	.10	.04	0	0	1.33	.23	.04	0	0	.01
24	.10	.31	.10	.04	0	0	1.27	.37	.03	0	0	.01
25	.10	.28	.09	.04	0	0	.10	.07	.02	0	.01	.01
26	.10	.28	.09	.03	0	0	.02	.01	.02	0	0	.01
27	.10	.26	.09	.04	0	0	0	.01	.01	0	0	.01
28	.10	.25	.09	.03	0	0	0	.01	.01	0	.01	0
29	.10	.09	.09	.03	0	0	0	.01	.01	0	.01	0
30	.10	.08	.08	.03	0	0	0	.01	.01	0	.01	0
31	.10	.13	.13	.03	0	0	.19	.01	0	0	0	0
Sum	3.36	7.29	4.45	2.78	0.24	0	19.93	27.72	2.46	0	0.04	0.23

Current Year 1998

Period 1951-1998

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.	0.745	0.720	1	0.13	26	0.10	0.11	290	2,433	35,987	3.2	
Feb.	.980	.720	19	.68	2	.10	.26	630	1,019	8,343	3.7	
Mar.	.770	.725	1	.23	30	.08	.14	384	887	9,129	16.4	
April	.770	.675	1	.21	30	.03	.09	240	207	1,282	0	
May	.670	.620	1	.02	30	0	.01	20.7	67.8	502	0	
June	.635	.410	1	0	15	0	0	0	143	1,716	0	
July	2.220	.405	5	7.00	1	0	.64	1,722	5,421	21,263	0	
Aug.	2.620	.860	5	5.18	27	0	.89	2,395	8,708	44,860	204	
Sept.	1.425	.670	6	.79	1	0	.08	213	2,094	20,160	13.9	
Oct.	.675	.590	1	0	8	0	0	0	2,064	58,371	0	
Nov.	.745	.660	29	.01	5	0	0	3.5	675	19,006	0	
Dec.	.745	.730	2	.01	13	0	.01	19.9	2,009	31,428	7.6	
Yearly	2.620	0.405		7.00		0	0.19	5,918	25,728	77,448	5,427	

φ Mean daily

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 1998.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.01	0.01	0.02	0.01	0	0	0	0.02	0.01	0	0.01	0.01
2	.01	.01	.02	.01	0	0	0	.02	.01	0	.01	.01
3	.01	.01	.02	.01	0	0	0	.01	.01	0	.01	.01
4	.01	.02	.02	.01	0	0	0	.01	.01	0	.01	.01
5	.01	.02	.02	.01	0	0	0	.01	.01	0	.01	.01
6	.01	.01	.02	.01	.01	0	2.38	.01	.01	0	.01	.01
7	.01	.01	.02	.01	.01	0	3.99	.01	.01	0	.01	.01
8	.01	.01	.02	.01	.01	0	.34	.01	.01	0	.01	.01
9	.01	.02	.02	.01	.01	0	0	.01	.01	0	.01	.01
10	.01	.02	.02	.01	.01	0	0	.01	.01	0	.01	.01
11	.01	.01	.02	.01	.01	0	0	.01	.01	0	.01	.01
12	.01	.01	.02	.01	.01	0	0	.01	.01	0	.01	.01
13	.01	.02	.02	.01	.01	0	0	.03	.01	0	.01	.01
14	.01	.01	.02	.01	0	0	0	.03	.01	0	.01	.01
15	.01	.02	.02	.01	0	0	0	.01	.01	0	.01	.01
16	.01	.02	.02	.01	0	0	0	.01	.01	0	.01	.01
17	.01	.02	.02	.01	0	0	0	1.56	.01	.01	.01	.02
18	.01	.02	.02	.01	0	0	0	.04	.01	.01	.01	.01
19	.01	.02	.02	.01	0	0	0	.01	.01	.01	.01	.02
20	.01	.02	.02	.01	0	0	.09	.01	0	0	.01	.02
21	.01	.02	.02	.01	0	0	3.14	.01	0	.01	.01	.02
22	.01	.02	.02	.01	0	0	.71	.01	0	.01	.01	.02
23	.01	.02	.02	.01	0	0	2.69	.01	0	.01	.01	.02
24	.01	.02	.01	.01	0	0	.99	2.01	0	.01	.01	.02
25	.01	.02	.01	.01	0	0	.01	.07	0	.01	.01	.02
26	.01	.02	.02	.01	0	0	.01	.01	0	.01	.01	.02
27	.01	.02	.01	.01	0	0	.01	.01	0	.01	.01	.01
28	.01	.02	.01	.01	0	0	.01	.01	0	.01	.01	.01
29	.01	.01	.01	0	0	0	.62	.01	0	.01	.01	.02
30	.01	.01	.01	0	0	0	.22	.01	0	.01	.01	.01
31	.01	.01	.01	.01	0	0	.01	.01	.01	.01	.01	.01
Sum	0.31	0.47	0.55	0.28	0.08	0	15.22	4.01	0.19	0.14	0.30	0.41

