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WESTERN WATER BULLETIN 1982

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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

1982

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## CONTENTS

	Page
Foreword and Acknowledgments . . . . .	4
General Hydrologic Conditions for 1982 . . . . .	6
Map of Western Boundary . . . . .	48

### I - Colorado River - Imperial Dam to Gulf of California

Map of Colorado River Basin below Imperial Dam . . . . .	Following Page 93
--	-------------------

#### Quantity of Water

Diversions from the Colorado River at Lake Havasu above Parker Dam - Emergency Deliveries of Colorado River Waters for Use in Tijuana, Baja California . . . . .	8
Stream-Flow and Stage Records . . . . .	
Tributary - Reservation Main Drain No. 4 (California Drain) . . . . .	9
Yuma Main Canal Wasteway to Colorado River at Yuma, Arizona . . . . .	10
Colorado River below Yuma Main Canal Wasteway at Yuma, Arizona - Discharges . . . . .	11
below Yuma Main Canal Wasteway at Yuma, Arizona - Stages . . . . .	12
Tributary - Yuma Mesa Outlet Drain to Colorado River near Yuma, Arizona . . . . .	13
Drain No. 8-B (Araz Drain) . . . . .	14
Pilot Knob Power Plant and Wasteway near Pilot Knob, California . . . . .	15
Colorado River at Northerly International Boundary - Discharges . . . . .	16
at Northerly International Boundary - Stages . . . . .	17
Tributary - Cooper Wasteway (Valley Division, Yuma Project) . . . . .	18
Colorado River immediately above Morelos Dam - Stages . . . . .	19
Diversions from the Colorado River - Intake Canal at Morelos Diversion Structure - Discharges . . . . .	20
at Morelos Diversion Structure - Stages . . . . .	21
Colorado River immediately below Morelos Dam - Stages . . . . .	22
Tributary - Wellton-Mohawk Drainage Water Discharged to Colorado River below Morelos Dam . . . . .	23
Colorado River at Morelos Gaging Station - Discharges . . . . .	24
at Morelos Gaging Station - Stages . . . . .	25
Tributary - Eleven Mile Wasteway (Valley Division, Yuma Project) . . . . .	26
Colorado River at Eleven Mile Gage - Stages . . . . .	27
Tributary - Twenty-one Mile Wasteway (Valley Division, Yuma Project) . . . . .	28
East Main Canal Wasteway (Valley Division, Yuma Project) . . . . .	29
Yuma Main Drain (Valley Division, Yuma Project) . . . . .	30
West Main Canal Wasteway (Valley Division, Yuma Project) . . . . .	31
242 Well Field near San Luis, Arizona . . . . .	32
Total Flows Crossing International Boundary into Mexico near San Luis, Sonora . . . . .	33
Colorado River at Southerly International Boundary - Discharges . . . . .	34
at Southerly International Boundary - Stages . . . . .	35
Wellton-Mohawk Bypass Drain at Southerly International Boundary . . . . .	36
Tributary - Wasteway to Colorado River at Kilometer 27 in Mexico . . . . .	37
Colorado River at Miguel C. Rodriguez in Mexico - Discharges . . . . .	38
at Miguel C. Rodriguez in Mexico - Stages . . . . .	39
Tributary - Wasteway to Colorado River at Kilometer 38 in Mexico . . . . .	40
Colorado River at El Maritimo in Mexico - Stages . . . . .	41
Stored Water in Large Reservoirs of the Colorado River . . . . .	42

#### Quality of Water

Suspended Silt in the Colorado River and Intake Canal at Morelos Diversion Structure . . . . .	43
Chemical Analyses of Water Samples . . . . .	45
Electrical Conductivity of Water Samples . . . . .	46

#### Climatological Data and Irrigated Areas

Rainfall on the Colorado River Watershed . . . . .	50
Location of Rainfall Stations on the Colorado River Watershed . . . . .	51
Evaporation in the Colorado River Basin . . . . .	52
Temperature in the Colorado River Basin . . . . .	53
Irrigated Areas along the Colorado River below Imperial Dam . . . . .	55

### II - Alamo and New Rivers

#### Quantity of Water

Stream-Flow and Stage Records . . . . .	
Alamo River at International Boundary . . . . .	56
New River at International Boundary . . . . .	57
Tributary - Wastes from Mexicali Potable Water Plant to New River in Mexico . . . . .	58
Waste Waters from Mexican System of Canals entering the United States . . . . .	59
Salton Sea - Elevations of Water Surface . . . . .	60

**CONTENTS**

<b>Quality of Water</b>		<b>Page</b>
Chemical Analyses of Water Samples . . . . .		61
Electrical Conductivity of Water Samples . . . . .		62

**III - Tijuana River**

Map of Tijuana River Basin . . . . .	63
--------------------------------------	----

**Quantity of Water**

<b>Stream-Flow Records</b>		
Cottonwood Creek above Morena Dam, California . . . . .		64
below Morena Dam, California . . . . .		65
above Barrett Dam, California . . . . .		66
Diversions from Cottonwood Creek - Dulzura Conduit below Barrett Dam, California . . . . .		67
Cottonwood Creek below Barrett Dam, California . . . . .		68
above Tecate Creek near Dulzura, California . . . . .		69
Tributary - Campo Creek near Campo, California . . . . .		70
Cottonwood Creek near International Boundary . . . . .		71
Inflows to Rodriguez Reservoir, Baja California . . . . .		72
Diversions from Rodriguez Reservoir, Baja California . . . . .		73
Tijuana River at International Boundary . . . . .		74
Stored Water in Reservoirs, Tijuana River Basin . . . . .		75

**Climatological Data and Drainage Basin and Irrigated Areas**

Rainfall on the Tijuana River Watershed . . . . .	76
Location of Rainfall Stations in the Tijuana River Basin . . . . .	78
Evaporation in the Tijuana River Basin . . . . .	79
Temperature in the Tijuana River Basin . . . . .	80
Drainage Areas above Gaging Stations and Irrigated Areas along Tijuana River and Tributaries . . . . .	82

**IV - Whitewater Draw, San Pedro, and Santa Cruz Rivers**

Map of Western Boundary - Whitewater Draw, San Pedro River, and Santa Cruz River Basins . . . . .	83
---	----

**Quantity of Water**

<b>Stream-Flow Records</b>		
Whitewater Draw near Douglas, Arizona . . . . .		84
Sewage Influent, Douglas, Arizona International Treatment Plant . . . . .		85
Sewage Influent, Agua Prieta, Sonora International Oxidation Ponds . . . . .		86
San Pedro River at Palominas, Arizona . . . . .		87
Santa Cruz River near Lochiel, Arizona . . . . .		88
near Nogales, Arizona . . . . .		89
Sewage Influent, Nogales International Treatment Plant . . . . .		90

**Climatological Data and Drainage Basin and Irrigated Areas**

Rainfall and Location of Rainfall Stations on the Santa Cruz River Basin . . . . .	91
Temperature, Humidity, Evaporation, and Wind in the Santa Cruz River Basin . . . . .	92
Drainage Areas above Gaging Stations and Irrigated Areas along Santa Cruz River, San Pedro River, and Whitewater Draw . . . . .	93

## FOREWORD

This bulletin is the twenty-third annual compilation of stream discharges and other hydrographic data relating to international aspects of the Colorado River below Imperial Dam, the Tijuana River, and other streams crossing the western land boundary of the United States and Mexico. The compilation was prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission, solely for the purpose of presenting statistical data relating to stream flow and kindred subjects for the Colorado River from Imperial Dam to the Gulf of California, the Tijuana River and its important tributaries in the United States and Mexico, and other streams, including the Alamo and New Rivers which cross the California-Baja California boundary, and the Santa Cruz River and Whitewater Draw which cross the Arizona-Sonora boundary. This volume contains information for the year 1982.

Stream gaging on the Colorado River below Imperial Dam began in 1902 when the station at Yuma, Arizona was established. Stage records were obtained at this station from January 1878 until December 1973, when it was discontinued. Continuous stream gaging on the Tijuana River and its important tributaries in the United States and in Mexico began in 1936. Each government operates the gaging stations located within its own country.

### Colorado River below Imperial Dam

Below Imperial Dam, the Colorado River flows southward 10 miles to the mouth of the Gila River, thence westward 11 miles to Pilot Knob Mountain, and south 1 mile to the point where the northerly international land boundary, between California and Baja California, intersects the river. From this point the river continues to flow southward and forms the boundary between the United States and Mexico for a distance of about 22 miles to the point where the southerly international land boundary between Arizona and Sonora intersects the river. From this point the river continues to flow southward about 90 miles to discharge into the Gulf of California.

The ordinary flows of Colorado River below Imperial Dam are largely controlled by releases at Hoover Dam, completed in 1935. The releases are further regulated at Davis Dam, completed in 1950, and by Parker and Imperial Dams, completed in 1938. Small amounts of runoff may occasionally be contributed to the flow in the lower river from the usually dry arroyos draining the 10,900 square miles along the river from Hoover Dam to the mouth of the Gila River. In addition, flows ranging from usually minor amounts to infrequent torrential floods may enter the lower Colorado River from the Bill Williams River, draining about 717 square miles below Alamo Dam and Lake, completed in 1963; and from the Gila River, draining about 7,300 square miles below Painted Rock Dam and Reservoir, completed in January 1960.

At Imperial Dam, diversions are made to Gila Gravity Main Canal and All-American Canal for irrigation projects in Arizona, including the Yuma Valley, Gila and Wellton-Mohawk projects; and in California, including the Imperial Valley, Coachella Valley and Reservation Division of Yuma Project. Also, under the provisions of the 1944 Water Treaty, there may be diverted to the All-American Canal at Imperial Dam for delivery to Mexico in the Alamo Canal, or substitute canal, at the northerly boundary, a portion of Mexico's guaranteed annual allotment of waters of the Colorado River. No such diversions were made in 1982.

Below Laguna Dam, measured and unmeasured flows are returned to the river principally as waste and drainage water from the irrigation projects in the United States. Waste and drainage waters from irrigation projects in the United States also cross the boundary into Mexico near San Luis, Arizona without returning to the river in the United States.

In the limitrophe section of the river, 1.1 miles downstream from the northerly boundary, Morelos Dam, the principal diversion structure for Mexico, was completed and placed in operation on November 8, 1950. Since that date almost all the Colorado River flows that cross the northerly boundary (except emergency deliveries to Tijuana 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 1,731 square miles, of which 27 percent lies in the United States and 73 percent in Mexico. This river is formed by the principal tributaries, Cottonwood Creek, which rises in the United States and Rio de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 21 miles from the Pacific Ocean to join the Rio de las Palmas in Mexico. From the confluence of these tributaries, the Tijuana River flows northwesterly 5 miles to cross the land boundary into the United States near San Ysidro, California and Tijuana, Baja California, and then flows westerly 6 miles to discharge into the Pacific Ocean 2 miles north of the boundary. The flow of Cottonwood Creek is partially controlled by Barrett and Morena Reservoirs in the United States, and the flow of the Rio de las Palmas is partially controlled by Rodriguez Reservoir in Mexico.

### Whitewater Draw near Douglas, Arizona

Whitewater Draw rises in the United States and flows south into Mexico, crossing the international boundary near Douglas, Arizona, eventually discharging into the Gulf of California through the Yaqui River in Mexico. The total drainage area above the Douglas Gaging Station is 1,023 square miles. A number of mountain streams in the upper reaches of the basin are diverted for irrigation, but they would normally sink or go to ground water before reaching the main water course.

## FOREWORD

### San Pedro River at Palominas, Arizona

The San Pedro River rises in Mexico and flows north into the United States, crossing the boundary near Palominas, Arizona and thence northwesterly into the Gila River. The river in the vicinity of the international boundary drains an area of 741 square miles, of which 649 square miles are in Mexico.

### Santa Cruz River near Nogales and Lochiel, Arizona

The Santa Cruz River rises in the United States and flows south into Mexico, crossing the international boundary near Lochiel, Arizona and returning to the United States near Nogales, Arizona, eventually discharging into the Gila River southwest of Phoenix, Arizona. The drainage area of the Santa Cruz River above Nogales station is 533 square miles. Of this amount, 348 square miles lie in Mexico. There are a few ground water irrigation diversions above the Lochiel station in Arizona and an unknown amount of water diverted for irrigation in Mexico.

### Acknowledgments

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

### Units of Measure

Data collected by the Mexican Section are computed and published in a Spanish version of the water bulletin in metric units. The Mexican data are converted and reported in this bulletin in English units. Conversion factors conform generally to those in the National Bureau of Standards Miscellaneous Publication 286 "Units of Weight and Measure (United States Customary and Metric) - Definitions and Tables of Equivalents." However, for convenience some of the factors have been shortened and modified to facilitate conversion, reconversion to the original units when necessary, and checking of data. Conversion of the mean daily discharges, the monthly average discharge, and the monthly and annual volumes from metric to English units is direct. For this reason the monthly average discharge in cubic feet per second and monthly volumes in acre-feet shown for gaging stations operated by the Mexican Section cannot necessarily be obtained in the usual manner from the total monthly flow in second-foot days. For the same reason, evaporation and rainfall data, when totaled, may not be equivalent to the direct conversion from metric to English units. The following factors have been used for data in this bulletin:

<u>METRIC UNITS</u>	<u>LENGTHS</u>	<u>ENGLISH UNITS</u>
1 Centimeter		0.393701 Inch
1 Meter		3.28084 Feet
1 Kilometer		0.621371 Mile
	<u>AREAS</u>	
1 Square Meter		10.76391 Square Feet
1 Hectare		2.471054 Acres
1 Square Kilometer		0.386102 Square Mile
	<u>VOLUMES</u>	
1 Cubic Meter		61023.74 Cubic Inches
1 Cubic Meter		35.31467 Cubic Feet
1 Cubic Meter		1.30795 Cubic Yards
1000 Cubic Meters		0.81071 Acre-Foot
1 Liter		0.264172 U.S. Gallon
	<u>WEIGHTS</u>	
1 Kilogram		2.204623 Pounds
1 Metric Ton		2204.623 Pounds
1 Metric Ton		1.102311 Short Tons (2000 lbs)

## GENERAL HYDROLOGIC CONDITIONS FOR 1982

### 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 1982. In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation during 1982 measured at 5 index stations was 4.25 inches, compared to an average of 2.83 inches during the last 24 years (1959 to 1982).

The flow of the Colorado River reaching Imperial Dam was 5,410,100 acre-feet, about 69% of the 48-year average (1935-1982) of 7,859,342 acre-feet. At the northerly international boundary, the total flow of the river during 1982 was 1,440,927 acre-feet, about 42% of the 1935-1982 average of 3,455,632 acre-feet. At the southerly international boundary, the flow during 1982 was 9,570 acre-feet, or about 0.4% of the 1935-1982 average of 2,478,492 acre-feet. The total flow of the Colorado River reaching the M. C. Rodriguez gaging station, 24.5 miles downstream from the southerly international boundary and 4.5 miles upstream from the Sonora-Baja California railroad bridge, was 6,791 acre-feet in 1982, about 0.7% of the 1951-1982 average of 973,719 acre-feet.

The total of all flows of the Colorado River entering Mexico in 1982 amounted to 1,699,016 acre-feet, 42% of the 1935-1982 average of 4,012,447 acre-feet, as measured 1) in the Colorado River at the northerly international boundary, 2) in the Wellton-Mohawk Main Outlet Drain Extension near Morelos Dam, 3) in the waste-ways that discharge into the limitrophe section of the river from the United States bank, 4) in the canal which discharges waste and drainage waters from the Yuma Project across the southerly land boundary into Mexico near San Luis, Arizona, 5) emergency delivery of Colorado River water for use in Tijuana, Baja California, 6) in the Wellton-Mohawk Bypass Drain at southerly land boundary near San Luis, Arizona, and 7) the 242 Well Field near San Luis, Arizona.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1982. A maximum instantaneous flow of 5,010 second-feet occurred in the Colorado River at the northerly boundary station on December 10, 1982.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 26,337,900 acre-feet, 92% of the usable capacity of 28,588,400 acre-feet. The greater part (24,151,000 acre-feet) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River water for irrigation during 1982 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1982 was 1,191,609 acres; 609,188 acres in the United States and 501,421 acres in Mexico. An estimated 34% of acreage in Mexico is served by pumping from ground water.

The suspended sediment load passing the northerly boundary station in 1982 was 37.1 acre-feet, about 17% of the 1956-1982 average of 221.6 acre-feet.

### Tijuana River Basin

During 1982, the temperatures at Barrett Dam, California (elevation 1,750 feet) in the upper portion of the basin in the United States averaged 60.9 degrees, 0.4 degree below the 52-year mean. In the extreme upper portion of the basin in Mexico at San Juan de Dios, Baja California (elevation 3,280 feet), the recorded temperatures during the year averaged 54 degrees, 2 degrees below the long-term average; and at Rodriguez Dam, Baja California (elevation 459 feet), the recorded temperatures averaged 64 degrees, 2 degrees above the normal for many years.

At Barrett Dam in the upper portion of the basin in the United States, the 1982 recorded precipitation was 26.35 inches, 149% of normal; and at Chula Vista near the lower end of the basin, 12.55 inches, or 131% of normal. The recorded precipitation at San Juan de Dios in the upper portion of the basin in Mexico, was 34.45 inches, approximately 199% of the normal during the 27-year period; and at Rodriguez Dam in the lower portion of the basin in Mexico, 11.97 inches, 139% of the 45-year average.

Runoff above the Barrett and Rodriguez Reservoirs during 1982 averaged more than 171% of normal. Above Morena Reservoir the runoff was 20,534 acre-feet, or about 250% of the 46-year 1937-1982 mean of 8,207 acre-feet. Above Barrett Reservoir the runoff was 21,659 acre-feet, or about 193% of the 46-year 1937-1982 mean of 11,237 acre-feet. At Rodriguez Reservoir, the runoff was 27,363 acre-feet, or about 129% of the 45-year mean of 21,238 acre-feet.

The flow of the Tijuana River at the international boundary was 15,748 acre-feet during 1982.

### Whitewater Draw

During 1982, the average annual temperature over the watershed was 0.8 degree above normal, while the annual precipitation was above normal. Runoff for the year at the gaging station near Douglas, Arizona, of 1,784 acre-feet, was about 28% of average.

## GENERAL HYDROLOGIC CONDITIONS FOR 1982

### San Pedro River

During 1982, the average annual temperature was 0.1 degree above normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 124% of the 1961-1982 mean of 19.76 inches. The stream flow at the international boundary was 10,836 acre-feet, 49% of the 1951-1982 normal.

### Santa Cruz River

During 1982, the average annual temperature over the watershed was somewhat above normal, and the annual precipitation was about 110% of the 44-year 1939-1982 mean. Runoff measured at the Nogales gaging station, where the stream re-enters the United States, was 7,114 acre-feet. The total runoff for the year measured at the gaging station near Lochiel, Arizona, where the stream enters Mexico from the United States, was 1,069 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 6,095 acre-feet from the loop of the river lying in Mexico, or approximately 85% of the flow reaching the Nogales station.

### Alamo and New Rivers

During 1982, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, was 71.6 degrees, 0.6 degree below normal; and over the drainage area of the New River, as recorded at Mexicali, Baja California, it was 73.0 degrees, 1 degree above the 57-year average.

At El Centro, the precipitation was 4.92 inches, about 187% of the 52-year average; and in Mexicali the annual precipitation was 7.64 inches, 242% of the 57-year average. The total flow of the New River at the international boundary in 1982 was 156,997 acre-feet, which was about 178% of the 1943-1982 normal.

### Salton Sea

During 1982, the average annual temperature around the Salton Sea was about 98% of the long-term average, while the annual precipitation recorded at Brawley, California was approximately 136% of the long-term mean of 2.61 inches. The water surface of the Salton Sea remained more or less the same during the year. The maximum stage, 227.4 feet below mean sea level, was recorded on April 29 to May 5, 1982. The minimum stage, 228.7 feet below mean sea level, was recorded on November 6 to December 5, 1982.

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

**DESCRIPTION:** Delivery of water is measured at a metering station located adjacent to the international boundary near Tijuana, and approximately 2.5 miles (4.0 km) east of the International Boundary Monument #253. The metering station consists of two venturi tubes, 20 inches (50.8 cm) and 18 inches (45.7 cm), and two BIF recorders.

**RECORDS:** Based on totalizer readings read at approximately 8:00 a.m. each day on continuous chart readings furnished by the Otay Municipal Water District. Records available since August 13, 1972. These records reflect a 12% loss incurred in conveying the water from the point of diversion above Parker Dam to the international boundary.

**REMARKS:** Emergency deliveries of Colorado River waters for use in Tijuana began August 13, 1972 pursuant to Minute No. 240 of this Commission. The deliveries are conveyed approximately 323 miles (520 km), using the following conveyance works: The diversions works from Lake Havasu above Parker Dam and the Colorado River Aqueduct, the San Diego Aqueducts, the Otay Reservoir and facilities of the Otay Municipal Water District. Furthermore, the following additional facilities were constructed as provided in Minute 240; new pumps at the Otay Pumping Station, approximately 5,800 feet (1,768 m) of 24-inch (61.0 cm) pipe and various valves, meters and accessories near the international boundary. The facilities were developed to circumvent serious water shortages predicted for Tijuana.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sum</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Current Year 1982</b>								<b>Period 1973-1982</b>				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.				0		0	0	0	474	902	0	
Feb.				0		0	0	0	476	813	0	
Mar.				0		0	0	0	504	849	0	
Apr.				0		0	0	0	490	857	0	
May				0		0	0	0	517	887	0	
June				0		0	0	0	518	986	0	
July				0		0	0	0	525	1,021	0	
Aug.				0		0	0	0	500	918	0	
Sept.				0		0	0	0	412	904	0	
Oct.				0		0	0	0	429	905	0	
Nov.				0		0	0	0	404	902	0	
Dec.				0		0	0	0	404	993	0	
<b>Yearly</b>				0		0	0	0	5,653	10,258	0	
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
			0		0	0	0	0	6,973	12,653	0	

\* Includes 12% losses

Ø Mean daily

**RESERVATION MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)**

**DESCRIPTION:** Water-stage recorder (digital) located 500 feet (152 m) upstream from railroad culvert and one mile (1.6 km) northwest of Yuma, Arizona. Discharge measurements are made from a footbridge immediately below the gage. The drainage canal discharges into the outfall channel of the Yuma Main Canal Wasteway 200 feet (61.0 m) downstream from the spillway structure, and thence into the Colorado River on the right bank, 1,000 feet (305 m) upstream from Colorado River below Yuma Main Canal Wasteway, and 6.5 miles (10.5 km) upstream from the northerly international boundary. Prior to October 1955, published as "California Drainage Canal near Yuma, Arizona."

**RECORDS:** Based on current meter measurements and a continuous record of gage heights. Records are computed and furnished by the U. S. Geological Survey. Records available: Monthly discharge, January 1913 to April 1920, October 1921 to March 1925, and January 1934 to September 1947; daily and monthly discharge, October 1947 through 1982.

**REMARKS:** Reservation Main Drain No. 4 collects drainage and wastewater from the area east of the Yuma Main Canal on the Reservation Division of the Yuma Project, located in California. Since 1939, collection of seepage from the All-American Canal has caused large increases in drainage flows. Average annual flow prior to 1937 was 12,800 acre-feet (15,789,000 m<sup>3</sup>). Monthly and annual averages since 1937 are shown in the table below.

**EXTREMES:** Prior to 1937: Maximum annual flow 20,190 acre-feet (24,904,000 m<sup>3</sup>), 1916; minimum annual flow 8,920 acre-feet (11,003,000 m<sup>3</sup>), 1913.

**Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	56	45	56	54	63	70	64	55	55	54	48	54
2	56	45	63	55	64	76	60	56	54	56	51	52
3	55	46	67	56	63	73	63	55	49	55	47	54
4	55	46	60	56	62	71	70	55	56	55	55	51
5	54	47	58	55	62	58	59	58	58	54	51	56
6	55	46	57	56	66	62	57	58	57	54	50	46
7	58	50	56	57	66	57	57	64	56	59	50	49
8	62	47	59	63	67	55	59	59	55	56	49	41
9	61	46	62	62	75	59	57	61	52	54	46	51
10	53	47	59	59	65	65	55	65	53	57	51	51
11	55	47	56	62	58	69	58	65	65	62	53	39
12	63	47	57	62	66	69	54	61	58	54	47	39
13	66	49	69	60	67	60	56	59	57	55	49	37
14	65	52	61	61	66	60	55	61	62	56	43	35
15	62	54	66	59	65	61	56	58	60	53	44	33
16	63	54	64	63	65	61	61	53	66	59	46	32
17	64	51	67	70	67	63	55	55	70	54	48	32
18	49	56	65	65	67	58	57	52	62	54	46	31
19	49	53	58	60	69	55	56	66	56	51	49	31
20	50	59	61	61	69	62	56	62	58	51	50	31
21	48	61	73	61	71	64	58	55	62	51	45	31
22	48	56	58	61	74	65	55	51	58	51	47	32
23	47	55	55	62	69	66	56	50	55	53	47	31
24	50	57	53	62	72	64	57	50	59	55	47	31
25	47	56	54	64	72	65	59	66	57	53	47	29
26	46	57	57	72	81	68	57	53	58	51	43	29
27	47	55	59	65	74	62	57	58	59	49	52	28
28	45	57	64	66	82	61	61	50	63	52	45	28
29	45	60	65	65	88	63	62	49	64	50	42	29
30	44	58	66	66	88	70	61	48	65	52	48	31
31	46	57	57	62	82	62	55	56	57	57	46	30
<b>Sum</b>	1,664	1,441	1,869	1,840	2,165	1,912	1,803	1,764	1,759	1,677	1,436	1,174
<b>Current Year 1982</b>									<b>Period 1937-1982</b>			
Month	Extreme Gage Feet		Extreme Second-Foot			Average Second-Foot	Total Acre-Feet	Acre-Feet				
	High	Low	Day	High	Low			Average	Maximum	Minimum		
Jan.			13	66	30	44	53.7	3,300	3,153	4,780	877	
Feb.			21	61	1	45	51.5	2,858	2,976	4,320	563	
Mar.			21	73	24	53	60.3	3,707	3,663	5,240	1,240	
Apr.			26	72	1	54	61.3	3,650	3,684	5,250	1,160	
May			129	88	11	58	69.8	4,294	3,837	5,590	992	
June			2	76	1	55	63.7	3,792	3,714	5,580	885	
July			4	70	12	54	58.2	3,576	3,979	6,550	816	
Aug.			119	66	30	48	56.9	3,499	3,955	6,810	861	
Sept.			17	70	3	49	58.6	3,489	3,728	6,220	889	
Oct.			11	62	27	49	54.1	3,326	3,729	5,740	1,040	
Nov.			4	55	29	42	47.9	2,848	3,478	5,490	994	
Dec.			5	56	127	28	37.9	2,329	3,358	4,960	966	
<b>Yearly</b>				88		28	56.2	40,668	43,254	63,700	12,840	
	<b>Meters</b>		<b>Cubic Meters per Second</b>			<b>Thousands of Cubic Meters</b>						
				2.49		0.79	1.59	50,164	53,353	78,573	15,838	

Ø Mean daily

! And other days

**YUMA MAIN CANAL WASTEWAY TO COLORADO RIVER AT YUMA, ARIZONA**

**DESCRIPTION:** The wasteway receives water from the Yuma Main Canal at the check structure on the canal, 1,645 feet (501 m) upstream from the intake of the Colorado River siphon, and 3.2 miles (5.1 km) downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side, 1,000 feet (305 m) upstream from Colorado River below Yuma Main Canal Wasteway, and 6.5 miles (10.5 km) upstream from the northerly international land boundary.

**RECORDS:** Discharge is computed as the difference between the measured discharge of the Yuma Main Canal at the Siphon Drop Power Plant upstream and that of the same canal below the Colorado River siphon, with deductions for small irrigation diversions from the canal between the two gaging stations. Records obtained and furnished by U. S. Geological Survey. Records available: April 1913 through 1982.

**REMARKS:** The wasteway discharges to the river the flow in excess of irrigation water in the Yuma Main Canal. **EXTREMES:** Prior to 1935, when storage began in Lake Mead: Average annual flow, 297,800 acre-feet (367,333,000 m<sup>3</sup>); maximum annual flow, 913,700 acre-feet (1,127,040,000 m<sup>3</sup>), 1932; minimum annual flow, 114,900 acre-feet (141,728,000 m<sup>3</sup>), 1917. Since 1935: Maximum mean daily discharge, 2,020 second-feet (57.2 m<sup>3</sup>/sec), December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.7	12	6.6	6.2	5.4	11	4.6	8.0	447	145	7.3	577
2	8.1	17	6.9	5.8	5.4	12	5.4	8.0	595	125	7.7	617
3	11	9.3	9.5	6.2	5.7	11	5.4	8.0	635	140	4.8	595
4	8.8	11	6.9	5.8	5.9	201	5.1	8.0	634	165	2.1	561
5	7.4	9.6	11	5.4	6.1	699	7.5	8.0	595	199	3.1	576
6	7.2	10	6.9	7.5	6.0	632	6.9	8.0	557	205	137	689
7	6.9	8.5	6.9	5.3	5.8	625	5.4	8.0	613	175	165	637
8	7.2	8.9	6.9	4.1	5.8	613	15	8.0	674	147	168	681
9	6.9	9.3	7.2	3.9	120	505	10	8.0	742	175	182	661
10	7.3	11	7.7	3.9	854	356	8.5	8.0	604	67	181	164
11	7.7	11	12	8.1	583	170	8.5	8.0	454	17	163	4.6
12	202	8.5	7.3	4.8	693	299	8.5	8.0	603	72	163	18
13	966	11	14	4.8	761	464	8.5	8.0	432	193	140	12
14	821	10	6.9	11	724	579	9.3	8.0	391	186	125	5.4
15	800	14	6.9	7.7	785	588	9.3	8.0	480	211	130	6.2
16	450	11	6.3	6.6	795	612	9.3	8.0	460	184	104	26
17	608	7.7	6.2	6.2	678	621	9.2	8.0	567	184	126	6.9
18	4.6	7.4	6.5	5.4	726	665	9.3	8.0	495	211	139	6.9
19	5.0	6.9	6.9	5.4	765	747	9.3	8.0	584	243	132	7.7
20	5.4	6.9	6.9	5.4	586	649	9.3	8.0	569	260	181	8.5
21	6.2	6.9	6.5	4.6	454	3.9	9.3	8.0	531	277	215	8.5
22	6.2	8.7	13	4.7	456	4.2	9.2	8.0	606	249	313	12
23	6.6	6.9	6.9	4.6	450	6.5	8.7	8.0	617	235	324	9.3
24	6.9	5.8	6.2	4.6	431	12	8.9	8.0	500	226	343	8.5
25	7.7	7.4	6.2	4.6	470	7.7	15	8.0	533	244	331	8.5
26	8.0	8.2	6.2	4.6	424	9.1	9.7	8.0	512	263	318	8.5
27	8.7	6.2	7.5	5.2	513	5.4	9.3	321	523	245	358	8.5
28	9.7	6.2	12	5.4	557	5.4	9.2	781	575	259	306	11
29	11		6.7	5.4	8.5	5.4	9.2	650	657	206	259	19
30	11		7.8	9.1	12	6.9	9.2	600	717	209	418	8.5
31	11		6.2		9.7		9.2	469		24		13

<b>Sum</b>	4,041.2	257.3	241.6	172.3	11,901.3	9,125.5	271.2	3,029.0	16,902	5,741	5,446.0	5,975.5
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Current Year 1982								Period 1935-1982			
Month	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum
Jan.			13	966	18	4.6	130	8,016	50,340	110,700	626
Feb.			2	17.0	24	5.8	9.19	510	44,186	89,140	510
Mar.			13	14.0	117	6.2	7.79	479	43,693	90,190	357
Apr.			14	11.0	19	3.9	5.74	342	44,199	86,580	326
May			10	854	11	5.4	384	23,606	52,921	88,280	333
June			19	747	21	3.9	304	18,100	46,249	86,960	342
July			18	15.0	1	4.6	8.75	538	43,234	91,220	452
Aug.			28	781	11	8.0	97.7	6,008	43,838	89,890	441
Sept.			9	742	14	391	563	33,525	48,006	83,660	736
Oct.			21	277	11	17	185	11,387	44,458	90,050	567
Nov.			30	418	4	2.1	182	10,802	44,497	101,500	841
Dec.			6	689	11	4.6	193	11,852	48,937	108,800	598
<b>Yearly</b>				966		2.1	173	125,165	554,558	1,042,850	11,945
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>				
				27.4		0.06	4.90	154,390	684,042	1,286,345	14,734

Ø Mean daily                      I And other days

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

**DESCRIPTION:** Water-stage recorder located in California on the right bank of the river, 1,000 feet (305 m) downstream from the mouth of the Yuma Main Canal Wasteway, 0.6 mile (1.0 km) downstream from the abandoned gaging station on the Colorado River at Yuma, 5.2 miles (8.4 km) downstream from the mouth of the Gila River, 19.6 miles (31.5 km) downstream from Imperial Dam, and 6.4 miles (10.3 km) upstream from the northerly international boundary. Zero of the gage is 101.99 feet (31.09 m) above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on current meter measurements and a continuous record of gage heights. Computations by shifting control methods. Records obtained and furnished by U. S. Geological Survey. Records available: October 1963 through 1982. Records from January 1951 through September 1963 deduced from "Colorado River at Yuma" plus flows from "Reservation Main Drain No. 4" and "Yuma Main Canal Wasteway."

**REMARKS:** Reservoirs on the Colorado River, power developments, transmountain diversions, reservoirs on the Gila River, irrigation diversions, and return flows modify the river flow at this station.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	524	594	677	722	730	665	638	725	1,240	679	491	962
2	527	545	767	711	746	661	645	704	1,260	656	482	968
3	527	550	925	729	731	680	725	710	1,230	656	552	1,120
4	522	560	803	711	718	779	675	699	1,260	665	606	1,080
5	500	565	817	720	711	1,430	614	721	1,250	693	591	1,090
6	512	557	866	720	716	1,430	618	857	1,230	688	629	1,220
7	562	562	780	756	696	1,400	637	912	1,250	647	681	1,210
8	570	550	708	1,000	701	1,370	630	800	1,320	652	684	1,210
9	569	546	690	807	829	1,400	570	756	1,490	665	676	1,310
10	569	543	685	746	1,730	1,390	555	761	1,930	661	687	1,390
11	566	590	689	736	1,540	1,320	551	746	1,220	652	735	1,370
12	677	550	715	736	1,380	1,290	540	691	1,290	652	716	1,380
13	1,490	534	1,300	714	1,410	1,330	555	711	1,290	697	701	790
14	1,400	554	1,640	743	1,410	1,360	535	735	1,250	720	681	575
15	1,470	689	1,490	728	1,410	1,340	523	850	1,290	706	700	546
16	1,370	705	1,740	732	1,410	1,390	518	702	1,180	697	747	517
17	1,270	616	2,080	746	1,320	1,380	500	685	1,220	693	756	505
18	779	662	1,500	737	1,400	1,430	622	690	1,160	720	746	576
19	700	679	906	759	1,420	1,550	602	887	1,260	738	688	601
20	705	706	875	820	1,410	1,420	680	823	1,250	738	686	524
21	718	720	1,150	756	1,350	674	657	777	1,200	733	707	496
22	698	807	882	773	1,370	665	675	666	1,240	733	784	493
23	660	826	758	859	1,390	694	681	622	1,270	724	803	495
24	640	795	745	871	1,360	692	669	635	1,190	729	808	493
25	618	758	728	821	1,470	695	689	1,300	1,220	711	825	550
26	623	723	752	792	1,390	676	699	2,180	1,240	711	810	504
27	657	694	835	729	1,450	686	724	1,430	1,210	720	822	524
28	683	694	844	752	1,480	599	1,110	1,620	1,160	724	777	735
29	647		712	754	841	629	1,370	1,560	1,160	675	801	633
30	608		877	747	683	675	894	1,500	1,170	679	836	485
31	595		765		660		717	1,330		675		486
<b>Sum</b>	22,956	17,874	29,701	22,927	35,862	31,700	20,818	28,785	37,930	21,489	21,208	24,838

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low	Feet	Acre-Feet	Average	Maximum	Minimum
Jan.	11.62	9.72	13	1,550	6	478	741	45,533	186,024	979,890	29,857
Feb.	10.32	9.71	23	845	112	530	638	35,453	138,726	826,600	33,790
Mar.	12.76	9.42	17	2,220	1	670	958	58,911	155,621	1,073,270	34,604
Apr.	10.84	10.13	8	1,040	13	688	764	45,475	149,959	843,010	33,687
May	12.11	10.07	10	1,790	31	647	1,160	71,131	150,916	863,860	45,872
June	11.81	9.91	19	1,610	28	589	1,060	62,876	138,723	833,970	35,856
July	11.83	9.65	29	1,620	17	474	672	41,292	143,532	649,820	34,413
Aug.	13.09	9.94	26	2,420	23	598	929	57,094	151,460	670,050	33,610
Sept.	12.67	10.28	10	2,160	30	756	1,260	75,233	137,500	775,930	43,182
Oct.	10.80	9.65	31	1,040	31	491	693	42,623	113,905	802,210	34,965
Nov.	10.61	9.58	30	940	1	462	707	42,065	125,749	911,370	34,832
Dec.	12.03	9.59	10	1,690	27	454	801	49,265	153,352	1,114,550	33,023
<b>Yearly</b>	13.09	9.42		2,420		454	866	626,951	1,745,467	10,220,870	513,755
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>				
	3.99	2.87		68.5		12.9	24.5	773,338	2,153,016	12,607,341	633,712

! And other days

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

(See Preceding Page For Description)

**Mean Daily Gage Height in Feet 1982**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9.94	9.93	9.92	10.21	10.22	10.08	10.03	10.22	11.18	10.25	9.63	10.65
2	9.94	9.81	10.12	10.18	10.26	10.07	10.04	10.17	11.23	10.02	9.63	10.65
3	9.94	9.82	10.55	10.22	10.23	10.11	10.21	10.19	11.19	10.02	9.79	10.97
4	9.89	9.84	10.19	10.18	10.20	10.30	10.10	10.18	11.23	10.04	9.91	10.91
5	9.88	9.84	10.21	10.20	10.18	11.51	9.97	10.21	11.20	10.10	9.88	10.92
6	9.91	9.82	10.31	10.20	10.19	11.51	9.97	10.49	11.17	10.09	9.96	11.15
7	9.91	9.82	10.14	10.24	10.15	11.46	10.02	10.60	11.22	10.01	10.07	11.13
8	9.93	9.78	9.98	10.78	10.16	11.41	10.00	10.38	11.32	10.01	10.08	11.13
9	9.93	9.77	9.94	10.38	10.40	11.45	9.87	10.29	11.60	10.04	10.06	11.29
10	9.92	9.75	9.93	10.26	12.01	11.45	9.84	10.30	12.31	10.03	10.09	11.43
11	9.92	9.84	9.99	10.24	11.71	11.32	9.83	10.27	11.16	10.01	10.19	11.40
12	10.07	9.75	10.10	10.23	11.44	11.27	9.80	10.15	11.28	10.01	10.15	11.42
13	11.52	9.72	11.22	10.19	11.48	11.34	9.83	10.19	11.28	10.11	10.12	10.33
14	11.37	9.75	11.85	10.25	11.49	11.40	9.79	10.24	11.22	10.16	10.07	9.87
15	11.47	10.05	11.61	10.22	11.48	11.36	9.76	10.48	11.27	10.13	10.12	9.81
16	11.32	10.08	12.01	10.23	11.48	11.44	9.75	10.17	11.08	10.11	10.22	9.74
17	11.15	9.87	12.55	10.26	11.34	11.42	9.71	10.13	11.15	10.10	10.24	9.71
18	10.24	9.97	11.62	10.24	11.46	11.52	9.98	10.14	11.05	10.16	10.22	9.87
19	10.17	10.00	10.58	10.29	11.49	11.71	9.94	10.55	11.22	10.20	10.09	9.83
20	10.18	10.05	10.52	10.41	11.50	11.48	10.11	10.43	11.21	10.20	10.08	9.76
21	10.21	10.08	11.04	10.28	11.40	10.10	10.06	10.33	11.11	10.19	10.13	9.69
22	10.16	10.25	10.60	10.32	11.42	10.08	10.10	10.09	11.18	10.20	10.30	9.68
23	10.08	10.28	10.28	10.49	11.45	10.14	10.11	9.99	11.24	10.17	10.34	9.69
24	10.04	10.22	10.26	10.51	11.42	10.14	10.09	10.02	11.10	10.18	10.35	9.68
25	9.98	10.13	10.22	10.41	11.59	10.14	10.13	11.25	11.15	10.14	10.38	9.81
26	10.00	10.05	10.27	10.36	11.46	10.10	10.15	12.72	11.19	10.14	10.35	9.71
27	10.07	9.98	10.44	10.22	11.55	10.12	10.21	11.51	11.13	10.16	10.37	9.75
28	10.13	9.97	10.46	10.27	11.61	9.93	10.92	11.83	11.05	10.17	10.28	10.22
29	10.05		10.39	10.28	10.47	9.99	11.41	11.73	11.05	10.06	10.33	10.00
30	9.96		10.32	10.26	10.15	10.10	10.55	11.63	11.07	10.07	10.40	9.67
31	9.94		10.30		10.10		10.19	11.35		10.06		9.67
Avg.	10.23	9.94	10.58	10.29	11.02	10.82	10.08	10.59	11.23	10.11	10.13	10.31

### YUMA MESA OUTLET DRAIN TO COLORADO RIVER NEAR YUMA, ARIZONA

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

RECORDS: Records are furnished by U. S. Geological Survey. Monthly discharge July 1970 through 1982. Prior to July 21, 1972, records furnished by U. S. Bureau of Reclamation.

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

**Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
1	52	48	50	46	41	14	41	20	50	43	34	39			
2	52	48	50	46	41	15	33	37	50	43	33	39			
3	52	48	50	46	35	15	20	39	45	42	33	39			
4	52	48	48	46	23	15	41	38	39	42	33	39			
5	51	27	47	45	23	15	41	39	37	42	33	39			
6	48	51	47	42	19	15	41	41	36	42	33	39			
7	52	51	47	42	20	15	41	41	40	42	33	39			
8	52	51	47	42	41	15	41	40	43	40	33	39			
9	52	51	47	42	41	15	41	40	32	39	33	39			
10	49	51	47	42	41	23	41	36	19	39	19	39			
11	19	51	46	42	41	41	41	34	19	39	0	39			
12	0	51	46	42	41	41	41	32	19	39	0	37			
13	0	51	43	42	43	41	41	32	19	39	25	35			
14	0	51	43	42	43	41	41	26	19	40	40	35			
15	35	51	34	42	43	41	41	0	30	40	40	35			
16	52	51	16	42	45	41	40	0	43	40	40	35			
17	49	51	16	42	45	41	41	0	48	40	40	24			
18	51	51	16	42	45	41	41	20	50	40	28	18			
19	49	51	32	42	45	41	41	37	50	40	40	18			
20	49	51	47	41	45	41	41	39	50	40	40	18			
21	45	51	47	41	45	41	41	40	50	42	40	18			
22	44	51	47	41	45	41	41	40	50	42	40	17			
23	46	51	45	41	45	41	41	38	50	42	40	18			
24	42	51	46	41	43	41	41	24	50	42	39	18			
25	47	36	46	41	41	41	37	14	49	42	39	18			
26	48	48	46	41	32	41	33	14	48	38	39	18			
27	48	51	46	41	14	41	31	30	48	34	40	18			
28	48	51	46	41	14	41	13	44	48	34	39	18			
29	48	51	46	41	14	41	13	44	46	34	39	18			
30	48	48	46	41	14	41	15	44	43	34	36	18			
31	48	48	46	41	14	41	13	47	43	34	36	18			
<b>Sum</b>	1,328	1,374	1,326	1,268	1,082	977	1,109	970	1,220	1,229	1,001	881			
<b>Current Year 1982</b>												<b>Period 1971-1982</b>			
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet						
	High	Low	Day	High	Low	Average			Maximum	Minimum					
											Day	Day			
Jan.	1	1	52	112	0	42.8	2,634	2,704	5,840	0					
Feb.	1	6	51	5	27	49.1	2,725	2,526	4,830	0					
Mar.	1	1	50	116	16	42.8	2,630	2,942	5,430	4					
Apr.	1	1	46	120	41	42.3	2,515	2,759	5,120	242					
May	116	45	127	14	34.9	34.9	2,146	2,621	4,933	0					
June	111	41	1	14	32.6	32.6	1,938	2,701	4,828	0					
July	1	1	41	128	13	35.8	2,200	3,043	5,510	692					
Aug.	31	47	115	0	31.3	31.3	1,924	3,129	6,000	180					
Sept.	1	1	50	110	19	40.7	2,420	3,108	5,880	0					
Oct.	1	1	43	127	34	39.6	2,438	3,119	5,360	157					
Nov.	114	40	111	0	33.4	33.4	1,985	3,151	5,290	313					
Dec.	1	1	39	22	17	28.4	1,747	3,334	5,970	0					
<b>Yearly</b>			52		0	37.7	27,302	35,137	58,680	1,753					
<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>									
			1.47		0	1.07	33,677	43,341	72,381	2,162					

∅ Mean daily

! And other days

## DRAIN NO. 8-B (ARAZ DRAIN)

DESCRIPTION: This drain discharges into the Colorado River 4.0 miles (6.4 km) downstream from Colorado River below Yuma Main Canal Wasteway, and 2.5 miles (4.0 km) upstream from the northerly international boundary. Prior to October 1955, published as "Araz Drain".

RECORDS: Records are furnished by the U. S. Geological Survey from current meter measurements during the year. Records available: May 1948 through 1982.

REMARKS: Drain 8-B, which was constructed in February 1948, collects seepage water in the westerly section of the Reservation Division of the Yuma Project which lies in California. Flow in the drain between the mouth and the U. S. Highway No. 80 culvert, about 3,200 feet (975 m) upstream, is affected by backwater from the river during ordinary high stages.

EXTREMES: Mean daily discharge: Maximum, 24 second-feet (0.68 m<sup>3</sup>/sec) on September 1, 1953; minimum, 0.1 second-foot (0.003 m<sup>3</sup>/sec) several days in February 1966.

## Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	3.5	3.5	3.5	4.0	4.5	6.0	6.0	5.0	6.0	8.0	5.0
2	3.5	3.5	3.5	3.5	4.0	4.5	6.0	6.0	5.0	6.0	7.5	4.0
3	3.5	3.5	3.5	3.5	4.0	4.5	6.0	6.0	5.0	6.0	7.0	4.0
4	3.5	3.5	3.5	3.5	4.0	4.5	6.0	6.0	5.0	6.0	6.5	4.0
5	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	6.0	6.0	4.0
6	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	6.0	6.0	4.0
7	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	7.0	6.0	4.0
8	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	7.0	6.0	4.0
9	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	7.0	6.0	4.0
10	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	7.0	6.0	4.0
11	3.5	3.5	3.5	3.5	4.0	5.0	6.0	6.0	5.0	7.0	6.0	4.0
12	3.5	3.5	3.5	3.5	4.5	5.0	6.0	6.0	5.0	7.0	6.0	4.0
13	3.5	3.5	3.5	3.5	4.5	5.0	6.0	6.0	5.5	7.0	6.0	4.0
14	3.5	3.5	3.5	3.5	4.5	5.0	6.0	6.0	5.5	7.0	6.0	4.0
15	3.5	3.5	3.5	3.5	4.5	5.0	6.0	6.0	5.5	7.0	6.0	4.0
16	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	5.5	7.0	6.0	4.0
17	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	5.5	7.0	6.0	4.0
18	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
19	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
20	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
21	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
22	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
23	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
24	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
25	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
26	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	6.0	4.0
27	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	5.5	4.0
28	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	5.0	4.0
29	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	5.0	4.0
30	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	5.0	4.0
31	3.5	3.5	3.5	4.0	4.5	5.0	6.0	6.0	6.0	8.0	5.0	4.0
Sum	108.5	98.0	108.5	112.5	134.0	148.0	186.0	186.0	165.5	225.0	181.5	125.0
Current Year 1982								Period 1948-1982				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			1	3.5	1	3.5	3.50	215	304	899	39.3	
Feb.			1	3.5	1	3.5	3.50	194	263	746	40.5	
Mar.			1	3.5	1	3.5	3.50	215	320	853	62.7	
Apr.			1	4.0	1	3.5	3.75	223	338	1,000	66.8	
May			1	4.5	1	4.0	4.32	266	346	966	58.3	
June			1	5.0	1	4.5	4.93	294	362	1,030	67.4	
July			1	6.0	1	6.0	6.00	369	415	1,260	72.8	
Aug.			1	6.0	1	6.0	6.00	369	461	1,350	73.8	
Sept.			1	6.0	1	5.0	5.52	328	442	1,370	53.6	
Oct.			1	8.0	1	6.0	7.26	446	453	1,220	55.3	
Nov.			1	8.0	1	5.0	6.05	360	407	1,240	57.7	
Dec.			1	5.0	1	4.0	4.03	248	362	1,050	42.2	
Yearly				8.0		3.5	4.87	3,527	4,473	12,429	774	
		Meters		Cubic Meters per Second				Thousands of Cubic Meters				
				0.23		0.10	0.14	4,351	5,517	15,331	955	

Ø Mean daily

! And other days

**PILOT KNOB POWER PLANT AND WASTEWAY NEAR PILOT KNOB, CALIFORNIA**

**DESCRIPTION:** The Pilot Knob Power Plant and Wasteway is located on the All-American Canal, 20.8 miles (33.5 km) downstream from the intake at Imperial Dam, 6 miles (9.7 km) west of Yuma, about one mile (1.6 km) north of the northerly international boundary and empties into the old Alamo Canal in the United States and thence into the Colorado River through Rockwood gates, about one mile (1.6 km) upstream from the northerly international boundary. Water-stage recorder is located in forebay on right bank of the All-American Canal, 550 feet (168 m) upstream from wasteway gates and 1,800 feet (549 m) from entrance to the power plant. Datum of stage is 150.00 feet (45.72 m) above mean sea level. Tailrace gate is on left bank, 680 feet (207 m) downstream from power plant with automatic recording equipment in control house. All bypass gates are equipped with calibrated openings which are read on all gate changes. Datum of tailrace gate is at mean sea level; elevation of sill of wasteway gates is 147.88 feet (45.07 m), U. S. C. & G. S datum. Prior to October 1956, this station was published as "Pilot Knob Wasteway near Pilot Knob, California".

**RECORDS:** Daily discharge is computed from flowmeter equipment and head and openings on wasteway gates or from head and gate opening on wicket and wasteway gates. Records furnished by the U. S. Geological Survey. Records available: July 1944 through 1982. The wasteway was operated for the purpose of diverting Colorado River water to the Alamo Canal for use in Mexico from July 1944 to November 8, 1950 in accordance with arrangements between the United States and Mexico for emergency use of the All-American Canal facilities. Records since 1950 show water released through Pilot Knob Power Plant and Wasteway from the All-American Canal and returned to the Colorado River through Rockwood gates.

**REMARKS:** Pilot Knob Wasteway was completed in 1938, and the first flow occurred on February 5, 1939. Pilot Knob Power Plant was completed in January 1957, and the first flow occurred on January 14, 1957.

**EXTREMES:** Maximum mean daily discharge, 8,350 second-feet (236 m<sup>3</sup>/sec) on January 26, 1958; minimum daily discharge, no flow during long periods.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,470	1,010	1,980	2,940	1,800	2,720	1,090	1,710	0	0	168	0
2	1,470	1,050	1,850	2,970	1,440	2,390	1,090	1,790	0	0	171	0
3	1,460	994	1,750	2,900	1,300	1,080	1,020	1,740	0	0	159	0
4	1,240	994	1,960	2,970	1,450	1,010	1,020	1,740	0	0	87	0
5	1,280	994	1,930	3,190	1,390	0	1,270	1,680	0	0	100	0
6	1,130	994	1,920	3,320	1,390	0	1,260	1,460	0	0	99	0
7	1,100	994	2,040	3,330	1,340	0	1,210	1,430	0	0	0	0
8	1,020	1,050	2,280	2,930	1,190	0	1,210	1,500	0	0	0	0
9	1,010	1,050	2,300	3,170	1,020	0	1,260	1,430	0	0	0	874
10	1,010	1,150	2,360	3,280	0	0	1,250	1,430	0	0	0	3,240
11	1,010	1,040	2,310	3,340	0	0	1,290	1,430	0	0	0	2,720
12	1,010	1,310	2,300	3,270	0	0	1,350	1,420	0	0	0	1,540
13	0	1,290	2,140	3,300	0	0	1,330	1,420	0	0	0	1,520
14	0	1,270	2,080	3,320	0	0	1,350	1,390	0	0	0	1,180
15	0	1,280	2,090	3,310	0	0	1,420	1,350	0	0	20	1,050
16	0	1,300	2,420	3,190	0	0	1,410	1,400	0	0	0	1,050
17	0	1,460	2,300	3,100	0	0	1,520	1,420	0	0	0	1,050
18	981	1,420	2,180	3,150	0	0	1,390	1,350	0	0	0	1,050
19	1,160	1,420	2,890	2,890	0	0	1,490	1,080	0	0	0	1,050
20	1,300	1,490	2,900	2,830	0	0	1,420	1,020	0	0	0	1,070
21	1,260	1,470	2,460	2,900	0	1,020	1,420	1,050	0	0	0	1,180
22	1,290	1,440	2,790	2,870	0	1,030	1,420	1,240	0	0	0	1,210
23	1,420	1,410	2,930	2,620	0	1,080	1,420	1,280	0	0	0	1,210
24	1,420	1,470	3,080	2,560	0	1,200	1,380	1,250	0	0	0	1,340
25	1,430	1,640	3,140	2,630	0	1,090	1,360	1,370	0	0	0	1,300
26	1,400	1,580	3,220	2,480	0	1,190	1,470	1,220	0	0	0	1,320
27	1,390	1,630	3,130	2,550	0	1,310	1,430	642	0	0	0	1,270
28	1,370	1,750	3,100	2,420	0	1,410	1,470	0	0	0	0	976
29	1,300	3,090	2,340	1,360	1,340	1,400	0	0	0	0	0	1,110
30	1,290	3,120	2,110	1,550	1,240	1,200	0	0	0	0	0	1,410
31	1,330	3,120	0	2,290	0	1,480	0	0	25	0	0	1,600
<b>Sum</b>	<b>32,551</b>	<b>35,950</b>	<b>77,160</b>	<b>88,180</b>	<b>17,520</b>	<b>19,110</b>	<b>41,100</b>	<b>37,242</b>	<b>0</b>	<b>25</b>	<b>804</b>	<b>31,320</b>

Month	Extreme Gate Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day		Low	Average			Maximum	Minimum		
			Day	High								
Jan.	1	1	1	1,470	1	113	0	1,050	64,564	43,754	400,200	0
Feb.	28	1	1	1,750	1	3	994	1,280	71,306	26,688	149,500	0
Mar.	26	3	1	3,220	3	1,750	2,490	153,045	89,882	394,116	0	0
Apr.	11	30	2	3,340	30	2,110	2,940	174,902	114,085	362,400	0	0
May	31	110	0	2,290	110	0	565	34,750	31,908	353,038	0	0
June	1	5	0	2,720	5	0	637	37,904	71,585	365,732	0	0
July	17	3	1,020	1,520	3	1,020	1,330	81,521	124,366	385,131	0	0
Aug.	2	128	0	1,790	128	0	1,200	73,868	124,741	334,036	0	0
Sept.		0	0	0	0	0	0	0	54,945	319,121	0	0
Oct.	31	25	1	171	1	1	0	49.6	21,261	381,640	0	0
Nov.	2	171	1	171	1	1	0	26.8	1,595	24,031	383,028	0
Dec.	10	1	1	3,240	1	1	0	1,010	62,122	51,288	336,397	0
<b>Yearly</b>				<b>3,340</b>			<b>0</b>	<b>1,040</b>	<b>755,627</b>	<b>778,534</b>	<b>3,850,009</b>	<b>0</b>
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
				<b>94.6</b>		<b>0</b>	<b>29.5</b>	<b>932,058</b>	<b>960,314</b>	<b>4,748,948</b>	<b>0</b>	

0 Mean daily      ! And other days

### COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

**RIPTION:** 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 6.4 miles (0.3 km) downstream from Colorado River below Yuma Main Canal Wasteway, 5 miles (8.0 km) west of Yuma, Arizona, 1.1 miles (1.8 km) upstream from Morelos Diversion Structure, and about one mile (1.6 km) downstream from Rockwood Gate. Zero of the gage is at mean sea level, U. S. C. & G. S. datum. Station is operated by the United States Section of the Commission.

**RECORDS:** Based on 299 current meter measurements during the year, 198 by the United States Section, '95 by the Mexican Section of the Commission, 6 by the U. S. Geological Survey, and a continuous record of gage heights. Discharges are computed on the basis of a water-stage recorder 1,680 feet (512 m) 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 1982; daily discharge records available January 1, 1950 through 1982.

**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 1982, the flow at this point, and the emergency deliveries for Tijuana, Baja California shown on page 8, 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 250,000 second-feet, (7,080 m<sup>3</sup>/sec), January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 13,443,000 acre-feet (16,581,806,000 m<sup>3</sup>); maximum annual flow 25,480,000 acre-feet (31,429,325,000 m<sup>3</sup>), 1907; minimum annual flow 1,174,000 acre-feet (1,448,117,000 m<sup>3</sup>), 1934. Since January 1935: Maximum mean daily discharge, about 33,000 second-feet (934 m<sup>3</sup>/sec), February 7, 1942; minimum discharge, no flow during April 1935.

#### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,100	1,800	2,700	3,600	2,810	3,340	1,880	2,500	1,340	799	696	1,090
2	2,090	1,730	2,740	3,620	2,510	3,100	1,870	2,590	1,340	720	687	1,110
3	2,080	1,710	2,760	3,600	2,310	1,900	1,910	2,560	1,340	730	730	1,290
4	1,860	1,720	2,820	3,620	2,290	1,830	1,900	2,560	1,370	730	728	1,280
5	1,910	1,690	2,830	3,840	2,250	1,500	1,930	2,530	1,310	735	740	1,300
6	1,800	1,690	2,880	3,970	2,270	1,440	1,920	2,440	1,330	740	748	1,410
7	1,790	1,690	2,880	3,970	2,190	1,410	1,900	2,450	1,330	750	750	1,420
8	1,710	1,740	2,960	3,860	2,030	1,390	1,900	2,400	1,410	720	757	1,400
9	1,670	1,760	2,960	3,830	1,970	1,430	1,880	2,300	1,510	730	743	2,300
10	1,670	1,810	3,020	3,900	1,730	1,420	1,890	2,310	2,010	720	741	4,720
11	1,670	1,810	3,030	3,970	1,460	1,380	1,920	2,320	1,320	710	795	4,020
12	1,650	1,930	3,060	3,990	1,450	1,340	1,980	2,230	1,360	725	770	3,010
13	1,620	1,910	3,350	3,960	1,490	1,370	1,960	2,260	1,380	750	780	2,470
14	1,550	1,920	3,710	3,990	1,500	1,450	1,960	2,270	1,350	800	767	1,870
15	1,590	2,080	3,650	3,990	1,480	1,390	1,980	2,350	1,350	777	781	1,740
16	1,600	2,080	4,050	3,900	1,490	1,420	1,960	2,200	1,320	770	759	1,710
17	1,470	2,170	4,530	3,900	1,380	1,420	2,020	2,230	1,330	760	762	1,690
18	1,850	2,190	3,860	3,940	1,440	1,480	2,050	2,120	1,290	795	784	1,750
19	1,960	2,190	3,830	3,780	1,460	1,650	2,090	2,130	1,360	807	790	1,790
20	2,080	2,270	3,760	3,760	1,480	1,610	2,130	2,030	1,370	813	780	1,780
21	2,070	2,270	3,680	3,740	1,410	1,860	2,100	1,990	1,290	810	800	1,800
22	2,060	2,340	3,700	3,750	1,410	1,860	2,130	2,010	1,340	825	900	1,790
23	2,130	2,330	3,710	3,610	1,460	1,900	2,120	1,950	1,360	815	904	1,810
24	2,130	2,360	3,720	3,550	1,440	1,980	2,100	1,940	1,290	830	905	1,970
25	2,140	2,430	3,750	3,560	* 1,500	1,910	2,100	2,530	1,300	810	930	1,970
26	2,150	2,430	3,860	3,410	1,440	1,940	2,180	3,270	1,330	798	920	1,960
27	2,160	2,380	3,860	3,380	1,460	2,130	2,200	2,260	1,330	805	940	1,920
28	2,180	2,540	3,850	3,340	1,530	2,120	2,470	1,660	1,310	810	886	1,940
29	2,080		3,870	3,260	2,400	2,120	2,860	1,660	1,290	770	929	1,950
30	2,040		3,860	3,080	2,290	2,040	2,210	1,600	1,340	750	943	2,080
31	2,060		3,840		3,010		2,230	1,440		788		2,250
Sum	58,920	56,970	107,080	111,670	56,340	53,130	63,730	69,090	40,910	23,892	24,145	60,590

Current Year 1982

Period 1935-1982

Month	Extreme Gage Feet		Extreme Second-Foot			Average Second-Foot	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low			Average	Maximum	Minimum	
						Day	Day				Day
Jan.	103.45	102.42	28	2,220	17	1,290	1,900	116,866	371,471	1,644,000	31,900
Feb.	103.74	102.70	28	2,600	5	1,650	2,030	112,998	310,682	1,378,000	60,400
Mar.	104.96	103.53	17	4,760	1	2,440	3,450	212,390	335,492	1,120,000	19,400
Apr.	105.12	103.97	11	4,140	30	3,030	3,720	221,494	276,781	823,850	0
May	104.67	102.53	31	3,080	17	1,330	1,820	111,749	264,959	1,151,000	71,400
June	105.32	102.46	1	3,570	21	1,220	1,770	105,382	254,646	1,175,000	8,500
July	104.19	102.95	29	3,060	3	1,810	2,060	126,407	257,613	763,800	24,400
Aug.	104.45	102.51	26	3,480	31	1,400	2,230	137,038	272,042	791,600	53,800
Sept.	103.37	102.38	10	2,180	11	1,140	1,360	81,144	234,841	1,029,000	53,851
Oct.	102.80	101.85	1	1,160	31	630	771	47,389	232,301	1,186,000	42,956
Nov.	102.30	101.84	15	1,400	2	640	805	47,891	281,270	1,422,000	41,403
Dec.	106.32	102.18	10	5,010	22	1,000	1,950	120,179	363,574	1,832,000	42,000
Yearly	106.32	101.84		5,010		630	1,990	1,440,927	3,455,632	10,596,900	722,100
	Meters		Cubic Meters per Second			Thousands of Cubic Meters					
	32.41	31.04		142		17.8	56.4	1,777,369	4,262,488	13,071,170	890,703

\* Partly estimated

## COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

## Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.31	103.04	*103.74	104.64	103.77	105.09	103.05	103.49	102.47	*102.20	101.85	102.06
2	103.34	102.85	103.83	104.63	103.36	104.57	103.03	103.81	102.46	*101.87	101.86	102.25
3	103.24	102.85	103.89	104.61	*103.13	*103.18	103.07	103.73	102.46	*101.89	101.87	102.40
4	102.94	102.84	103.98	104.62	103.19	*103.19	103.13	103.76	102.49	*101.92	101.88	102.38
5	103.06	102.80	104.00	104.88	103.29	*103.04	103.18	103.73	102.46	101.90	101.89	102.40
6	102.95	102.86	104.06	104.94	103.56	*102.71	103.26	*103.65	102.47	101.91	101.90	102.45
7	102.80	102.80	103.98	104.93	103.39	*102.50	103.16	*103.49	102.46	101.90	101.91	102.50
8	102.76	102.80	104.03	104.81	103.20	102.49	103.19	103.37	102.61	101.86	101.90	102.46
9	102.69	102.77	104.07	104.69	103.23	102.52	103.12	103.26	102.90	101.90	101.89	103.26
10	102.68	102.76	104.17	104.84	*103.08	102.52	103.21	103.31	103.24	101.90	101.89	105.83
11	102.69	102.75	104.16	104.91	102.73	102.57	103.26	103.48	102.58	101.90	101.94	104.43
12	102.67	102.83	104.15	104.97	102.63	102.53	103.36	103.41	102.49	101.88	101.90	103.71
13	102.62	102.83	104.31	104.94	102.73	102.55	103.27	103.43	102.62	101.90	101.91	103.40
14	102.59	102.84	104.58	104.94	102.80	102.74	103.17	103.53	102.62	101.96	101.90	102.90
15	102.65	102.98	104.53	104.98	102.78	102.59	103.07	103.75	102.51	101.95	101.92	102.78
16	102.75	103.01	104.67	104.94	102.80	102.57	103.00	103.54	102.59	101.93	101.90	102.74
17	102.60	103.11	104.63	104.80	102.80	102.52	103.03	103.28	102.55	101.91	101.90	102.72
18	102.95	103.09	104.54	104.81	102.82	102.57	103.05	103.23	*102.59	101.95	101.91	102.75
19	102.95	103.06	104.42	104.67	102.79	102.73	103.08	103.34	*102.70	101.96	101.93	102.79
20	103.05	103.15	104.40	104.64	102.77	102.77	103.12	103.23	*102.70	102.00	101.92	102.79
21	103.07	103.14	104.39	104.67	102.66	103.08	103.08	*103.05	102.48	101.99	101.93	102.80
22	103.06	103.22	104.43	104.64	102.65	103.09	103.12	*103.01	102.50	102.04	102.01	101.85
23	103.10	103.22	104.50	104.50	102.96	103.16	103.13	*102.96	102.54	102.00	102.03	102.89
24	103.10	103.24	104.65	104.40	102.91	103.22	103.13	*102.94	102.53	102.04	102.03	102.95
25	103.08	103.37	104.66	104.38	102.98	103.06	103.09	103.46	102.58	102.03	102.07	102.93
26	103.11	103.48	104.78	104.20	102.88	102.97	103.13	104.14	102.60	101.95	102.06	102.92
27	103.28	103.40	104.82	104.21	102.90	103.25	*103.15	103.55	102.70	101.94	102.08	102.89
28	103.37	*103.64	104.84	104.19	102.87	103.37	103.50	102.78	102.72	101.96	*102.07	102.91
29	103.27		104.85	104.16	103.42	103.44	*104.00	102.76	102.74	101.92	*102.07	102.93
30	103.18		104.84	104.00	103.23	103.25	*103.21	102.67	102.83	101.90	102.18	103.06
31	103.21		104.82		104.19		103.18	102.54		101.95		103.26
Avg.	102.97	103.03	104.38	104.65	103.05	102.99	103.18	103.34	102.61	101.95	101.95	102.95

\* Partly estimated

## COOPER WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging regulatory waste water from the Cooper Canal to the Colorado River. This wasteway is located 0.5 mile (0.8 km) downstream from the northerly international boundary and 0.6 mile (1.0 km) upstream from Morelos Diversion Dam. Prior to July 14, 1971, the wasteway was located 0.4 mile (0.6 km) downstream from Morelos Diversion Dam. This wasteway discharges waste water from the Valley Division of the Yuma Project in the United States into the Colorado River. Since July 14, 1971, zero of the gage is 117.64 feet (35.86 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, March 1950 through 1982 obtained by the United States Section; monthly discharge, January 1934 through March 1950 by the Bureau of Reclamation.

EXTREMES: Prior to March 1950, maximum monthly discharge 914 acre-feet (1,127,000 m<sup>3</sup>) in January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 79.3 second-feet (2.25 m<sup>3</sup>/sec) on June 19, 1965, at a maximum gage height of 114.13 feet (34.79 m) (old datum); minimum instantaneous discharge, zero during parts of each month.

Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.3	1.2	0.1	0	3.6	0.1	0	0.4	0	1.0	0.3	2.5
2	.2	.2	0	0	.4	1.4	0	0	0	0	0	.1
3	.2	.1	0	2.9	.1	0	3.4	0	.2	1.4	0	3.3
4	.2	0	0	.4	* .1	.6	0	0	0	3.0	0	1.3
5	.5	2.6	2.5	.1	0	.4	0	0	0	3.0	0	.2
6	3.6	20.6	1.6	0	0	.3	0	0	0	2.2	0	0
7	3.7	2.9	4.6	0	0	.1	0	1.8	.1	1.1	0	0
8	4.9	7.4	.1	0	5.1	0	0	0	.1	.1	7.6	0
9	2.5	.2	0	0	.4	0	0	2.0	2.1	0	.3	.6
10	.7	.1	0	3.1	0	1.1	0	.3	6.1	0	0	.2
11	.1	.5	0	.5	0	.1	.9	.3	.7	1.3	0	0
12	0	1.2	1.0	0	0	.1	* 1.0	.3	3.4	1.2	0	0
13	0	1.0	0	0	0	0	1.1	.4	3.8	.2	1.9	0
14	0	.7	7.7	0	0	0	3.2	1.0	.1	0	2.5	0
15	0	.4	* 6.2	1.1	0	.2	.6	7.4	.1	0	1.5	0
16	.4	.3	0	.2	0	.7	0	.3	0	0	2.1	0
17	.8	1.9	0	4.7	0	.4	0	.1	.6	.7	2.5	0
18	1.1	4.3	0	.3	0	0	0	.1	1.2	3.2	0	0
19	0	.4	0	* .2	4.2	0	0	1.6	1.9	.1	0	0
20	0	.1	1.0	* .1	0	.1	0	.4	1.3	.1	.1	0
21	0	.1	3.4	0	0	.1	0	.1	.5	0	2.6	0
22	0	0	.2	0	0	2.7	2.7	0	.1	0	4.7	0
23	0	1.3	1.6	3.6	5.8	.1	1.5	0	.3	0	1.6	0
24	0	0	.3	.2	3.3	.2	1.6	0	0	.9	1.4	0
25	0	0	.1	.1	.6	0	* .6	.2	0	3.9	3.5	0
26	3.2	5.7	0	.1	0	2.2	* .3	.9	0	3.7	.3	0
27	5.2	.6	2.1	* .6	0	.3	.2	3.7	0	.4	.2	0
28	.2	.4	.3	.1	1.8	.1	.1	.4	0	1.2	5.8	2.6
29	.1	0	0	0	.1	.1	0	0	.3	1.5	.2	4.9
30	.1	1.5	.6	0	0	0	.8	0	3.7	2.7	2.7	.2
31	1.4	1.0	0	0	0	0	7.0	0	10.8	0	0	.1
Sum	29.4	54.2	35.3	18.9	25.5	11.4	25.0	21.7	26.6	43.7	41.8	16.0
Current Year 1982												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1935-1982			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	1.90	0	18	33.2	110	0	0.9	58.3	160	914	0	
Feb.	2.40	0	6	44.5	14	0	1.9	108	142	400	6.0	
Mar.	1.45	0	6	23.4	11	0	1.1	70.0	152	517	0	
Apr.	1.84	0	23	31.9	11	0	.6	37.5	159	425	27.8	
May	1.55	0	19	25.6	11	0	.8	50.6	158	440	40.3	
June	1.53	0	26	25.1	11	0	.4	22.6	144	595	22.6	
July	1.24	0	3	19.0	11	0	.8	49.6	135	516	0	
Aug.	2.35	0	15	43.4	12	0	.7	43.0	104	617	0	
Sept.	1.52	0	9	24.9	11	0	.9	52.8	104	462	0	
Oct.	1.89	0	30	33.0	12	0	1.4	86.7	131	490	0	
Nov.	1.92	0	14	33.6	12	0	1.4	82.9	152	462	9.0	
Dec.	1.94	0	1	34.1	16	0	.5	31.7	171	592	13.7	
Yearly	2.40	0		44.5		0	1.0	694	1,712	4,500	638	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.73	0		1.26		0	0.03	856	2,112	5,551	787	

\* Partly estimated

! And other days

## COLORADO RIVER IMMEDIATELY ABOVE MORELOS DAM - STAGES

**DESCRIPTION:** Water-stage recorder located on the right bank of the Colorado River in Mexico attached to the upstream abutment of the gates of the Intake Canal at Morelos Dam, 1.1 miles (1.8 km) downstream from the northerly international boundary, and about 7.5 miles (12.1 km) downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 0.16 foot (0.05 m) below mean sea level.

**RECORDS:** Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage height records November 8, 1950 to June 3, 1951; a continuous record of gage heights June 4, 1951 through 1982.

**REMARKS:** Prior to June 4, 1951, when a continuous water-stage recorder was installed, mean daily gage height records were determined from hourly readings of a staff gage.

**EXTREMES:** Since November 8, 1950: Maximum mean daily elevation above mean sea level, 113.48 feet (34.59 m) on August 18, 1977; minimum mean daily elevation above mean sea level, 101.51 feet (30.94 m) on February 17, 1957.

## Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102.99	102.76	103.35	104.23	103.44	104.89	102.69	103.12	102.20	102.00	101.71	102.00
2	103.02	102.56	103.44	104.20	103.02	104.27	102.66	103.44	102.20	101.67	101.71	102.03
3	102.89	102.56	103.51	104.20	102.79	102.95	102.72	103.38	102.20	101.67	101.74	102.17
4	102.62	102.56	103.61	104.20	102.85	102.99	102.79	103.41	102.20	101.71	101.74	102.13
5	102.76	102.53	103.67	104.43	102.99	102.69	102.82	103.38	102.17	101.71	101.74	102.17
6	102.62	102.59	103.71	104.49	103.28	102.36	102.92	103.31	102.17	101.71	101.74	102.23
7	102.46	102.49	103.61	104.49	103.05	102.30	102.82	103.15	102.17	101.71	101.74	102.23
8	102.46	102.49	103.61	104.36	102.85	102.30	102.85	102.99	102.33	101.67	101.74	102.23
9	102.36	102.49	103.67	104.23	102.92	102.33	102.82	102.89	102.62	101.74	101.74	103.05
10	102.33	102.49	103.77	104.36	102.76	102.33	102.89	102.95	102.92	101.74	101.74	105.48
11	102.36	102.49	103.77	104.46	102.46	102.36	102.95	103.15	102.33	101.74	101.77	104.04
12	102.33	102.56	103.74	104.53	102.40	102.33	103.05	103.08	102.23	101.74	101.77	103.28
13	102.33	102.56	103.90	104.49	102.49	102.36	102.95	103.12	102.33	101.74	101.77	103.02
14	102.30	102.56	104.13	104.49	102.56	102.56	102.82	103.22	102.33	101.80	101.77	102.66
15	102.33	102.66	104.04	104.56	102.53	102.40	102.72	103.44	102.23	101.80	101.77	102.53
16	102.43	102.69	104.20	104.56	102.56	102.40	102.66	103.25	102.30	101.77	101.77	102.53
17	102.30	102.79	104.13	104.40	102.56	102.30	102.66	102.95	102.26	101.77	101.77	102.49
18	102.56	102.79	104.13	104.43	102.53	102.26	102.69	102.89	102.33	101.80	101.77	102.53
19	102.56	102.76	104.00	104.30	102.49	102.43	102.69	103.02	102.43	101.84	101.77	102.56
20	102.66	102.82	104.00	104.27	102.49	102.46	102.76	102.92	102.43	101.87	101.77	102.53
21	102.66	102.79	104.00	104.30	102.36	102.76	102.72	102.69	102.23	101.84	101.77	102.56
22	102.66	102.85	104.00	104.23	102.36	102.76	102.72	102.66	102.23	101.90	101.87	102.56
23	102.69	102.85	104.07	104.07	102.66	102.89	102.76	102.62	102.30	101.87	101.87	102.62
24	102.69	102.85	104.23	104.00	102.62	102.92	102.76	102.62	102.26	101.90	101.90	102.66
25	102.66	102.99	104.20	103.94	102.69	102.76	102.72	103.05	102.30	101.90	101.90	102.66
26	102.69	103.12	104.33	103.77	102.59	102.62	102.76	103.71	102.33	101.80	101.87	102.66
27	102.85	103.05	104.40	103.77	102.62	102.92	102.82	103.28	102.43	101.80	101.90	102.59
28	102.95	103.28	104.43	103.81	102.59	103.05	103.12	102.56	102.46	101.80	101.87	102.62
29	102.95		104.43	103.77	103.12	103.08	103.61	102.49	102.46	101.77	101.87	102.66
30	102.89		104.43	103.64	102.95	102.92	102.85	102.40	102.56	101.77	101.87	102.76
31	102.92		104.43		104.00		102.79	102.26		101.80		103.05
<b>Avg.</b>	102.62	102.72	103.97	104.23	102.76	102.72	102.82	103.02	102.33	101.77	101.80	102.69

## INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

**DESCRIPTION:** Water-stage recorder and staff gage on left bank of Intake Canal, 200 feet (61.0 m) downstream from the intake at Morelos Dam, 1,350 feet (410 m) upstream from the point where it joins the old Alamo Canal, 2.2 miles (3.5 km) upstream from Matamoros Check, and about one mile (1.6 km) south of the northerly international boundary. The zero of the gage is 0.16 foot (0.05 m) 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 1982. 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 1982, 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, 6,540 second-feet (185 m<sup>3</sup>/sec), August 3, 1958; maximum mean daily gage height 107.05 feet (32.63 m) November 8, 1950. Minimum daily discharge, no flow on various occasions.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,090	1,770	2,690	3,600	2,800	1,920	1,870	2,490	1,330	788	685	1,080
2	2,080	1,720	2,730	3,600	2,500	1,830	1,860	2,580	1,330	710	675	1,100
3	2,070	1,700	2,750	3,600	2,300	1,800	1,900	2,550	1,330	724	717	1,280
4	1,850	1,710	2,810	3,600	2,280	1,820	1,890	2,550	1,360	724	713	1,270
5	1,900	1,690	2,820	3,810	2,240	1,490	1,920	2,520	1,300	727	727	1,290
6	1,790	1,710	2,870	3,960	2,260	1,430	1,910	2,430	1,320	731	735	1,400
7	1,790	1,690	2,870	3,960	2,180	1,400	1,890	2,440	1,330	738	738	1,410
8	1,710	1,740	2,950	3,950	2,020	1,380	1,890	2,390	1,400	710	752	1,390
9	1,660	1,750	2,950	3,810	1,960	1,420	1,870	2,290	1,500	720	731	1,980
10	1,660	1,800	3,010	3,880	1,720	1,410	1,880	2,300	2,010	710	731	2,580
11	1,660	1,800	3,020	3,960	1,450	1,370	1,910	2,310	1,310	699	784	2,790
12	1,640	1,920	3,050	3,990	1,440	1,330	1,970	2,220	1,360	713	756	2,810
13	1,610	1,900	3,270	3,960	1,480	1,360	1,950	2,250	1,370	738	770	2,450
14	1,540	1,910	3,600	3,990	1,490	1,440	1,950	2,260	1,340	788	759	1,860
15	1,580	2,070	3,640	3,990	1,470	1,380	1,970	2,350	1,340	766	770	1,730
16	1,590	2,070	3,960	3,880	1,480	1,410	1,950	2,190	1,310	759	745	1,700
17	1,460	2,160	3,920	3,880	1,370	1,410	2,010	2,220	1,320	752	752	1,680
18	1,840	2,190	3,600	3,920	1,430	1,470	2,040	2,110	1,280	784	770	1,740
19	1,950	2,180	3,150	3,780	1,450	1,640	2,080	2,120	1,350	795	777	1,780
20	2,070	2,260	3,090	3,740	1,470	1,600	2,120	2,020	1,360	802	770	1,770
21	2,060	2,260	3,090	3,740	1,400	1,850	2,090	1,980	1,280	798	791	1,790
22	2,050	2,330	3,180	3,740	1,400	1,850	2,120	2,000	1,330	812	893	1,780
23	2,130	2,320	3,440	3,600	1,450	1,890	2,110	1,940	1,350	805	893	1,800
24	2,130	2,350	3,710	3,530	1,430	1,970	2,090	1,930	1,280	819	893	1,960
25	2,130	2,420	3,740	3,530	1,490	1,900	2,090	2,510	1,290	802	922	1,960
26	2,150	2,430	3,850	3,400	1,430	1,930	2,170	3,260	1,320	791	911	1,950
27	2,160	2,370	3,850	3,400	1,450	2,120	2,190	2,250	1,320	795	929	1,910
28	2,170	2,530	3,850	3,370	1,520	2,110	2,460	1,650	1,300	798	883	1,930
29	2,070		3,850	3,250	2,040	2,100	2,850	1,650	1,280	759	918	1,940
30	2,030		3,850	3,070	2,100	2,030	2,200	1,590	1,330	742	936	2,070
31	2,060		3,850		2,080		2,230	1,430		788		2,160
<b>Sum</b>	58,680	56,750	103,010	111,320	54,580	50,060	63,430	68,780	40,630	23,587	23,826	56,340
<b>Current Year 1982</b>												
<b>Period 1950-1982</b>												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	103.02	101.41	28	2,170	17	1,460	1,890	116,443	71,299	144,049	966	
Feb.	103.22	101.54	28	2,530	15	1,690	2,030	112,647	70,294	128,841	9,232	
Mar.	104.30	102.99	16	3,960	1	2,690	3,320	204,329	174,405	283,684	97,902	
Apr.	104.46	103.35	112	3,990	30	3,070	3,710	220,832	199,545	264,127	153,792	
May	103.48	102.00	1	2,800	17	1,370	1,760	108,248	100,335	188,597	66,207	
June	103.08	101.51	27	2,120	12	1,330	1,670	99,212	155,217	269,632	95,177	
July	103.61	101.97	29	2,850	2	1,860	2,040	125,745	218,834	327,042	125,745	
Aug.	103.81	101.41	26	3,260	31	1,430	2,220	136,365	216,336	341,044	130,298	
Sept.	102.89	101.25	10	2,010	121	1,280	1,350	80,559	123,996	268,414	53,633	
Oct.	102.56	100.33	24	819	11	699	759	46,784	57,851	227,661	10,453	
Nov.	101.51	99.74	30	936	2	675	795	47,260	48,125	177,971	7,516	
Dec.	102.85	99.93	12	2,810	1	1,080	1,820	111,722	80,440	168,417	8,825	
<b>Yearly</b>	104.46	99.74		3,990		675	1,950	1,410,146	1,519,391	2,735,390	1,272,332	
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	31.84	30.40		113		19.1	55.2	1,739,396	1,874,148	3,374,067	1,569,404	

∅ Mean daily

! And other days

## INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102.89	102.66	103.18	104.00	103.18	102.59	102.56	102.85	101.31	101.87	100.23	100.10
2	102.92	102.43	103.28	104.00	102.69	102.56	102.56	103.31	101.38	101.41	100.13	100.23
3	102.79	102.43	103.41	104.00	102.20	102.76	102.59	103.22	101.41	101.44	100.03	101.08
4	102.46	102.43	103.44	104.00	102.20	102.82	102.69	103.25	101.54	101.54	100.16	101.28
5	102.62	102.40	103.48	104.23	102.72	102.49	102.76	103.22	101.51	101.25	100.10	101.05
6	102.53	102.46	103.54	104.27	103.15	102.03	102.82	103.12	101.64	101.31	100.10	101.28
7	102.23	102.33	103.41	104.27	102.92	101.77	102.72	102.92	101.64	101.31	100.20	101.41
8	102.23	102.26	103.44	104.13	102.72	101.67	102.76	102.76	102.03	101.25	100.49	101.25
9	101.97	102.20	103.51	104.00	102.79	101.84	102.69	102.62	102.53	101.48	100.69	101.31
10	101.77	102.00	103.64	104.20	102.69	101.77	102.79	102.69	102.76	101.54	101.05	102.13
11	101.67	101.80	103.61	104.27	102.30	102.10	102.85	102.95	102.10	101.35	101.38	102.43
12	101.57	101.74	103.58	104.33	102.20	102.07	102.95	102.92	101.84	101.31	101.05	102.53
13	101.61	101.71	103.71	104.30	102.36	102.10	102.85	102.95	102.13	101.35	100.89	102.40
14	101.94	101.74	103.90	104.27	102.43	102.36	102.69	103.08	102.17	101.54	100.79	102.10
15	102.00	102.13	103.81	104.33	102.40	102.17	102.56	103.35	102.00	101.51	100.82	102.07
16	102.33	102.40	103.97	104.30	102.46	102.10	102.43	103.08	102.17	101.44	100.72	102.07
17	102.17	102.49	103.87	104.17	102.49	101.80	102.36	102.72	102.07	101.41	100.56	102.07
18	102.46	102.43	103.87	104.17	102.46	101.87	102.40	102.69	102.17	101.51	100.30	102.10
19	102.40	102.30	103.77	104.07	102.43	102.17	102.33	102.82	102.30	101.54	100.20	102.13
20	102.49	102.40	103.77	104.04	102.36	102.30	102.46	102.72	102.30	101.64	100.10	102.03
21	102.53	102.36	103.81	104.07	102.23	102.66	102.36	102.40	101.90	101.61	100.20	102.13
22	102.53	102.53	103.84	104.00	102.20	102.69	102.43	102.33	101.97	101.67	100.33	102.17
23	102.53	102.53	103.87	103.84	102.62	102.76	102.49	102.20	102.07	101.67	100.30	102.33
24	102.49	102.56	104.00	103.77	102.59	102.79	102.49	101.94	102.10	101.74	100.20	102.23
25	102.49	102.72	103.97	103.71	102.62	102.59	102.33	102.59	102.20	101.67	100.00	102.23
26	102.56	102.95	104.10	103.51	102.53	102.40	102.07	103.48	102.23	101.44	99.90	102.13
27	102.82	102.85	104.20	103.58	102.53	102.76	102.30	103.12	102.33	101.12	99.93	102.10
28	102.92	103.12	104.20	103.54	102.49	102.92	102.79	102.33	102.40	100.89	99.84	102.13
29	102.82		104.20	103.54	102.79	102.99	103.41	102.23	102.40	100.49	99.90	102.26
30	102.72		104.20	103.38	102.33	102.79	102.49	101.94	102.49	100.33	99.97	102.43
31	102.79		104.20		102.72		102.20	101.44		100.62		102.69
Avg.	102.40	102.36	103.77	104.00	102.53	102.36	102.59	102.76	102.03	101.38	100.36	101.87

### COLORADO RIVER IMMEDIATELY BELOW MORELOS DAM - STAGES

**DESCRIPTION:** Water-stage recorder located on the right bank of the Colorado River in Mexico immediately downstream from Morelos Dam, 1.1 miles (1.8 km) downstream from the northerly international boundary, and about 7.5 miles (12.1 km) downstream from the Colorado River below Yuma Main Canal Wasteway. Since April 17, 1969, zero of the gage is at mean sea level, U. S. C. & G. S. datum; prior to that date, zero of the gage was 0.16 foot (0.05 m) below mean sea level.