Current Year 1998

Period 1949-1998

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	360	8,822	1.6
Feb.			1	.02	1	.01	.02	40.6	126	1,233	2.2
Mar.			1	.02	124	.01	.02	47.5	142	2,594	.9
April			1	.01	129	0	.01	24.2	65.7	638	0
May			1	.01	1	0	0	6.9	33.3	210	0
June			1	0	1	0	0	0	22.8	208	0
July			7	3.99	1	0	.49	1,315	581	5,267	2.0
Aug.			24	2.01	13	.01	.13	346	1,140	14,207	.1
Sept.			1	.01	120	0	.01	16.4	356	3,249	0
Oct.			1	.01	1	0	0	12.1	326	5,837	0
Nov.			1	.01	1	.01	.01	25.9	74.5	497	0
Dec.			1	.02	1	.01	.01	35.4	133	1,348	0
Yearly				3.99		0	0.06	1,897	3,360	21,433	155

φ Mean daily

! And other days

09-4805.00 SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 8.9 kilometers east of Nogales, Arizona, 1.3 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 1998.

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 1994.

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 1998 --- ANNUAL AND PERIOD SUMMARY

Day	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.79	4.64	0.05	0	0	0.03	0	0	0	0
2	0	0	.48	3.96	.05	0	0	.09	0	0	0	0
3	0	0	.26	3.12	.04	0	0	0	0	0	0	0
4	0	.01	.12	2.61	.04	0	0	0	0	0	0	0
5	0	.40	.07	2.18	.03	0	.21	1.22	.02	0	0	0
6	0	.37	.05	1.61	.03	0	.54	1.39	0	0	0	0
7	0	.15	.03	1.22	.03	0	0	.10	0	0	0	0
8	0	.05	.02	.88	.03	0	0	0	0	0	0	0
9	0	.37	.01	.62	.02	0	0	0	0	0	0	0
10	0	2.92	.01	.42	.02	0	0	.15	0	0	0	0
11	0	1.64	.01	.40	.02	0	0	1.61	0	0	0	0
12	0	1.05	.01	.37	.02	0	0	.91	0	0	0	0
13	0	.79	.01	.37	.01	0	0	1.78	0	0	0	0
14	0	.65	.01	.31	.01	0	0	.10	0	0	0	0
15	0	1.30	.02	.31	.01	0	0	.01	0	0	0	0
16	0	2.46	.01	.27	.01	0	0	0	0	0	0	0
17	0	2.12	.01	.24	.01	0	0	1.76	0	0	0	0
18	0	7.45	.01	.21	.01	0	0	1.76	0	0	0	0
19	0	5.89	.01	.22	.01	0	0	.02	0	0	0	0
20	0	4.25	.01	.20	.01	0	0	0	0	0	0	0
21	0	6.66	.01	.19	.01	0	1.56	0	0	0	0	0
22	0	5.13	.01	.22	0	0	5.75	0	0	0	0	0
23	0	3.20	.01	.15	0	0	.34	0	0	0	0	0
24	0	2.29	.01	.14	0	0	0	0	0	0	0	0
25	0	1.95	.01	.10	0	0	0	0	0	0	0	0
26	0	1.73	.01	.08	0	0	0	0	0	0	0	0
27	0	1.50	.01	.11	0	0	0	0	0	0	0	0
28	0	1.16	.01	.08	0	0	0	0	0	0	0	0
29	0		.16	.06	0	0	0	0	0	0	0	0
30	0		3.71	.06	0	0	.96	0	0	0	0	0
31	0		6.32		0	0	.48	0	0	0	0	0
Sum	0	55.49	12.22	25.35	0.47	0	9.84	10.93	0.02	0	0	0

Current Year 1998

Period 1936-1998

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.			1	1	0	1	1	0	0	2,999	37,352	0
Feb.			18	7.45	1	1	0	1.98	4,794	2,231	25,344	0
Mar.			31	6.32	1	9	.01	.39	1,056	1,938	24,145	0
April			1	4.64	129		.06	.84	2,190	584	4,263	0
May			1	.05	122		0	.02	40.6	140	1,272	0
June			1	0	1	1	0	0	95.1	95.1	1,787	0
July			22	5.75	1	1	0	.32	850	3,008	19,255	0
Aug.			13	1.78	1	3	0	.35	944	6,308	56,481	12.1
Sept.			5	.02	1	1	0	0	1.7	1,770	111,633	0
Oct.			1	0	1	1	0	0	0	2,094	72,806	0
Nov.			1	0	1	1	0	0	0	614	9,108	0
Dec.			1	0	1	1	0	0	0	2,876	41,405	0
Yearly				7.45		0		0.31	9,876	24,657	108,071	1,662

φ Mean daily

! And other days

SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

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

RECORDS: Flows from the United States are deduced from total plant influent less the flows measured crossing the international boundary from Mexico. Records available: Continuous monthly record for plant influent since August 1951; daily records for plant influent, January 1952 through 1998.

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 Thousand Cubic Meters				Daily Flows—Thousand Cubic Meters Per Day					
	U.S.	Mexico	Plant*	Total	Current Year 1998			Period 1952-1998		
					Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	685	1,013	0	1,698	58.9	42.0	54.8	93.0	2.5	23.0
Feb.	743	994	0	1,737	69.2	55.2	62.0	80.4	2.5	23.6
Mar.	717	1,181	0	1,898	69.3	57.7	61.2	85.7	2.8	23.4
April	644	1,051	0	1,695	66.2	45.0	56.5	69.2	2.6	22.1
May	601	1,036	0	1,637	57.5	48.1	52.8	59.4	2.1	20.8
June	393	1,149	0	1,542	54.5	47.4	51.4	62.5	2.6	19.4
July	407	995	0	1,402	64.7	30.7	45.2	64.7	2.6	20.0
Aug.	498	1,256	0	1,754	75.6	31.9	56.6	75.6	2.8	21.8
Sept.	533	1,206	0	1,739	67.9	51.1	58.0	67.9	3.0	23.1
Oct.	527	1,153	0	1,680	58.7	50.6	54.2	76.3	2.6	23.0
Nov.	623	995	0	1,618	57.7	49.7	53.9	81.8	3.0	22.6
Dec.	557	1,105	0	1,662	58.8	44.3	53.6	75.9	1.3	23.0
Yearly	6,928	13,134	0	20,062	75.6	30.7	55.0	93.0	1.3	22.1

* 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			
	1998	Average 1973-1998	1998	Average 1930-1998	1998	Average 1930-1998	1998	Average 1953-1998		
Jan.	0	45	2	32	3	34	4	31		
Feb.	114	39	98	29	92	29	63	23		
Mar.	59	34	44	23	45	25	37	24		
April	13	13	7	10	8	10	2	9		
May	0	9	0	5	0	5	0	6		
June	0	13	0	18	0	11	0	10		
July	84	115	101	103	142	108	133	113		
Aug.	115	102	56	106	116	106	147	106		
Sept.	31	57	16	44	45	45	35	41		
Oct.	5	32	8	25	7	27	9	32		
Nov.	11	25	15	21	19	21	12	18		
Dec.	9	43	13	37	13	38	17	38		
Yearly	441	527	360	453	490	459	459	451		

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 1998.

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		
	1998		
	Mean	Max.	Min.
Jan.	7.8	25.0	-7.2
Feb.	7.4	23.9	-5.6
Mar.	10.9	28.9	-5.0
April	12.5	31.7	-2.8
May	18.1	35.0	2.2
June	22.6	41.1	5.6
July	26.7	41.1	15.6
Aug.	25.9	37.2	13.9
Sept.	23.9	36.1	6.1
Oct.	17.2	35.6	-0.6
Nov.	11.6	29.4	-3.9
Dec.	7.8	25.6	-8.3
Yearly	16.0	41.1	-8.3

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

1998

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.

CORRECTIONS TO PREVIOUS WATER BULLETINS

Water
Bulletin
And Page
Number

	<u>Heading</u>	<u>Reference</u>	<u>Published As</u>	<u>Correction</u>
1991-1997 Page 13	09-5305.00 DRAIN NO. 8-B (ARAZ DRAIN)	Period Maximum - Dec.	12,295	1,295