**RECORDS:** Records obtained and furnished by the Mexican Section of the Commission. Records available: Staff gage heights, February 20, 1951 to June 6, 1966; continuous record of gage heights June 7, 1966 through 1982.

**REMARKS:** On June 7, 1966 a continuous water-stage recorder was installed; prior to this date, mean daily gage heights were determined from hourly readings of staff gage.

**EXTREMES:** Maximum mean daily gage height, 113.42 feet (34.57 m) on August 18, 1977; minimum mean gage height, 98.03 feet (29.88 m) several days during December 1982.

#### Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	99.21	99.11	99.21	98.75	98.49	104.82	98.20	98.13	98.13	98.10	98.20	98.16
2	99.18	99.15	99.21	98.75	98.49	104.13	98.16	98.16	98.13	98.10	98.20	98.16
3	99.18	99.18	99.25	98.72	98.52	99.02	98.16	98.20	98.13	98.10	98.16	98.16
4	99.21	99.18	99.28	98.72	98.49	98.56	98.20	98.16	98.13	98.10	98.16	98.16
5	99.18	99.15	99.28	98.72	98.49	98.43	98.23	98.20	98.10	98.10	98.20	98.16
6	99.18	99.11	99.25	98.72	98.49	98.39	98.20	98.20	98.03	98.13	98.16	98.16
7	99.15	99.08	99.25	98.72	98.49	98.39	98.20	98.16	98.06	98.13	98.16	98.16
8	99.11	99.15	99.28	98.72	98.49	98.39	98.20	98.16	98.06	98.13	98.16	98.16
9	99.08	99.15	99.28	98.72	98.49	98.33	98.20	98.16	98.06	98.13	98.16	99.67
10	99.08	99.18	99.31	98.69	98.56	98.39	98.20	98.16	98.06	98.13	98.16	105.41
11	99.11	99.15	99.31	98.69	98.56	98.43	98.20	98.16	98.03	98.13	98.20	103.87
12	99.15	99.18	99.34	98.69	98.52	98.36	98.23	98.20	98.03	98.13	98.20	99.21
13	99.18	99.21	100.03	98.69	98.56	98.23	98.23	98.20	98.06	98.16	98.20	98.16
14	99.21	99.21	100.26	98.69	98.56	98.29	98.16	98.13	98.10	98.16	98.16	98.06
15	99.21	99.21	99.38	98.69	98.56	98.29	98.16	98.16	98.06	98.16	98.16	98.03
16	99.18	99.21	100.26	98.69	98.52	98.33	98.16	98.16	98.06	98.13	98.16	98.03
17	99.18	99.21	102.79	98.69	98.56	98.33	98.13	98.13	98.10	98.13	98.16	98.03
18	99.18	99.21	101.21	98.69	98.56	98.26	98.13	98.13	98.10	98.16	98.16	98.03
19	99.15	99.18	103.05	98.65	98.52	98.26	99.13	98.16	98.10	98.13	98.16	98.03
20	99.15	99.18	102.95	98.69	98.49	98.26	98.13	98.13	98.10	98.16	98.16	98.06
21	99.15	99.18	102.69	98.62	98.46	98.26	98.13	98.13	98.10	98.16	98.16	98.06
22	99.18	99.18	102.49	98.59	98.39	98.26	98.13	98.10	98.10	98.16	98.16	98.06
23	99.15	99.18	101.12	98.59	98.39	98.23	98.16	98.13	98.10	98.16	98.16	98.06
24	99.11	99.18	99.11	98.59	98.39	98.23	98.13	98.13	98.10	98.16	98.16	98.06
25	99.11	99.18	98.92	98.56	98.39	98.23	98.16	98.16	98.10	98.16	98.16	98.03
26	99.15	99.15	98.82	98.56	98.36	98.16	98.16	98.16	98.10	98.16	98.16	98.03
27	99.15	99.18	98.79	98.56	98.39	98.20	98.16	98.13	98.10	98.16	98.16	98.06
28	99.11	99.18	98.79	98.52	98.39	98.23	98.16	98.10	98.10	98.16	98.16	98.06
29	99.11		98.79	98.52	100.89	98.23	98.20	98.10	98.10	98.16	98.16	98.03
30	99.11		98.75	98.49	100.33	98.16	98.16	98.10	98.10	98.16	98.16	98.03
31	99.11		98.75		103.90		98.13	98.10		98.16		98.79
<b>Avg.</b>	99.15	99.18	99.93	98.65	98.79	98.72	98.16	98.16	98.10	98.13	98.16	98.62

## WELLTON-MOHAWK DRAINAGE WATER DISCHARGED TO COLORADO RIVER BELOW MORELOS DAM

**DESCRIPTION:** Water-stage recorder located on downstream end of the Wellton-Mohawk Drainage Extension Channel on the Arizona bank of the Colorado River at the east end of the weir section of Morelos Dam, 1.1 miles (1.8 km) downstream from the northerly international boundary. The elevation of the zero of the gage has not been determined.

**RECORDS:** Based on discharge measurements and a continuous record of gage heights. Station is operated by the United States Section of the Commission. Records available: November 16, 1965 through 1982.

**REMARKS:** Pursuant to Minute 218 of the Commission, an extension to the Wellton-Mohawk Drainage Conveyance Channel was constructed along the left bank of the Colorado River to a point immediately below Morelos Dam, a distance of about 12 miles (19.3 km), and placed in operation on November 16, 1965. Drainage flows may be discharged on an emergency basis to the Gila River and thence to the Colorado River at the diversion structure, Main Outlet Drain Extension No. 1, at the upstream end of the extension; directly to the Colorado River at Main Outlet Drain Extension No. 2, 1.9 miles (3.1 km) upstream from Morelos Dam; and directly to the Colorado River immediately below Morelos Dam at this station, Main Outlet Drain Extension No. 3. On July 14, 1972, Minute No. 241 of the Commission became effective. The Minute called for discharge of all Wellton-Mohawk drainage waters to be made below Morelos Dam. On August 30, 1973, Minute No. 242 of the Commission became effective. The Minute called for construction of a concrete-lined bypass drain from Morelos Dam to the Santa Clara Slough in Mexico. On June 23, 1977, the first flow was recorded in the bypass drain. Drainage flows through Main Outlet Extension No. 3 will be only on an emergency basis.

**Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sum</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Current Year 1982</b>								<b>Period 1966-1982</b>				
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Foot	Acre-Foot			
	High	Low	Day	High	Low	Average			Maximum	Minimum		
				Day	Day							
Jan.	0	0		0		0	0	11,418	18,718	0		
Feb.	0	0		0		0	0	8,886	16,992	0		
Mar.	0	0		0		0	0	6,204	18,506	0		
Apr.	0	0		0		0	0	5,165	18,061	0		
May	0	0		0		0	0	8,459	19,091	0		
June	0	0		0		0	0	6,567	18,756	0		
July	0	0		0		0	0	6,016	18,946	0		
Aug.	0	0		0		0	0	6,216	19,188	0		
Sept.	0	0		0		0	0	8,683	18,474	0		
Oct.	0	0		0		0	0	11,966	19,200	0		
Nov.	0	0		0		0	0	11,662	18,478	0		
Dec.	0	0		0		0	0	10,594	19,121	0		
<b>Yearly</b>	0	0		0		0	0	101,836	214,781	0		
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0	0		0	0	0	0	125,614	264,930	0		

**COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES**

**DESCRIPTION:** Water-stage recorder on the left (Arizona) bank of the river, and cableway 1.8 miles (2.9 km) downstream from the northerly international boundary, 0.7 mile (1.1 km) downstream from Morelos Diversion Dam, and about 9 miles (14.5 km) downstream from Yuma, Arizona, along the river levee. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on current meter measurements and a continuous record of gage heights. Computations by shifting control methods. Records available: Daily discharges, January 1, 1954 though 1982; continuous record of gage heights, July 20, 1952 through 1982.

**REMARKS:** Reservoirs, diversions in the United States and Mexico, drainage returns, and waste flows modify the river flow at this station. The record at this station, less Main Outlet Drain Extension No. 3, represents the river flow passing Morelos Diversion Dam.

**EXTREMES:** Maximum instantaneous discharge, 22,240 second-feet (630 m<sup>3</sup>/sec) on January 4, 1955; maximum gage height, 112.85 feet (34.40 m) on August 18, 1977. Minimum discharge, no flow on various occasions.

**Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.5	8.6	11.2	9.5	12.6	1,420	11.6	8.5	12.4	12.5	11.8	10.3
2	8.3	9.2	11.8	10.6	11.8	1,270	10.8	10.4	11.7	9.5	13.7	11.4
3	8.0	9.3	10.3	11.4	12.9	99.9	11.0	12.2	11.3	8.7	13.4	11.5
4	12.4	8.9	11.8	12.6	12.4	15.0	10.3	12.2	9.5	9.9	13.1	11.0
5	10.1	5.6	11.0	14.8	12.1	13.4	12.8	12.2	8.7	10.4	13.8	10.3
6	8.5	5.0	9.5	15.8	12.5	10.7	13.6	12.5	9.5	11.5	11.8	11.4
7	6.8	6.5	10.3	16.5	12.9	11.3	11.9	11.0	9.5	11.4	10.7	11.9
8	9.3	7.8	11.0	16.5	11.0	12.4	10.8	10.0	11.3	11.6	12.1	12.3
9	9.5	8.7	9.5	14.9	11.0	12.6	10.3	11.4	11.3	10.3	12.8	319
10	9.5	9.9	10.3	14.9	12.7	11.0	10.6	12.8	11.8	9.5	11.8	2,140
11	10.2	8.8	11.0	14.2	12.2	12.8	11.0	12.3	9.5	11.2	12.3	1,230
12	9.2	8.4	11.0	15.7	10.8	11.8	12.6	13.4	7.2	12.1	13.6	199
13	7.1	10.3	78.8	15.9	10.4	11.0	14.4	13.6	9.7	13.1	11.8	18.8
14	8.8	10.3	120	17.1	12.2	13.6	14.1	11.8	11.0	12.3	10.3	13.0
15	9.1	11.9	15.7	17.7	11.5	13.2	14.1	11.0	10.6	11.6	12.3	11.0
16	7.5	11.1	110	17.7	10.3	13.7	12.3	13.2	11.3	10.5	14.6	11.8
17	7.2	11.5	593	16.5	12.2	13.4	9.5	13.1	11.0	10.3	13.2	11.0
18	8.3	9.5	242	15.7	12.6	11.5	9.5	12.4	9.5	13.8	12.9	11.0
19	8.4	8.8	685	16.5	11.1	9.8	11.8	13.2	8.7	13.9	13.6	11.0
20	8.2	8.7	667	11.4	10.9	10.3	12.9	14.3	11.4	12.9	11.0	13.0
21	8.1	8.7	590	11.7	11.4	12.6	13.6	12.6	11.0	13.3	10.3	12.3
22	7.0	9.0	519	13.8	8.7	14.4	13.0	11.0	12.1	13.6	13.1	11.9
23	5.0	9.4	269	13.9	9.5	13.1	13.1	12.5	11.2	10.8	13.1	11.1
24	4.3	9.2	16.2	13.4	10.6	12.1	11.8	13.0	12.3	10.7	12.1	12.0
25	5.7	9.3	11.0	12.6	10.7	11.4	11.0	14.5	9.5	12.9	11.8	12.0
26	6.6	8.0	9.5	14.2	10.2	11.0	13.7	15.9	9.2	12.3	10.3	10.4
27	7.3	8.0	8.7	13.6	10.1	9.5	14.5	14.9	12.6	12.3	10.0	14.0
28	7.2	6.9	8.7	12.9	8.7	13.5	11.8	11.8	12.6	11.5	10.1	12.6
29	5.8	11.5	11.5	11.8	359	14.5	11.8	11.8	* 10.8	11.0	10.7	11.6
30	4.6	10.3	10.3	12.6	192	12.6	10.3	11.8	* 10.7	11.0	10.3	10.9
31	4.5	8.4	8.4		930		7.7	11.3		10.9		86.3
Sum	241.0	247.3	4,102.5	426.4	1,797.0	3,122.1	368.2	382.6	318.9	357.3	362.4	4,283.8

Month	Current Year 1982							Period 1954-1982			
	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum
Jan.	97.99	97.14	4	51.0	31	0	7.8	478	124,885	969,540	478
Feb.	97.99	97.13	17	19.0	28	0	8.8	491	62,621	414,310	491
Mar.	101.46	97.17	19	900	31	6.5	132	8,137	51,972	630,230	659
Apr.	97.30	97.05	16	26.7	20	6.5	14.2	846	44,315	532,320	745
May	102.30	97.05	31	1,150	122	7.2	58.0	3,564	57,247	467,742	460
June	103.05	97.15	1	1,590	21	8.7	104	6,193	27,827	417,461	507
July	97.36	97.07	126	31.1	31	7.2	11.9	730	24,742	315,015	584
Aug.	97.32	97.07	116	27.6	1	7.2	12.3	759	34,380	316,701	618
Sept.	97.63	97.04	27	28.5	12	6.5	10.6	633	33,932	377,078	113
Oct.	97.66	97.33	19	27.6	1	7.2	11.5	709	56,737	489,302	383
Nov.	97.67	97.31	5	27.6	30	8.0	12.1	719	77,265	448,165	355
Dec.	104.22	96.98	10	2,630	28	4.3	138	8,497	94,627	643,850	465
Yearly	104.22	97.04		2,630	0	43.4	31,756	690,550	4,200,009	31,756	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	31.77	29.58		74.5	0	1.23	39,171	851,787	5,180,669	39,171	

\* Partly estimated

! And other days

## COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

## Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	97.35	97.60	97.50	97.19	97.12	102.78	97.16	97.10	97.10	97.52	97.52	97.34
2	97.34	97.27	97.30	97.18	97.11	102.40	97.14	97.13	97.09	97.46	97.45	97.36
3	97.34	97.25	97.28	97.18	97.11	97.95	97.13	97.13	97.08	97.43	97.43	97.41
4	97.39	97.24	97.30	97.19	97.11	97.41	97.12	97.14	97.07	97.52	97.46	97.38
5	97.37	97.16	97.28	97.20	97.10	97.39	97.14	97.14	97.06	97.57	97.47	97.33
6	97.33	97.17	97.26	97.19	97.11	97.36	97.14	97.14	97.07	97.52	97.41	97.38
7	97.24	97.20	97.27	97.18	97.11	97.36	97.12	97.12	97.07	97.50	97.41	97.35
8	97.29	97.22	97.28	97.18	97.09	97.36	97.11	97.11	97.09	97.47	97.43	97.29
9	97.29	97.23	97.27	97.16	97.11	97.34	97.10	97.12	97.09	97.43	97.45	98.43
10	97.29	97.25	97.28	97.16	97.12	* 97.30	97.10	97.14	97.10	97.41	97.47	103.71
11	97.30	97.23	97.29	97.15	97.11	97.30	97.11	97.14	97.07	97.43	97.48	102.40
12	97.30	97.22	97.29	97.17	97.09	97.27	97.13	97.15	97.05	97.43	97.49	98.49
13	97.27	97.24	97.91	97.17	97.08	97.24	97.16	97.15	97.08	97.44	97.47	97.37
14	97.29	97.24	98.38	97.19	97.10	97.26	97.16	97.13	97.10	97.42	97.45	97.25
15	97.30	97.25	97.35	97.19	97.10	97.25	97.16	97.12	97.09	97.36	97.49	97.17
16	97.27	97.24	98.10	97.19	97.09	97.23	97.14	97.15	97.10	97.34	97.52	97.16
17	97.27	97.24	100.61	97.18	97.11	97.21	97.10	97.15	97.11	97.36	97.52	97.15
18	97.29	97.21	* 99.04	97.17	97.12	97.19	97.10	97.14	97.09	97.41	97.51	97.13
19	97.30	97.20	* 100.90	97.18	97.10	97.16	97.13	97.15	97.08	97.41	97.53	97.12
20	97.30	97.22	100.82	97.11	97.10	97.17	97.14	97.16	97.11	97.37	97.50	97.14
21	97.31	97.22	100.58	97.12	97.10	97.20	97.15	97.14	97.12	97.38	97.50	97.17
22	97.30	97.23	100.32	97.14	97.07	97.22	97.14	97.12	97.13	97.38	97.54	97.15
23	97.27	97.24	99.25	97.15	97.08	97.21	97.15	97.14	97.13	97.36	97.55	97.13
24	97.26	97.25	97.40	97.14	97.10	97.19	97.13	97.15	97.15	97.36	97.52	97.09
25	97.28	97.25	97.31	97.13	97.10	97.18	97.12	97.15	97.12	97.39	97.52	97.03
26	97.29	97.23	97.27	97.15	97.10	97.17	97.15	97.17	97.12	97.40	97.48	97.04
27	97.30	97.23	97.24	97.14	97.10	97.15	97.16	97.15	97.17	97.40	97.48	97.11
28	97.30	97.33	97.22	97.13	97.08	97.19	97.13	97.11	97.18	97.39	97.44	97.09
29	97.28		97.24	97.12	99.22	97.20	97.13	97.10	97.33	97.39	97.32	97.08
30	97.26		97.22	97.13	98.54	97.17	97.11	97.10	97.56	97.40	97.34	99.07
31	97.39		97.20		101.67		97.08	97.09		97.42		97.53
<b>Avg.</b>	97.30	97.24	98.03	97.16	97.36	97.63	97.13	97.13	97.12	97.42	97.47	97.67

\* Partly estimated

## ELEVEN MILE WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir on wasteway for discharging water from the West Main Canal to the Colorado River. This wasteway is located in Arizona, 4.3 miles (6.9 km) downstream from the northerly international boundary and 3.2 miles (5.1 km) downstream from Morelos Diversion Dam. It is the largest of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limnoprope section of the Colorado River.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1982, obtained by the United States Section; monthly discharge, January 1924 through 1950, by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 9,740 acre-feet (12,014,000 m<sup>3</sup>) in August 1940; minimum monthly discharge, zero in April 1941. Since January 1, 1951, maximum instantaneous discharge, 800 second-feet (22.7 m<sup>3</sup>/sec) on December 3, 1961, at a maximum gage height of 117.60 feet (35.84 m); minimum instantaneous discharge, zero during parts of most years.

## Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	58.3	43.1	0.5	0.5	0.1	0.1	34.5	0.1	0.1	37.9	0.6
2	.3	2.8	4.6	.5	.4	.2	.1	14.8	.2	.1	2.3	.2
3	.2	.9	.8	.5	.4	.2	.1	3.0	.2	.1	1.4	.7
4	.1	.3	.3	66.0	.4	.1	.1	* 1.7	.2	.2	.9	5.5
5	.1	.3	.3	15.7	.5	.1	.1	.2	.1	0	.2	50.6
6	.3	.4	.4	1.7	.5	.1	0	.2	.1	.4	1.1	24.8
7	.2	.3	.3	.7	.5	.3	0	.1	.2	.3	.6	1.4
8	.4	.3	.3	.4	.5	.1	.2	.1	.1	.4	.7	1.1
9	.2	.3	.2	.4	48.8	.1	.1	.1	.1	.5	.3	.2
10	.2	.4	.2	.4	11.0	.4	.1	.1	.1	.7	.4	.2
11	.2	.5	.2	.4	1.4	.2	.1	.1	.1	1.1	.3	.1
12	.1	.4	.2	6.5	.5	.4	.2	.1	.1	.2	.3	.1
13	.2	.4	.2	.3	.3	.2	.2	.2	.1	.1	.3	.1
14	.2	.4	3.5	10.5	.3	.3	.2	.1	.1	.1	.3	.1
15	.2	.6	4.4	.4	.3	.2	* .2	.1	.1	.1	.3	.5
16	.2	.3	.3	.4	.3	.3	∞ .2	.2	.1	.2	.2	.2
17	.2	.4	.3	.4	.2	.2	∞ .2	0	.1	.4	.5	.2
18	.2	.4	.3	.4	0	.2	∞ .2	.1	.2	.2	.4	.2
19	.4	.4	.5	.4	0	.3	∞ .2	.2	.2	0	.3	.3
20	.3	.4	.4	.9	.1	.4	* .2	0	.6	0	.4	.3
21	.3	3.5	.4	.6	.1	.2	.2	.2	.1	.1	.4	.1
22	.3	.4	.4	.5	.1	0	.2	.1	.1	0	.3	.1
23	.3	.4	.4	.5	.1	.1	.1	.1	.1	0	.4	.1
24	.3	.4	.4	.5	.1	.1	0	.1	.1	0	.4	.1
25	.5	.4	.4	.5	.1	0	.1	.1	.1	0	.4	.1
26	.2	.4	.6	.5	.2	.1	.2	0	.1	0	.4	.2
27	.1	.4	.7	.6	.2	.1	.2	0	.1	0	1.3	.2
28	.2	43.7	.5	.6	.2	.1	.2	.1	.1	0	.8	.2
29	.1	.6	.6	.2	.1	.2	.1	.2	.1	.1	.4	.1
30	.2	.5	.5	.6	.2	.1	.2	.1	.2	.1	.5	.3
31	35.5	.5	.5	.6	.1	.2	.2	.1	.2	46.3	.1	.1
Sum	42.6	118.1	66.2	112.9	68.5	5.3	4.6	56.9	4.3	51.8	54.4	89.0
Current Year 1982												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1935-1982			
	High	Low	Day	Day	Low	Average			Maximum	Minimum		
Jan.	114.86	111.73	31	183	1	5	1.4	84.5	2,794	9,570	0	
Feb.	115.51	111.75	28	242	4	.2	4.2	234	2,274	8,430	14.5	
Mar.	114.15	111.75	1	137	1	9	.2	2.1	131	2,143	6,230	59.1
Apr.	115.87	111.76	12	290	1	7	3.8	224	1,983	6,300	0	
May	114.90	111.72	9	186	118	0	2.2	136	2,345	9,320	8.3	
June	111.85	111.72	12	1.3	122	0	.2	10.5	2,244	7,440	10.5	
July	111.93	111.72	8	2.9	1	6	0	.1	9.1	2,246	8,320	9.1
Aug.	114.38	111.72	1	151	116	0	1.8	113	1,943	9,740	87.5	
Sept.	111.85	111.72	20	1.3	113	0	.1	8.5	1,403	6,140	6.0	
Oct.	115.23	111.72	31	213	1	4	0	1.7	103	1,914	5,680	11.9
Nov.	114.50	111.74	1	158	1	5	.1	1.8	108	2,304	8,220	18.8
Dec.	114.19	111.73	5	139	113	.1	2.9	177	3,037	9,430	61.9	
Yearly	115.87	111.72		290		0	1.8	1,339	26,629	82,900	943	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	35.32	34.05		8.21		0	0.05	1,652	32,847	102,256	1,163	

\* Partly estimated

∞ Estimated

! And other days

**COLORADO RIVER AT ELEVEN MILE GAGE - STAGES**

**DESCRIPTION:** Water-stage recorder on the left (Arizona) bank of the river, 4.3 miles (6.9 km) downstream from northerly international boundary, 3.2 miles (5.1 km) downstream from Morelos Diversion Dam, about 50 feet (15 m) downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 11 miles (17.7 km) downstream from Yuma, Arizona, along the river levee. The zero of the gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Mean daily gage heights based on continuous water-stage records. Records available: Continuous record of gage heights, November 1947 through 1982; once weekly readings obtained by the U. S. Bureau of Reclamation, January 1940 through October 1947.

**REMARKS:** This station is maintained by the United States Section of the Commission as part of the continuing study of channel conditions in the limitrophe section of the river.

**EXTREMES:** Since November 1947, maximum mean daily gage height, 108.20 feet (32.98 m) on January 2, 1958; minimum mean daily gage height, 94.95 feet (28.94 m) on June 22, 1968.

**Mean Daily Gage Height in Feet 1982**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	97.09	97.32	97.17	96.03	95.89	99.70	95.97	■ 96.18	96.00	96.04	96.47	96.02
2	97.09	97.11	96.81	96.02	95.87	99.56	95.98	■ 96.22	95.99	96.02	96.10	96.01
3	97.09	96.81	96.73	96.01	95.87	96.73	95.98	■ 96.09	95.98	96.01	96.07	96.04
4	97.13	96.80	96.71	96.42	95.87	96.15	95.97	■ 96.07	95.95	96.00	96.07	96.07
5	97.10	96.79	96.70	96.19	95.88	96.12	95.98	■ 96.03	95.94	96.02	96.07	96.46
6	97.09	96.76	96.68	96.01	95.89	96.07	95.98	* 96.04	95.94	96.03	96.08	96.32
7	97.06	96.76	96.67	96.00	95.89	96.08	95.96	96.04	95.96	96.03	96.04	96.08
8	97.07	96.77	96.68	96.00	95.87	96.05	95.94	96.03	95.99	96.04	96.04	96.08
9	97.06	96.76	96.68	95.98	96.24	96.04	95.94	96.03	96.01	96.02	96.03	96.55
10	97.04	96.76	96.68	95.96	96.07	96.02	95.97	96.04	96.01	96.01	96.05	100.63
11	97.05	96.76	96.69	95.94	95.90	96.02	95.99	96.04	96.00	96.01	96.05	99.54
12	97.05	96.75	96.70	96.00	95.88	96.00	96.00	96.04	95.98	96.02	96.05	96.98
13	97.06	96.76	96.99	95.96	95.86	95.98	96.03	96.04	95.99	96.04	96.05	96.08
14	97.06	96.76	97.35	96.07	95.89	95.98	96.03	96.04	* 96.00	96.05	96.05	* 96.01
15	97.07	96.77	96.79	95.99	95.88	95.98	96.03	96.02	* 96.00	96.05	96.04	■ 96.00
16	97.06	96.77	97.00	95.97	95.86	95.98	96.02	96.01	* 96.01	96.04	96.04	■ 95.99
17	97.04	96.75	98.47	95.96	95.87	95.93	95.98	95.98	* 96.01	96.03	96.06	■ 95.99
18	97.04	96.74	97.64	95.94	95.87	95.93	95.97	95.99	* 96.00	96.02	96.04	■ 95.99
19	97.04	96.71	98.67	95.96	95.85	95.94	95.98	96.00	* 96.00	96.02	96.04	■ 95.97
20	97.03	96.70	98.44	95.93	95.85	95.94	96.00	96.03	* 96.01	96.02	96.02	■ 95.94
21	97.03	96.72	98.18	95.90	95.86	95.94	96.01	96.03	* 96.02	96.03	96.01	* 95.92
22	97.03	96.69	97.99	95.93	95.84	95.98	96.02	96.03	96.03	96.04	96.01	95.91
23	97.04	96.68	97.40	95.94	95.83	95.97	96.02	96.03	96.03	96.06	96.02	95.90
24	97.02	96.67	96.32	95.92	95.84	95.99	96.01	96.03	96.04	96.05	96.02	95.87
25	97.03	96.68	96.17	95.93	95.86	95.99	95.99	96.04	96.02	96.06	96.02	95.86
26	97.02	96.67	96.14	95.93	95.87	95.98	96.00	96.05	96.01	96.12	96.01	95.84
27	97.03	96.65	96.09	95.92	95.88	95.97	96.00	96.06	96.02	96.11	96.01	95.84
28	97.04	96.86	96.06	95.92	95.88	95.98	95.95	96.03	96.04	96.10	96.02	95.87
29	97.04		96.06	95.91	97.20	96.00	95.96	96.01	96.01	96.10	96.00	95.86
30	97.03		96.03	95.90	96.75	95.99	95.95	96.00	96.02	96.10	96.00	95.86
31	97.21		96.03		98.81		95.94	96.00		96.33		95.87
<b>Avg.</b>	97.06	96.78	96.93	95.98	96.05	96.27	95.99	96.04	96.00	96.05	96.05	96.30

■ Estimated

\* Partly estimated

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

**DESCRIPTION:** Water-stage recorder and control weir on wasteway from West Main Canal to Colorado River. Located on east side of levee at site used prior to May 1, 1971. The site used May 1, 1971 to September 20, 1977 was located 200 feet (61 m) downstream from present site on west side of levee. This wasteway is located in Arizona, 18.5 miles (29.8 km) downstream from the northerly international boundary, 17.4 miles (28.0 km) downstream from Morelos Diversion Dam, and 2.2 miles (3.5 km) upstream from the southerly international boundary. It is the farthest downstream of the two wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River. The elevation of the zero of the gage at the new location has not been determined.

**RECORDS:** Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through 1982, obtained by the United States Section; monthly discharge, March 1939 through 1950, by Bureau of Reclamation.

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

**EXTREMES:** Prior to January 1951, maximum monthly discharge 2,860 acre-feet (3,528,000 m<sup>3</sup>) in January 1946; minimum monthly discharge, 122 acre-feet (150,000 m<sup>3</sup>) in September 1950. Since January 1, 1951, maximum instantaneous discharge, 102 second-feet (2.89 m<sup>3</sup>/sec) on January 24, 1954, at a maximum gage height of 95.46 feet (29.10 m) (old datum); minimum instantaneous discharge, zero during a part of most months.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	22.2	15.2	0	0	0	0	9.0	0	0	12.3	0
2	0	2.7	.8	0	0	0	0	19.1	0	0	1.2	0
3	0	.3	0	0	0	0	0	.3	0	0	.3	0
4	0	.1	.1	3.0	0	0	0	0	0	0	0	0
5	0	0	.1	.7	0	0	0	0	0	0	.2	10.8
6	0	0	.1	0	0	0	0	0	0	0	0	9.2
7	0	0	0	0	0	0	0	0	0	0	0	2.0
8	0	0	.1	0	0	0	0	0	0	0	0	.7
9	0	0	0	0	0	0	0	0	0	0	0	.6
10	0	3.5	0	0	8.8	0	0	0	0	0	0	.1
11	0	35.8	0	0	1.4	0	0	0	0	0	0	.1
12	0	9.6	0	0	.5	0	0	0	0	0	0	0
13	0	0	0	0	.1	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	.2	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	.1	0	0	0	0	0	0	0	0	0	0
20	0	.8	0	0	0	0	0	0	0	0	0	0
21	0	1.0	0	0	0	0	0	0	0	0	0	0
22	0	2.6	0	0	0	0	0	0	0	0	0	0
23	0	.5	0	0	0	.2	0	0	0	0	0	0
24	0	.1	0	0	0	.9	0	0	0	0	0	0
25	0	.1	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	.1	0	0	0	0	0	0	0	0	0	0
28	0	10.5	0	0	0	0	0	0	0	0	0	0
29	0	1.5	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	13.0	0	0	0	0	0	0	0	0	3.2	0	0
<b>Sum</b>	13.0	91.5	16.6	3.7	10.8	1.1	0	28.4	0	3.2	14.0	23.5
<b>Current Year 1982</b>								<b>Period 1939-1982</b>				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	1.47	0	31	46.4	1 1	0	0.4	25.8	686	2,860	0	
Feb.	2.19	0	27	86.0	1 5	0	3.3	181	594	2,510	0	
Mar.	1.17	0	1	30.6	1 3	0	.5	32.9	544	1,660	0	
Apr.	.58	0	4	9.4	1 1	0	.1	7.3	585	1,940	0	
May	1.17	0	10	30.6	1 1	0	.3	21.4	712	2,470	0	
June	1.05	0	23	25.5	1 1	0	0	2.2	622	2,350	0	
July	0	0	0	0	0	0	0	0	537	1,950	0	
Aug.	1.34	0	2	39.2	1 1	0	.9	56.3	565	2,530	0	
Sept.	0	0	0	0	0	0	0	0	506	2,180	0	
Oct.	1.18	0	31	31.1	1 1	0	.1	6.3	614	2,100	0	
Nov.	1.06	0	1	20.2	1 3	0	.5	27.8	711	2,380	0	
Dec.	1.43	0	5	37.8	1 1	0	.8	46.6	784	2,680	0	
<b>Yearly</b>	2.19	0		86.0		0	0.6	408	7,460	24,370	0	
<b>Yearly</b>	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	0.67	0		2.44		0	0.02	503	9,202	30,060	0	

! And other days

**EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)**

**DESCRIPTION:** Water-stage recorder and control weir located about 300 feet (91.4 m) north of the international boundary near San Luis, Arizona and 1.5 miles (2.4 km) east of the Colorado River. From September 28, 1977 to April 6, 1978, recorder moved west 100 feet (30.5 m) to a temporary bypass channel. On April 7, 1978 recorder was moved back to original site.

**RECORDS:** Wasteway discharges computed by United States Section of the Commission beginning November 1, 1953, from head on control weir as measured by water-stage recorder and weir ratings as determined by current meter measurements. Records available: October 1946 through 1982. Records of monthly discharges also are available for the periods January 1924 through June 1928, January 1932 through 1933, and April 1935 through September 1946.

**REMARKS:** Wasteway discharges from the East Main Canal comprise regulatory waste and drainage waters from the eastern half of the Valley Division of the Yuma Project and are considered as part of the volumes arriving at the limitrophe section of the Colorado River.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	8.1	4.3	3.7	13.1	3.3	6.7	4.8	0.6	2.6	15.5	2.3
2	9.5	9.7	.4	1.6	7.6	4.0	2.0	3.0	.4	.2	5.2	1.1
3	1.7	4.5	2.0	4.6	6.9	5.5	.6	2.2	.4	4.1	1.9	1.6
4	5.0	.6	2.0	2.6	12.0	3.3	3.8	2.1	12.3	1.7	.8	1.8
5	3.6	5.1	1.1	.5	13.5	8.8	1.9	2.8	5.9	7.4	.5	5.4
6	4.3	2.8	6.2	4.2	6.8	4.1	2.5	2.5	4.7	14.5	.4	3.2
7	2.7	3.7	.7	3.4	6.5	5.4	.3	5.7	6.0	6.9	10.3	4.1
8	1.3	1.0	2.0	2.6	1.0	3.8	5.7	2.4	5.2	7.5	9.6	5.6
9	5.8	4.3	.5	4.3	.4	5.4	1.4	7.5	13.2	4.1	13.4	7.2
10	2.3	11.6	6.4	2.9	.4	4.8	.7	5.8	17.2	17.1	5.9	30.2
11	1.4	13.6	2.6	.8	.8	1.9	2.2	1.5	4.1	12.3	7.7	12.1
12	7.0	1.5	1.1	.4	2.2	1.8	4.9	.6	6.6	3.1	10.5	8.3
13	2.9	5.8	8.6	.5	4.5	7.1	4.0	2.5	2.0	8.3	3.3	12.7
14	7.1	17.4	6.8	.5	5.3	1.8	1.4	1.6	5.6	4.0	7.8	2.5
15	4.9	7.7	7.5	1.8	5.3	1.4	1.2	18.9	1.1	.9	10.8	1.0
16	6.6	3.2	2.0	.5	2.9	.5	.5	7.8	1.2	2.4	9.8	2.5
17	6.0	1.5	.8	1.4	1.3	1.6	6.7	1.9	4.1	1.3	2.6	1.3
18	4.1	.8	1.5	7.8	3.2	4.9	1.0	1.8	3.7	.6	1.6	7.2
19	5.5	5.2	1.2	3.6	6.2	3.7	1.4	3.7	2.3	3.2	1.6	17.4
20	1.6	6.1	1.0	3.0	6.5	.6	1.0	11.8	.9	10.3	11.9	3.1
21	10.6	10.6	.9	.8	5.4	5.6	2.2	13.2	4.0	6.2	6.8	2.7
22	12.4	12.5	13.7	.4	13.8	3.2	2.6	4.0	3.3	5.4	.7	.8
23	9.5	3.6	2.9	1.8	13.2	3.5	3.2	3.5	3.1	10.7	.5	.3
24	7.8	2.8	1.1	6.0	19.0	11.5	1.2	3.5	1.6	7.8	1.5	.3
25	1.8	8.4	2.7	6.2	4.5	4.5	9.6	5.8	4.9	11.3	7.9	2.4
26	9.1	4.4	2.2	8.6	.8	1.4	4.7	14.1	5.0	11.4	6.5	1.2
27	12.8	12.2	.6	8.6	.4	.7	2.9	12.4	1.0	16.1	2.2	.9
28	4.5	3.2	.4	1.6	1.4	6.6	7.0	7.4	5.6	3.0	2.3	.7
29	2.5		1.1	.7	2.9	.7	9.9	6.7	2.3	2.2	10.5	2.7
30	4.7		4.0	6.7	.2	7.7	2.9	2.8	2.2	8.2	6.5	6.0
31	10.3		1.0		6.1		5.2	1.1		11.3		1.0
<b>Sum</b>	171.1	171.9	89.3	92.1	174.1	119.1	101.3	165.4	130.5	206.1	176.5	149.6
<b>Current Year 1982</b>									<b>Period 1935-1982</b>			
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	1.16	0.06	12	42.8	111	0.6	5.5	339	1,050	3,360	90.0	
Feb.	1.00	.04	24	34.0	4	.4	6.1	341	884	3,170	133	
Mar.	.98	.02	22	32.9	12	.2	2.9	177	1,016	2,920	154	
Apr.	.81	0	6	24.0	113	0	3.1	183	989	3,170	175	
May	1.10	0	13	39.4	110	0	5.6	345	1,093	3,040	228	
June	1.06	.03	23	37.2	16	.3	4.0	206	931	3,660	161	
July	1.20	0	13	45.0	5	0	3.3	231	1,003	3,590	170	
Aug.	.90	.03	3	28.7	13	.3	5.3	328	1,023	3,960	159	
Sept.	.77	.02	4	22.0	11	.2	4.4	259	965	3,170	159	
Oct.	.88	.01	6	27.7	12	.1	6.6	409	1,008	3,280	307	
Nov.	.81	.03	7	24.0	16	.3	5.9	350	1,090	3,570	241	
Dec.	.98	0	10	32.9	123	0	4.8	297	1,063	3,080	247	
<b>Yearly</b>	1.20	0		45.0		0	4.8	3,465	12,115	38,310	3,026	
<b>Yearly</b>	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	0.37	0		1.27		0	0.14	4,274	14,944	47,255	3,733	

1 And other days

### YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

**DESCRIPTION:** Water-stage recorders located in the forebay and afterbay, with flow meters in the four discharge pipes at the Boundary Pumping Plant on the Main Drain about 200 Feet (61 m) north of the international boundary near San Luis, Arizona, 1.3 miles (2.1 km) east of the Colorado River.

**RECORDS:** Main Drain discharges are lifted 10 (3.05) to 12 feet (3.66 m) at the pumping plant. Prior to April 1, 1969, discharges were computed from pump ratings and the differential head measured by the two gages. Beginning April 1, 1969, discharges were computed from flow meter charts. Pump ratings and flow meter discharges are checked by current meter measurements. Records obtained and computed by the United States Section of the Commission. Records available: Monthly discharges, June 1919 through 1951; daily discharges January 1952 through 1982.

**REMARKS:** Flows in the Main Drain are principally drainage waters from the Valley Division of the Yuma Project. The Main Drain, the East Main Canal Wasteway, West Main Canal Wasteway, and 242 Lateral discharge into Mexico at the international land boundary near San Luis, Sonora. The water is used for irrigation in Mexico on the left (Sonora) bank of the Colorado River and is considered as part of the volumes arriving at the limitrophe section of the river.

#### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	89.9	99.8	106	125	117	96.4	101	113	116	111	130	84.7
2	88.3	99.7	108	112	115	99.2	105	107	113	111	121	93.3
3	88.5	101	108	107	120	108	99.7	101	114	109	111	108
4	87.4	98.3	102	117	114	94.0	108	102	117	114	113	106
5	92.5	99.0	113	119	111	109	104	98.9	99.8	135	110	103
6	101	97.5	100	105	112	98.0	99.8	96.9	80.0	108	107	86.9
7	98.0	100	101	101	108	99.4	101	103	104	115	121	102
8	94.8	99.2	103	105	108	87.0	106	109	97.4	119	111	92.9
9	95.6	99.8	110	104	104	105	101	96.8	107	115	113	106
10	95.1	98.8	117	106	112	95.5	103	95.8	112	117	109	98.0
11	94.9	101	110	101	94.8	95.4	99.7	107	109	112	108	84.4
12	94.0	101	125	112	104	92.8	103	102	118	117	110	94.3
13	95.8	107	118	111	102	100	107	99.9	123	119	122	92.3
14	85.8	115	103	117	116	88.2	94.5	84.4	104	117	117	89.3
15	98.7	111	108	108	115	103	109	138	109	129	124	89.8
16	93.8	98.8	109	122	99.6	95.4	93.6	104	117	121	109	98.4
17	93.9	93.8	98.2	113	106	90.5	107	90.7	121	120	117	87.6
18	105	96.0	101	130	104	93.4	90.2	93.7	109	118	113	101
19	98.8	96.9	102	114	95.1	105	107	86.8	105	126	101	90.0
20	97.3	103	104	114	99.7	104	104	100	94.3	106	97.7	98.8
21	108	112	100	103	93.5	89.7	104	99.0	102	110	105	87.0
22	99.9	110	107	104	98.7	93.3	110	97.5	117	125	103	83.0
23	107	105	107	110	110	109	103	93.1	108	116	92.5	80.0
24	105	111	101	101	105	115	113	112	111	128	97.8	101
25	90.8	112	109	107	* 99.4	107	99.6	102	116	123	112	100
26	93.4	114	101	103	* 90.1	109	89.4	112	115	114	104	87.5
27	103	111	111	111	* 96.8	110	89.1	107	111	122	101	79.3
28	111	105	114	104	* 112	106	99.2	136	113	118	88.6	100
29	99.5	110	110	117	* 106	105	91.9	107	123	124	76.5	92.8
30	94.4	123	113	* 97.8	101	103	103	104	112	129	80.7	83.5
31	94.1	109	109	* 106	107	104	99.7	114	114	130	110	91.7
Sum	2,995.2	2,896.6	3,338.2	3,316	3,272.5	3,004.2	3,145.4	3,213.5	3,297.5	3,678	3,225.8	2,892.5
Current Year 1982										Period 1935-1982		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day		Day	Low			Average	Maximum	Minimum	
Jan.			28	111	14	85.8	96.6	5,941	7,604	11,203	1,740	
Feb.			14	115	17	93.8	103	5,745	7,484	11,988	1,640	
Mar.			12	125	17	98.2	108	6,621	8,603	12,430	1,940	
Apr.			18	130	17	101	111	6,577	8,452	11,890	1,920	
May			3	120	26	90.1	106	6,491	8,664	13,140	1,950	
June			24	115	8	87.0	100	5,959	8,048	12,040	2,290	
July			24	113	27	89.1	101	6,239	7,962	11,830	2,530	
Aug.			15	138	14	84.4	104	6,374	7,930	11,960	2,560	
Sept.			113	123	6	80.0	110	6,540	7,886	11,568	2,280	
Oct.			5	135	20	106	119	7,295	8,764	12,385	2,940	
Nov.			1	130	29	76.5	108	6,398	8,352	12,010	2,800	
Dec.			3	108	27	79.3	93.3	5,737	8,018	11,480	2,450	
Yearly				138		76.5	105	75,917	97,767	139,380	27,040	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				3.91		2.17	2.97	93,643	120,595	171,924	33,354	

\* Partly estimated

Ø Mean daily

! And other days

**WEST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)**

DESCRIPTION: Water-stage recorder located about 0.3 mile (0.5 km) upstream from outlet to Yuma Main Drain, which is 175 feet (53.3 m) upstream from East Main Canal Wasteway outlet and 0.4 mile (0.6 km) west of San Luis, Arizona. Prior to August 1, 1975, the recorder was located about 150 feet (45.7 m) upstream from outlet to Yuma Main Drain.

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

REMARKS: Wasteway discharges from West Main Canal Wasteway comprise regulatory waste from the West Main Canal.

**Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.1	17.1	11.6	8.8	0.4	1.6	1.5	8.4	1.9	1.0	10.5	2.0
2	.9	2.5	1.4	1.0	7.2	.5	1.8	15.0	3.6	1.1	1.9	5.3
3	.9	.8	.6	7.4	4.2	.2	4.3	1.8	3.1	3.2	.5	2.4
4	4.9	.5	.4	8.2	.4	1.0	1.9	.7	2.5	12.5	.5	4.7
5	.3	.4	6.9	10.1	.6	.2	2.8	2.7	5.0	6.8	.3	10.0
6	3.6	2.4	8.8	3.7	4.7	2.5	6.0	7.5	1.2	.7	.4	.3
7	.1	1.2	6.2	.7	2.9	.6	2.9	.8	1.1	.9	5.8	.1
8	8.3	2.5	1.0	.3	2.1	3.9	6.9	.7	1.4	4.8	6.8	.1
9	5.0	5.7	6.3	2.1	7.7	1.9	7.8	6.1	6.4	3.5	6.7	.7
10	4.0	1.8	1.8	.2	10.4	1.9	6.5	8.7	12.7	14.0	12.3	.5
11	2.0	.2	5.0	.9	.1	1.2	10.4	6.1	3.1	4.8	3.0	1.5
12	4.2	1.2	7.1	5.9	0	.8	3.1	10.5	4.6	3.2	1.2	1.4
13	1.4	1.9	19.0	.5	0	2.4	.3	10.0	5.9	2.4	3.7	1.3
14	1.1	5.7	16.2	2.7	.8	4.4	5.1	4.9	1.5	1.1	4.7	1.4
15	.1	6.4	9.2	1.3	.4	1.3	7.9	3.4	1.9	.5	6.2	1.7
16	0	1.5	5.2	14.1	2.5	1.1	5.5	5.9	.9	4.2	2.6	1.4
17	7.0	1.0	7.5	4.1	.4	.8	3.3	1.8	4.1	3.2	8.7	7.0
18	2.5	.8	3.0	2.8	2.1	1.8	1.0	.5	7.9	1.3	9.1	6.4
19	6.1	1.1	1.4	5.1	.8	1.5	3.0	3.6	10.1	3.2	3.9	6.4
20	6.8	.6	2.1	4.5	0	.4	.8	7.0	8.6	3.6	6.1	4.3
21	1.0	.2	3.9	11.0	4.8	4.1	1.5	2.5	4.6	7.6	8.4	2.2
22	1.4	.1	16.8	3.9	.9	.4	4.4	11.4	4.0	8.0	11.6	5.9
23	6.9	.2	7.8	1.8	3.1	.2	3.3	1.9	6.5	7.1	6.0	8.9
24	2.0	.2	10.9	.6	.2	.1	1.4	2.9	2.4	1.6	2.0	.8
25	8.9	6.7	9.3	5.9	1.4	.7	4.4	10.4	8.3	5.5	1.3	.4
26	13.7	1.4	7.6	1.9	6.1	.9	9.0	2.9	6.7	.3	7.0	7.5
27	8.4	16.5	11.7	.6	3.7	4.4	7.2	7.4	6.8	1.6	1.9	3.5
28	2.0	2.0	6.7	2.2	3.5	2.6	11.2	2.4	.6	1.4	7.2	1.6
29	1.7		8.9	3.4	6.2	.8	11.9	.6	5.0	4.5	6.9	12.9
30	1.7		17.7	2.1	7.6	4.5	9.4	.5	5.0	2.6	2.9	9.2
31	8.2		11.7		6.0		3.4	.5		7.6		4.2
Sum	116.2	82.6	233.7	117.8	91.2	48.7	145.9	149.5	137.4	123.8	150.1	116.0

Month	Extreme Gage Feet		Current Year 1982					Period 1971-1982			
	High	Low	Extreme Second-Foot		Average Second-Foot	Total Acre-Feet	Acre-Feet				
			Day	Low			Day	Average	Maximum	Minimum	
Jan.	2.02	0	31	42.7	17	0	3.7	230	376	565	125
Feb.	1.91	0	27	38.8	24	0	3.0	164	468	681	164
Mar.	2.09	.04	28	45.2	11	.2	7.5	464	523	939	203
Apr.	1.76	0	19	33.6	11	0	3.9	234	394	664	164
May	1.58	0	10	27.9	111	0	2.9	181	305	434	148
June	1.61	0	14	28.8	11	0	1.6	96.6	311	480	96.6
July	1.57	.01	9	27.6	120	.1	4.7	289	308	556	93.2
Aug.	1.67	.02	19	30.7	8	.1	4.8	297	330	536	98.0
Sept.	1.60	.06	20	28.5	12	.4	4.6	273	380	768	190
Oct.	1.66	.04	31	30.4	126	.2	4.0	246	367	728	133
Nov.	1.73	.05	17	32.6	15	.3	5.0	298	371	541	161
Dec.	1.61	0	5	28.8	17	0	3.7	230	359	610	188
Yearly	2.09	0		45.2		0	4.1	3,003	4,492	6,229	2,829
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	0.64	0		1.28		0	0.12	3,704	5,541	7,683	3,490

! And other days

## 242 WELL FIELD NEAR SAN LUIS, ARIZONA

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

RECORDS: Based on current meter measurements and a continuous record of gage heights. The station is operated by the United States Section of the Commission. Records available: October 18, 1978 through 1982.

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

## Mean Daily Discharge in Second-Foot 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	49.9	43.9	32.4	43.9	48.4	1.1	46.4	0	50.8	49.6	45.0	6.0
2	50.8	43.9	36.6	44.0	48.4	3.5	39.2	0	52.0	49.6	45.0	6.6
3	50.8	42.8	30.3	43.9	48.4	1.1	16.7	0	50.8	49.6	45.0	7.0
4	49.6	41.7	41.1	43.9	48.4	0	16.7	.7	50.1	49.6	45.0	6.9
5	50.8	40.3	49.6	43.9	48.4	0	16.7	21.4	50.8	50.0	45.0	6.9
6	45.2	40.6	49.6	43.9	48.4	0	22.0	47.8	50.8	52.0	45.0	6.5
7	41.2	41.7	43.9	43.3	48.4	0	48.5	48.4	35.1	52.0	45.0	5.7
8	45.0	41.7	43.9	42.8	48.4	0	52.0	43.7	19.3	52.0	45.0	6.8
9	45.0	41.3	43.9	42.8	48.4	0	52.0	47.9	.8	52.0	44.8	7.2
10	45.0	40.6	43.9	42.8	48.4	13.7	52.0	48.1	0	53.2	25.1	6.4
11	45.0	40.6	43.9	42.8	48.4	49.6	52.0	44.7	0	53.2	.4	6.6
12	45.0	41.0	43.8	42.8	48.4	49.6	52.0	43.2	0	53.2	0	7.0
13	45.0	39.1	33.3	42.8	48.4	49.6	52.0	51.0	0	30.1	0	6.7
14	45.0	38.5	1.5	42.8	48.6	49.6	51.2	43.8	0	.8	0	6.5
15	45.1	39.7	.8	42.8	48.4	49.6	50.0	1.0	14.7	.1	0	6.4
16	44.7	43.2	0	42.8	48.4	49.6	50.4	.2	43.2	0	0	6.5
17	43.9	42.8	0	42.8	48.4	49.6	49.6	0	49.6	0	2.1	6.5
18	44.2	42.8	0	38.4	48.5	49.6	49.6	27.1	49.4	0	5.3	6.8
19	45.0	40.6	13.2	45.7	48.4	49.6	49.6	47.3	49.6	0	6.4	6.8
20	45.0	43.9	40.1	48.4	48.4	49.6	49.6	47.3	49.6	0	6.1	6.5
21	45.0	43.9	43.9	47.7	47.6	47.0	49.6	47.3	49.6	0	6.0	6.5
22	45.0	43.9	43.9	48.1	48.4	42.0	50.6	47.3	46.6	0	6.0	6.4
23	45.0	42.8	43.9	49.9	48.4	41.3	50.8	36.5	49.6	0	6.0	6.3
24	45.0	41.7	43.9	48.4	48.4	45.4	49.7	18.3	49.6	0	6.0	6.9
25	38.8	39.5	43.9	48.4	48.4	48.5	44.5	.5	49.6	0	6.0	7.3
26	39.4	33.1	43.9	48.4	34.6	51.6	29.6	0	49.6	0	6.0	7.5
27	42.9	32.5	43.9	48.4	4.9	51.6	24.9	15.8	49.6	0	6.0	6.8
28	39.6	29.7	43.9	48.4	1.5	50.1	1.8	36.2	49.6	14.2	6.1	6.9
29	43.9	41.7	43.9	48.4	.4	45.3	.9	36.2	49.6	45.4	6.0	6.9
30	42.1		43.9	48.4	0	41.9	.8	42.9	49.6	45.4	5.6	7.2
31	43.9		43.9		0		.4	52.0		46.2		7.3
Sum	1,391.8	1,137.8	1,074.7	1,351.8	1,250.9	980.1	1,171.8	896.6	1,109.6	798.2	509.9	208.3
Current Year 1982												
Period 1979-1982												
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Foot	Acre-Foot			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			15	56.9	1	37.3	44.9	2,761	693	2,761	0	
Feb.			19	49.6	26	22.9	40.6	2,257	569	2,257	0	
Mar.			! 4	49.6	116	0	34.7	2,132	534	2,132	0	
Apr.			23	98.0	18	36.2	45.1	2,681	746	2,681	0	
May			14	59.4	130	0	40.4	2,481	1,477	2,750	11.3	
June			125	52.0	1	0	32.7	1,944	1,433	2,800	21.4	
July			25	56.9	31	0	37.8	2,324	1,391	3,020	42.8	
Aug.			113	54.4	1	0	28.9	1,778	963	2,073	0	
Sept.			! 1	52.0	110	0	37.0	2,201	1,132	2,326	0	
Oct.			111	54.4	115	0	25.7	1,583	1,086	2,711	0	
Nov.			! 1	46.2	111	0	17.0	1,011	260	1,011	0	
Dec.			2	9.0	7	2.2	6.7	413	844	2,962	0	
Yearly				98.0		0	32.6	23,566	11,128	23,566	163	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				2.78		0	0.92	29,068	13,726	29,068	201	

! And other days

**TOTAL FLOWS CROSSING INTERNATIONAL BOUNDARY INTO MEXICO NEAR SAN LUIS, SONORA**

**DESCRIPTION:** The tabulated data below are the combined flows of the East Main Canal Wasteway, West Main Canal Wasteway, 242 Lateral, and the Yuma Main Drain and represent the total water crossing the international land boundary into the Sanchez Mejorada Canal near San Luis, Arizona.

**RECORDS:** Records obtained and computed by the United States Section of the Commission. Records available: East Main Canal Wasteway and Yuma Main Drain from January 1935 through 1982; West Main Canal Wasteway from February 23, 1971 through 1982; 242 Lateral from November 1978 through 1982.

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

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	143	169	154	181	179	102	156	126	169	164	201	95.0
2	150	156	146	159	178	107	148	125	169	162	173	106
3	142	149	141	163	180	115	121	105	168	166	158	119
4	147	141	146	172	175	98.3	130	106	182	178	159	119
5	147	145	171	174	174	118	125	126	162	199	156	125
6	154	143	165	157	172	105	130	155	137	175	153	96.9
7	142	147	152	148	166	105	153	158	146	175	182	112
8	149	144	150	151	160	94.7	171	156	123	183	172	105
9	151	151	161	153	160	112	162	158	127	175	178	121
10	146	153	169	152	171	116	162	158	142	201	152	135
11	143	155	162	146	144	148	164	159	116	182	119	105
12	150	145	177	161	155	145	163	156	129	176	122	111
13	145	154	179	155	155	159	163	163	131	160	129	113
14	139	177	128	163	171	144	152	135	111	123	130	99.7
15	149	165	126	154	169	155	168	161	127	130	141	98.9
16	145	147	116	179	153	147	150	118	162	128	121	109
17	151	139	106	161	156	142	167	94.4	179	124	130	102
18	156	140	106	179	158	150	142	123	170	120	129	121
19	155	144	118	168	150	160	161	141	167	132	113	121
20	151	154	147	170	155	155	155	166	153	120	122	113
21	165	167	149	162	151	146	157	162	160	124	126	98.4
22	159	166	181	156	162	139	164	160	171	138	121	96.1
23	168	152	162	164	175	154	160	135	167	134	105	95.5
24	160	156	157	156	173	172	165	137	165	137	107	109
25	140	167	165	168	154	161	158	119	179	140	127	110
26	156	153	155	162	132	163	133	129	176	126	124	104
27	167	172	167	169	106	167	124	143	168	140	111	90.5
28	157	140	165	156	118	165	119	182	169	137	104	109
29	148	164	170	116	152	115	150	180	176		99.9	115
30	143	189	170	106	155	116	150	169	185		95.7	106
31	156	166		118		109	168		195			104
Sum	4,674	4,291	4,740	4,879	4,792	4,152.0	4,563	4,424.4	4,674	4,805	4,060.6	3,365.0

Month	Current Year 1982						Period 1935-1982					
	Extreme Gage Feet		Extreme Second-Feet		Average Second-Feet	Total Acre-Feet	Acre-Feet					
	High	Low	Day	High			Low	Average	Maximum	Minimum		
Jan.			23	168	14	139	151	9,271	9,723	12,131	* 2,123	
Feb.			14	177	17	139	153	8,507	9,405	12,970	* 2,023	
Mar.			30	189	117	106	153	9,394	10,676	13,704	* 2,322	
Apr.			1	181	11	146	163	9,675	10,581	12,982	2,117	
May			3	180	127	106	154	9,498	11,539	13,900	2,473	
June			24	172	8	94.7	138	8,236	10,723	12,570	2,525	
July			8	171	31	109	147	9,053	10,664	12,420	2,927	
Aug.			28	182	17	94.4	143	8,777	10,246	12,657	2,989	
Sept.			4	182	14	111	156	9,273	10,363	12,450	2,602	
Oct.			10	201	118	120	155	9,531	11,225	13,898	3,444	
Nov.			1	201	30	95.7	135	8,057	10,073	12,712	3,407	
Dec.			10	135	27	90.5	109	6,677	10,284	12,050	2,888	
Yearly				201		90.5	146	105,949	125,502	149,010	31,840	
	Meters		Cubic Meters per Second			Thousands of Cubic Meters						
			5.69		2.56	4.13	130,687	154,805	183,802	39,274		

‡ Mean daily      \* Partly estimated      † And other days

## COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

**DESCRIPTION:** Water-stage recorder located in Mexico on the right bank of the river about 1,000 feet (305 m) upstream from the southerly international boundary, 2 miles (3.2 km) west of San Luis, Arizona, and 21.9 miles (35.2 km) downstream from Morelos Dam. The zero of the gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records obtained and furnished by the United States Section of the Commission. Computations by shifting control methods. Records available: Daily discharges, January 1950 through 1982; continuous record of gage heights, January 1947 through 1982. Monthly flows for this station have been derived for the period January 1935 through 1949 based on the computed records of monthly flows of the Colorado River at the northerly international boundary combined with the measured monthly flows from the wasteways discharging into the boundary section of the river from the Yuma Project in Arizona.

**REMARKS:** Reservoirs, diversions in the United States and Mexico, drainage returns, and waste flows modify the river flow at this station.

**EXTREMES:** Since January 1950: Maximum instantaneous discharge, 28,610 second-feet (810 m<sup>3</sup>/sec) on December 18, 1952; maximum gage height, 84.84 feet (25.86 m) on November 29, 1957. Minimum discharge, no flow on several occasions since September 1, 1956.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	249	0	0	0	0	0	0
2	0	0	0	0	0	831	0	0	0	0	0	0
3	0	0	0	0	0	464	0	0	0	0	0	0
4	0	0	0	0	0	37.2	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	103
11	0	0	0	0	0	0	0	0	0	0	0	1,070
12	0	0	0	0	0	0	0	0	0	0	0	761
13	0	0	0	0	0	0	0	0	0	0	0	56.4
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	82.2	0	0	0	0	0	0	0	0	0
20	0	0	279	0	0	0	0	0	0	0	0	0
21	0	0	276	0	0	0	0	0	0	0	0	0
22	0	0	308	0	0	0	0	0	0	0	0	0
23	0	0	224	0	0	0	0	0	0	0	0	0
24	0	0	83.6	0	0	0	0	0	0	0	0	0
25	0	0	.6	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
<b>Sum</b>	0	0	1,253.4	0	0	1,581.2	0	0	0	0	0	1,990.4
<b>Current Year 1982</b>												
<b>Month</b>	<b>Extreme Gage Feet</b>		<b>Extreme Second-Feet</b>				<b>Average Second-Feet</b>	<b>Total Acre-Feet</b>	<b>Period 1935-1982</b>			
	<b>High</b>	<b>Low</b>	<b>Day</b>	<b>High</b>	<b>Low</b>	<b>Day</b>			<b>Average</b>	<b>Maximum</b>	<b>Minimum</b>	
Jan.	74.90	74.90		0	0	0	0	328,405	1,672,000	0		
Feb.	74.90	74.90		0	0	0	0	269,783	1,385,000	0		
Mar.	76.11	74.10	20	348	1 1	40.4	2,486	222,384	1,127,000	.98		
Apr.	74.10	74.10		0	0	0	0	145,293	700,900	0		
May	74.10	74.10		0	0	0	0	200,039	1,160,000	0		
June	76.99	74.40	2	915	1 4	52.7	3,136	154,767	1,180,000	0		
July	74.40	74.40		0	0	0	0	114,159	772,800	0		
Aug.	74.40	74.40		0	0	0	0	128,397	796,000	0		
Sept.	74.40	74.40		0	0	0	0	154,229	1,033,000	0		
Oct.	74.40	74.40		0	0	0	0	196,479	1,192,000	0		
Nov.	74.40	74.40		0	0	0	0	252,238	1,428,000	0		
Dec.	76.93	74.40	11	1,240	1 1	64.2	3,948	312,319	1,839,000	0		
<b>Yearly</b>	76.99	74.10		1,240		0	13.2	9,570	2,478,492	10,688,800	9,570	
<b>Yearly</b>	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	23.47	22.59		35.1		0	0.37	11,804	3,057,195	13,184,528	11,804	

1 And other days



## WELLTON-MOHAWK BYPASS DRAIN AT SOUTHERLY INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and Parshall flume located 80 feet (24.4 m) upstream from the southerly land boundary, 550 feet (168 m) east of the Colorado River, and 1.8 miles (2.9 km) west of San Luis, Arizona. The zero of the gage has not been determined.

RECORDS: Based on current meter measurements and a continuous record of gage heights. Station is operated by United States Section of the Commission. Records available: June 23, 1977 through 1982.

REMARKS: Pursuant to Minute No. 242 of the Commission, a bypass drain of the Wellton-Mohawk extension channel was constructed from Morelos Dam to the Santa Clara Slough in Mexico along the left bank of the Colorado River.

## Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	207	206	194	191	210	208	199	194	204	200	214	196
2	218	207	194	193	204	200	208	200	208	200	216	199
3	216	209	196	198	212	196	200	198	214	206	212	219
4	214	208	198	200	216	198	198	194	210	200	214	217
5	214	205	202	202	218	161	204	200	212	213	214	221
6	212	206	204	200	220	182	204	210	210	218	216	220
7	206	204	206	204	218	202	208	210	211	210	216	219
8	210	204	206	208	216	202	208	210	208	212	216	218
9	206	205	206	210	214	202	202	208	213	214	219	231
10	206	208	210	212	214	200	196	206	212	216	228	229
11	208	210	212	212	213	196	199	208	208	218	228	213
12	206	210	216	212	210	194	198	210	214	218	233	211
13	208	208	212	214	212	193	198	208	210	218	234	211
14	202	208	214	212	209	191	200	200	210	216	232	211
15	194	208	220	210	209	183	204	204	206	214	236	215
16	194	209	214	212	211	187	206	202	208	214	227	222
17	198	206	214	212	212	185	204	198	212	216	224	217
18	202	206	204	210	210	191	198	206	214	216	216	214
19	206	208	210	206	208	196	200	206	214	216	214	214
20	206	204	214	200	208	198	198	204	212	218	212	220
21	210	202	210	200	208	200	194	204	210	212	218	218
22	210	200	208	202	208	200	193	202	214	212	224	218
23	208	200	208	202	210	202	198	204	212	214	226	218
24	208	202	206	202	212	200	196	189	212	218	226	210
25	208	202	206	198	212	183	198	204	212	220	226	210
26	210	189	204	198	210	193	198	194	206	220	226	216
27	211	156	204	196	212	185	184	193	212	220	222	215
28	211	173	206	208	212	180	137	193	206	212	226	218
29	209	209	206	208	212	176	132	200	200	212	226	218
30	210	204	210	208	176	132	200	200	200	215	228	224
31	210	200	200	208	208	155	198	198	200	216	228	228
Sum	6,438	5,663	6,408	6,142	6,556	5,760	5,951	6,257	6,294	6,624	6,669	6,710
Current Year 1982												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1977-1982			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	1.92	1.71	1	230	15	189	208	12,770	13,864	17,542	9,241	
Feb.	1.89	1.59	10	212	127	154	202	11,232	13,014	14,896	11,232	
Mar.	1.94	1.77	12	224	2	191	207	12,710	15,011	17,427	12,710	
Apr.	1.92	1.72	14	226	1	187	205	12,182	14,719	16,711	12,182	
May	1.91	1.70	6	224	2	183	211	13,004	15,250	16,808	13,004	
June	1.84	1.51	1	210	5	149	192	11,425	13,799	16,086	11,425	
July	1.85	1.37	7	214	28	127	192	11,804	14,037	17,022	11,296	
Aug.	1.85	1.66	12	216	24	180	202	12,411	14,840	18,196	11,566	
Sept.	1.88	1.73	12	222	30	193	210	12,484	12,834	17,423	6,780	
Oct.	1.89	1.76	5	224	1	198	214	13,139	13,435	18,543	6,343	
Nov.	2.02	1.84	30	246	1	210	222	13,228	12,993	16,980	6,047	
Dec.	1.97	1.62	9	238	1	171	216	13,209	13,392	18,256	6,216	
Yearly	2.02	1.37		246		127	207	149,698	167,188	180,374	148,426	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	0.62	0.42		6.97		3.60	5.86	184,651	206,225	222,490	183,082	

1 And other days

## WASTEWAY TO COLORADO RIVER AT KILOMETER 27 IN MEXICO

**DESCRIPTION:** Water-stage recorder and cableway located on the left bank of the canal wasteway immediately upstream from where it discharges into the Colorado River, 0.6 mile (1.0 km) downstream from the wasteway gates on the Central Feeder Canal on the right bank of the Colorado River, 16.8 miles (27.0 km) downstream from Morelos Dam, and 820 feet (250 m) south of the junction of the Mexicali-San Luis and Algodones-Pescaderos highways.

**RECORDS:** Data obtained and computed by the Colorado River Irrigation District of the Ministry of Agriculture and Hydraulic Resources and furnished by the Mexican Section of the Commission. Records shown in table below are waste returns to the Colorado River. Records available: April 1956 through 1982.

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

## Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1956-1982		
		Average	Maximum	Minimum
January	0	7,600	69,527	0
February	0	2,340	14,698	0
March	3,319	5,662	35,492	0
April	0	11,183	68,714	0
May	0	8,842	58,365	0
June	0	9,346	50,025	0
July	0	11,660	46,139	0
August	1,762	13,151	55,497	0
September	58.1	10,559	68,053	0
October	0	7,780	110,417	0
November	0	9,165	69,415	0
December	16,031	7,451	70,213	0
	21,170	98,101	509,407	0
Yearly	Thousands of Cubic Meters			
	26,113	121,006	628,347	0

## COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - DISCHARGES

**DESCRIPTION:** Water-stage recorder and cableway located in Mexico on the left bank of the Colorado River about 24.5 miles (39.4 km) downstream from the southerly international boundary, 44.5 miles (71.6 km) downstream from Morelos Dam and 4.5 miles (7.2 km) upstream from the Sonora-Baja California railroad bridge. The zero of the gage is at mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on 43 double current meter measurements made during the year and a continuous record of gage heights. Data obtained and furnished by the Mexican Section of the Commission. From June 1951 to July 1954, discharges were computed from gage height records based on daily gage readings at 8:00 a.m., Pacific Standard Time. A continuous record of gage heights obtained since July 21, 1954. Records available: June 1951 through 1982.

**REMARKS:** The flows at this gage show the seepage from canals that run parallel at higher elevations and adjacent to the river. On June 23, 1977 the Wellton-Mohawk drainage water discharged below Morelos Dam was diverted to the Santa Clara Estuary. Also, better utilization of irrigation waters has reduced the waste returns to a minimum. Normal flows are measured by wading at a section located 2,000 feet (600 m) below the gage. Occasionally there are high flows from excess water arriving at Morelos Dam; discharge measurements are then made at the gage and the discharge-relationship curve extended for greater flows.

**EXTREMES:** Since January 1, 1952: Maximum mean daily gage height, 54.04 feet (16.47 m) on May 3, 1980, minimum mean daily gage height 37.73 feet (11.50 m) on July 18 and 19, 1970; maximum mean daily discharge, 20,200 second-feet (571 m<sup>3</sup>/sec) on December 19, 1952; minimum mean daily discharge, no flow on various occasions.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	45.2	11.3	9.9	8.8	10.6	11.3	6.4	6.0	4.2	3.5	4.2	7.1
2	31.1	11.3	9.9	9.9	10.6	9.9	6.4	6.0	4.2	3.5	4.2	8.8
3	16.2	11.3	10.6	9.9	10.6	8.8	6.4	6.0	4.2	3.9	4.2	10.2
4	18.4	11.3	10.6	10.6	10.6	7.8	6.4	6.0	3.9	3.9	4.2	11.7
5	17.7	10.6	10.6	10.6	10.6	6.7	6.4	6.0	3.9	3.9	4.2	13.1
6	17.7	10.6	9.9	10.6	10.6	5.3	6.4	5.7	3.9	3.9	4.2	14.5
7	18.4	11.3	9.9	10.6	10.6	4.2	6.0	5.7	3.9	3.9	4.2	16.2
8	16.2	10.6	9.9	10.6	10.6	4.9	6.0	5.7	3.9	3.9	4.2	17.7
9	14.1	10.6	9.9	10.6	10.6	5.3	6.0	5.7	3.9	3.9	4.2	19.1
10	11.3	11.3	9.9	10.6	10.6	6.0	6.0	5.7	3.5	3.9	4.2	20.5
11	12.4	11.3	10.6	10.6	11.3	6.7	5.7	5.3	3.5	3.9	4.2	22.2
12	12.4	10.6	7.8	10.6	11.3	7.1	5.7	5.3	3.5	4.2	4.2	23.7
13	11.3	10.6	9.9	10.6	11.3	7.8	5.7	4.9	3.5	4.2	4.2	25.1
14	11.3	10.6	11.3	10.6	11.3	7.8	6.0	4.9	3.5	4.2	4.2	26.5
15	11.3	7.8	10.6	10.6	11.3	7.8	6.0	4.6	3.5	4.2	4.2	27.9
16	11.3	10.6	7.8	10.6	11.3	7.4	6.0	4.6	3.5	4.2	4.2	29.7
17	11.3	8.8	7.1	7.8	11.3	7.1	6.0	4.6	3.9	4.2	4.2	31.1
18	11.3	10.6	8.8	7.8	11.3	7.1	6.4	4.6	3.9	4.2	4.2	32.5
19	10.6	7.1	11.3	7.8	10.6	7.1	6.4	4.6	3.9	4.2	4.2	33.9
20	10.6	8.8	11.3	7.8	10.6	7.1	6.4	4.9	3.9	4.2	4.2	35.3
21	10.6	7.1	10.6	7.8	11.3	6.7	6.4	4.9	3.9	4.2	4.2	37.1
22	10.6	7.1	9.9	10.6	11.3	6.7	6.4	4.9	3.5	4.2	4.2	38.5
23	10.6	8.8	9.9	10.6	11.3	6.7	6.0	4.9	3.5	4.2	4.2	39.9
24	10.6	11.3	10.6	7.1	11.3	6.7	6.0	4.9	3.5	4.2	4.2	41.3
25	11.3	11.3	8.8	7.1	11.3	6.4	6.0	4.9	3.5	4.2	4.2	43.1
26	11.3	11.3	8.8	7.1	11.3	6.4	6.0	4.6	3.2	4.2	4.2	41.3
27	11.3	10.6	8.8	7.1	11.3	6.4	6.0	4.6	3.2	4.2	4.2	39.9
28	11.3	10.6	9.9	7.1	11.3	6.4	6.0	4.6	3.2	4.2	4.2	38.5
29	11.3	9.9	9.9	7.1	11.3	6.4	6.0	4.6	3.5	4.2	4.2	37.1
30	11.3	9.9	9.9	8.8	11.3	6.4	6.0	4.2	3.5	4.2	5.6	35.3
31	11.3	9.9	9.9	9.9	11.3	6.4	6.0	4.2	4.2	4.2	4.2	33.9
<b>Sum</b>	441.6	285.1	304.6	278.0	341.9	208.4	189.5	158.1	110.6	126.1	127.4	852.7
<b>Current Year 1982</b>								<b>Period 1951-1982</b>				
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	41.01	39.93	1	47.7	19	10.6	14.1	876	169,606	1,047,732	426	
Feb.	39.96	39.80	1	11.3	15	7.1	10.2	565	103,332	696,461	317	
Mar.	39.99	39.80	19	12.4	116	7.1	9.9	604	81,150	807,342	0	
Apr.	39.93	39.80	14	10.6	124	7.1	9.2	550	58,558	588,983	0	
May	39.96	39.93	11	11.3	1	10.6	10.9	678	81,374	732,815	0	
June	39.99	39.96	1	11.3	7	4.2	7.1	413	42,753	555,460	0	
July	40.06	39.86	1	6.4	111	5.7	6.0	375	28,230	339,089	0	
Aug.	40.35	40.19	1	6.0	130	4.2	4.9	314	37,352	323,679	0	
Sept.	41.17	40.88	1	4.2	126	3.2	3.5	220	51,644	572,551	0	
Oct.	41.17	41.08	112	4.2	1	3.5	4.2	251	82,007	769,939	0	
Nov.	41.31	41.17	30	5.7	1	4.2	4.2	255	117,072	909,399	173	
Dec.	44.13	40.19	25	43.1	1	7.1	27.5	1,691	146,202	1,060,767	502	
<b>Yearly</b>	44.13	39.80		47.7		3.2	9.5	6,791	973,719	7,923,600	6,791	
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	13.45	12.13		1.35		0.09	0.27	8,376	1,201,070	9,773,655	8,376	

Ø Mean daily

! And other days

## COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page for Description)

## Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>1</b>	40.94	39.96	39.90	39.86	39.93	39.96	40.03	40.22	40.88	41.14	41.17	41.27
<b>2</b>	40.52	39.96	39.90	39.90	39.93	39.96	40.03	40.22	40.91	41.14	41.17	41.27
<b>3</b>	40.12	39.96	39.93	39.90	39.93	39.96	40.03	40.22	40.94	41.14	41.17	41.27
<b>4</b>	40.19	39.96	39.93	39.93	39.93	39.96	40.03	40.19	40.94	41.14	41.21	41.31
<b>5</b>	40.16	39.93	39.93	39.93	39.93	39.96	40.03	40.22	40.94	41.14	41.21	41.34
<b>6</b>	40.16	39.93	39.90	39.93	39.93	39.96	40.03	40.26	40.94	41.14	41.21	41.40
<b>7</b>	40.19	39.96	39.90	39.93	39.93	39.96	40.03	40.26	40.98	41.17	41.21	41.50
<b>8</b>	40.12	39.93	39.90	39.93	39.93	39.96	40.03	40.29	40.98	41.17	41.24	41.50
<b>9</b>	40.06	39.93	39.90	39.93	39.93	39.96	40.03	40.29	40.98	41.17	41.24	41.57
<b>10</b>	39.96	39.96	39.90	39.93	39.93	39.96	40.03	40.29	40.98	41.17	41.24	41.67
<b>11</b>	39.99	39.96	39.93	39.93	39.96	39.96	40.03	40.26	40.98	41.17	41.24	41.83
<b>12</b>	39.99	39.93	39.83	39.93	39.96	39.96	40.03	40.26	40.98	41.17	41.24	41.99
<b>13</b>	39.96	39.93	39.90	39.93	39.96	39.96	40.03	40.26	40.98	41.17	41.27	42.32
<b>14</b>	39.96	39.93	39.96	39.93	39.96	39.96	40.03	40.26	41.01	41.17	41.27	42.42
<b>15</b>	39.96	39.83	39.93	39.93	39.96	39.96	40.03	40.26	40.91	41.17	41.27	42.65
<b>16</b>	39.96	39.93	39.83	39.93	39.96	39.96	40.03	40.26	40.91	41.17	41.31	42.81
<b>17</b>	39.96	39.86	39.80	39.83	39.96	39.96	40.03	40.26	40.91	41.17	41.31	43.14
<b>18</b>	39.96	39.93	39.86	39.83	39.96	39.96	39.96	40.29	40.91	41.17	41.31	43.47
<b>19</b>	39.93	39.80	39.96	39.83	39.93	39.96	39.93	40.29	40.98	41.17	41.24	43.64
<b>20</b>	39.93	39.86	39.96	39.83	39.93	39.96	39.86	40.32	41.04	41.14	41.24	43.73
<b>21</b>	39.93	39.80	39.93	39.83	39.96	39.96	39.86	40.29	41.08	41.11	41.24	43.80
<b>22</b>	39.93	39.80	39.90	39.93	39.96	39.96	39.90	40.29	41.08	41.08	41.24	43.90
<b>23</b>	39.93	39.86	39.90	39.93	39.96	39.96	39.90	40.32	41.11	41.14	41.24	44.00
<b>24</b>	39.93	39.96	39.93	39.80	39.96	39.96	39.93	40.35	41.14	41.14	41.24	44.03
<b>25</b>	39.96	39.96	39.86	39.80	39.96	39.96	39.86	40.35	41.14	41.17	41.24	44.13
<b>26</b>	39.96	39.96	39.86	39.80	39.96	39.96	39.86	40.35	41.17	41.17	41.24	42.95
<b>27</b>	39.96	39.93	39.86	39.80	39.96	39.96	39.86	40.35	41.17	41.17	41.21	40.32
<b>28</b>	39.96	39.93	39.90	39.80	39.96	39.96	39.86	40.35	41.17	41.17	41.21	40.26
<b>29</b>	39.96	39.90	39.90	39.80	39.96	39.96	39.93	40.32	41.17	41.17	41.21	40.42
<b>30</b>	39.96	39.90	39.90	39.86	39.96	39.96	39.93	40.35	41.17	41.17	41.21	40.52
<b>31</b>	39.96	39.90	39.90	39.90	39.96	39.96	39.96	40.35	41.17	41.17	41.21	40.52
<b>Avg.</b>	40.06	39.93	39.90	39.90	39.96	39.96	39.96	40.29	41.01	41.17	41.24	42.16

### WASTEWAY TO COLORADO RIVER AT KILOMETER 38 IN MEXICO

**DESCRIPTION:** Wasteway to the Colorado River on the left bank of new Barrote Canal at old dam and bridge at Kilometer 18+251 (old Kilometer 38+000). The wasteway is located in the Colonia Bojorquez 0.8 mile (1.3 km) upstream from the Sonora-Baja California railroad bridge, 3.7 miles (5.9 km) downstream from the Miguel C. Rodriguez gaging station, and 28.1 miles (45.3 km) downstream from the southerly international boundary.

**RECORDS:** The records are computed by the Ministry of Agriculture and Hydraulic Resources and based upon gate openings. Records available: January 1964 through 1982.

**REMARKS:** The wasteway structure on the left bank of the Colorado River has two manually operated radial gates 9.8 feet (3.0 m) wide. It discharges into a dirt canal 656 feet (200 m) long with a total capacity of 459 second-feet (13.0 m<sup>3</sup>/sec) which discharges to the river.

#### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1964-1982		
		Average	Maximum	Minimum
January	0	1,051	8,546	0
February	0	557	7,653	0
March	58.9	364	4,809	0
April	0	109	1,992	0
May	0	207	1,973	0
June	0	192	2,411	0
July	0	161	1,768	0
August	267	214	2,383	0
September	0	497	6,375	0
October	0	1,706	23,242	0
November	77.7	928	14,510	0
December	570	1,044	10,559	0
Yearly	973	7,030	69,574	0
	Thousands of Cubic Meters			
	1,200	8,672	85,819	0

## COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

**DESCRIPTION:** Water-stage recorder and cableway in Mexico, 47.6 miles (76.6 km) downstream from the southerly international boundary, 18.6 miles (30.0 km) downstream from the Sonora-Baja California railroad bridge and 3.7 miles (6.0 km) east of Kilometer 70 of the Mexicali-San Felipe highway. The recorder is located on the right bank of the Colorado River. The zero of the gage is 9.84 feet (3.00 m) above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records obtained and computed by the Mexican Section of the Commission. Records available: Mean daily discharges from January 1960 through 1968. Incomplete record of gage heights, March 1, 1946 through November 1947; twice daily readings of gage heights, January 1, 1948 through December 1949; continuous record of gage heights since installation of water-stage recorder February 8, 1956. Mean daily gage heights, January 1960 through 1982.

**REMARKS:** In former years, the flow past this station was affected by the tides in the Gulf of California. After July 1968, measurement by current meter was suspended; beginning in 1969, twice daily readings of gage heights and no record of mean daily discharges. At the beginning of the year, the release of surplus flow at Morelos Dam noticeably increased the height of the river above the normal river bed.

**EXTREMES:** January 1960 through 1968: Maximum daily discharge, 4,380 second-feet (124 m<sup>3</sup>/sec), January 21 and December 7 and 8, 1960; minimum discharge, no flow on various occasions. Maximum monthly discharge, 225,224 acre-feet (277,811,000 m<sup>3</sup>) January 1960; minimum monthly discharge, zero during various months of several years. Annual maximum discharge, 503,260 acre-feet (620,765,000 m<sup>3</sup>) during 1960; minimum 59,335 acre-feet (73,189,000 m<sup>3</sup>) in 1968. January 1960 through 1982: Maximum gage height, 19.69 feet (6.00 m) April 30 to May 4, May 24-27, August 1-3, and August 16 to December 4, 1980; minimum gage height, 12.47 feet (3.80 m) on August 31 and September 1, 1960.

## Mean Daily Gage Height in Feet 1982

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	14.83	14.86	14.90	15.26	15.09	14.60	14.70	14.60	14.37	14.24	14.11	14.44
2	14.83	14.90	14.90	15.26	15.09	14.60	14.70	14.60	14.37	14.24	14.11	14.44
3	14.86	14.96	14.90	15.29	15.09	14.60	14.70	14.60	14.37	14.24	14.11	14.44
4	14.86	14.96	14.93	15.29	15.09	14.60	14.70	14.57	14.37	14.24	14.14	14.44
5	14.83	14.99	14.93	15.29	15.09	14.63	14.70	14.57	14.37	14.24	14.14	14.44
6	14.83	14.99	14.96	15.29	15.09	14.63	14.70	14.57	14.37	14.24	14.14	14.47
7	14.83	14.99	14.96	15.29	15.09	14.63	14.67	14.57	14.37	14.21	14.14	14.47
8	14.86	14.96	14.96	15.29	15.09	14.63	14.67	14.57	14.37	14.21	14.17	14.50
9	14.86	14.96	14.96	15.32	15.09	14.63	14.67	14.57	14.37	14.21	14.17	14.50
10	14.83	14.93	14.96	15.32	15.09	14.63	14.63	14.53	14.37	14.21	14.17	14.50
11	14.83	14.96	14.99	15.32	15.09	14.63	14.63	14.53	14.37	14.21	14.17	14.53
12	14.83	14.96	14.99	15.32	15.09	14.63	14.63	14.53	14.37	14.21	14.21	14.57
13	14.83	14.93	15.03	15.32	15.09	14.63	14.63	14.53	14.24	14.21	14.21	14.60
14	14.80	14.93	15.06	15.32	15.09	14.63	14.63	14.53	14.24	14.17	14.21	14.63
15	14.80	14.96	15.06	15.32	15.03	14.63	14.63	14.53	14.24	14.17	14.21	14.63
16	14.80	14.96	15.09	15.35	14.96	14.63	14.60	14.53	14.24	14.17	14.24	14.67
17	14.80	14.96	15.09	15.35	14.96	14.63	14.60	14.50	14.24	14.17	14.24	14.70
18	14.83	14.93	15.09	15.35	14.96	14.63	14.57	14.50	14.11	14.17	14.27	14.70
19	14.83	14.96	15.09	15.35	14.96	14.67	14.57	14.50	14.11	14.17	14.27	14.73
20	14.83	14.96	15.09	15.35	14.93	14.67	14.57	14.50	14.11	14.14	14.30	14.76
21	14.80	14.96	15.09	15.39	14.90	14.67	14.53	14.50	14.11	14.14	14.30	14.76
22	14.80	14.99	15.12	15.39	14.90	14.67	14.53	14.47	14.11	14.14	14.30	14.83
23	14.83	14.99	15.16	15.39	14.90	14.67	14.50	14.47	14.11	14.14	14.34	14.83
24	14.83	15.03	15.16	15.35	14.90	14.67	14.47	14.47	14.11	14.14	14.34	14.86
25	14.80	15.03	15.19	15.35	14.83	14.67	14.47	14.44	14.11	14.11	14.37	14.90
26	14.80	15.03	15.19	15.35	14.76	14.67	14.47	14.44	14.11	14.11	14.37	14.96
27	14.83	15.03	15.22	15.35	14.76	14.70	14.47	14.44	14.11	14.11	14.37	14.96
28	14.83	15.03	15.22	15.32	14.67	14.70	14.44	14.44	14.11	14.11	14.40	14.99
29	14.83		15.22	15.32	14.60	14.70	14.44	14.44	14.11	14.11	14.40	15.03
30	14.86		15.26	15.32	14.60	14.70	14.44	14.44	14.11	14.11	14.44	15.03
31	14.86		15.26		14.53		14.44	14.44		14.11		15.06
<b>Avg.</b>	14.83	14.96	15.06	15.32	14.96	14.63	14.57	14.50	14.24	14.17	14.24	14.70

## STORED WATER IN LARGE RESERVOIRS OF THE COLORADO RIVER

Data are presented below for all large storage reservoirs in the Colorado River basin below Lee's Ferry, all of which are located in the United States. The monthly figures represent usable contents on the last day of the month, in thousands of acre-feet. The capacities indicated are usable capacities at the top of the spillway gates in closed position, for those dams having controlled spillways; for all others, capacities indicated are at spillway level. Records furnished by the U. S. Geological Survey.

### In Thousands of Acre-Feet

Month	LAKE MEAD		LAKE MOHAVE		HAVASU LAKE		TOTAL IN UNITED STATES RESERVOIRS	
	(Capacity 26,159.0)		(Capacity 1,810.0)		(Capacity 619.4)		(Capacity 28,588.4)	
	1982	Average 1935-1982	1982	Average 1951-1982	1982	Average 1939-1982	1982	Estimated Average
Jan.	23,083	17,534	1,642	1,654	547.9	553.8	25,272.9	19,741.8
Feb.	23,264	17,330	1,629	1,674	554.8	555.9	25,447.8	19,559.9
Mar.	23,064	17,060	1,673	1,670	547.9	570.8	25,284.9	19,300.8
Apr.	22,671	17,137	1,719	1,673	616.4	601.9	25,006.4	19,411.9
May	22,474	17,941	1,782	1,736	626.2	603.8	24,882.2	20,280.8
June	22,401	19,102	1,668	1,623	613.2	604.6	24,682.2	21,329.6
July	22,410	19,270	1,519	1,491	598.2	591.4	24,527.2	21,352.4
Aug.	22,540	19,073	1,562	1,438	589.3	575.0	24,691.3	21,086.0
Sept.	22,766	18,832	1,426	1,420	565.2	570.4	24,757.2	20,822.4
Oct.	23,070	18,613	1,402	1,439	557.7	571.1	25,029.7	20,623.1
Nov.	23,613	18,437	1,508	1,516	552.4	560.8	25,673.4	20,513.8
Dec.	24,151	18,240	1,646	1,606	540.9	555.9	26,337.9	20,401.9
Avg.	22,959	18,214	1,598	1,578	575.8	576.3	25,132.8	20,368.7
Max.	24,151	! 27,780	1,782	! 1,808	626.2	! 688.7	26,337.9	! 28,235.0
Min.	22,401	* 10,727	1,402	!! 1,186	540.9	!! 76.9	24,527.2	!! 13,062.6

! Maximum end of month storage for period of record  
!! Minimum end of month storage for period of record

\* Minimum end of month storage since 1940

### SUSPENDED SILT

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

A. By lowering a D-48 depth integrating sampler at verticals located at centers of sections of equal discharge in the river cross section, being careful to approach but not strike the bottom. The samples obtained in the section are combined to comprise a composite sample for that date.

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

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

For ease of comparison, the assumption is made that 1,847 tons of deposited silt would occupy a volume of one acre-foot, or one cubic foot of deposited silt would weigh 85 pounds.

Month	1982						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

#### Colorado River at Northerly International Boundary

Period 1956-1982

Jan.	158,821,000	3,000	4	0.0019	0.0040	0.0010	1.6	23.8	336	1.4
Feb.	153,564,000	3,700	4	.0024	.0042	.0014	2.0	13.1	116	1.6
Mar.	288,638,000	16,900	5	.0058	.0081	.0043	9.1	40.1	499	6.3
Apr.	301,010,000	14,700	4	.0049	.0055	.0031	8.0	36.0	434	7.3
May	151,867,000	4,000	4	.0026	.0036	.0021	2.2	13.9	201	2.2
June	143,214,000	4,700	5	.0033	.0042	.0026	2.5	14.7	92.6	2.5
July	171,787,000	4,600	4	.0027	.0037	.0023	2.5	19.5	89.3	2.5
Aug.	186,235,000	7,300	4	.0039	.0059	.0027	4.0	19.2	103	3.8
Sept.	110,275,000	3,900	5	.0035	.0042	.0029	2.1	8.7	43.6	1.6
Oct.	64,402,000	1,200	4	.0019	.0030	.0014	.6	5.0	36.7	.5
Nov.	65,084,000	1,200	4	.0018	.0041	.0012	.6	9.7	89.9	.5
Dec.	163,323,000	3,600	5	.0022	.0052	.0012	1.9	17.9	174	.6
Yearly	1,958,220,000	68,800	52	0.0035	0.0081	0.0010	37.1	221.6	2,198	37.1

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

#### Intake Canal at Morelos Diversion Structure

Period 1952-1982

Jan.	158,326,000	7,491	4	0.0047	0.0112	0.0009	4.0	6.0	22.3	0.2
Feb.	153,164,000	6,318	4	.0041	.0058	.0028	3.4	6.7	45.2	.9
Mar.	277,823,000	18,379	5	.0066	.0091	.0050	9.9	39.6	154	5.3
Apr.	300,262,000	18,739	4	.0062	.0076	.0045	10.1	35.4	121	7.5
May	147,184,000	9,084	4	.0062	.0090	.0017	4.9	10.0	51.2	1.5
June	134,898,000	4,289	5	.0032	.0061	.0008	2.3	25.3	109	2.3
July	170,974,000	7,255	4	.0042	.0067	.0026	3.9	35.9	156	3.9
Aug.	185,413,000	10,766	4	.0058	.0082	.0044	5.8	33.6	135	3.8
Sept.	109,536,000	5,248	5	.0048	.0064	.0026	2.8	14.4	64.7	1.9
Oct.	63,611,000	2,725	4	.0043	.0061	.0020	1.5	4.5	26.7	.3
Nov.	64,258,000	3,673	4	.0057	.0071	.0048	2.0	2.6	13.9	.2
Dec.	151,907,000	5,270	5	.0035	.0066	.0014	2.9	5.8	18.6	1.1
Yearly	1,917,356,000	99,239	52	0.0049	0.0112	0.0009	53.5	220	696	51.4

Samples and analyses by Mexican Section, Method B

#### Colorado River at Southerly International Boundary

Jan.										
Feb.										
Mar.										
Apr.										
May										
June										
July										
Aug.										
Sept.										
Oct.										
Nov.										
Dec.										
Yearly										

NO SAMPLES TAKEN DURING 1982

## SUSPENDED SILT

Month	1982						Period of Record		
	Tons		No. of Samples	Gravimetric Percentages			Acre-Feet at 1,847 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

## Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1982

Jan.	1,190,000	80.9	4	0.0068	0.0134	0.0030	0.04	16.1	251	0
Feb.	768,000	57.1	4	.0074	.0151	.0021	.03	3.5	34.5	0
Mar.	821,000	71.4	5	.0087	.0134	.0020	.04	5.1	100	0
Apr.	748,000	36.2	4	.0048	.0085	.0031	.02	8.0	172	0
May	922,000	59.1	5	.0064	.0081	.0061	.03	6.3	132	0
June	561,000	53.2	4	.0095	.0164	.0052	.03	5.9	127	0
July	509,000	46.6	4	.0092	.0133	.0065	.02	4.3	83.9	0
Aug.	427,000	37.1	4	.0087	.0136	.0052	.02	7.1	126	0
Sept.	299,000	28.5	4	.0095	.0134	.0062	.02	7.1	146	0
Oct.	342,000	29.5	2	.0086	.0103	.0061	.02	11.1	206	0
Nov.	346,000	29.5	3	.0085	.0123	.0082	.02	11.1	192	0
Dec.	2,299,000	272	1	.0118	.0122	.0113	.2	8.8	140	0
Yearly	9,233,000	802	44	0.0083	0.0164	0.0020	0.45	94.3	1,476	0.45

Samples and analyses by Mexican Section, Method C

## CHEMICAL ANALYSES OF WATER SAMPLES

1982

The table below is based on chemical analyses of weekly samples from the Colorado River at the Northerly International Boundary taken by the United States Section of the Commission and analyzed by the U.S. Geological Survey.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na 22.99; (CO<sub>3</sub> plus HCO<sub>3</sub>) expressed as CO<sub>3</sub>, 30.00; SO<sub>4</sub>, 48.03; Cl, 35.45; NO<sub>3</sub>, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as EC x 10<sup>6</sup> at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		ECx10 <sup>6</sup> @25°C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO <sub>3</sub> + HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>

## Colorado River at Northerly International Boundary

Jan.	1	1.36	159,000	1,580		7.9	50	33	4.99	3.12	8.13	3.38	7.58	5.36
Feb.	1	1.33	150,000	1,630		7.9	48	27	5.24	3.12	7.83	3.47	7.75	4.23
Mar.	1	1.22	259,000	1,430		7.8	47	30	5.29	2.71	6.96	3.06	7.00	4.29
Apr.	1	1.12	248,000	1,290		7.9	45	27	4.69	2.80	6.09	2.90	6.83	3.67
May	1	1.26	141,000	1,490		7.9	48	31	4.89	3.12	7.39	3.24	7.25	4.65
June	1	1.28	135,000	1,470		8.0	49	29	4.79	2.96	7.44	3.34	7.62	4.37
July	1	1.25	158,000	1,400		7.9	47	27	5.04	2.80	6.83	3.15	7.70	4.01
Aug.	1	1.29	177,000	1,490		7.9	51	30	4.49	2.96	7.74	3.24	7.62	4.57
Sept.	1	1.32	107,000	1,530		7.9	58	30	3.59	2.96	9.13	3.20	7.79	4.65
Oct.	1	1.41	66,800	1,730		7.8	48	33	5.49	3.29	8.05	3.61	7.66	5.64
Nov.	1	1.51	72,300	1,710		7.9	51	33	5.54	3.21	9.22	3.77	8.16	5.98
Dec.	1	1.44	173,000	1,700		8.2	52	33	5.24	3.12	8.92	3.52	8.04	5.61
Mean #	Ø12	1.28	Ø1,846,100	1,490		7.9	50	30	4.92	2.95	7.52	3.24	7.46	4.54
Period Avg.		1.50	2,523,129	1,795		8.0			5.57	3.33	9.21	3.28	7.89	6.96
Tons of Constituents				1982					193,000	70,300	339,000	387,000	702,000	315,000
Avg. Tons				Period 1962-1982					259,000	94,000	487,000	258,000	870,000	565,000

\*\* Percent of total cations

\*\*\* Percent of total anions

Ø Weighted mean

Ø Total

## ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1982

The following tables show electrical conductivity, expressed in mhos per centimeter  $\times 10^6$  at  $25^\circ\text{C}$ , of individual water samples taken at Colorado River stations and in Mexican canals. Samples were taken at the northerly international boundary by both Sections of the Commission and at the southerly international boundary by the United States Section. Conductivity determinations were made by the United States Geological Survey. Samples for the Intake Canal at Morelos Dam and Miguel C. Rodriguez Gaging Station were taken by the Mexican Section of the Commission, and determinations were made by the Ministry of Agriculture and Hydraulic Resources of Mexico.

Electrical conductivity is a relative indication of the concentration of dissolved solids in the water samples.

Date	ECx10 <sup>6</sup> @25°C												
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## Colorado River at Northerly International Boundary

January	February	April	May	July	August	October	November
1 * 1,540	15 * 1,470	1 1,360	16 * 1,550	1 1,510	16 1,330	1 1,690	16 1,960
2 1,560	16 1,470	2 1,320	17 1,570	2 1,540	17 1,400	2 1,730	17 1,890
3 1,550	17 1,460	3 1,320	18 1,530	3 1,480	18 1,420	3 * 1,730	18 1,790
4 1,580	18 1,510	4 * 1,320	19 1,500	4 * 1,490	19 1,440	4 1,730	19 1,770
5 1,540	19 1,520	5 1,290	20 1,490	5 * 1,440	20 1,570	5 1,680	20 1,780
6 1,570	20 * 1,520	6 1,300	21 1,470	6 1,400	21 1,490	6 1,670	21 * 1,780
7 1,570	21 * 1,520	7 1,290	22 1,450	7 1,430	22 * 1,490	7 1,640	22 1,780
8 1,610	22 1,510	8 1,340	23 * 1,460	8 1,480	23 1,490	8 1,760	23 1,840
9 1,650	23 1,500	9 1,340	24 1,500	9 1,500	24 1,450	9 1,770	24 1,800
10 1,690	24 1,480	10 1,380	25 1,480	10 1,560	25 1,470	10 * 1,780	25 1,760
11 1,720	25 1,480	11 * 1,380	26 1,480	11 * 1,550	26 1,320	11 1,780	26 1,750
12 1,500	26 1,510	12 1,320	27 1,440	12 1,520	27 1,370	12 1,790	27 1,780
13 1,450	27 1,490	13 1,300	28 1,450	13 1,520	28 1,510	13 1,770	28 * 1,850
14 1,430	28 * 1,450	14 1,330	29 1,410	14 1,490	29 * 1,590	14 1,720	29 1,980
15 1,460	March	15 1,330	30 * 1,430	15 1,490	30 1,610	15 1,720	30 1,800
16 1,530	1 1,430	16 1,340	31 1,440	16 1,550	31 1,590	16 1,770	December
17 1,630	2 1,400	17 1,370	June	17 1,490	September	17 * 1,770	1 1,760
18 1,580	3 1,430	18 * 1,360	1 1,400	18 * 1,480	1 1,590	18 1,760	2 1,730
19 1,580	4 1,420	19 1,330	2 1,370	19 1,470	2 1,610	19 1,760	3 1,680
20 1,520	5 1,470	20 1,330	3 1,440	20 1,410	3 1,560	20 1,740	4 1,670
21 1,560	6 1,430	21 1,310	4 1,470	21 1,390	4 1,600	21 1,730	5 * 1,680
22 1,530	7 * 1,400	22 1,330	5 1,430	22 * 1,400	5 * 1,590	22 1,710	6 1,700
23 1,520	8 1,400	23 1,360	6 * 1,440	23 1,420	6 1,570	23 1,730	7 1,670
24 1,550	9 1,400	24 1,370	7 1,470	24 1,420	7 1,530	24 * 1,760	8 1,600
25 1,580	10 1,380	25 * 1,350	8 1,480	25 * 1,420	8 1,500	25 1,770	9 1,530
26 1,530	11 1,360	26 1,330	9 1,450	26 1,420	9 1,440	26 1,760	10 1,390
27 1,510	12 1,360	27 1,350	10 1,430	27 1,420	10 1,410	27 1,690	11 1,320
28 1,520	13 1,470	28 1,350	11 1,530	28 1,380	11 1,470	28 1,680	12 * 1,350
29 1,540	14 * 1,480	29 1,360	12 1,580	29 1,320	12 * 1,550	29 1,710	13 1,460
30 1,550	15 1,400	30 1,390	13 * 1,600	30 1,370	13 1,590	30 1,700	14 1,550
31 1,550	16 1,320	May	14 1,610	31 1,420	14 1,600	31 * 1,740	15 1,650
February	17 1,350	1 1,410	15 1,500	August	15 1,530	November	16 1,680
1 1,630	18 1,340	2 * 1,480	16 1,490	1 * 1,450	16 1,590	1 1,770	17 1,740
2 1,540	19 1,390	3 1,490	17 1,500	2 1,490	17 1,600	2 1,750	18 * 1,720
3 1,500	20 1,450	4 1,410	18 1,520	3 1,490	18 1,620	3 1,820	19 * 1,700
4 1,500	21 * 1,450	5 1,370	19 1,500	4 1,430	19 * 1,620	4 1,790	20 1,690
5 1,470	22 1,530	6 1,390	20 * 1,520	5 1,420	20 1,610	5 1,790	21 1,730
6 1,490	23 1,400	7 1,410	21 1,550	6 1,440	21 1,600	6 1,820	22 1,760
7 1,450	24 1,360	8 1,470	22 1,530	7 1,450	22 1,520	7 * 1,810	23 1,680
8 1,500	25 1,330	9 * 1,480	23 1,520	8 * 1,450	23 1,560	8 1,800	24 * 1,670
9 1,480	26 1,310	10 1,480	24 1,480	9 1,440	24 1,580	9 1,700	25 * 1,690
10 1,450	27 1,310	11 1,510	25 1,520	10 1,430	25 1,590	10 1,680	26 * 1,700
11 1,490	28 * 1,320	12 1,490	26 1,520	11 1,410	26 * 1,610	11 1,630	27 1,710
12 1,440	29 1,290	13 1,520	27 * 1,520	12 1,440	27 1,640	12 1,630	28 1,710
13 * 1,450	30 1,310	14 1,530	28 1,520	13 1,460	28 1,600	13 1,710	29 1,650
14 * 1,460	31 1,320	15 1,510	29 1,500	14 1,460	29 1,580	14 * 1,800	30 1,560
			30 1,480	15 * 1,390	30 1,540	15 1,830	31 1,610

\* Estimated

**ELECTRICAL CONDUCTIVITY OF WATER SAMPLES**  
1982

Date	ECx10 <sup>6</sup> @25°C												
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**Intake Canal at Morelos Diversion Structure**

January		February		April		May		July		August		October		November	
1	1,650	15	1,570	1	1,370	16	1,540	1	1,560	16	1,400	1	1,600	16	1,960
2	1,620	16	1,570	2	1,390	17	1,600	2	1,570	17	1,450	2	1,760	17	1,940
3	1,640	17	1,460	3	1,400	18	1,560	3	1,510	18	1,450	3	1,710	18	1,790
4	1,620	18	1,520	4	1,450	19	1,510	4	1,490	19	1,530	4	1,750	19	1,760
5	1,640	19	1,540	5	1,370	20	1,490	5	1,530	20	1,520	5	1,720	20	1,790
6	1,640	20	1,520	6	1,360	21	1,490	6	1,500	21	1,510	6	1,710	21	1,800
7	1,780	21	1,530	7	1,370	22	1,500	7	1,460	22	1,510	7	1,680	22	1,780
8	1,670	22	1,580	8	1,360	23	1,490	8	1,520	23	1,560	8	1,770	23	1,830
9	1,730	23	1,530	9	1,390	24	1,540	9	1,600	24	1,530	9	1,800	24	1,810
10	1,730	24	1,530	10	1,450	25	1,520	10	1,580	25	1,540	10	1,800	25	1,760
11	1,770	25	1,560	11	1,430	26	1,500	11	1,590	26	1,340	11	1,770	26	1,670
12	1,630	26	1,590	12	1,370	27	1,450	12	1,520	27	1,380	12	1,810	27	1,780
13	1,520	27	1,580	13	1,360	28	1,460	13	1,570	28	1,500	13	1,810	28	1,810
14	1,450	28	1,550	14	1,350	29	1,440	14	1,550	29	1,560	14	1,750	29	1,840
15	1,480	28	1,550	15	1,340	30	1,420	15	1,560	30	1,620	15	1,770	30	1,800
16	1,560	1	1,530	16	1,380	31	1,430	16	1,580	31	1,610	16	1,760		
17	1,630	2	1,500	17	1,420			17	1,510			17	1,800	1	1,770
18	1,640	3	1,490	18	1,440	1	1,430	18	1,590	1	1,600	18	1,780	2	1,730
19	1,590	4	1,440	19	1,400	2	1,420	19	1,560	2	1,630	19	1,800	3	1,720
20	1,630	5	1,510	20	1,400	3	1,440	20	1,500	3	1,590	20	1,760	4	1,700
21	1,630	6	1,500	21	1,360	4	1,510	21	1,470	4	1,590	21	1,730	5	1,700
22	1,640	7	1,520	22	1,400	5	1,430	22	1,480	5	1,590	22	1,730	6	1,700
23	1,650	8	1,540	23	1,410	6	1,470	23	1,470	6	1,580	23	1,750	7	1,660
24	1,640	9	1,510	24	1,430	7	1,500	24	1,500	7	1,540	24	1,770	8	1,620
25	1,650	10	1,430	25	1,450	8	1,490	25	1,540	8	1,500	25	1,760	9	1,550
26	1,650	11	1,400	26	1,440	9	1,460	26	1,530	9	1,540	26	1,740	10	1,450
27	1,600	12	1,460	27	1,420	10	1,460	27	1,500	10	1,420	27	1,720	11	1,340
28	1,610	13	1,480	28	1,390	11	1,520	28	1,460	11	1,420	28	1,670	12	1,440
29	1,600	14	1,410	29	1,390	12	1,640	29	1,350	12	1,530	29	1,660	13	1,470
30	1,650	15	1,420	30	1,440	13	1,680	30	1,400	13	1,600	30	1,690	14	1,590
31	1,630	16	1,360			14	1,660	31	1,460	14	1,630	31	1,680	15	1,670
				May						August					
February	17	1,360	1	1,500	15	1,580			15	1,620	November	16	1,730		
1	1,670	18	1,390	2	1,610	16	1,520	1	1,470	16	1,580	17	1,790	17	1,780
2	1,670	19	1,420	3	1,620	17	1,510	2	1,520	17	1,630	2	1,780	18	1,780
3	1,610	20	1,470	4	1,510	18	1,500	3	1,540	18	1,610	3	1,800	19	1,700
4	1,560	21	1,510	5	1,460	19	1,520	4	1,490	19	1,640	4	1,800	20	1,760
5	1,540	22	1,570	6	1,450	20	1,550	5	1,480	20	1,630	5	1,800	21	1,740
6	1,510	23	1,440	7	1,500	21	1,570	6	1,540	21	1,560	6	1,800	22	1,780
7	1,550	24	1,420	8	1,520	22	1,550	7	1,510	22	1,540	7	1,800	23	1,720
8	1,560	25	1,390	9	1,500	23	1,530	8	1,560	23	1,570	8	1,810	24	1,700
9	1,560	26	1,380	10	1,540	24	1,500	9	1,540	24	1,590	9	1,720	25	1,640
10	1,510	27	1,370	11	1,520	25	1,530	10	1,470	25	1,590	10	1,680	26	1,690
11	1,520	28	1,420	12	1,500	26	1,530	11	1,470	26	1,590	11	1,630	27	1,750
12	1,480	29	1,340	13	1,480	27	1,540	12	1,480	27	1,640	12	1,640	28	1,740
13	1,530	30	1,380	14	1,530	28	1,520	13	1,560	28	1,610	13	1,740	29	1,690
14	1,560	31	1,370	15	1,520	29	1,530	14	1,560	29	1,580	14	1,820	30	1,620
						30	1,510	15	1,430	30	1,500	15	1,810	31	1,600

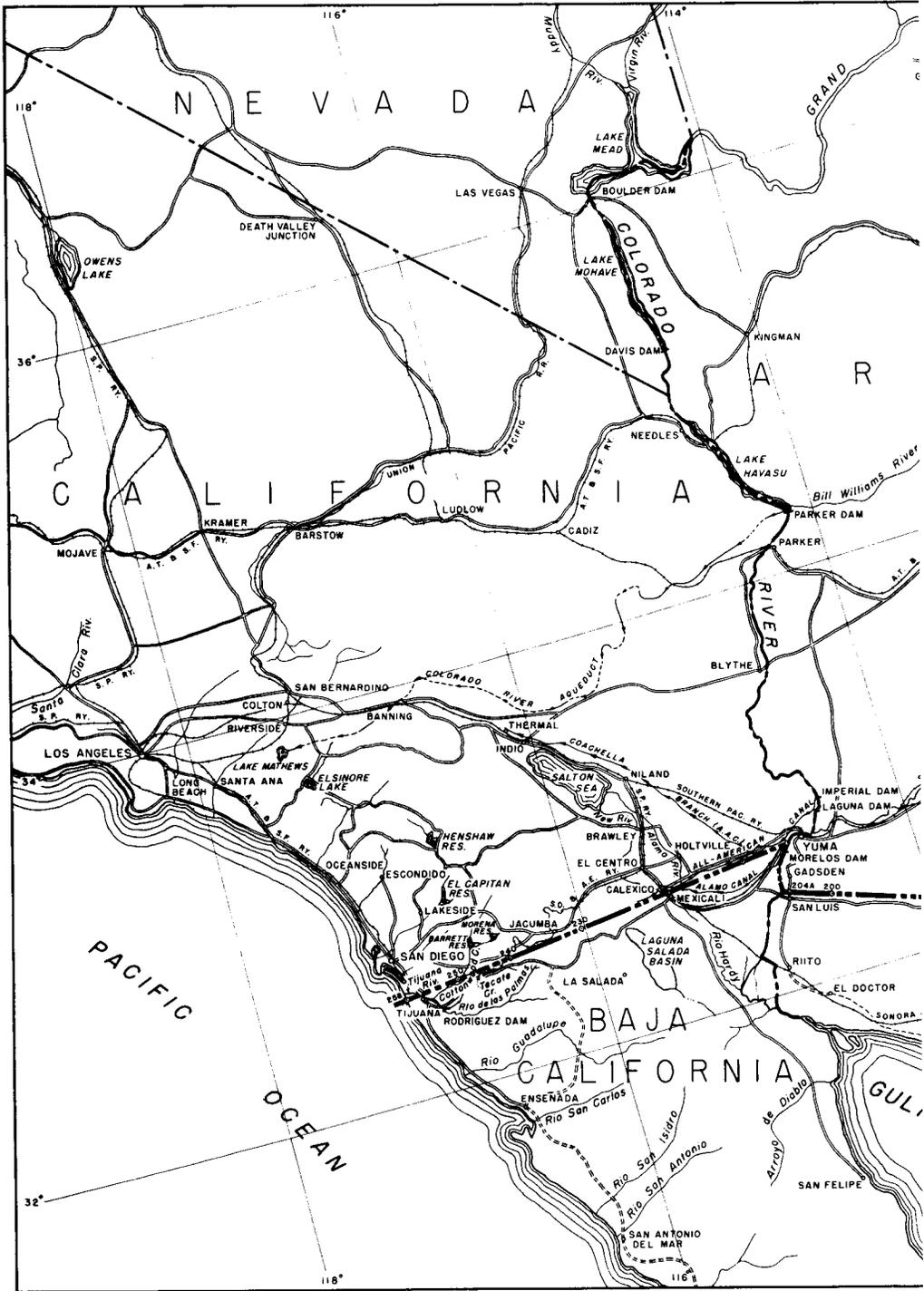
**Colorado River at Southerly International Boundary**

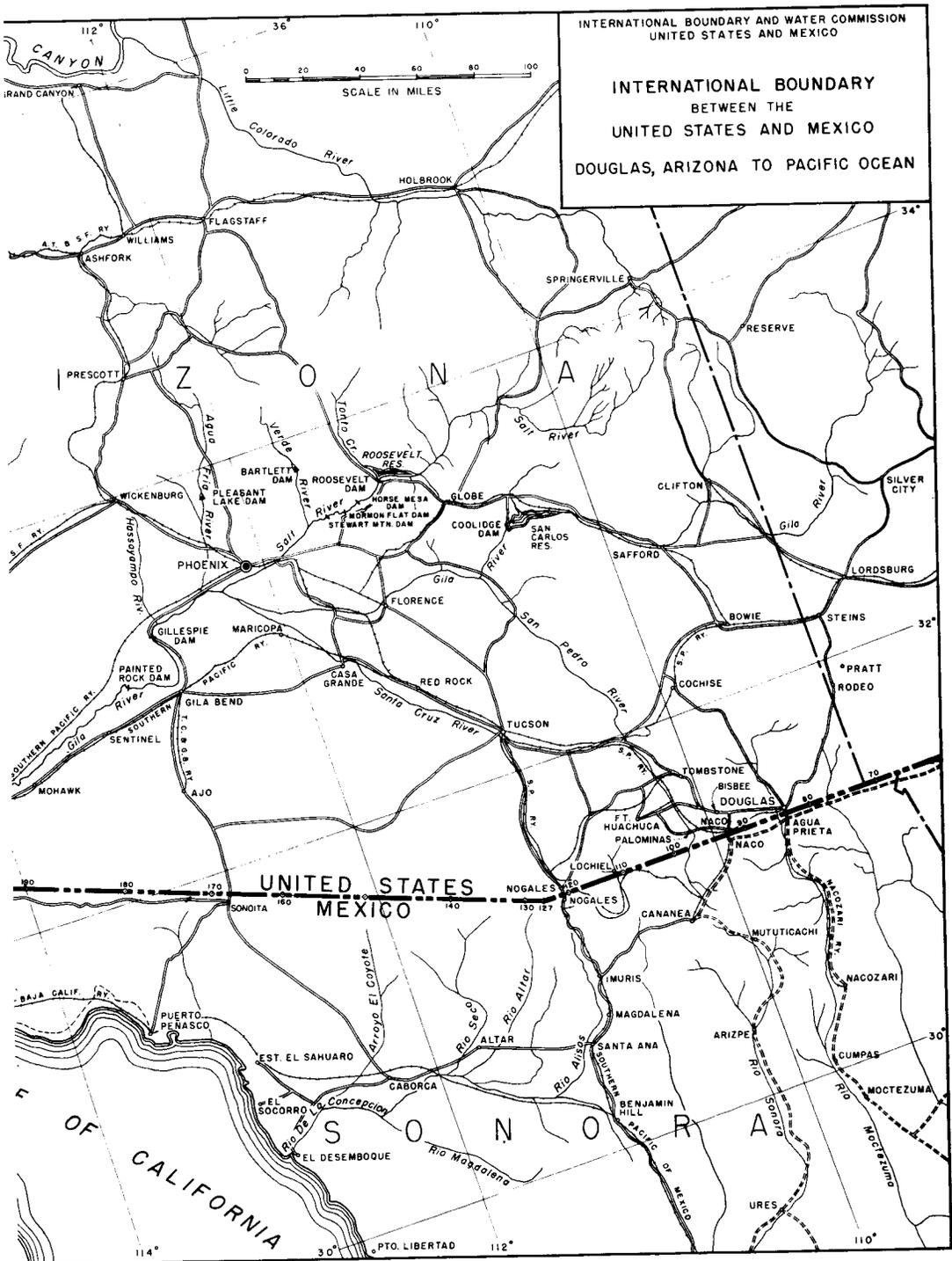
No Samples Collected During 1982											
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**Colorado River at Miguel C. Rodriguez Gaging Station**

January		February		March		May		June		July		September		October	
7	3,560	15	3,470	22	3,390	3	3,860	14	3,670	26	3,700	6	3,480	18	3,600
14	3,590	23	3,630	29	3,510	10	3,820	21	3,640			13	3,500	November	
21	3,570			April		17	3,880	28	3,680	August		20	3,500	1	3,420
28	3,540	1	3,640	5	3,830	24	3,830			9	3,700	27	3,470	15	3,560
February		8	3,620	12	3,770	31	2,720	June		16	3,530	October		29	3,530
1	2,720	15	3,540	19	3,770			7	3,480	12	3,840	4	3,650	December	
8	3,270			26	3,820					23	3,620			13	3,500
										30	1,480				

\* Estimated





## RAINFALL ON THE COLORADO RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall at stations located in California and Arizona in the United States and in Baja California and Sonora in Mexico, with averages for their periods of record. Records of daily rainfall amounts, where available, are on file in the offices of the United States or Mexican Sections of the Commission. For location, elevation, period of record, and the observer, see alphabetical listings of these stations on page 51 in this bulletin.

### In United States

Month	Brawley, California		El Centro, California		Blythe, California		Yuma Citrus Station, Arizona		Bullhead City, Arizona	
	1982	Average 1931-1982	1982	Average 1931-1982	1982	Average 1931-1982	1982	Average 1931-1982	1982	Average 1978-1982
Jan.	0.20	0.36	0.05	0.38	0.10	0.45	0.31	0.42	0.69	1.56
Feb.	.15	.33	.09	.34	0	.44	.16	.35	1.23	1.29
Mar.	.27	.22	.63	.21	.68	.40	1.16	.27	1.16	1.60
Apr.	0	.10	0	.10	0	.14	0	.11	.01	.16
May	T	.02	0	.01	.21	.03	T	.02	.14	.28
June	0	.01	0	.01	0	.04	0	.02	T	.01
July	.76	.07	0	.09	.49	.18	.08	.15	.02	.38
Aug.	.04	.35	0	.35	1.05	.79	1.39	.55	2.46	.80
Sept.	.16	.33	1.28	.28	.56	.36	.26	.34	.17	.35
Oct.	T	.24	0	.24	0	.28	T	.40	.05	.24
Nov.	.11	.16	.15	.18	.39	.24	.26	.18	.77	.60
Dec.	1.86	.42	2.72	.44	1.25	.49	1.66	.40	1.19	.64
Yearly	3.55	2.61	4.92	2.63	4.73	3.84	5.28	3.21	7.89	7.91

### In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1982	Average 1948-1982	1982	Average 1926-1982	1982	Average 1948-1982	1982	Average 1949-1982	1982	Average 1948-1982
Jan.	0.28	0.43	0.16	0.39	0.16	0.39	0.16	0.35	0.24	0.39
Feb.	.16	.24	.12	.31	.24	.20	.24	.28	.47	.24
Mar.	.94	.16	1.30	.24	1.26	.16	.98	.24	.71	.16
Apr.	0	.08	0	.08	0	.08	0	.08	0	.08
May	0	T	T	T	T	T	0	.04	0	T
June	0	T	0	T	0	T	0	.04	0	T
July	T	.08	T	.12	.79	.08	1.18	.24	.31	.08
Aug.	.08	.39	1.97	.39	.75	.20	.43	.43	.71	.20
Sept.	.04	.20	.47	.39	.12	.12	.12	.24	.39	.24
Oct.	0	.31	T	.28	0	.28	0	.35	0	.31
Nov.	.31	.16	.04	.16	.20	.16	.20	.47	.08	.12
Dec.	2.09	.35	3.58	.75	1.42	.24	1.50	.51	2.36	.35
Yearly	3.90	2.40	7.64	3.15	4.92	1.85	4.80	2.80	5.28	2.13

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		Santa Clara, Sonora		San Felipe, Baja California		El Centinela, Baja California	
	1982	Average 1952-1982	1982	Average 1974-1982	1982	Average 1959-1982	1982	Average 1971-1982	1982	Average 1969-1982	1982	Average 1978-1982
Jan.	0.12	0.51	0.28	0.51	0.16	0.31	0	0.31	0	0.35	0.43	0.59
Feb.	.31	.28	.08	T	.31	.20	.35	.20	0	.16	T	T
Mar.	.59	.28	.31	.08	.47	.20	.04	.12	0	.12	T	T
Apr.	0	.12	0	.11	0	.04	0	.08	0	.08	0	0
May	0	.04	0	.04	0	T	0	.04	0	.04	0	0
June	0	T	0	0	0	.04	0	T	0	.04	0	0
July	.94	.16	0	.16	0	.08	0	0	0	.12	*	0
Aug.	.63	.31	1.26	.83	0	.24	.55	.16	0	.28	*	0
Sept.	.43	.28	.20	.94	.35	.51	.47	.35	2.36	.43	T	T
Oct.	0	.47	0	.20	0	.43	.04	.63	0	.24	0	0
Nov.	.16	.24	0	.12	.35	.24	.39	.12	1.54	.20	0	0
Dec.	1.02	.35	4.57	1.06	1.34	.35	1.73	.35	1.50	.39	.35	.87
Yearly	4.21	2.52	6.69	4.76	2.99	2.76	3.58	2.28	5.39	2.56		

\* Blythe FAA Airport

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## 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 1982.

## In United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	♠ ELEV. (FT.)	RECORD BEGAN	OBSERVER
* Blythe, California	33° 37'	114° 36'	268	1909	State Division of Forestry
Brawley, California	32° 57'	115° 33'	100	1908	Agricultural Research Service
Bullhead City, Arizona	35° 07'	114° 36'	580	1980	Bullhead City Fire Department
El Centro, California	32° 46'	115° 34'	30	1930	El Centro Water Department
Yuma Citrus Station, Arizona	32° 37'	114° 39'	191	1923	University of Arizona Experimental Farm

## In Mexico

NAME OF STATION	LATI- TUDE	LONGI- TUDE	♠ ELEV. (FT.)	RECORD BEGAN	OBSERVER
Bataques, Baja California	32° 34'	115° 00'	** 66	1948	# S. A. R. H.
Colonia Juarez, Baja California	32° 18'	115° 05'	49	1952	S. A. R. H.
Delta, Baja California	32° 21'	115° 11'	** 39	1948	S. A. R. H.
El Centinela, Baja California	32° 35'	115° 45'	164	1978	S. A. R. H.
Laguna Selada, Baja California	32° 12'	115° 44'	7	1975	S. A. R. H.
Los Algodones, Baja California	32° 42'	114° 44'	115	1948	S. A. R. H.
Mexicali, Baja California	32° 40'	115° 28'	13	1926	S. A. R. H.
Riito, Sonora	32° 08'	114° 54'	43	1959	S. A. R. H.
San Felipe, Baja California	31° 01'	114° 51'	72	1969	S. A. R. H.
San Luis, R. C., Sonora	32° 28'	114° 47'	131	1949	S. A. R. H.
Santa Clara, Sonora	31° 42'	114° 29'	49	1971	S. A. R. H.

\* Not shown on map

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

\*\* Elevations obtained from International Boundary and Water Commission topographic maps

# Ministry of Agriculture and Hydraulic Resources

## EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at one station in Arizona and at ten stations in Baja California and Sonora, Mexico. The station in the United States is operated by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Agriculture and Hydraulic Resources. The type of pan used at all these stations was the National Weather Service standard pan of 4-foot diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," page 51 in this bulletin.

### In United States

Month	Yuma Citrus Station, Arizona	
	1982	Average 1931-1982
Jan.	3.80	3.85
Feb.	4.85	4.80
Mar.	5.80	7.42
Apr.	9.68	10.09
May	11.94	13.02
June	12.85	14.33
July	13.73	15.41
Aug.	10.33	13.58
Sept.	8.48	10.73
Oct.	7.25	7.59
Nov.	3.97	4.96
Dec.	3.44	3.68
Yearly	96.12	109.46

### In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Bataques, Baja California		San Luis, R. C., Sonora		Delta, Baja California	
	1982	Average 1949-1955 1961-1982	1982	Average 1926-1982	1982	Average 1963-1982	1982	Average 1953-1982	1982	Average 1948-1982
Jan.	4.92	4.37	2.64	2.60	3.82	3.70	3.74	3.31	3.31	3.23
Feb.	6.46	5.28	3.31	3.50	4.53	4.72	4.45	4.06	4.21	4.33
Mar.	7.28	7.52	5.28	5.91	5.59	6.85	5.20	6.26	5.16	6.18
Apr.	11.46	10.28	9.13	7.99	9.57	8.58	7.91	8.39	8.46	8.23
May	12.52	12.83	11.61	10.59	12.91	11.30	11.06	11.06	10.43	10.31
June	13.78	14.02	13.03	11.77	13.86	12.95	11.89	12.68	11.30	11.57
July	14.29	13.86	12.09	11.85	15.04	12.80	11.89	13.74	12.95	12.05
Aug.	11.42	12.48	9.88	10.20	12.13	10.98	10.04	12.32	11.81	10.98
Sept.	9.57	10.31	7.01	8.15	10.47	9.21	8.15	9.49	8.23	8.54
Oct.	9.61	8.19	5.75	5.79	*	6.46	6.54	6.38	7.91	6.34
Nov.	5.12	5.35	3.19	3.39	4.92	4.76	3.35	4.21	3.66	4.29
Dec.	4.57	4.37	1.97	2.44	3.66	3.54	3.15	3.19	2.72	3.31
Yearly	110.98	110.24	84.88	84.21		96.14	87.36	95.71	90.16	83.43

Month	Colonia Juarez, Baja California		Laguna Salada, Baja California		Riito, Sonora		Santa Clara, Sonora		San Felipe, Baja California	
	1982	Average 1970-1982	1982	Average 1974-1982	1982	Average 1963-1982	1982	Average 1971-1982	1982	Average 1952-1982
Jan.	4.06	3.39	4.33	4.13	2.80	3.03	4.09	5.00	4.33	4.84
Feb.	4.29	4.29	4.84	4.57	4.25	4.06	4.37	4.76	4.72	5.59
Mar.	5.63	6.22	6.85	7.17	5.43	5.94	4.69	6.14	6.06	6.85
Apr.	9.09	7.99	9.57	8.54	8.03	7.68	7.91	7.68	8.50	8.27
May	11.93	10.20	11.46	11.06	13.19	10.47	8.39	8.62	*	10.16
June	13.82	12.24	12.48	13.58	12.76	11.77	9.17	10.94	*	10.79
July	14.84	12.20	14.62	13.66	*	12.40	*	11.02	*	11.46
Aug.	12.99	10.94	13.27	12.44	*	10.43	8.46	10.20	*	11.22
Sept.	10.39	9.17	11.93	8.35	9.72	8.43	7.40	9.02	9.84	9.65
Oct.	9.61	7.01	10.59	7.28	8.07	5.91	7.83	7.44	*	8.23
Nov.	4.96	4.84	7.60	5.39	4.76	3.74	5.51	5.71	*	6.10
Dec.	3.86	3.58	4.37	3.90	4.41	3.03	4.72	5.12	*	4.76
Yearly	105.47	95.20	111.89	103.27		88.43		93.50		99.21

\* No record

**TEMPERATURE IN THE COLORADO RIVER BASIN  
IN DEGREES FAHRENHEIT**

The maximum, minimum, and monthly mean temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with maximum and minimum for their periods of record. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations," page 51 in this bulletin.

**In United States**

Month	Blythe, California				Yuma Citrus Station, Arizona				Brawley, California			
	1982			Average 1931-82	1982			Average 1931-82	1982			Average 1931-82
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	52.9	78	28	52.6	52.3	75	31	53.1	54.6	77	30	53.8
Feb.	59.9	88	33	57.3	58.7	87	32	57.1	60.9	87	33	57.9
Mar.	61.9	85	36	62.8	60.3	87	35	62.0	62.0	85	38	63.1
Apr.	69.9	97	43	70.0	68.5	95	40	68.6	69.0	95	42	69.8
May	77.2	104	50	77.4	74.5	101	46	75.7	75.4	102	48	77.1
June	83.3	110	57	85.4	80.7	107	56	83.6	81.6	109	53	85.1
July	89.9	114	62	92.4	89.8	113	61	91.0	89.2	112	60	91.9
Aug.	89.7	113	70	90.9	89.9	117	71	90.2	91.0	114	70	91.3
Sept.	82.4	115	52	84.9	83.5	115	53	84.9	83.4	116	51	86.1
Oct.	69.0	94	45	73.1	70.0	95	45	73.4	71.8	97	45	74.9
Nov.	57.8	81	35	60.1	59.0	82	37	61.3	60.3	86	36	62.4
Dec.	50.9	70	30	53.2	53.0	75	32	54.5	54.6	78	32	55.1
Yearly	70.6	115	28	71.7	70.0	117	31	71.3	71.2	116	30	72.4

Month	El Centro, California				Bullhead City, Arizona							
	1982			Average 1931-82	1982			Average 1978-82				
	Mean	Max.	Min.		Mean	Max.	Min.					
Jan.	54.5	77	30	53.8	51.1	72	30	52.3				
Feb.	60.9	87	35	58.0	60.5	85	35	57.4				
Mar.	61.8	85	36	62.9	61.8	87	37	61.9				
Apr.	70.7	94	45	69.5	70.4	100	42	70.4				
May	76.2	102	45	77.0	80.4	106	50	78.5				
June	82.5	108	56	85.1	87.7	113	60	89.8				
July	90.4	113	63	91.8	94.1	116	64	94.7				
Aug.	92.1	114	71	91.0	94.7	117	71	93.2				
Sept.	84.0	116	53	85.6	85.9	115	54	86.9				
Oct.	72.0	97	46	74.6	71.0	94	44	73.9				
Nov.	60.1	84	38	62.1	59.7	80	38	60.7				
Dec.	53.4	75	30	54.7	50.4	70	30	53.1				
Yearly	71.6	116	30	72.2	72.3	117	30	72.7				

**In Mexico**

Month	Los Algodones, Baja California				Mexicali, Baja California				Bataques, Baja California			
	1982		1948-1982		1982		1926-1982		1982		1948-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	81	32	88	23	79	30	93	19	73	32	113	16
Feb.	90	34	95	28	86	37	93	23	86	36	99	21
Mar.	90	41	100	32	86	39	100	30	86	37	113	25
Apr.	97	43	109	37	97	43	106	34	93	43	118	16
May	106	50	117	43	106	52	117	43	100	48	124	34
June	106	54	126	52	111	57	120	48	108	52	135	43
July	111	66	118	61	117	63	118	55	111	61	133	45
Aug.	113	70	120	61	117	72	120	54	111	70	129	46
Sept.	115	50	122	50	117	55	122	48	113	50	135	39
Oct.	95	45	111	32	99	50	111	32	99	37	118	32
Nov.	84	36	100	27	82	41	104	28	82	36	115	32
Dec.	72	36	90	23	73	34	90	23	73	34	97	25
Yearly	115	32	126	23	117	30	122	19	113	32	135	16

\* Blythe FAA Airport

# Less than 10 days missing

## TEMPERATURE IN THE COLORADO RIVER BASIN IN DEGREES FAHRENHEIT

### In Mexico

Month	Riito, Sonora				Santa Clara, Sonora				San Felipe, Baja California			
	1982		1949-1982		1982		1971-1982		1982		1969-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	75	32	91	19	75	39	90	18	84	36	99	30
Feb.	86	34	95	21	84	39	90	23	91	36	102	32
Mar.	88	37	100	25	82	46	90	37	86	39	104	32
Apr.	91	43	109	36	93	52	102	46	93	39	113	34
May	102	46	115	41	90	57	106	50	99	48	120	41
June	108	50	124	45	93	64	117	57	97	55	124	50
July	108	63	140	52	104	68	115	64	108	64	124	50
Aug.	111	70	122	46	106	75	106	68	106	72	135	41
Sept.	113	50	118	39	106	61	108	61	108	57	126	37
Oct.	95	43	115	30	93	54	102	41	88	50	117	23
Nov.	79	37	118	27	82	46	93	36	75	45	118	21
Dec.	70	34	86	21	72	39	86	25	68	37	97	28
Yearly	113	32	140	19	106	39	117	18	108	36	135	21

Month	San Luis, R. C., Sonora				Delta, Baja California				Colonia Juarez, Baja California			
	1982		1949-1982		1982		1948-1982		1982		1964-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	79	36	100	19	81	39	104	27	77	30	91	19
Feb.	90	36	109	27	90	39	104	28	82	34	97	21
Mar.	86	39	108	28	90	46	113	28	84	41	99	25
Apr.	93	43	115	37	97	45	118	32	95	46	115	30
May	102	48	115	41	102	50	129	32	100	46	117	36
June	111	55	126	45	108	57	133	36	109	50	122	39
July	117	61	126	59	111	68	135	45	111	52	122	45
Aug.	115	72	122	55	113	77	140	52	113	72	118	50
Sept.	115	52	118	50	115	59	135	39	113	54	122	39
Oct.	99	45	118	32	99	52	117	34	97	48	118	36
Nov.	86	37	113	28	86	45	120	32	82	41	104	25
Dec.	77	34	102	23	79	39	104	27	73	36	97	19
Yearly	117	34	126	19	115	39	140	27	113	30	122	19

Month	Laguna Salada, Baja California				El Centinela, Baja California							
	1982		1974-1982		1982		1977-1982					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.	77	32	84	18	75	37	75	34				
Feb.	86	36	95	27	79	43	82	41				
Mar.	86	36	95	32	79	48	90	41				
Apr.	100	41	100	36	100	50	100	50				
May	106	41	111	39	104	57	109	57				
June	113	50	120	50	99	64	118	50				
July	118	57	122	54	*	*	120	68				
Aug.	115	68	118	52	*	*	115	68				
Sept.	118	48	118	48	97	59	115	52				
Oct.	100	39	118	36	93	50	108	50				
Nov.	84	36	95	28	77	46	93	39				
Dec.	79	30	86	19	72	37	82	32				
Yearly	118	30	122	18	*	*	120	32				

\* Missing record

## IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM

### 1982

The total drainage area within the Colorado River basin is about 246,000 square miles, of which 184,600 square miles lie above Imperial Dam and about 61,400 square miles are below the dam. Of the area below Imperial Dam, 59,400 square miles are in the United States and about 2,000 square miles are in Mexico. The area below Imperial Dam includes the Gila River watershed with a total area of about 58,200 square miles, of which about 1,100 square miles are in Mexico.

The irrigated areas tabulated below comprise the areas in the United States and Mexico which are served by diversions from the Colorado River at or below Imperial Dam. The diversions are supplemented by some pumping from wells in both countries. The areas in the United States include: 1) those within the U. S. Bureau of Reclamation Projects and in the North and South Gila Valleys located near Yuma, Arizona, the data for which are furnished by the U. S. Bureau of Reclamation; 2) those within the Coachella Valley, California, the data for which are furnished by the Coachella Valley County Water District; and 3) those within the Imperial Valley, California, the data for which are furnished by the Imperial Irrigation District. The areas in Mexico include those in the Mexicali Valley located in the states of Baja California and Sonora, the data for which are furnished by the Ministry of Agriculture and Hydraulic Resources of Mexico. The areas tabulated below refer to the total areas farmed, and insofar as possible, duplication of irrigated areas because of double cropping has been eliminated.

Point of Diversion from Colorado River and Designation of Areas	Total Irrigated Areas Acres
<b>IN UNITED STATES:</b>	
Imperial Dam	
Yuma Valley Division	46,537
Reservation Division	12,879
Yuma Mesa	17,932
Yuma Aux. Project Unit "B" (Yuma Mesa)	2,488
South Gila Valley	9,677
North Gila Valley	5,612
Wellton-Mohawk	59,928
Coachella Valley	57,180
Imperial Valley	465,315
Warren Act	80
Non-Project lands adjacent to Colorado River	12,560
Total in United States	690,188
<b>IN MEXICO:</b>	
Morelos Dam	
Mexicali Valley	* 501,421
Total in United States and Mexico	1,191,609

\* An estimated 34% of total acreage is served by pumping from ground water in Mexicali Valley

## ALAMO RIVER AT INTERNATIONAL BOUNDARY

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

**RECORDS:** Computed on the basis of head on the Cipolletti weir from daily staff gage readings, and weir ratings as determined by monthly current meter measurements. Records obtained and furnished by Imperial Irrigation District. Records available: June 1942 through 1982.

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

**EXTREMES:** Maximum mean daily discharge, 258 second-feet (7.31 m<sup>3</sup>/sec) (estimated), April 13, 1946; minimum discharge, no flow July 22-23, 29-30, 1949. Prior to the period of record, and since 1900, considerably higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a part of its flow passed through the Alamo River channel.

Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.35	2.74	2.86	4.90	4.07	2.54	2.13	2.13	2.34	1.74	2.13	2.44
2	3.79	2.74	3.38	5.17	4.35	2.65	2.13	2.23	2.34	2.13	2.13	2.44
3	3.79	2.74	2.96	4.90	4.35	2.65	2.13	2.75	2.23	2.13	2.13	2.44
4	3.52	2.43	2.86	4.90	4.07	2.65	2.13	2.13	2.13	1.74	2.34	2.44
5	3.52	2.43	3.65	5.16	3.65	2.44	2.34	2.13	2.44	1.74	2.13	2.34
6	3.52	2.43	4.76	4.35	3.65	2.65	2.54	2.13	2.13	1.92	2.34	2.34
7	3.24	2.64	3.38	4.07	3.65	2.44	2.34	2.34	2.44	1.92	2.13	2.13
8	3.24	2.64	3.38	4.35	4.07	2.34	2.34	2.23	4.35	1.92	2.13	2.44
9	3.24	2.64	3.24	3.65	4.49	2.34	2.34	2.13	4.07	2.34	2.13	2.44
10	2.96	2.64	3.24	3.79	4.35	2.34	2.34	2.34	2.96	1.74	2.34	3.93
11	3.65	3.05	3.52	4.35	3.52	2.54	2.13	2.34	2.96	1.74	2.34	5.03
12	3.65	3.05	3.10	4.35	2.96	2.54	2.34	2.34	2.54	1.74	2.13	3.93
13	3.65	3.05	6.55	4.35	3.24	2.65	2.44	2.34	2.34	1.92	2.23	3.24
14	3.65	3.05	6.22	4.35	3.24	2.44	1.92	2.34	2.54	1.92	2.23	2.86
15	3.38	3.05	5.45	4.62	3.24	2.54	1.74	2.54	2.54	1.74	2.13	2.86
16	3.38	3.05	4.76	4.62	3.24	2.44	2.02	2.75	2.44	1.74	2.13	2.65
17	3.38	3.05	4.76	4.07	3.52	2.44	2.13	2.54	2.44	1.92	2.13	2.44
18	3.24	2.64	4.35	4.07	3.24	2.54	2.54	2.75	2.75	1.74	2.13	2.44
19	3.38	2.74	3.79	4.07	3.38	2.54	2.23	2.44	2.75	2.13	2.13	2.44
20	2.96	2.74	3.24	4.35	3.38	2.65	2.13	2.44	2.23	2.13	2.13	2.34
21	2.96	2.74	3.52	4.35	2.13	2.54	2.13	2.44	2.23	2.02	2.13	2.54
22	2.96	2.64	3.65	4.62	2.13	2.34	2.13	2.54	2.13	2.02	2.13	2.54
23	2.96	2.95	3.79	4.35	2.44	2.34	2.13	2.54	2.13	2.02	2.13	2.65
24	3.24	2.43	4.76	4.35	2.54	2.34	2.13	3.24	2.13	1.92	2.34	2.75
25	3.24	2.95	3.79	4.07	2.34	2.34	2.13	2.96	2.13	1.92	2.34	2.75
26	3.24	2.95	3.93	4.07	2.34	2.34	2.13	3.93	2.34	2.13	2.23	2.75
27	3.93	2.95	5.89	3.79	2.13	2.34	2.34	2.75	2.34	2.13	2.23	2.75
28	3.93	2.75	5.31	3.79	2.13	2.54	2.13	2.65	1.92	2.13	2.44	2.75
29	4.21		4.76	3.79	2.13	2.44	2.13	2.54	1.92	2.13	2.23	2.75
30	3.65	5.58	5.58	4.07	2.54	2.13	2.13	2.75	1.74	2.02	2.23	2.75
31	3.93		5.03		2.54		2.13	2.34		2.13		2.65

Sum	107.74	77.90	129.46	129.69	99.05	74.05	68.02	78.04	73.97	60.61	66.28	88.76
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Month	Current Year 1982								Period 1943-1982		
	Extreme Gage β Feet		β Extreme Second-Feet				Average Second- Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	0.50	0.40	1	4.35	110	2.96	3.48	214	320	2,790	99
Feb.	.48	.38	111	3.05	! 4	2.43	2.78	155	290	2,822	90.2
Mar.	.65	.39	13	6.55	! 1	2.86	4.18	257	329	3,154	87.1
Apr.	.56	.45	2	5.17	9	3.65	4.32	257	349	2,222	97
May	.51	.32	9	4.49	121	2.13	3.20	196	273	1,799	73
June	.37	.32	! 2	2.65	30	2.13	2.47	147	266	1,686	61
July	.36	.28	! 6	2.54	15	1.74	2.19	135	245	1,712	59
Aug.	.47	.32	26	3.93	! 1	2.13	2.52	155	273	1,672	65.7
Sept.	.50	.28	8	4.35	30	1.74	2.47	147	296	1,406	83.5
Oct.	.34	.28	9	2.34	! 1	1.74	1.96	120	293	1,845	61.6
Nov.	.35	.32	28	2.44	! 1	2.13	2.21	131	301	2,080	62.4
Dec.	.62	.32	10	6.06	7	2.13	2.86	176	284	1,686	80.0
Yearly	0.65	0.28		6.55		1.74	2.89	2,090	3,519	22,146	1,071
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
	0.20	0.09		0.19		0.05	0.08	2,578	4,341	27,317	1,321

β Mean daily

! And other days

**NEW RIVER AT INTERNATIONAL BOUNDARY**

**DESCRIPTION:** Water-stage recorder located on the left (west) bank of the river in the limits of the city of Calexico, California, 1,400 feet (427 m) downstream (north) from the international land boundary between the United States and Mexico. Measurements are made from a foot bridge at the gage.

**RECORDS:** Based on a continuous record of gage heights and weekly current meter measurements, supplemented by additional measurements during periods of high flow, by the Imperial Irrigation District. Records computed and furnished by the District. Records available: June 1942 through 1982.

**REMARKS:** The New River flows northward from Mexico into the United States and thence into the Salton Sea. The flow at this station normally comprises 1) a portion of the waste and drainage water from the irrigation system in the Mexicali Valley, and 2) sewage and other wastes from Mexicali, Baja California. Flood waters enter the river from local drainage in Mexico, and such waters can reach damaging rates during violent desert storms. Waste flows from the Mexican system of canals are limited to an average annual quantity of 35,000 acre-feet (43,172,000 m<sup>3</sup>) during any successive five-year period under the provisions of Minute No. 197 of the Commission.

**EXTREMES:** Maximum mean daily discharge, 1,030 second-feet (29.2 m<sup>3</sup>/sec) on December 9, 1982; minimum mean daily discharge, 2 second-feet (0.06 m<sup>3</sup>/sec) on May 14, 1945. Prior to the period of record, and since 1900, much higher flows occurred. During the years 1905 to 1907, when the Colorado River flowed into the Salton Sea, a considerable part of its flow passed through the New River channel.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	207	244	247	222	284	182	145	208	263	180	165	129
2	208	238	235	225	272	183	163	216	229	181	166	135
3	217	233	221	240	261	174	174	210	212	170	165	140
4	219	219	237	241	249	177	165	228	213	155	154	145
5	210	205	245	236	236	165	163	231	210	156	138	145
6	208	188	230	257	223	164	169	218	226	170	137	152
7	201	182	220	239	224	168	192	202	262	165	140	168
8	181	189	238	241	211	163	205	187	213	155	147	513
9	196	197	240	246	217	164	184	184	247	147	159	1,030
10	207	200	229	255	221	154	180	172	247	144	162	925
11	220	204	230	275	274	162	178	160	256	150	155	882
12	253	199	560	280	290	176	178	164	266	158	152	566
13	272	204	523	279	259	170	175	173	251	161	158	343
14	251	196	433	266	237	169	179	187	239	156	163	285
15	242	197	329	238	214	162	169	192	218	169	170	247
16	214	223	307	224	216	148	157	212	205	187	175	250
17	202	224	315	226	234	151	153	216	206	163	180	252
18	201	202	316	227	230	154	157	210	231	167	177	239
19	205	199	303	236	232	151	166	208	234	169	169	250
20	216	202	248	239	236	151	170	229	221	173	163	339
21	206	209	221	225	229	145	174	227	214	159	157	311
22	201	213	213	217	218	144	173	245	210	160	149	303
23	201	219	222	224	216	147	174	247	202	167	149	300
24	210	236	232	224	212	151	176	262	194	169	140	266
25	216	252	234	228	209	151	182	331	188	169	141	244
26	229	257	242	237	210	150	185	359	182	169	142	234
27	229	248	235	231	214	155	213	366	173	183	138	205
28	217	251	241	239	201	154	223	352	172	189	137	194
29	211		237	249	177	149	206	310	177	195	130	195
30	211		238	271	175	141	187	294	178	183	132	191
31	221		231		181		192	289		171		202
<b>Sum</b>	6,682	6,030	8,452	7,237	7,062	4,775	5,507	7,289	6,539	5,190	4,610	9,780
<b>Current Year 1982</b>									<b>Period 1943-1982</b>			
Month	Extreme Gage ∅ Feet		∅ Extreme Second-Feet				Average Second- Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.	40.09	41.01	13	272	8	181	216	13,254	8,146	20,160	1,751	
Feb.	40.42	41.04	26	257	7	182	215	11,960	6,930	17,845	1,258	
Mar.	38.06	40.78	12	560	22	213	273	16,764	7,850	16,764	1,008	
Apr.	39.97	40.67	12	280	22	217	241	14,354	8,067	14,489	1,390	
May	39.86	41.41	12	290	30	175	228	14,007	7,278	15,057	629	
June	41.32	41.76	2	183	30	141	159	9,471	6,241	17,026	1,087	
July	40.92	41.72	28	223	1	145	178	10,923	6,469	22,576	817	
Aug.	39.57	41.15	27	366	11	160	235	14,458	7,388	16,487	1,139	
Sept.	40.19	41.37	12	266	28	172	218	12,970	7,280	14,664	1,795	
Oct.	41.23	41.80	29	195	10	144	167	10,294	7,391	13,991	2,081	
Nov.	41.44	41.92	17	180	29	130	154	9,144	6,993	12,670	2,483	
Dec.	35.85	41.91	9	1,030	1	129	315	19,398	7,955	21,205	1,763	
<b>Yearly</b>	35.85	41.92		1,030		129	217	156,997	87,988	156,997	24,573	
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
	10.93	12.78		29.2		3.65	6.15	193,654	108,532	193,654	30,311	

∅ Mean daily

## WASTES FROM MEXICALI POTABLE WATER PLANT TO NEW RIVER IN MEXICO

**DESCRIPTION:** An 11.5-foot (3.50 m) Parshall flume installed by the State Commission of Public Services of Mexicali. Located 1.2 miles (2.0 km) upstream of the pumping plant on the supply canal. Excess water discharges into an open channel, thence into a 36-inch (91 cm) diameter pipe that empties into Rivera Drain (Drain 134), which is 1.2 miles (2.0 km) below the plant and 1.2 miles (2.0 km) south of the international boundary. From this point the waste is carried by a closed concrete box conduit into New River.

**RECORDS:** During 1982 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 1982.

**REMARKS:** The plant began operation on September 28, 1963 by the State Commission of Public Services of Mexicali. Before 1968 the flow was small and infrequent. The potable water plant obtains water from the West Main Canal, which is a part of Mexico's system of canals in the Colorado Irrigation System. Excess water discharges into a closed conduit that empties into New River 0.9 mile (1.4 km) upstream of the international boundary.

**EXTREMES:** Maximum instantaneous discharge, 81.9 second-feet (2.32 m<sup>3</sup>/sec) on March 26, 1969; minimum instantaneous discharge, zero during several days in 1977, 1978, 1979, 1980, 1981 and 1982.

### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.7	0	1.8	1.8	1.8	1.4	1.8	1.8	0	1.8	1.8	1.8
2	.7	0	1.8	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
3	0	0	0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
4	.4	0	1.8	1.4	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8
5	.7	0	0	1.4	1.8	1.8	0	1.8	1.4	1.8	1.8	1.8
6	.7	0	0	1.8	1.8	1.8	1.4	1.8	1.8	1.8	1.8	3.5
7	0	0	.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
8	0	0	.7	1.8	0	1.8	1.8	1.8	1.8	1.8	1.8	3.5
9	0	0	0	1.8	2.5	1.8	1.8	1.1	1.8	1.8	1.8	1.1
10	0	0	0	1.8	2.1	1.8	0	1.8	1.8	1.8	1.8	1.8
11	0	0	0	1.8	1.8	1.8	2.8	1.8	1.8	1.8	1.8	2.5
12	0	0	1.1	1.8	.7	1.8	.4	1.8	1.8	1.8	1.4	1.8
13	0	0	0	1.8	2.5	1.8	1.8	1.8	1.8	1.8	1.8	1.8
14	0	0	2.1	0	0	1.8	1.8	1.8	1.8	1.8	1.8	1.8
15	0	0	1.8	1.8	0	1.8	1.8	0	1.8	1.8	1.8	1.8
16	0	0	1.8	0	0	1.8	1.8	1.8	1.8	1.8	1.8	0
17	0	0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
18	0	0	1.8	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
19	0	0	.7	0	1.8	0	0	1.8	1.8	1.8	1.8	1.1
20	0	0	.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.1
21	0	0	.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
22	0	0	1.8	1.8	1.8	0	1.8	1.8	0	1.8	1.8	0
23	0	1.8	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
24	0	2.8	1.8	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0
25	0	.7	1.8	1.8	0	.7	1.8	1.8	1.8	1.8	0	0
26	0	1.8	0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0	0
27	0	0	1.8	1.8	1.8	1.4	1.8	1.8	1.8	1.8	.7	0
28	0	2.1	1.1	1.8	1.8	1.8	2.1	1.8	1.8	1.8	2.5	0
29	0		1.8	1.8	1.8	1.8	1.4	1.8	1.8	1.8	1.4	0
30	0		1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.5	0
31	0		.7		1.8		1.8	1.8	1.8	1.8		0
<b>Sum</b>	3.2	9.2	34.0	46.6	47.7	48.5	49.5	53.3	50.0	55.8	49.9	34.4
<b>Current Year 1982</b>										<b>Period 1968-1982</b>		
Month	Extreme Gage Feet		Extreme Second-Foot				Average Second-Foot	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			1 1	0.7	1 3	0	0	6.3	195	520	0	
Feb.			24	2.8	1 1	0	.4	18.2	168	311	0	
Mar.			114	2.1	1 3	0	1.7	66.6	244	871	33.6	
Apr.			1 1	1.8	114	0	1.4	90.8	230	431	90.8	
May			1 9	2.5	1 8	0	1.4	93.2	247	435	46.2	
June			1 2	1.8	119	0	1.4	94.9	218	409	21.0	
July			1 1	2.8	1 5	0	1.4	96.5	280	528	0	
Aug.			1 1	1.8	1 5	0	1.8	104	313	596	102	
Sept.			1 2	1.8	1 1	0	1.8	97.3	293	549	97.3	
Oct.			1 1	1.8	1 1	1.8	1.8	109	269	507	109	
Nov.			130	2.5	125	0	1.8	97.3	233	504	97.3	
Dec.			1 6	3.5	116	0	1.1	67.2	227	597	67.2	
<b>Yearly</b>				3.5		0	1.4	940	2,922	5,359	940	
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>					
				0.10		0	0.04	1,160	3,604	6,610	1,160	

0 Mean daily

! And other days

## WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

**DESCRIPTION:** During 1982 the only flow to the New River in Mexico was waste from the City of Mexicali Potable Water Plant, which discharges into Rivera Drain and then to New River, and drainage water coming from the Colorado River District system of canals that enter the New River below Laguna Xochimilco.

**RECORDS:** Records of the Potable Water Plant are based on flows measured on a Parshall flume less pumping to the city. Records obtained and furnished by the State Commission of Public Services of Mexicali. Records available: Wisteria Wasteway, January 1951 through 1975; Sifon Wasteway, January 1952 to April 30, 1964; Pueblo Nuevo Wasteway, January 1956 through 1965; and the Potable Water Plant, January 1968 through December 1982.

**REMARKS:** To obtain data for Sifon and Pueblo Nuevo Wasteways, see bulletins 1 to 6 (1960-1965); and for Wisteria Wasteway, bulletins 1 to 16 (1960-1975). For data on wastes from Potable Water Plant, see page 58 of this bulletin.

### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1956-1982		
		Average	Maximum	Minimum
January	6.3	1,119	8,758	6.3
February	18.2	799	7,281	18.2
March	66.6	555	2,610	21.7
April	90.8	495	3,194	16.1
May	93.2	336	1,176	9.1
June	94.9	440	5,670	0
July	96.5	669	10,251	0
August	104	594	4,137	0
September	97.3	490	3,215	21.0
October	109	652	3,474	8.4
November	97.3	681	3,784	0
December	67.2	1,081	8,691	0
Yearly	940	7,915	27,430	399
	Thousands of Cubic Meters			
	1,160	9,763	33,835	492

**SALTON SEA - ELEVATIONS OF WATER SURFACE**

**DESCRIPTION:** Water-stage recorder and staff gage located on the western shore of the Salton Sea, 15.5 miles (24.9 km) northwest of Westmoreland, Imperial County, California. The Salton Sea is the sink of a closed basin which has a drainage area of 8,360 square miles (21,652 km<sup>2</sup>). Zero of the gage is 250.00 feet (76.2 m) below mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records of water surface elevations available from November 1904 through 1982. From January 1925 to October 22, 1951, once monthly records of elevations were collected by Imperial Irrigation District from a bench mark at Figtree John's Spring, about 22 miles (35.4 km) northwest along the western shore from the present gage. Since October 24, 1951, a continuous record of gage heights has been obtained by the U. S. Geological Survey at new gaging station published as "Salton Sea near Westmoreland, California." The elevation of the old station is at a datum of one foot (0.30 m) higher than that of the present station. All records reported below and the area and capacity table are adjusted to the datum of the present station.

**REMARKS:** Runoff from the basin, irrigation drainage and waste water from Imperial and Coachella Valleys in the United States, and drainage and waste water from part of the Mexicali Valley in Mexico discharge into the Salton Sea. Water from Mexico enters the United States in the Alamo and New River channels. The bottom of the sea is 277.7 feet (84.6 m) below mean sea level, U. S. C. & G. S. datum.

**EXTREMES:** Maximum elevation during year, 227.4 feet (69.3 m) below mean sea level. Minimum elevation during year, 228.7 feet (69.7 m) below mean sea level. Extremes for period of record, maximum elevation 195.9 feet (59.7 m) below mean sea level, February 10 to March 29, 1907; minimum elevation since 1906, 251.6 feet (76.7 m) below mean sea level in November 1924.

**Mean Daily Water Surface Elevation in Feet below Mean Sea Level - 1982**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	228.2	228.0	227.7	227.6	227.4	227.6	227.9	228.0	228.2	* 228.4	* 228.6	228.7
2	228.2	228.0	227.7	227.6	227.4	227.6	227.9	228.1	228.2	* 228.4	* 228.6	228.7
3	228.2	228.0	227.7	227.6	227.4	227.6	227.9	228.1	228.2	* 228.4	* 228.6	228.7
4	228.2	228.0	227.7	227.6	227.4	227.6	227.9	228.1	228.2	* 228.4	* 228.6	228.7
5	228.2	228.0	227.7	227.6	227.4	227.6	227.9	228.1	228.2	* 228.4	* 228.6	228.7
6	228.2	228.0	227.7	227.6	227.5	227.6	227.9	228.1	228.2	* 228.4	228.7	* 228.6
7	228.2	228.0	227.7	227.6	227.5	227.7	227.9	228.1	228.2	* 228.4	228.7	* 228.6
8	228.2	228.0	227.7	227.6	227.5	227.7	227.9	228.1	228.2	* 228.4	228.7	* 228.6
9	228.2	228.0	227.7	227.6	227.5	227.7	227.9	228.1	228.2	* 228.4	228.7	* 228.5
10	228.2	228.0	227.7	227.5	227.5	227.7	228.0	228.1	228.2	* 228.4	228.7	* 228.5
11	228.2	227.9	227.7	227.5	227.5	227.7	228.0	228.1	228.2	* 228.4	228.7	* 228.5
12	228.2	227.9	227.7	227.5	227.5	227.7	228.0	228.1	* 228.3	* 228.5	228.7	* 228.4
13	228.2	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	* 228.4
14	228.2	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	* 228.4
15	228.1	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	* 228.4
16	228.1	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	* 228.4
17	228.1	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	228.3
18	228.1	227.9	227.7	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	228.3
19	228.1	227.9	227.6	227.5	227.5	227.7	228.0	228.2	* 228.3	* 228.5	228.7	228.4
20	228.1	227.9	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
21	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
22	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
23	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
24	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
25	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.5	228.7	228.4
26	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.6	228.7	228.4
27	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.3	* 228.6	228.7	228.4
28	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.4	* 228.6	228.7	228.4
29	228.1	227.8	227.6	227.5	227.5	227.8	228.0	228.2	* 228.4	* 228.6	228.7	228.4
30	228.0	227.6	227.4	227.5	227.5	227.8	228.0	228.2	* 228.4	* 228.6	228.7	228.4
31	228.0	227.6	227.4	227.5	227.6	227.8	228.0	228.2	* 228.4	* 228.6	228.7	228.4
<b>Avg.</b>	228.1	227.9	227.7	227.5	227.5	227.7	228.0	228.2	228.3	228.5	228.7	228.5

Month	Current Year 1982		Period 1935-1982		
	Extreme Elevation Feet		Elevation Feet		
	High	Low	# Average	Maximum	! Minimum
Jan.	228.0	228.2	236.64	227.9	249.3
Feb.	227.8	228.0	236.33	227.7	248.8
Mar.	227.6	227.7	236.07	227.4	248.6
Apr.	227.4	227.6	235.88	227.2	248.7
May	227.4	227.6	235.85	227.2	248.5
June	227.6	227.8	236.00	227.2	248.8
July	227.9	228.0	236.17	227.4	249.1
Aug.	228.0	228.2	236.36	227.6	249.4
Sept.	228.2	* 228.4	236.55	227.9	249.4
Oct.	* 228.4	* 228.6	236.61	228.1	249.8
Nov.	228.6	228.7	236.64	228.2	250.0
Dec.	228.3	228.7	236.51	228.1	249.6
<b>Yearly</b>	227.4	228.7	236.30	227.2	250.0

Area and Capacity Table		
Elevation	Area	Capacity
Feet Below M.S.L.	Acres	Acres-Feet
277.7	0	0
274.0	20,600	25,700
270.0	62,900	188,700
266.0	94,600	510,600
260.0	122,600	1,170,000
256.0	134,700	1,684,000
252.0	148,800	2,250,000
244.0	179,700	3,562,000
240.0	196,900	4,315,000
235.0	221,800	5,360,000
230.0	235,800	6,504,000
220.0	262,000	8,993,000
210.0	288,500	11,740,000
200.0	315,500	14,760,000

Ø Mean daily      # Mean monthly      ! Reading near first day of month      \* Estimated

**CHEMICAL ANALYSES OF WATER SAMPLES**

1982

The tables below are based on quarterly samples from the Alamo River taken and analyzed by the State of California Department of Water Resources. Beginning December 1971, not all constituents analyzed. New River samples are collected monthly and analyzed by the U. S. Geological Survey.

Samples from the Alamo River are taken north of the international boundary at upstream end of box culvert under the All-American Canal. Flow at this point includes drainage flows across international boundary and flows from drain intercepts along toe of south bank of All-American Canal. Samples from New River are taken from the right bank at road bridge 450 feet north of international boundary. Records of sampling extend from April 1957 through 1982.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20.04; Mg, 12.16; Na 22.99; (CO<sub>3</sub> plus HCO<sub>3</sub>) expressed as CO<sub>3</sub>, 30.00; SO<sub>4</sub>, 48.03; Cl, 35.45; NO<sub>3</sub>, 62.00. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5. Electrical conductivity, reported in the tables as EC x 10<sup>6</sup> at 25°C, is a relative measure of the total salt concentration.

Month	No. of Samples	Dissolved Solids		ECx10 <sup>6</sup> @25°C	Boron p. p. m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter						
		Tons Per Acre-Foot	Total Tons						Ca	Mg	Na	CO <sub>3</sub> + HCO <sub>3</sub>	SO <sub>4</sub>	Cl	NO <sub>3</sub>

**Alamo River**

Jan.																	
Feb.																	
Mar.	1	7.56	1,940	8,000		8.2							28.73		53.31		
Apr.																	
May	1	3.98	585	5,200		8.2							17.55		25.25		
June																	
July																	
Aug.																	
Sept.	1	4.98	732	5,400		8.1							20.70		32.16		
Oct.																	
Nov.																	
Dec.	1	5.47	963	4,500		7.4							22.28		35.26		
	4																

**New River**

Jan.	1	5.07	67,200	5,900		7.9	67		10.98	8.22	38.71		14.37		45.13		
Feb.																	
Mar.	1	5.57	93,400	6,200		8.0	65		12.48	10.69	43.50		16.03		47.95		
Apr.																	
May	1	5.97	83,600	6,700		8.2	68		11.98	10.69	47.85		17.91		50.78		
June																	
July	1	6.50	71,000	7,790		7.7	70		11.48	10.69	52.20		17.07		59.24		
Aug.																	
Sept.	1	5.25	68,100	6,220		7.6	70		9.98	7.48	40.45						
Oct.																	
Nov.	1	6.43	58,800	8,320		7.5	70		12.48	9.87	52.20		15.41		59.24		
Dec.																	
	6																

\*\* Percent of total cations

\*\*\* Percent of total anions

## ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1982

The following table shows electrical conductivity, expressed in mhos per centimeter  $\times 10^6$  at  $25^\circ\text{C}$ , of individual water samples from the New River in Mexico at the international boundary. Samples were taken by the Mexican Section of the Commission, who also made the determinations.

Electrical conductivity is a relative indication of the concentration of dissolved solids in the water samples.

Date	ECx10 <sup>6</sup> @25°C												
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## New River at International Boundary

January	February	April	May	July	August	October	November
12 6,190	24 7,000	7 8,250	17 6,400	7 7,790	18 6,640	4 7,430	17 8,720
19 6,870	March	14 6,900	24 7,000	14 6,990	25 6,440	11 9,140	24 8,140
27 7,130	3 6,490	21 7,790	June	21 7,580	September	20 8,000	December
February	10 6,630	28 7,710	2 7,570	28 7,820	1 5,500	27 7,480	8 10,180
3 6,340	17 6,630	May	9 8,250	August	8 6,160	November	15 6,130
10 6,460	23 6,910	7 6,640	16 7,180	4 7,080	15 6,400	3 6,890	22 5,860
17 6,440	31 7,600	12 6,710	23 7,100	11 6,760	22 6,900	10 7,960	29 6,490
			30 7,250		29 7,490		



### COTTONWOOD CREEK ABOVE MORENA DAM, CALIFORNIA

**DESCRIPTION:** Staff gage located on east side of outlet tower immediately upstream from face of Morena Dam. The dam is located on Cottonwood Creek 1.8 miles (2.9 km) upstream from the mouth of Hauser Creek, 8.5 miles (13.7 km) upstream from Barrett Dam, and about 20 miles (32.2 km) upstream from the international boundary. The zero of the gage is 2,882.4 feet (878.56 m) above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Reservoir inflows shown below were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall, by the International Boundary and Water Commission, United States Section. They represent all water reaching Morena Reservoir, including rainfall on reservoir water surface. Basic data were furnished by the city of San Diego, California. Records April 1911 through 1982.

**REMARKS:** Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1982 computed on basis of area-capacity curves determined from 1948 resurvey. Various changes have been made to the spillway section since construction of the dam. Elevation of the present crest of ungated spillway is 157.00 feet (47.85 m), gage datum. Reservoir capacity at spillway crest, 1948 survey, is 50,210 acre-feet (61,934,000 m<sup>3</sup>). The entire capacity of Morena Reservoir is used to furnish a part of the water supply of the city of San Diego, California. Water is released from Morena Reservoir down Cottonwood Creek to Barrett Reservoir as required.

**EXTREMES:** Maximum monthly inflow since 1937, 33,569 acre-feet (41,407,000 m<sup>3</sup>), February 1980. Prior to 1937, maximum monthly inflow, 37,200 acre-feet (45,886,000 m<sup>3</sup>), January 1916; minimum no flow during parts of many years.

#### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1937-1982		
		Average	Maximum	Minimum
January	1,817	624	7,472	0
February	2,307	1,868	33,569	8.0
March	4,671	2,307	24,190	19.3
April	3,462	1,350	12,101	3.3
May	1,803	615	10,544	0
June	275	314	5,719	0
July	29.0	177	3,151	0
August	283	109	1,260	0
September	653	73.5	1,070	0
October	28.9	70.9	1,270	0
November	505	160	1,380	0
December	4,700	539	4,700	4.4
Yearly	20,534	8,207	100,006	121
	Thousands of Cubic Meters			
	25,328	10,123	123,356	149

## COTTONWOOD CREEK BELOW MORENA DAM, CALIFORNIA

**DESCRIPTION:** Two water-stage recorders, one on the upstream side of the southeast abutment of Morena Dam for measuring head on the spillway crest and one immediately below the dam with a rectangular control weir for measuring ordinary reservoir releases, and cableway located about 0.8 mile (1.3 km) downstream from the dam. Discharge measurements made at the cableway include leakage, controlled releases, and spillway discharges.

**RECORDS:** Monthly records shown below represent the water available immediately below Morena Dam, consisting of spillway waste, draft, and leakage from the dam. They are computed by the International Boundary and Water Commission, United States Section, from basic data furnished by the city of San Diego, California. Records available: January 1911 through 1982.

**REMARKS:** Flows at this station are regulated by Morena Dam; storage began March 1910. Water is released from Morena Reservoir as required and flows down the natural channel of Cottonwood Creek to Barrett Reservoir. There are no major diversions above Morena Dam.

**EXTREMES:** Maximum monthly discharge since 1937, 24,097 acre-feet (29,723,000 m<sup>3</sup>) March 1980. Prior to 1937, maximum monthly discharge, 21,400 acre-feet (26,397,000 m<sup>3</sup>), February 1916; minimum, no flow during several months of various years.

## Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1937-1982		
		Average	Maximum	Minimum
January	350	111	1,700	0
February	316	627	15,926	0
March	350	916	24,097	0
April	1,823	981	12,950	0
May	695	434	10,398	0
June	339	370	7,360	0
July	350	203	2,340	0
August	350	154	1,550	0
September	339	252	5,880	0
October	350	91.1	529	0
November	339	114	1,260	0
December	350	277	5,350	0
Yearly	5,951	4,530	71,416	0
	Thousands of Cubic Meters			
	7,340	5,588	88,091	0

## COTTONWOOD CREEK ABOVE BARRETT DAM, CALIFORNIA

**DESCRIPTION:** Staff gage located immediately upstream from face of dam on west side of outlet tower. Barrett Dam is located on Cottonwood Creek 8.5 miles (13.7 km) downstream from Morena Dam, 1 mile (1.6 km) downstream from the mouth of Pine Valley Creek, and about 12 miles (19.3 km) upstream from the international boundary. Zero of gage is 1,446.12 feet (440.78 m) above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Records reported below represent all water reaching Barrett Dam from the sub-basin below Morena Dam, including rainfall on the reservoir water surface. Leakage, releases, and spills from Morena Reservoir are not included. The inflows were computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, and rainfall furnished by the city of San Diego, California. Records available: January 1921 through 1982. Records of stream flow for a station at the dam site are also available for the periods 1906-1915 and 1917-1920.

**REMARKS:** Storage began at Barrett Reservoir in January 1921. The area-capacity-elevation curves used in the inflow calculations are dated 1948, 1951, and 1955 and were furnished by the city of San Diego, California. Capacity of reservoir at top of flash gates on spillway (gage height 168.88 feet (51.47 m)) is 44,755 acre-feet (55,205,000 m<sup>3</sup>). Capacity at spillway crest (gage height 160.88 feet (49.04 m)) is 37,950 acre-feet (46,811,000 m<sup>3</sup>). Dead storage, 719 acre-feet (887,000 m<sup>3</sup>) below lowest outlet (gage height 58.88 feet (17.95 m)) is included in these capacities. The entire capacity of Barrett Reservoir is used to furnish a part of the water supply of the city of San Diego, California.

**EXTREMES:** Maximum monthly discharge since 1937, 54,755 acre-feet (67,540,000 m<sup>3</sup>) February 1980. Prior to 1937, maximum monthly discharge, 54,800 acre-feet (67,595,000 m<sup>3</sup>) February 1927; minimum, no flow during several months of various years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1937-1982		
		Average	Maximum	Minimum
January	1,719	667	3,721	5.2
February	1,584	2,730	54,755	7.6
March	5,443	3,696	36,010	14.1
April	4,207	1,912	21,630	10.2
May	909	723	5,461	0
June	695	299	2,568	0
July	291	190	1,687	0
August	267	111	596	0
September	350	117	759	0
October	156	85.6	645	.1
November	489	151	1,200	0
December	5,549	555	5,549	1.7
Yearly	21,659	11,237	114,330	129
	Thousands of Cubic Meters			
	26,716	13,861	141,025	159

**DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA**

**DESCRIPTION:** Water-stage recorder 0.5 mile (0.8 km) downstream from Barrett Dam on right bank of Dulzura Conduit 50 feet (15.2 m) upstream from road crossing to Barrett Dam. Elevation of gage has not been determined.

**RECORDS:** Computed on basis of head on control section of flume, as measured by water-stage recorder, and rating curve determined from current meter measurements. Records obtained and furnished by the city of San Diego, California. Records available: January 1909 through 1982.

**REMARKS:** Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 1.5 miles (2.4 km) upstream. The conduit carries diversions from Barrett Reservoir on Cottonwood Creek westerly across the divide into Otay Reservoir for municipal use by the city of San Diego. Prior to September 30, 1958, station was located 8 miles (12.9 km) along the conduit from Barrett Dam, being reported as "Dulzura Conduit near Dulzura"; and the draft from Barrett Reservoir was computed from the discharges obtained at the conduit gaging station, multiplied by the factor 1.05 to allow for channel loss in the reach from the reservoir to the gaging station.

**EXTREMES:** Since 1937: Maximum mean daily discharge, 55 second-feet (1.56 m<sup>3</sup>/sec) on March 15, 1954; minimum discharge, no flow for long periods on many occasions.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	24.7	29.0	31.3	29.4	32.4	22.5	26.7	30.9	0	0
2	0	0	24.7	29.4	31.3	29.4	32.8	27.8	26.7	30.3	0	0
3	0	0	24.7	29.6	31.1	29.4	33.4	27.5	26.7	30.1	0	0
4	0	0	24.7	29.6	31.1	29.4	34.3	27.5	26.9	29.8	0	0
5	0	0	24.7	29.8	30.9	29.4	35.2	27.5	26.9	26.9	0	0
6	0	0	24.5	30.1	30.9	29.4	0	27.5	26.9	28.6	0	0
7	0	0	24.5	30.3	30.9	29.2	0	27.5	26.9	28.6	0	0
8	0	0	24.5	30.3	30.5	29.2	0	28.0	26.5	28.2	0	0
9	0	0	27.8	30.5	30.5	29.2	0	28.0	26.3	28.0	0	0
10	0	0	27.8	30.7	30.3	29.2	0	28.0	26.3	27.8	0	0
11	0	0	27.8	30.9	30.1	29.4	0	28.0	26.3	27.5	0	0
12	0	0	27.8	30.7	29.8	29.4	0	28.2	26.3	27.3	0	0
13	0	0	27.8	30.9	29.8	29.4	0	28.4	26.1	27.3	0	0
14	0	0	27.8	31.1	29.8	29.6	0	28.4	26.1	27.3	0	0
15	0	0	28.0	31.1	29.6	29.6	0	28.6	26.5	27.3	0	0
16	0	0	28.0	31.3	29.6	29.6	0	28.6	30.1	27.3	0	0
17	0	0	28.2	31.3	29.6	29.6	0	28.6	30.1	27.3	0	0
18	0	0	28.8	31.5	29.6	29.8	0	28.6	29.8	27.3	0	0
19	0	0	27.1	31.7	29.8	30.1	0	28.6	30.1	27.3	0	0
20	0	0	27.3	32.0	29.8	30.1	0	28.6	30.3	27.3	0	0
21	0	0	27.5	32.4	29.8	30.3	0	28.6	30.5	27.3	0	0
22	0	0	27.8	32.0	30.1	30.5	0	28.6	30.7	27.1	0	0
23	0	0	28.0	32.0	29.8	30.5	0	0	30.7	26.9	0	0
24	0	0	28.0	31.7	29.8	30.5	0	0	30.7	0	0	0
25	0	0	28.2	31.7	29.6	30.3	0	0	30.7	0	0	0
26	0	12.8	28.2	31.5	29.6	30.9	0	11.1	30.9	0	0	0
27	0	17.1	28.2	31.5	29.6	30.9	0	15.7	30.9	0	0	0
28	0	21.6	28.2	31.5	29.6	31.1	0	20.6	30.9	0	0	0
29	0		28.4	31.5	29.6	31.5	11.9	27.3	31.1	0	0	0
30	0		28.8	31.3	29.6	31.5	14.3	27.3	31.1	0	0	0
31	0		28.8		29.6		17.5	26.9		0	0	0
Sum	0	51.5	841.3	928.9	933.0	897.8	211.8	742.5	856.7	643.7	0	0
Current Year 1982									Period 1937-1982			
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Day	Low	Average	Maximum	Minimum		
Jan.				0		0	0	351	2,350	0		
Feb.			28	21.6	1 1	0	1.84	102	2,130	0		
Mar.			118	28.8	1 6	24.5	27.1	1,669	2,330	0		
Apr.			21	32.4	1	29.0	31.0	1,842	2,860	0		
May			1 1	31.3	115	29.6	30.1	1,851	3,040	0		
June			129	31.5	1 7	29.2	29.9	1,781	2,920	0		
July			5	35.2	1 6	0	6.83	420	2,920	0		
Aug.			115	28.6	123	0	24.0	1,473	2,820	0		
Sept.			129	31.1	113	26.1	28.6	1,699	2,320	0		
Oct.			1	30.9	124	0	20.8	1,277	2,450	0		
Nov.				0		0	0	495	2,760	0		
Dec.				0		0	0	432	2,305	0		
Yearly				35.2		0	16.7	12,114	7,310	27,170	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				1.00		0	0.47	14,942	9,017	33,514	0	

Ø Mean daily

1 And other days

## COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

**DESCRIPTION:** Water-stage recorder and cableway located about 2.5 miles (4.0 km) downstream from Barrett Dam and 0.5 mile (0.8 km) upstream from Rattlesnake Canyon for measuring Barrett Dam spills; and staff gage and control weir located immediately below the dam for measuring leakage. The elevation of the gage is about 1,000 feet (305 m) (from topographic map).

**RECORDS:** Data furnished by the city of San Diego, California. Prior to January 1953, the records were furnished by the city of San Diego and reviewed and revised by the United States Section of the Commission. The recorder is to be operated only when Barrett Reservoir is near or above spillway level. Spillway discharges have occurred in May 1943, March, April 1979, January to May of 1980, and April and December 1982. 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 1982. Storage began in Barrett Reservoir in January 1921.

**REMARKS:** Records reported below represent the water available in the natural channel of Cottonwood Creek immediately below Barrett Dam. Records of draft from Barrett Reservoir are not included, inasmuch as all releases are made to Dulzura Conduit which transports water outside the basin. Leakage is mainly through the spillway gates.

**EXTREMES:** Maximum monthly discharge since 1937, 70,318 acre-feet (86,737,000 m<sup>3</sup>) February 1980. Prior to 1937, maximum monthly discharge 38,400 acre-feet (47,366,000 m<sup>3</sup>) February 1927; minimum, no flow during several months of various years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1937-1982		
		Average	Maximum	Minimum
January	0	15.0	590	0
February	0	1,551	70,318	0
March	0	1,973	60,278	0
April	2,538	1,449	33,400	0
May	0	455	11,702	0
June	0	196	7,738	0
July	0	95.2	4,306	0
August	0	34.8	1,535	0
September	0	7.6	298	0
October	0	3.7	123	0
November	0	1.1	19.8	0
December	1,481	33.4	1,481	0
Yearly	4,019	5,815	172,679	0
	Thousands of Cubic Meters			
	4,957	7,173	212,998	0

**COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA**

DESCRIPTION: Water-stage recorder and cableway located 1.6 miles (2.6 km) upstream from the international land boundary between the United States and Mexico, 0.8 mile (1.3 km) upstream from the confluence with Tecate Creek, and 5.1 miles (8.2 km) south of Dulzura, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the cableway, which is located 700 feet (213 m) downstream from the gage. Zero of the gage is 569.40 feet (173.55 m) above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on a continuous record of gage heights and current meter measurements or observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1982.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 (16.1 km) and 18 miles (29.0 km), respectively, upstream from this station. During 1982 there were releases or spills to the natural channel of Cottonwood Creek at Barrett Dam, the lowermost dam in Cottonwood Creek Basin.

EXTREMES: Maximum discharge 11,700 second-feet (331 m<sup>3</sup>/sec) February 21, 1980 (gage height 11.15 feet) (3.40 m). Minimum discharge, no flow during part of each year.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.4	5.5	2.0	42.0	3.1	1.2	0.16	0	0	0	0	7.6
2	1.3	5.3	2.3	78.0	2.8	1.0	.07	0	0	0	0	4.6
3	.36	5.6	.99	115	2.6	.90	.03	0	0	0	0	3.3
4	.15	5.7	1.2	159	2.9	.74	.02	0	0	0	0	2.7
5	.65	4.2	.86	124	2.9	.59	.01	0	0	0	0	2.1
6	2.1	2.4	.39	64.0	2.6	.52	0	0	0	0	0	1.9
7	1.4	2.6	.27	59.0	2.1	.51	0	0	0	0	0	1.9
8	.80	7.0	.27	60.0	2.0	.43	0	0	0	0	0	1.9
9	.78	4.8	.31	55.0	2.2	.36	0	0	0	0	0	2.3
10	1.6	10.0	.22	56.0	2.1	.40	0	0	0	0	.30	2.5
11	2.9	34.0	.45	55.0	2.6	.38	0	0	0	0	.58	1.9
12	2.2	17.0	.52	56.0	3.0	.38	0	0	0	0	.14	1.7
13	1.7	9.7	.30	57.0	2.7	.29	0	0	0	0	.07	1.5
14	1.8	2.0	2.7	57.0	2.8	.24	0	0	0	0	.08	1.5
15	2.1	3.2	12.0	56.0	2.8	.23	0	0	0	0	.09	1.5
16	2.1	2.3	5.4	52.0	2.9	.42	0	0	0	0	.09	1.4
17	2.4	3.1	21.0	49.0	2.5	.79	0	0	0	0	.14	1.3
18	2.6	1.3	214	48.0	2.3	.93	0	0	0	0	.14	1.3
19	2.8	1.2	95.0	47.0	2.2	.97	0	0	0	0	.56	1.2
20	9.1	1.5	64.0	43.0	2.2	.85	0	0	0	0	.28	1.1
21	14.0	1.8	34.0	39.0	2.3	1.1	0	0	0	0	.16	1.1
22	5.0	1.8	27.0	32.0	2.2	1.2	0	0	0	0	.14	1.4
23	.26	1.8	24.0	17.0	2.1	1.0	0	0	0	0	.14	11.0
24	.10	2.0	24.0	13.0	2.0	.76	0	0	0	0	.13	30.0
25	1.6	1.4	26.0	9.7	1.9	.47	0	0	0	0	.10	39.0
26	3.4	1.4	26.0	7.1	2.1	.23	0	0	0	0	.08	29.0
27	.80	1.2	27.0	5.3	2.5	.12	0	0	0	0	.09	24.0
28	1.5	1.8	27.0	4.8	2.4	.07	0	0	0	0	.16	24.0
29	5.8	31.0	4.0	1.9	1.9	.10	0	0	0	0	.95	24.0
30	8.2	35.0	3.6	1.7	1.7	.22	0	0	0	0	5.6	28.0
31	7.6	36.0	3.6	1.4	1.4		0	0	0	0		33.0
Sum	88.50	141.6	741.18	1,467.5	73.8	17.40	0.29	0	0	0	10.02	289.7

Month	Current Year 1982						Period 1937-1982				
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.			21	14.0	24	0.10	2.85	176	451	11,918	0
Feb.			11	34.0	119	1.2	5.06	281	2,082	69,019	0
Mar.			18	214	10	.22	23.9	1,470	2,368	31,214	0
Apr.			4	159	30	3.6	48.9	2,911	1,910	40,240	0
May			1	3.1	31	1.4	2.38	146	538	10,885	0
June			1	1.2	28	.07	.58	34.5	185	5,919	0
July			1	.16	1	6	.01	.58	69.5	2,918	0
Aug.			0	0	0	0	0	0	32.9	1,500	0
Sept.			0	0	0	0	0	0	15.6	685	0
Oct.			0	0	0	0	0	0	8.3	236	0
Nov.			30	5.6	1	1	.33	19.9	22.1	440	0
Dec.			25	39.0	120	1.1	9.35	575	129	1,316	0
Yearly				214		0	7.75	5,614	7,811	154,242	0
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
				6.06		0	0.22	6,925	9,635	190,256	0

0 Mean daily

! And other days

**CAMPO CREEK NEAR CAMPO, CALIFORNIA**

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

RECORDS: Based on current meter measurements and observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1982.

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

EXTREMES: Maximum discharge, 880 second-feet (24.9 m<sup>3</sup>/sec), February 6, 1937 (gage height 4.80 feet (1.46 m) present datum), from rating curve extended above 110 second-feet (3.12 m<sup>3</sup>/sec) 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 Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	22.0	8.8	7.3	33.0	5.5	2.5	1.5	0.65	0.37	0.62	0.85	69.0
2	34.0	8.3	8.0	41.0	4.7	2.5	1.4	.63	.31	.57	.93	21.0
3	20.0	8.3	8.5	23.0	4.7	2.5	1.4	.61	.28	.56	.89	11.0
4	9.5	8.5	8.5	18.0	4.3	2.5	1.3	.58	.27	.55	.96	9.0
5	15.0	8.1	8.0	16.0	4.4	2.4	1.3	.55	.27	.56	2.1	8.0
6	17.0	7.4	7.4	14.0	4.6	2.4	1.2	.58	.25	.53	3.0	7.3
7	9.5	7.7	7.6	13.0	4.7	2.3	1.1	.57	.26	.56	2.6	7.2
8	6.7	13.0	7.7	12.0	5.0	2.3	1.0	.53	.37	.50	2.4	9.9
9	6.6	14.0	7.7	11.0	5.2	2.3	.93	.53	.47	.45	2.8	13.0
10	6.7	31.0	7.7	10.0	5.0	2.3	.87	.51	.51	.43	5.2	19.0
11	11.0	54.0	11.0	9.9	6.1	2.3	.78	.53	.52	.45	13.0	4.7
12	9.6	18.0	22.0	9.3	6.2	2.2	.72	.56	.50	.42	5.5	3.4
13	7.6	14.0	23.0	8.7	5.2	1.5	.71	.59	.53	.42	4.3	3.1
14	6.7	13.0	28.0	8.6	4.8	1.8	.70	.59	.57	.41	3.8	2.9
15	6.7	11.0	37.0	8.7	4.4	2.1	.68	.57	.59	.40	3.6	2.5
16	6.4	11.0	17.0	8.4	4.2	2.0	.68	.52	.72	.38	3.7	2.5
17	6.4	11.0	20.0	8.4	4.0	2.0	.67	.51	.71	.38	3.8	2.5
18	6.4	10.0	84.0	8.3	3.4	2.0	.64	.49	.64	.36	3.8	2.4
19	6.4	8.8	41.0	8.4	3.4	2.1	.61	.46	.60	.42	5.3	2.4
20	15.0	8.4	26.0	7.9	3.3	2.1	.56	.47	.56	.44	6.2	2.4
21	67.0	8.4	20.0	7.3	3.2	2.1	.54	.67	.54	.47	5.0	2.4
22	21.0	8.5	15.0	7.9	3.7	2.1	.67	.60	.46	.46	4.5	2.7
23	12.0	8.0	14.0	8.3	3.5	2.0	.81	.66	.40	.48	4.4	28.0
24	10.0	7.7	14.0	8.2	3.1	1.8	.76	.73	.41	.52	4.3	14.0
25	9.6	8.0	14.0	8.4	3.1	1.7	.74	.79	.48	.55	4.0	9.6
26	8.9	7.7	18.0	8.4	3.7	1.6	.73	.72	.70	.61	3.8	8.4
27	8.6	7.5	16.0	8.3	3.5	1.5	.69	.59	.76	.61	3.7	8.2
28	9.0	7.1	15.0	8.0	2.7	1.4	.60	.52	.62	.61	3.9	8.1
29	16.0		23.0	8.6	2.7	1.4	.60	.50	.62	.64	6.3	8.1
30	10.0		19.0	6.9	2.6	1.5	.56	.48	.61	.69	75.0	9.0
31	9.2		16.0		2.6		.58	.43		.75		8.5
Sum	410.5	337.2	571.4	357.9	127.5	61.2	26.03	17.72	14.9	15.8	189.63	310.2

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day		Low	Second-Feet	Acre-Feet	Average	Maximum	Minimum	
			High	Day							
Jan.			21	67.0	116	6.4	13.2	814	145	906	0
Feb.			11	54.0	28	7.1	12.0	669	319	4,287	0
Mar.			18	84.0	1	7.3	18.4	1,133	450	5,203	0
Apr.			2	41.0	30	6.9	11.9	710	294	3,250	0
May			12	6.2	130	2.6	4.11	253	144	1,878	0
June			1	2.5	128	1.4	2.04	121	63.7	1,002	0
July			1	1.5	21	.54	.84	51.6	32.2	726	0
Aug.			25	.79	31	.43	.57	35.1	23.2	529	0
Sept.			27	.76	6	.25	.50	29.6	21.1	440	0
Oct.			31	.75	18	.36	.51	31.3	30.2	551	0
Nov.			30	75.0	1	.85	6.32	376	53.3	542	0
Dec.			1	69.0	118	2.4	10.0	615	113	808	0
Yearly				84.0		0.25	6.68	4,839	1,689	19,254	0
	Meters		Cubic Meters per Second				Thousands of Cubic Meters				
				2.38		0.01	0.19	5,969	2,083	23,750	0

Ø Mean daily

! And other days

**COTTONWOOD CREEK NEAR INTERNATIONAL BOUNDARY**

**DESCRIPTION:** Water-stage recorder and cableway, 0.6 mile (1.0 km) upstream from the international land boundary between the United States and Mexico, 0.5 mile (0.8 km) downstream from the confluence of Cottonwood Creek and Tecate Creek, and 5.5 miles (8.9 km) south of Dulzura, California. This station is published by the U. S. Geological Survey under the name "Tijuana River near Dulzura, California." Low water discharge measurements are made by wading at the gage. The zero of the gage is 542.42 feet (165.33 m) above mean sea level, U. S. C. & G. S. datum.

**RECORDS:** Based on a continuous record of gage heights and current meter measurements or observation of no flow. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through 1982.

**REMARKS:** Flow is partially controlled by Barrett and Morena Reservoirs, 11 (17.7 km) and 19 miles (30.6 km), respectively, upstream from this station. The flow at this station represents the amount of water passing the Marron Dam site.

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

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	37.0	14.0	13.0	80.0	9.6	2.0	0.33	0.17	0.09	0.08	0.05	86.0
2	37.0	13.0	12.0	152	9.2	1.6	.32	.14	.09	.08	.04	38.0
3	26.0	13.0	12.0	153	11.0	1.4	.33	.17	.09	.08	.04	22.0
4	20.0	13.0	12.0	186	19.0	1.2	.33	.26	.10	.08	.04	14.0
5	29.0	12.0	11.0	160	13.0	1.1	.29	.16	.10	.08	.04	8.0
6	29.0	11.0	9.7	77.0	12.0	.90	.38	.07	.10	.07	.04	6.1
7	22.0	12.0	11.0	71.0	12.0	.80	.40	.07	.10	.07	.05	7.9
8	12.0	19.0	12.0	71.0	10.0	.70	.18	.08	.10	.07	.05	22.0
9	7.4	19.0	11.0	69.0	12.0	.60	.25	.09	.10	.07	.06	21.0
10	9.5	29.0	12.0	71.0	14.0	.60	.24	.07	.10	.07	21.0	53.0
11	21.0	77.0	23.0	75.0	19.0	.60	.24	.06	.10	.06	19.0	46.0
12	12.0	35.0	47.0	78.0	18.0	.60	.24	.07	.10	.06	2.9	34.0
13	6.5	22.0	23.0	79.0	16.0	.50	.30	.07	.10	.06	.70	29.0
14	4.4	18.0	60.0	82.0	15.0	.40	.33	.07	.10	.06	.45	16.0
15	5.0	18.0	25.0	82.0	14.0	.40	.42	.08	.10	.06	.07	10.0
16	3.9	17.0	9.0	78.0	12.0	.50	.41	.09	.09	.05	.19	7.2
17	3.8	17.0	60.0	75.0	9.2	.70	.32	.12	.09	.05	.36	5.3
18	3.6	17.0	350	71.0	7.5	1.0	.24	.11	.09	.05	.58	4.0
19	3.5	16.0	150	67.0	7.4	1.6	.23	.13	.09	.05	4.8	2.7
20	10.0	16.0	90.0	51.0	5.6	1.4	.21	.11	.09	.05	6.6	1.4
21	125	15.0	70.0	37.0	6.0	1.5	.19	.13	.09	.05	1.1	1.0
22	67.0	15.0	60.0	54.0	5.9	1.7	.18	.14	.09	.05	.84	2.1
23	33.0	15.0	49.0	40.0	6.6	1.9	.21	.16	.09	.05	1.5	109
24	29.0	14.0	39.0	25.0	6.3	.90	.22	.17	.09	.06	1.4	116
25	23.0	14.0	34.0	20.0	5.5	.44	.21	.13	.09	.06	.61	121
26	19.0	14.0	48.0	15.0	3.9	.33	.19	.10	.08	.08	.69	92.0
27	17.0	13.0	43.0	12.0	8.2	.30	.17	.10	.08	.07	.51	75.0
28	17.0	13.0	36.0	8.7	9.1	.22	.21	.10	.08	.06	1.2	64.0
29	35.0		74.0	10.0	6.3	.28	.19	.08	.08	.05	9.4	58.0
30	18.0		63.0	9.6	3.0	.29	.14	.10	.08	.05	96.0	72.0
31	15.0		53.0		2.4		.14	.10	.08	.05		59.0
Sum	700.6	521.0	1,521.7	2,059.3	308.7	26.46	8.04	3.50	2.77	1.93	170.31	1,202.7

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
	Jan.			21	125	19	3.5	22.6	1,390	898	20,792	0
Feb.			11	77.0	6	11.0	18.6	1,033	4,173	143,486	0	
Mar.			18	350	16	9.0	49.1	3,018	4,500	72,313	0	
Apr.			4	186	28	8.7	68.6	4,085	2,634	51,060	0	
May			1	19.0	31	2.4	9.96	612	748	14,110	0	
June			1	2.0	28	.22	.88	52.5	242	6,803	0	
July			15	.42	130	.14	.26	15.9	89.3	3,350	0	
Aug.			4	.26	11	.06	.11	6.9	44.0	1,694	0	
Sept.			1	.10	126	.08	.09	5.5	27.4	831	0	
Oct.			1	.08	116	.05	.06	3.9	36.3	742	0	
Nov.			30	96.0	1	2	.04	5.68	338	80.5	865	0
Dec.			25	121	21	1.0	38.8	2,386	367	3,330	0	
Yearly				350		0.04	17.9	12,947	13,840	288,517	0	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
				9.91		0	0.51	15,970	17,071	355,880	0	

0 Mean daily                      1 And other days

## INFLOWS TO RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

**DESCRIPTION:** Rodriguez Dam is located in Mexico on Rio de las Palmas, the principal tributary to the Tijuana River, about 5.6 miles (9.0 km) upstream from its confluence with Cottonwood Creek, 10.6 miles (17.0 km) upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 9.9 miles (16.0 km) southeast of Tijuana, Baja California.

**RECORDS:** Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation, rainfall and including Emergency Deliveries of Colorado River Water to Tijuana beginning in August 1972. The Emergency Deliveries of Colorado River Water to Tijuana are made pursuant to Minute 240 of this Commission. Records obtained by the Ministry of Agriculture and Hydraulic Resources through May 1961; from June 1961 through March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano de Tijuana, Baja California, and from April 1966 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1982. Storage began in Rodriguez Reservoir on September 22, 1936.

**REMARKS:** Records of runoff represent all water reaching Rodriguez Reservoir, including rainfall on the reservoir water surface. Area-capacity-elevation rating for reservoir used in the computations is dated 1927 when the reservoir area was initially surveyed. Elevation of crest of spillway 380.08 feet (115.85 m) above mean sea level; at top of spillway gates 410.19 feet (125.00 m) above mean sea level. Reservoir capacity at spillway crest 74,885 acre-feet (92,370,000 m<sup>3</sup>); at top of spillway gates 111,880 acre-feet (138,000,000 m<sup>3</sup>).

**EXTREMES:** Maximum monthly inflow, 157,453 acre-feet (194,216,000 m<sup>3</sup>); February 1980; minimum, no flow during part of most years.

### Monthly Discharge in Acre-Feet

Month	Current Year 1982			Period 1938-1982		
	Natural Inflow	* Otay Aqueduct	Total	Average	Maximum	Minimum
January	885	0	885	2,150	54,820	0
February	2,521	0	2,521	5,952	157,453	5.8
March	12,050	0	12,050	8,302	68,321	4.2
April	4,212	0	4,212	3,069	77,790	0
May	519	0	519	592	11,460	0
June	10.7	0	10.7	166	4,661	0
July	0	0	0	102	1,464	0
August	0	0	0	63.1	770	0
September	16.9	0	16.9	60.3	466	0
October	67.2	0	67.2	70.2	344	0
November	422	0	422	165	1,940	0
December	7,689	0	7,689	929	15,686	8.4
Yearly	28,393	0	28,393	21,623	309,298	254
	Thousands of Cubic Meters					
	35,022	0	35,022	26,672	381,515	313

\* Inflow from the supply of water from Otay Aqueduct for the city of Tijuana

## DIVERSIONS FROM RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

**DESCRIPTION:** Sparling flow meter located immediately below the dam in the pipeline which carries water from Rodriguez Reservoir to Gate No. 1 (Poblado Presa) and to Gate No. 2 (City Aqueduct). Formerly, water for irrigation was also diverted to the North and South Canals.

**RECORDS:** Direct recording by Sparling flow meter. Records through May 1961 were obtained by the Ministry of Agriculture and Hydraulic Resources; from June 1961 to March 1966 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano de Tijuana; and from April 1966 through 1982 by the State of Baja California Commission of Public Services for Tijuana. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through 1982.

**REMARKS:** Beginning in January 1937, diversions for irrigation began from both sides for the Tijuana valley and for domestic use at the village by Rodriguez Dam and the city of Tijuana. Since February 1960, no water has been released for irrigation of farmlands.

**EXTREMES:** Maximum monthly diversion, 1,963 acre-feet (2,421,000 m<sup>3</sup>), July 1944; minimum, no flow March and April 1941, August 1960, and December 1962.

### Monthly Discharge in Acre-Feet

Month	Current Year 1982	Period 1938-1982		
		Average	Maximum	Minimum
January	854	250	854	1.5
February	827	266	1,132	.8
March	902	319	1,223	0
April	879	430	1,602	0
May	985	568	1,676	1.8
June	960	654	1,857	1.9
July	1,058	695	1,963	1.9
August	1,275	624	1,859	0
September	1,187	525	1,420	1.9
October	1,135	460	1,187	1.9
November	1,021	369	1,037	1.9
December	1,013	332	1,013	0
Yearly	12,097	5,492	15,317	29.3
	Thousands of Cubic Meters			
	14,921	6,774	18,893	36.2

**TIJUANA RIVER AT INTERNATIONAL BOUNDARY**

**DESCRIPTION:** Water-stage recorder on top of north levee about 0.7 mile (1.1 km) downstream (north) from boundary, 1.1 miles (1.8 km) upstream from the new Dairy Mart Road bridge, and 1.4 miles (2.3 km) west of the international gate at San Ysidro, California. Zero of the gage is 38.04 feet (11.59 m) above mean sea level, U. S. C. & G. S. datum.

**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 1982.

**EXTREMES:** Since May 1947: Maximum instantaneous discharge, 33,100 second-feet (937 m<sup>3</sup>/sec), February 21, 1980; minimum discharge, no flow during many years since 1951.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.3	13.0	11.2	153	10.4	2.1	1.4	1.6	1.4	0.4	1.4	24.4
2	13.7	11.5	10.0	162	9.4	2.4	2.4	1.1	4.1	.6	1.4	29.2
3	2.4	10.4	14.4	139	9.4	2.4	2.8	1.5	0	.8	1.1	9.5
4	1.9	10.8	13.1	177	11.0	1.6	2.0	.9	0	.9	1.1	3.1
5	3.4	10.8	11.9	158	11.0	1.6	1.4	.7	0	.8	.9	.6
6	1.8	8.0	9.4	109	8.5	1.6	.9	.5	.2	.8	.9	2.1
7	1.6	7.4	7.1	81.1	6.1	1.6	1.1	.3	.5	.9	.9	2.6
8	.7	13.1	7.1	76.1	5.6	1.6	1.1	.9	2.6	.8	1.1	2.6
9	.7	29.3	7.4	74.2	6.1	1.6	1.1	1.1	.8	.9	37.3	44.7
10	7.3	46.5	6.4	74.2	7.0	1.6	.7	.9	.8	.9	28.4	13.9
11	4.9	137	7.2	75.1	8.0	1.6	1.4	.9	.5	.9	2.4	11.5
12	1.6	93.5	29.9	76.1	8.0	1.6	2.0	1.6	.9	.6	1.7	9.6
13	1.2	46.7	66.9	74.2	8.0	2.0	.7	1.1	.5	.4	2.0	6.1
14	1.4	34.2	135	74.2	6.6	2.6	.7	1.1	.5	.5	2.0	5.0
15	1.4	28.4	171	74.2	5.6	2.8	.9	1.6	1.5	.5	1.7	3.5
16	1.6	24.7	101	71.2	4.8	2.4	1.1	1.1	2.3	1.6	1.5	3.5
17	1.4	24.7	279	67.3	4.4	2.6	1.1	.9	.8	2.0	1.1	4.0
18	1.2	23.0	909	65.3	4.4	2.4	1.1	.7	.8	.6	.8	4.0
19	.9	19.5	364	62.4	3.6	2.8	1.1	1.1	.9	.6	11.1	4.5
20	95.5	17.7	146	57.5	2.4	2.8	1.1	1.1	.8	.5	1.2	5.2
21	171	15.9	102	47.2	2.0	3.6	1.4	1.4	.4	.7	.9	5.0
22	96.6	15.0	80.9	48.5	2.8	3.7	.5	1.4	.8	.9	.5	8.7
23	39.2	15.0	70.4	43.4	1.6	2.8	.9	3.3	.8	1.1	.5	105
24	21.9	15.0	64.0	23.9	2.0	2.6	1.1	1.4	.4	1.2	.6	49.3
25	15.9	14.2	60.4	17.5	1.6	2.4	0	1.1	.6	1.1	.6	85.2
26	11.5	13.1	67.5	15.0	2.0	2.7	.9	.7	5.7	1.2	.6	73.3
27	9.4	12.3	65.1	13.2	2.4	2.8	1.3	.9	.8	1.4	.6	53.9
28	16.1	11.5	59.7	12.7	2.4	2.4	1.0	.9	.8	1.4	.8	44.2
29	31.2		87.8	12.1	2.4	2.4	1.4	1.1	.5	1.4	13.9	65.0
30	24.2		75.0	11.0	2.8	2.0	1.6	1.1	.5	1.4	68.8	64.2
31	15.9		63.6		2.0		1.6	1.1		1.4		59.3
<b>Sum</b>	610.8	722.2	3,103.4	2,145.6	164.3	69.1	37.8	35.1	31.3	29.2	187.8	802.7
<b>Current Year 1982</b>												
<b>Month</b>	<b>Extreme Gage Feet</b>		<b>Extreme Second-Feet</b>				<b>Average Second-Feet</b>	<b>Total Acre-Feet</b>	<b>Period 1947-1982</b>			
	<b>High</b>	<b>Low</b>	<b>Day</b>	<b>High</b>	<b>Day</b>	<b>Low</b>			<b>Average</b>	<b>Maximum</b>	<b>Minimum</b>	
Jan.	42.39	39.50	19	426	8	0.1	19.7				0	
Feb.	41.39	39.75	11	184	7	6.4	25.8	1,212	2,757	72,441	0	
Mar.	43.13	39.69	17	1,230	11	2.7	100	1,432	9,427	315,328	0	
Apr.	42.41	39.59	1	698	30	9.9	71.5	6,156	6,108	126,292	0	
May	39.63	39.38	5	12.1	120	1.1	.9	4,256	1,935	39,217	0	
June	39.58	39.37	22	9.4	7	.9	5.3	326	850	27,027	0	
July	39.48	39.33	12	4.8	120	0	2.3	137	264	8,144	0	
Aug.	39.97	39.37	23	30.7	17	0	1.2	75.0	120	3,360	0	
Sept.	40.26	39.45	26	18.6	13	0	1.1	69.6	80.8	1,720	0	
Oct.	39.66	39.46	17	3.5	14	.1	1.0	62.1	49.2	561	0	
Nov.	42.49	39.45	30	312	12	0	.9	57.9	55.0	320	0	
Dec.	42.50	39.47	23	329	15	0	6.3	372	135	1,084	0	
							25.9	1,592	329	2,725	0	
<b>Yearly</b>	43.13	39.33		1,230		0	21.8	15,748	22,110	595,739	0	
<b>Meters</b>												
<b>Cubic Meters per Second</b>												
<b>Thousands of Cubic Meters</b>												
	13.15	11.99		34.8		0	0.62	19,425	27,272	734,838	0	

! And other days

**STORED WATER IN RESERVOIRS, TIJUANA RIVER BASIN**

Data are presented below for all storage reservoirs in the Tijuana River Basin. The data represent contents on the last day of the month in acre-feet. The reservoir capacities indicated are total capacities at the top of the spillway gates in closed position on the controlled spillways of Barrett and Rodriguez Dams, and at spillway level for Morena Dam, which has had an uncontrolled spillway since the spillway gates were removed in 1942. The records of storage reported below for Morena, Barrett, and Rodriguez Reservoirs are based on the capacities as determined by the following surveys: Morena 1948; Barrett 1948, 1951, and 1955; and Rodriguez 1927, when the reservoir area was initially surveyed.

Records for Morena and Barrett Reservoirs are obtained and furnished by the city of San Diego and the U. S. Geological Survey. Records for Rodriguez Reservoir obtained and furnished by the State of Baja California Commission of Public Services for Tijuana.

**In Acre-Feet**

Month	MORENA RESERVOIR, CALIFORNIA (Capacity 50,210)		BARRETT RESERVOIR, CALIFORNIA (Capacity 44,760)		RODRIGUEZ RESERVOIR, BAJA CALIFORNIA (Capacity 111,880)		TOTAL IN TIJUANA RIVER BASIN RESERVOIRS (Capacity 206,850)	
	1982	Average 1937-1982	1982	Average 1937-1982	1982	Average 1937-1982	1982	Average 1937-1982
Jan.	43,544	15,770	31,058	11,742	59,647	31,168	134,249	58,680
Feb.	45,132	16,918	33,121	13,120	60,839	32,137	139,092	62,175
Mar.	49,046	18,170	37,124	15,155	71,357	36,485	157,527	69,810
Apr.	50,206	18,328	38,534	15,711	73,864	36,671	162,604	70,710
May	50,267	18,210	38,012	15,286	72,638	36,479	160,917	69,975
June	49,424	17,782	36,901	14,529	70,649	35,443	156,974	67,754
July	48,021	17,324	36,645	13,745	68,597	34,360	153,263	65,429
Aug.	46,955	16,892	35,386	12,971	66,371	33,328	148,712	63,191
Sept.	46,704	16,405	34,042	12,594	64,403	32,438	145,149	61,437
Oct.	45,019	16,124	33,016	12,192	62,554	31,673	140,589	59,989
Nov.	45,047	16,035	33,739	11,855	61,384	31,138	140,170	59,028
Dec.	49,288	16,201	38,093	12,159	67,548	31,441	154,929	59,801
Average	47,388	17,013	35,473	13,422	66,654	33,563	149,515	63,998
Maximum	50,267	! # 61,670	38,534	! # 45,920	73,864	! 109,608	162,604	! 213,600
Minimum	43,544	!! 10	31,058	!! 106	59,647	!! 0	134,249	!! 1,264

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

## RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall with averages for their periods of record at stations located in California and Baja California. Daily records, where available, are on file in the offices of the United States and Mexican Sections of the Commission. For location, elevation, period of record, and the observer, see alphabetical listing of these stations on page 78.

### In United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California		Sawday Ranch, California	
	1982	Average 1906-1982	1982	Average 1907-1982	1982	Average 1951-1982	1982	Average 1914-1982	1982	Average 1950-1982
Jan.	6.31	3.86	6.67	3.49	4.10	2.98	5.64	3.48	7.23	3.52
Feb.	3.52	3.77	2.14	3.43	1.30	2.20	2.41	3.65	3.44	2.92
Mar.	7.24	3.49	6.42	3.12	5.60	2.76	7.09	3.18	7.45	3.28
Apr.	.80	1.70	1.17	1.55	.50	1.30	.99	1.75	1.33	1.59
May	.24	.62	.17	.56	0	.40	.29	.62	0	.44
June	0	.13	.02	.07	0	.06	.03	.10	0	.05
July	.23	.34	0	.10	0	.03	.04	.19	.37	.46
Aug.	1.10	.51	.19	.21	0	.13	.22	.20	1.78	.70
Sept.	1.42	.39	.48	.25	0	.27	.69	.29	1.23	.42
Oct.	.24	.86	.12	.70	0	.40	.20	.72	.12	.51
Nov.	3.93	1.59	3.93	1.40	2.20	1.48	3.72	1.52	3.33	1.73
Dec.	3.97	3.15	5.04	2.81	2.00	2.08	4.84	3.03	6.04	2.46
Yearly	29.00	20.41	26.35	17.69	15.70	14.09	26.16	18.73	34.32	18.08

Month	Campo, California		Chula Vista, California		Lower Otay Dam, California		Brown Field, California			
	1982	Average 1900-1982	1982	Average 1930-1982	1982	Average 1906-1982	1982	Average 1964-1982		
Jan.	5.14	3.08	2.63	1.87	3.14	2.23	2.64	1.89		
Feb.	2.15	3.26	.53	1.67	.66	1.51	.73	1.37		
Mar.	4.30	2.79	3.87	1.65	4.01	2.14	3.68	2.07		
Apr.	.82	1.42	.78	.81	.62	1.06	.64	.99		
May	.12	.51	.05	.24	0	.31	.05	.23		
June	T	.06	.11	.05	.30	.07	.14	.07		
July	.33	.50	0	.02	0	.03	0	.05		
Aug.	.56	.48	.01	.09	0	.11	0	.13		
Sept.	.37	.34	.69	.18	.31	.21	.16	.16		
Oct.	.13	.62	.04	.40	.04	.33	.04	.31		
Nov.	4.42	1.37	2.84	1.06	1.98	1.29	2.40	1.47		
Dec.	3.44	2.47	1.00	1.57	2.47	1.45	1.51	1.62		
Yearly	21.78	16.90	12.55	9.61	13.53	10.74	11.99	10.36		

### In Mexico

Month	La Rumorosa, Baja California		Valle Redondo, Baja California		Tecate, Baja California		Tijuana, Baja California		Rodriguez Dam, Baja California	
	1982	Average 1945-1982	1982	Average 1971-1982	1982	Average 1946-1959 1961-1982	1982	Average 1948-1959 1961-1982	1982	Average 1938-1982
Jan.	1.69	0.94	3.70	2.95	4.57	2.76	2.36	1.85	2.20	1.65
Feb.	1.50	.55	1.10	2.44	1.69	1.81	.59	1.46	.63	1.42
Mar.	2.20	.55	4.09	2.64	6.30	2.40	3.43	1.57	3.39	1.57
Apr.	.39	.31	.55	.91	.59	1.06	.55	.67	.79	.75
May	T	.12	0	.35	.08	.31	T	.20	0	.16
June	0	.04	0	.04	.04	.12	.08	.04	.12	.04
July	.04	.28	0	.04	0	.08	0	.04	0	T
Aug.	1.87	.71	0	.16	.04	.16	.08	.04	0	.12
Sept.	1.89	.35	.31	.35	.39	.12	.16	.16	.20	.24
Oct.	0	.39	.08	.59	.16	.35	T	.28	.08	.31
Nov.	*	*	2.87	1.65	4.65	1.34	1.46	1.06	3.43	.94
Dec.	2.44	.75	2.09	1.46	1.97	2.01	1.18	1.26	1.14	1.46
Yearly	*	*	14.80	13.39	20.47	13.31	9.88	8.66	11.97	8.58

\* Missing record

T Trace

## RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

### In Mexico

Month	Valle de las Palmas, Baja California		P. B. Rosarito, Baja California		El Pinal, Baja California		San Juan de Dios, Baja California		El Hongo, Baja California	
	1982	Average 1948-1982	1982	Average 1967-1982	1982	Average 1964-1982	1982	Average 1956-1982	1982	Average 1980-1982
Jan.	2.40	1.73	2.05	2.09	6.26	3.31	5.08	2.68	4.72	2.72
Feb.	.67	1.26	.67	1.85	4.06	3.54	2.68	2.68	1.65	2.13
Mar.	3.43	1.42	4.49	1.89	6.46	3.62	5.20	2.36	4.96	4.25
Apr.	.35	.59	.28	.67	.94	1.69	.51	.91	.91	1.06
May	.12	.12	T	.31	.12	.47	.08	.28	.16	.39
June	0	.04	.04	.04	0	.04	0	.12	0	T
July	.12	.04	0	0	.83	.63	4.09	1.18	.87	.43
Aug.	.08	.12	0	.08	2.09	.71	4.96	1.02	.79	.51
Sept.	.39	.24	.55	.20	.94	.71	1.34	.59	.59	.24
Oct.	.20	.20	T	.35	.12	.39	.16	.59	.08	.16
Nov.	2.72	.83	3.43	1.06	5.87	2.01	6.46	1.50	3.98	1.85
Dec.	1.77	1.02	1.02	1.14	3.90	2.95	3.90	1.97	3.31	1.18
Yearly	12.24	7.76	12.52	9.33	31.57	20.04	34.45	17.28	22.01	15.91

Month	El Carrizo, Baja California		Belen, Baja California						
	1982	Average 1980-1982	1982	Average 1965-1982					
Jan.	3.70	2.44	5.12	2.80					
Feb.	.91	1.34	2.01	2.68					
Mar.	4.06	3.74	4.17	2.68					
Apr.	.63	.79	.43	1.14					
May	.04	.20	.08	.24					
June	.08	.04	0	.08					
July	0	T	.28	.20					
Aug.	T	T	.08	.24					
Sept.	.20	.08	.24	.43					
Oct.	.04	.12	.20	.47					
Nov.	3.35	1.46	4.41	1.61					
Dec.	1.42	1.10	3.35	2.09					
Yearly	14.41	11.81	20.35	14.92					

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 1982.

### In United States

NAME OF STATION	LATI-TUDE	LONGI-TUDE	8 ELEV. (FT.)	RECORD BEGAN	OBSERVER
Barrett Dam, California	32° 41'	116° 40'	1,623	1907	City of San Diego
Brown Field, California	32° 34'	116° 59'	5 15	1964	City of San Diego
Campo, California	32° 38'	116° 28'	2,630	1877	Archie C. Leach
Chula Vista, California	32° 36'	117° 06'	9	1930	Western Salt Company
Lower Otay Dam, California	32° 37'	116° 56'	540	1906	City of San Diego
Marron Valley, California	32° 34'	116° 46'	550	1951	County of San Diego
Morena Dam, California	32° 41'	116° 31'	3,075	1906	City of San Diego
Potrero, California	32° 37'	116° 36'	2,400	1914	County of San Diego
Sawday Ranch, California	32° 45'	116° 29'	3,200	1950	William Tulloch

### In Mexico

NAME OF STATION	LATI-TUDE	LONGI-TUDE	8 ELEV. (FT.)	RECORD BEGAN	OBSERVER
Belén, Baja California	32° 12'	116° 29'	1,821	1965	* S. A. R. H.
El Carrizo, Baja California	32° 29'	116° 42'	1,624	1980	S. A. R. H.
El Hongo, Baja California	32° 31'	116° 18'	3,150	1980	S. A. R. H.
El Pinal, Baja California	32° 11'	116° 17'	4,429	1964	S. A. R. H.
La Rumorosa, Baja California	32° 31'	116° 04'	4,042	1945	S. A. R. H.
P. B. Rosarito, Baja California	32° 18'	117° 02'	72	1967	S. A. R. H.
Rodriguez Dam, Baja California	32° 26'	116° 54'	394	1938	S. A. R. H.
San Juan de Dios, Baja California	31° 59'	116° 00'	4,199	1956	S. A. R. H.
Tecate, Baja California	32° 33'	116° 41'	1,575	1946	S. A. R. H.
Tijuana, Baja California	32° 31'	117° 02'	180	1948	S. A. R. H.
Valle de Las Palmas, Baja California	32° 23'	116° 40'	919	1948	S. A. R. H.
Valle Redondo, Baja California	32° 31'	116° 45'	794	1971	S. A. R. H.

8 Elevation above mean sea level

\* Estimated from topographic maps

\* Ministry of Agriculture and Hydraulic Resources

## EVAPORATION IN THE TIJUANA RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at four stations in California and at five stations in Baja California, with averages for their periods of record. The stations in California are observed by Western Salt Company, city of San Diego, California, and the United States Section of the Commission; those in Baja California are observed by the Ministry of Agriculture and Hydraulic Resources of Mexico. For specific location of these stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 78 in this bulletin.

### Types of pans used:

1. Barrett Reservoir: January 1921 through September 1926, square 3-foot by 3-foot by 18-inch deep floating pan. October 1926 through 1982, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

2. Chula Vista: Discontinued December 31, 1981.

3. Morena Reservoir: October 1915 through December 1921, square 3-foot by 3-foot by 18-inch deep floating pan. January 1922 through August 1926 records are the average of evaporation in a square 3-foot by 3-foot by 18-inch deep floating pan and a land pan of the same dimensions. September 1926 through 1982, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

4. Lower Otay Dam: January 1950 through 1982, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

### In United States

Month	Morena Dam, California		Barrett Dam, California		Lower Otay Dam, California			
	1982	Average 1916-1982	1982	Average 1921-1982	1982	Average 1950-1982		
Jan.	0.27	2.11	1.97	1.89	2.32	1.89		
Feb.	3.03	2.18	1.76	2.21	1.82	2.30		
Mar.	2.66	3.34	2.26	3.40	3.02	3.35		
Apr.	3.33	4.69	4.40	4.73	4.49	4.62		
May	7.26	6.55	5.08	6.68	4.73	6.04		
June	5.47	8.48	6.19	8.27	5.50	6.84		
July	6.27	9.75	8.44	9.83	8.26	8.37		
Aug.	7.28	9.05	7.71	9.23	7.44	7.88		
Sept.	4.13	7.20	5.90	7.52	5.47	6.46		
Oct.	3.62	5.07	4.74	5.29	5.20	4.73		
Nov.	1.04	3.32	2.08	3.31	2.28	2.84		
Dec.	.77	2.38	1.18	2.06	2.13	2.17		
Yearly	45.13	64.12	51.71	64.42	52.66	57.49		

### In Mexico

Month	Tijuana, Baja California		Rodriguez Dam, Baja California		Valle de las Palmas, Baja California		San Juan de Dios, Baja California		Valle Redondo, Baja California	
	1982	Average 1952-1959 1961-1982	1982	Average 1939-1942 1946-1982	1982	Average 1952-1982	1982	Average 1956-1982	1982	Average 1976-1982
Jan.	*	3.07	2.44	4.37	2.56	3.50	*	2.68	2.76	3.35
Feb.	*	3.43	2.56	4.61	2.91	3.50	3.27	2.83	2.76	3.15
Mar.	*	3.94	3.31	4.65	3.58	4.80	3.98	4.13	3.15	3.78
Apr.	*	4.84	5.59	5.67	5.63	6.26	5.47	5.00	5.87	5.51
May	*	5.75	4.84	4.92	6.46	7.48	5.63	6.65	*	6.69
June	*	5.83	5.08	7.76	7.56	9.21	7.52	8.07	7.13	9.88
July	*	6.77	7.60	8.74	10.83	10.71	8.62	8.98	10.91	10.47
Aug.	*	7.17	7.17	8.03	9.72	9.84	7.91	8.23	10.63	9.84
Sept.	*	5.83	5.87	6.77	7.36	8.35	4.61	7.48	7.64	7.17
Oct.	*	4.80	6.34	5.67	7.40	6.18	5.12	5.28	7.28	5.04
Nov.	*	3.54	3.27	4.65	3.50	4.41	2.87	3.74	3.39	3.70
Dec.	*	3.03	2.05	3.62	2.32	3.78	*	3.23	2.68	2.80
Yearly	*	57.13	56.10	69.88	69.84	77.56		60.71		73.46

\* No record

## TEMPERATURE IN THE TIJUANA RIVER BASIN IN DEGREES FAHRENHEIT

The maximum, minimum, and monthly average temperature observations for United States stations are from daily readings of thermometers generally exposed in a shelter located a few feet above sod-covered ground. The maximum and minimum temperatures shown for the stations in Mexico are from daily maximum and minimum thermometer observations, with maximum and minimum for their periods of record. For specific location, elevation, period of record, and the observer, refer to data opposite same station name as shown in "Location of Rainfall Stations," page 78 in this bulletin.

### In United States

Month	Barrett Dam, California				Campo, California				Chula Vista, California			
	1982			Average 1931- 1982	1982			Average 1951- 1982	1982			Average 1931- 1982
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	48.6	75	31	48.8	47.0	78	17	47.0	54.5	76	35	52.9
Feb.	53.1	80	35	50.6	51.0	80	28	48.3	58.6	84	41	54.2
Mar.	52.9	82	34	53.1	50.6	79	27	49.4	58.3	79	40	55.4
Apr.	57.3	83	37	57.6	54.8	82	31	53.2	60.2	81	44	58.0
May	61.4	88	42	62.5	59.4	89	31	58.2	63.3	75	53	60.7
June	64.2	92	42	68.4	61.8	93	33	65.1	63.9	73	55	63.2
July	74.8	100	50	76.1	72.1	101	39	73.2	68.6	85	54	66.9
Aug.	77.9	104	53	76.2	74.4	105	41	73.1	70.8	85	59	68.5
Sept.	73.8	108	45	72.3	68.8	107	33	68.9	70.6	92	50	67.3
Oct.	64.4	90	42	64.1	58.6	88	31	60.6	66.6	90	49	63.1
Nov.	53.6	82	32	55.8	50.2	78	26	52.6	59.8	85	42	58.1
Dec.	49.3	76	26	50.6	47.1	80	20	47.9	54.8	72	34	54.4
Yearly	60.9	108	26	61.3	58.0	107	17	58.1	62.5	92	34	60.2

Month	Potrero, California											
	1982			Average 1975- 1982								
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	47.8	79	26	50.9								
Feb.	52.4	84	30	52.0								
Mar.	51.2	82	28	51.2								
Apr.	56.1	90	32	55.7								
May	60.0	90	35	60.4								
June	63.4	92	40	70.2								
July	75.0	104	43	76.4								
Aug.	77.6	104	49	75.4								
Sept.	72.5	110	38	72.5								
Oct.	63.4	92	35	64.7								
Nov.	52.6	84	32	56.7								
Dec.	48.9	78	28	52.4								
Yearly	60.1	110	26	61.5								

### In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1982		1946-1982		1982		1946-1982		1982		1948-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	64	19	81	5	79	30	100	16	77	41	93	27
Feb.	61	30	82	10	81	32	100	18	84	43	102	32
Mar.	68	28	88	16	86	32	97	23	86	43	93	34
Apr.	72	30	91	23	86	36	100	28	86	43	97	34
May	79	37	97	27	90	41	100	36	90	46	100	43
June	86	45	113	34	90	39	106	32	82	55	108	41
July	86	45	104	39	106	45	115	36	95	50	120	46
Aug.	88	52	102	46	104	48	113	34	95	61	106	52
Sept.	91	39	104	34	109	41	115	36	104	50	120	46
Oct.	84	43	95	25	93	37	106	27	95	50	117	41
Nov.	*	*	95	14	81	34	97	27	82	43	108	34
Dec.	77	19	84	10	79	30	97	23	79	34	99	25
Yearly			113	5	109	30	115	16	104	34	120	25

\* No record

**TEMPERATURE IN THE TIJUANA RIVER BASIN  
IN DEGREES FAHRENHEIT**

**In Mexico**

Month	Rodriguez Dam, Baja California				Valle de las Palmas, Baja California				P. B. Rosarito, Baja California			
	1982		1938-1982		1982		1948-1982		1982		1967-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	75	37	90	27	77	28	91	12	77	45	93	36
Feb.	82	43	93	32	81	30	99	23	*	*	90	36
Mar.	86	41	90	32	86	34	100	28	81	37	90	34
Apr.	86	43	93	36	88	36	104	32	81	36	88	36
May	88	41	100	37	91	45	108	36	75	48	104	43
June	82	54	108	46	95	45	118	39	70	52	104	43
July	93	50	104	46	106	48	120	45	77	52	90	50
Aug.	97	59	106	50	108	46	111	41	79	57	91	50
Sept.	102	52	109	48	113	43	117	43	82	52	108	48
Oct.	93	48	108	34	95	37	109	32	88	50	100	43
Nov.	86	43	99	30	82	36	100	19	86	45	97	32
Dec.	75	36	93	27	73	30	95	21	73	37	90	36
Yearly	102	36	109	27	113	28	120	12			108	32

Month	El Pinal, Baja California				San Juan de Dios, Baja California				Valle Redondo, Baja California			
	1982		1964-1982		1982		1956-1982		1982		1974-1982	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	68	23	77	3	72	21	88	3	75	34	90	21
Feb.	66	23	81	14	70	21	84	16	82	47	95	23
Mar.	84	23	84	19	72	21	84	14	82	36	90	27
Apr.	84	28	84	18	79	25	102	19	88	39	95	32
May	77	30	90	25	84	28	91	19	90	46	102	39
June	82	25	99	25	88	27	106	27	88	46	113	41
July	90	39	102	32	93	36	120	36	104	48	111	48
Aug.	100	36	104	32	91	45	106	32	102	55	111	48
Sept.	91	34	102	25	95	30	106	25	109	39	115	39
Oct.	77	36	95	23	81	28	100	18	95	45	115	39
Nov.	70	25	88	14	75	25	99	12	82	39	97	28
Dec.	72	23	79	10	72	23	88	12	77	32	91	30
Yearly	100	23	104	3	95	21	120	3	109	32	115	21

Month	El Hongo, Baja California				El Carrizo, Baja California							
	1982		1980-1982		1982		1980-1982					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
Jan.	70	28	70	28	75	34	79	34				
Feb.	70	34	75	25	77	39	88	39				
Mar.	72	30	73	30	82	39	82	39				
Apr.	79	36	86	34	82	43	90	41				
May	90	36	90	36	88	46	93	43				
June	90	39	100	39	84	48	106	48				
July	97	45	99	45	100	54	102	52				
Aug.	93	50	102	50	100	54	102	52				
Sept.	91	37	93	37	106	48	106	48				
Oct.	82	37	82	36	91	46	97	43				
Nov.	66	37	82	34	86	43	91	41				
Dec.	75	27	75	27	73	36	86	36				
Yearly	97	27	102	25	106	34	106	34				

\* Missing data

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

**1982**

The total area within the Tijuana River basin is 1,731 square miles, as determined from the best available maps from both the United States and Mexico. The drainage areas shown below are tabulated according to their downstream sequence.

The irrigated areas, tabulated in downstream sequence, are from the most reliable sources available. Those in the United States were furnished by the Tijuana River Valley Association or estimated from aerial photographs. Those in Mexico were furnished by the Ministry of Agriculture and Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana River basin in 1982 was by pumping from ground water.

Designation of Areas	Drainage Basin-Square Miles			Irrigated Areas-Acres		
	United States	Mexico	Total	United States	Mexico	Total
Cottonwood Creek above Morena Dam	114	0	114	0	0	0
Morena Dam to Barrett Dam above Barrett Dam	133	0	133	0	0	0
below Barrett Dam and above Tecate Creek	247	0	247	0	0	0
above Tecate Creek	65	0	65	0	0	0
	312	0	312	0	0	0
Campo Creek above International Boundary	82	4	86	0	0	0
Tecate Creek above International Boundary (not including Campo Creek)	19	64	83	0	0	0
Cottonwood Creek above International Boundary Station	413	68	481	100	0	100
Rio de las Palmas above Rodriguez Dam	7	981	988	0	(a) 0	0
Tijuana River above Nestor Gaging Station	458	1,266	1,724			
above the Mouth	462	1,269	1,731	400	(b) 0	400

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

(b) There was no irrigation in 1982 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir.



### WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

**DESCRIPTION:** Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 450 feet (137 m) upstream from the Southern Pacific Railroad bridge, 1.5 miles (2.4 km) upstream from the international boundary, and 2 miles (3.2 km) west of Douglas, Arizona. Zero of gage is 3,909.14 feet (1,191.51 m) above mean sea level, U. S. C. & G. S. datum of 1929. Location April 26, 1972 to April 10, 1974 was 200 feet (61.0 m) upstream from bridge. Datum 4.40 feet (1.34 m) higher.

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Computations by shifting control methods. Records obtained and furnished by the U.S. Geological Survey to September 30, 1982; October 1 to December 31, 1982 by the U. S. Section of the Commission. Records poor. Records available: August to October 1911 (gage heights and discharge measurements only), July to October 1912, January to June 1913, October 1913, December 1913 to June 1914, February to June 1915, October 1915 to September 1919, October 1919 to April 1922 (gage heights and discharge measurements only), June 1930 to December 1933, May 1935 to July 1947, October 1947 through 1982 (July 1954 to March 1955, monthly discharge only).

**REMARKS:** Diversions above this station are mainly by pumping from ground water for irrigation. Records show flow at the international boundary into Mexico except for some sneater waste water entering the stream a short distance below this station.

**EXTREMES:** Prior to 1936: Maximum recorded discharge, 3,450 second-feet (97.7 m<sup>3</sup>/sec) August 10, 1931 (gage height 12.15 feet (3.70 m); maximum estimated discharge, 4,050 second-feet (115 m<sup>3</sup>/sec) July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 5,060 second-feet (143 m<sup>3</sup>/sec) August 7, 1955; maximum gage height 16.55 feet (5.04 m) July 29, 1966; minimum daily discharge, no flow at times during most years.

#### Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0.96	1.1	0	0	4.0
2	0	0	0	0	0	0	0	.90	.02	0	0	2.7
3	0	0	0	0	0	0	0	.38	0	0	0	.2
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	.78	0	0	0	0
6	0	0	0	0	0	0	4.0	21	0	0	0	0
7	0	0	0	0	0	0	2.3	2.7	0	0	0	0
8	0	0	0	0	0	0	0	.05	0	0	0	0
9	0	0	0	0	0	0	0	3.3	0	0	0	0
10	0	0	0	0	0	0	0	2.1	17	0	0	37.5
11	0	0	0	0	0	0	0	.03	187	0	0	25.5
12	0	0	0	0	0	0	0	0	218	0	0	.2
13	0	0	0	0	0	0	0	2.6	48	0	0	0
14	0	0	0	0	0	0	0	.02	5.4	1.6	0	0
15	0	0	0	0	0	0	0	.01	.17	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	.2
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	15	0	0	0	0	0
23	0	0	0	0	0	0	2.9	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	12	0	0	0	0	0
27	0	0	0	0	0	0	26	0	0	0	0	0
28	0	0	0	0	0	0	1.8	0	0	0	0	0
29	0	0	0	0	0	0	2.7	0	0	0	0	0
30	0	0	0	0	0	0	.04	211	0	0	0	0
31	0	0	0	0	0	0	.17	38	0	0	0	0
Sum	0	0	0	0	0	0	66.93	289.21	472.89	0	0	70.3

Month	Current Year 1982						Period 1936-1982			
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Low			Average	Maximum	Minimum
Jan.						0	0	37.5	451	0
Feb.						0	0	18.4	132	0
Mar.						0	0	26.7	295	0
Apr.						0	0	18.3	173	0
May						0	0	13.4	138	0
June						0	0	117	1,590	0
July	5.91		26	75	1 1	2.16	133	1,973	8,110	0
Aug.	8.19		30	542	1 4	9.33	574	2,949	14,480	0
Sept.	8.09		12	514	1 3	15.8	938	698	3,170	0
Oct.						0	0	287	6,103	0
Nov.						0	0	34.5	352	0
Dec.	6.57		11	110	1 4	2.3	139	114	2,363	0
Yearly	8.19			542		2.5	1,784	6,287	22,321	235
	Meters		Cubic Meters per Second			Thousands of Cubic Meters				
	2.50		15.3			0 0.07 2,201 7,755 27,533 290				

1 And other days

## SEWAGE INFLUENT, DOUGLAS, ARIZONA INTERNATIONAL TREATMENT PLANT

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

**RECORDS:** Continuous monthly records since March 1948; daily records from March 18, 1948 through 1950 and from January 1952 through 1982.

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

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year			Period 1952-1982		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	33.740	0	33.740	1.867	0.823	1.089	1.867	0.416	1.061
Feb.	29.830	0	29.830	1.390	.934	1.065	1.784	.543	1.065
Mar.	37.584	0	37.584	1.362	1.101	1.212	1.598	.590	1.065
Apr.	35.986	0	35.986	1.522	.884	1.200	2.047	.380	1.066
May	37.972	0	37.972	1.455	.941	1.224	1.850	.510	1.072
June	38.702	0	38.702	1.454	.954	1.290	2.060	.555	1.132
July	41.538	0	41.538	1.783	.940	1.339	3.209	.483	1.188
Aug.	36.441	0	36.441	1.443	.791	1.175	2.681	.365	1.208
Sept.	33.948	0	33.948	1.604	.688	1.132	1.884	.470	1.157
Oct.	42.487	0	42.487	1.654	1.119	1.370	1.770	.603	1.115
Nov.	39.129	0	39.129	1.422	1.205	1.304	1.586	.587	1.089
Dec.	41.183	0	41.183	1.556	1.052	1.328	3.330	.500	1.087
<b>Yearly</b>	<b>448.540</b>	<b>0</b>	<b>448.540</b>	<b>1.867</b>	<b>0.688</b>	<b>1.227</b>	<b>3.330</b>	<b>0.365</b>	<b>1.109</b>

**SEWAGE INFLUENT, AGUA PRIETA, SONORA  
INTERNATIONAL OXIDATION PONDS**

DESCRIPTION: Parshall flume equipped with staff gage in influent line to oxidation ponds. Since April 8, 1968, all sewage from Agua Prieta, Sonora has been diverted to oxidation ponds, which are located in Mexico; if necessary, sewage from Douglas, Arizona may be included, but this has never been done.

RECORDS: Discharges are computed from daily 11:00 a.m. readings of the staff gage by applying an index for that hour, determined from 7 days of hourly measurements from which the relationship between mean daily readings and 11:00 a.m. readings was developed. Records available: Mean daily flows from April 8, 1968 through 1982.

REMARKS: The construction of the international oxidation ponds in Agua Prieta, Sonora was completed in April 1968 by the government of Mexico, fulfilling an international agreement to solve the problem of insufficient capacity at the international treatment plant in Douglas, where the combined flows from Douglas and Agua Prieta were treated. If necessary, sewage from Agua Prieta may be treated in this plant, but since the completion of the oxidation ponds, this has never been done. The ponds are located 1.6 miles (2.6 km) south of international monument 85a.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1982			Period 1968-1982		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	0	17.247	17.247	0.630	0.436	0.561	0.640	0.394	0.510
Feb.	0	16.062	16.062	.630	.436	.574	.726	.394	.518
Mar.	0	17.828	17.828	.630	.436	.575	.666	.394	.507
Apr.	0	17.689	17.689	.630	.436	.590	.666	.394	.514
May	0	18.186	18.186	.630	.436	.587	.666	.394	.531
June	0	17.566	17.566	.630	.436	.586	.630	.394	.536
July	0	18.196	18.196	.630	.436	.587	.691	.259	.532
Aug.	0	17.880	17.880	.630	.436	.577	.967	0	.519
Sept.	0	17.505	17.505	.630	.436	.584	.630	0	.540
Oct.	0	18.309	18.309	.630	.436	.591	.630	0	.509
Nov.	0	18.189	18.189	.630	.436	.606	.717	.394	.528
Dec.	0	18.380	18.380	.630	.436	.593	.709	.394	.519
<b>Yearly</b>	0	213.037	213.037	0.630	0.436	0.584	0.967	0	0.522

**SAN PEDRO RIVER AT PALOMINAS, ARIZONA**

**DESCRIPTION:** Water-stage recorder located near left bank on downstream side of the bridge pier at Highway 92, 0.7 mile (1.1 km) east of Palominas, 2.5 miles (4.0 km) upstream from Green Brush Draw, 4.5 miles (7.2 km) downstream from international boundary, and 12 miles (19 km) southwest of Bisbee, Arizona. Zero of gage is 4,187.62 feet (1,276.39 m) above mean sea level (State Highway bench mark).

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Records available: May 1930 to October 1933, May 1935 to July 1941, and July 1950 through 1982. Records obtained and furnished by the United States Section of the Commission.

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

**EXTREMES:** Maximum daily discharge, 22,000 second-feet (623 m<sup>3</sup>/sec) on August 14, 1940 (gage height 16.16 feet (4.93 m) present datum), from rating curve extended above 5,600 second-feet (159 m<sup>3</sup>/sec) on basis of slope-area measurement of peak flow; no flow at times in most summers. Greatest flood known occurred on September 28, 1926 (gage height, about 23.9 feet (7.28 m) present datum, from flood marks; discharge not determined).

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1	2.3	1.4	1.9	0.2	77.8	0	0	1.9	3.9	0	0	14.7		
2	2.3	1.3	1.5	.3	36.0	0	0	1.2	4.9	0	0	48.2		
3	2.3	1.3	1.4	.7	2.0	0	0	1.2	6.2	0	0	10.5		
4	2.3	1.2	1.4	.8	.2	.5	0	1.0	6.2	0	0	1.8		
5	2.3	1.2	1.3	.8	.1	.8	0	1.0	5.1	0	0	.1		
6	2.3	1.0	1.3	.8	.1	.6	0	48.1	4.7	0	0	0		
7	2.2	1.1	1.3	.8	.1	0	0	32.4	4.7	0	0	0		
8	1.5	1.2	1.7	1.2	.1	0	0	142	8.9	0	0	0		
9	1.4	1.4	2.1	1.7	.1	0	0	84.7	15.8	0	0	7.1		
10	1.2	1.5	2.6	1.4	.1	0	0	.2	1,110	0	0	432		
11	1.4	1.5	1.7	.6	.2	0	0	32.6	495	0	0	219		
12	2.2	1.5	1.6	.6	.1	0	0	162	509	0	0	105		
13	2.9	1.7	1.5	.9	.1	0	0	.3	126	0	0	36.6		
14	3.0	1.9	1.1	.8	.1	0	0	0	35.5	0	0	18.4		
15	2.6	1.9	1.0	1.2	.1	0	0	0	16.8	0	.5	13.6		
16	2.2	1.9	1.2	1.4	.1	0	0	0	6.8	0	.6	11.2		
17	2.0	1.9	1.2	.4	.1	0	0	0	3.5	0	.6	9.4		
18	2.2	2.1	.9	0	.1	0	0	0	1.4	0	.6	8.8		
19	2.0	2.0	.9	0	.1	0	0	0	38.8	1.4	0	8.1		
20	1.3	2.0	1.2	0	.1	0	0	126	1.0	0	.8	7.4		
21	1.3	2.0	1.3	0	.1	0	0	90.3	1.0	0	.8	7.4		
22	1.4	2.3	2.1	0	.1	0	38.1	19.4	.9	0	.8	7.4		
23	1.4	2.3	2.1	0	.1	0	.6	2.9	.8	0	.8	9.0		
24	1.5	2.3	2.5	0	0	0	79.6	1.9	.8	0	.9	7.9		
25	1.7	2.3	1.7	.1	0	0	197	1.5	.8	0	1.0	7.4		
26	1.8	2.3	.9	.1	.6	0	69.3	1.2	.8	0	1.0	7.4		
27	1.6	2.3	.6	0	.3	0	54.3	39.6	.5	0	1.2	7.2		
28	1.5	2.3	.4	0	0	0	56.6	53.7	.3	0	1.4	6.2		
29	1.2	.3	0	0	0	0	9.7	16.0	0	0	1.5	5.5		
30	1.2	.3	.4	0	0	0	4.3	310	0	0	1.8	5.1		
31	1.3	.3	0	0	0	0	1.9	39.0	0	0	0	8.7		
Sum	57.8	49.1	41.3	15.2	118.9	1.9	511.4	1,248.9	2,372.7	0	15.1	1,031.1		
<b>Current Year 1982</b>												<b>Period 1951-1982</b>		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet					
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum			
Jan.	4.03	3.84	15	3.5	29	1.0	1.9	115	1,400	27,763	2.6			
Feb.	3.98	3.83	18	2.3	12	.9	1.8	97.4	529	4,080	3.0			
Mar.	4.07	3.73	10	3.5	31	.2	1.3	81.9	497	4,659	13.3			
Apr.	4.03		9	2.3	117	0	.5	30.1	120	871	0			
May	7.89		1	835	124	0	3.8	236	50.6	285	0			
June	3.60		4	1.5	11	0	.1	3.8	170	1,391	0			
July	7.20		24	1,450	11	0	16.5	1,014	5,704	17,238	184			
Aug.	6.22		30	790	113	0	40.3	2,477	8,451	36,369	165			
Sept.	9.94		10	4,380	128	0	79.1	4,706	1,746	16,344	11.3			
Oct.						0	0	0	1,708	47,322	0			
Nov.	3.92		30	2.7	11	0	.5	30.0	228	2,563	0			
Dec.	6.49		10	915	15	0	33.3	2,045	1,496	25,479	6.2			
Yearly	9.94			4,380		0	15.0	10,836	22,100	62,788	4,400			
	<b>Meters</b>		<b>Cubic Meters per Second</b>				<b>Thousands of Cubic Meters</b>							
	3.03			124		0	0.42	13,366	27,260	77,448	5,427			

! And other days

## SANTA CRUZ RIVER NEAR LOCHIEL, ARIZONA

**DESCRIPTION:** Water-stage recorder located in the United States near left bank on the downstream side of concrete bridge pier of county highway bridge, 2.5 miles (4.0 km) northeast of Lochiel, Arizona, and 1.7 miles (2.7 km) upstream from the international land boundary. The elevation of the zero of the gage has not been determined, but topographic maps indicate the elevation of the stream bed at the gage is about 4,620 feet (1,408 m).

**RECORDS:** Based on current meter measurements or observations of no flow during the year. Records obtained and furnished by the U. S. Geological Survey. Records available: January 1949 through 1982.

**REMARKS:** There are small diversions by ground water pumping for irrigating about 200 acres (80.9 ha) above this station.

**EXTREMES:** Maximum discharge, 12,300 second-feet (348 m<sup>3</sup>/sec) on October 9, 1977 (gage height 10.21 feet) (3.11 m); minimum discharge, no flow for several days of each year.

## Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.35	0.33	0.34	0.20	0.10	0	0	0.20	0.26	0.17	0.22	0.43
2	.35	.33	.35	.19	.11	0	0	.19	.29	.17	.22	.30
3	.36	.35	.32	.19	.10	0	0	.18	.28	.16	.20	.28
4	.34	.35	.32	.19	.11	0	0	.18	.28	.16	.20	.28
5	.35	.35	.31	.18	.12	0	0	.19	.27	.16	.20	.26
6	.38	.35	.31	.19	.12	0	.06	.21	.26	.16	.22	.26
7	.35	.35	.30	.17	.11	0	0	.19	.29	.16	.22	.26
8	.35	.35	.29	.16	.11	0	0	.21	.57	.17	.22	.26
9	.35	.35	.29	.16	.10	0	0	.21	1.0	.18	.28	.28
10	.35	.35	.30	.17	.10	0	0	.19	2.8	.18	.24	.52
11	.38	.38	.29	.15	.09	0	0	28.0	.90	.19	.24	.28
12	.41	.36	.27	.16	.09	0	0	3.0	20.0	.18	.24	.26
13	.41	.35	.35	.17	.09	0	0	.20	.64	.18	.24	.26
14	.35	.35	.28	.17	.10	0	0	.18	.40	.18	.24	.26
15	.35	.35	.29	.16	.10	0	.09	22.0	.37	.18	.24	.26
16	.33	.35	.28	.15	.10	0	0	.97	.34	.19	.24	.26
17	.33	.38	.29	.16	.10	0	0	.24	.34	.19	.26	.26
18	.35	.38	.30	.15	.10	0	0	.23	.31	.18	.26	.24
19	.35	.37	.28	.13	.10	0	0	.22	.29	.18	.24	.24
20	.35	.37	.29	.09	.11	0	0	51.0	.28	.17	.24	.24
21	.33	.37	.30	.06	.10	0	11.0	6.1	.26	.16	.24	.24
22	.35	.37	.31	.05	.10	0	3.7	.29	.27	.16	.24	.26
23	.33	.37	.33	.06	.08	0	.10	.26	.27	.18	.24	.28
24	.35	.37	.27	.07	.07	0	.06	.29	.25	.17	.24	.26
25	.35	.38	.24	.05	.05	0	.06	.26	.26	.18	.26	.26
26	.35	.34	.24	.06	.03	0	4.9	.23	.26	.19	.26	.26
27	.32	.33	.23	.06	.01	0	.12	.24	.27	.20	.26	.26
28	.32	.33	.22	.06	.01	0	4.9	.56	.28	.20	.26	.26
29	.34	.19	.08	.01	0	0	.19	3.7	.27	.21	.26	.26
30	.33	.18	.09	0	0	0	48.0	.36	.24	.21	.26	.28
31	.33	.19		0	0	0	3.1	.27		.21		.35
Sum	10.84	9.96	8.75	3.93	2.52	0	76.28	372.55	32.80	5.56	7.18	8.66
Current Year 1982										Period 1949-1982		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Low	Average			Maximum	Minimum		
Jan.	2.85	2.72	12	0.64	27	0.30	0.35	21.5	128	2,895	1.3	
Feb.	2.75	2.72	11	.41	7	.33	.36	19.8	52.7	437	1.8	
Mar.	2.81	2.69	13	.52	30	.16	.28	17.4	46.4	396	.7	
Apr.	2.73	2.64	2	.21	21	.05	.13	7.8	28.9	262	0	
May	2.73		6	.14	31	0	.08	5.0	13.1	128	0	
June				0		0	0	0	14.2	169	0	
July	5.20		30	670	1	0	2.46	151	522	4,270	1.6	
Aug.	7.40	2.67	11	2,640	2	.16	12.02	739	859	10,120	.08	
Sept.	4.00	2.85	12	127	30	.15	1.09	65.1	269	2,634	0	
Oct.	2.95	2.85	30	.22	3	.15	.18	11.0	212	4,732	0	
Nov.	3.08	2.94	30	.49	3	.19	.24	14.2	46.2	273	0	
Dec.	3.27	2.99	1	1.4	7	.24	.28	17.2	93.0	1,093	0	
Yearly	7.40			2,640		0	1.48	1,069	2,284	12,633	126	
	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	2.26			74.8		0	0.04	1,319	2,817	15,583	155	

! And other days

**SANTA CRUZ RIVER NEAR NOGALES, ARIZONA**

**DESCRIPTION:** Water-stage recorder, cable with sit-down cable car located 5.5 miles (8.9 km) east of Nogales, Arizona, 0.8 mile (1.3 km) downstream from the international boundary and 6 miles (9.7 km) upstream from the Santa Cruz bridge on State Highway No. 82. Zero of gage is 3,702.54 feet (1,128.53 m) above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

**RECORDS:** Based on current meter measurements or observation of no flow during the year. Records obtained and furnished by the U. S. Geological Survey. 1982 records fair. Records available: March to November 1907 and April 1909 to December 1912 (discharge measurements and fragmentary gage height record); January 1913 to June 1922 (October 1915 to September 1916, monthly discharges only); May 1930 to December 1933; and July 1935 through 1982.

**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 1982.

**EXTREMES:** Maximum discharge, 33,500 second-feet (949 m<sup>3</sup>/sec) on October 9, 1977 (gage height 15.5 feet) (4.72 m); minimum discharge, no flow for several days of many years.

**Mean Daily Discharge in Second-Feet 1982 — Annual and Period Summary**

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.2	1.2	0.83	0.35	0	0	0	1.8	20	0	0	0
2	1.4	.93	.83	.42	0	0	0	1.6	15	0	0	1.8
3	1.6	.98	.83	.38	0	0	0	1.0	17	0	0	2.4
4	1.7	.99	.83	.35	0	0	0	1.0	2.0	0	0	1.7
5	1.9	.85	.70	.35	0	0	0	.50	2.0	0	0	2.7
6	2.2	.82	.70	.26	0	0	0	.50	1.0	0	0	3.3
7	2.0	.88	.76	.28	0	0	0	.50	1.0	0	0	2.4
8	2.0	.88	.67	.34	0	0	0	0	1.0	0	0	2.7
9	2.0	.94	.60	.28	0	0	0	0	1.0	0	0	1.97
10	2.1	1.1	.60	.40	0	0	0	0	35	0	0	1,080
11	2.2	1.0	.63	.42	0	0	0	23	89	0	0	279
12	2.4	1.2	.67	.45	0	0	0	73	111	0	0	149
13	3.0	1.7	.89	.31	0	0	0	5.0	56	0	0	117
14	2.4	1.6	.79	.21	0	0	0	2.0	37	0	0	92
15	2.3	1.1	.74	.34	0	0	0	22	25	0	0	68
16	2.1	.82	.70	.40	0	0	0	5.0	5.0	0	0	56
17	1.8	.75	.56	.49	0	0	0	2.0	2.5	0	0	46
18	1.6	.73	.47	.46	0	0	0	1.0	1.5	0	0	37
19	1.5	.81	.47	.26	0	0	6.5	2.5	1.0	0	0	33
20	1.6	1.1	.47	.10	0	0	0	12	.50	0	0	29
21	1.6	.82	.49	0	0	0	1.6	91	.40	0	0	25
22	1.8	.70	.47	0	0	0	0	42	.30	0	0	24
23	1.5	.70	.41	0	0	0	0	23	.30	0	0	24
24	1.4	.70	.37	0	0	0	0	3.9	.30	0	0	44
25	1.2	.68	.35	0	0	0	3.4	2.3	.30	0	0	32
26	.99	.69	.42	0	0	0	23	1.6	.20	0	0	27
27	.88	.70	.49	0	0	0	.63	5.2	.20	0	0	25
28	.93	.70	.46	0	0	0	28	17	.10	0	0	24
29	1.1	.42	0	0	0	0	2.0	79	.20	0	0	21
30	1.3	.42	0	0	0	0	2.0	38	.10	0	0	22
31	1.2	.39	.39	0	0	0	4.6	31	0	0	0	30
Sum	52.90	26.07	18.43	6.85	0	0	71.73	488.40	425.90	0	0	2,498.0
<b>Current Year 1982</b>												
<b>Period 1936-1982</b>												
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	3.72	3.58	12	4.1	26	0.88	1.71	105	1,634	30,282	0	
Feb.	3.63	3.53	13	1.8	18	.42	.93	51.7	1,041	11,129	0	
Mar.	3.59	3.53	13	1.1	23	.35	.59	36.6	1,036	12,454	0	
Apr.	3.53		112	.49	121	0	.23	13.6	283	2,301	0	
May				0	0	0	0	0	82.8	897	0	
June				0	0	0	0	0	60.9	1,020	0	
July	5.21		26	357	1	1	0	2.3	142	2,690	45	
Aug.	5.33		29	550	1	8	0	15.8	969	5,551	91	
Sept.	5.03		28	344	28	.1	0	14.2	845	7,507	0	
Oct.				0	0	0	0	0	0	1,592	59,025	0
Nov.				0	0	0	0	0	0	437	7,384	0
Dec.	6.79		10	2,340	1	1	0	80.6	4,955	2,314	33,568	0
Yearly	6.79			2,340		0	9.83	7,118	18,038	66,030	2,234	
Yearly	Meters		Cubic Meters per Second				Thousands of Cubic Meters					
	2.07			66.3		0	0.28	8,780	22,250	81,447	2,756	

1 And other days

## SEWAGE INFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Three 24-inch (61.0 cm) Parshall flumes, each with a recording flow meter and continuous totalizer, one located at the international boundary for measuring effluent from Nogales, Sonora, one located in the influent line to the treatment plant, and one on the plant effluent line. Nogales International Treatment Plant is located approximately 6 miles (9.7 km) north of the international boundary.

RECORDS: Flows from the United States are deduced from total plant influent less the flows measured crossing the international boundary from Mexico. Records available: Continuous monthly record for plant influent since August 1951, daily records for plant influent, January 1952 through 1982.

REMARKS: Prior to December 18, 1971 the plant was located along the right bank of Nogales Wash, approximately two miles (3.2 km) north of the international boundary. Nogales International Treatment Plant treats combined sewage from Nogales, Arizona and Nogales, Sonora by means of aerated stabilization lagoons. Chlorination of plant effluent, which may be used for irrigation of lands lying north of the plant, is carried out by the United States at its expense.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1982			Period 1952-1982		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	99.126	107.813	206.939	7.253	6.226	6.675	7.942	0.650	3.129
Feb.	85.223	99.457	184.680	6.946	6.301	6.596	7.031	.650	3.173
Mar.	87.485	109.434	196.919	7.177	5.884	6.352	7.922	.750	3.172
Apr.	85.678	90.586	176.264	6.295	5.458	5.875	6.369	.700	3.038
May	78.012	88.835	166.847	5.728	4.669	5.382	6.811	.550	2.911
June	82.134	73.179	155.313	5.770	4.659	5.177	5.804	.700	2.764
July	83.116	81.196	164.312	7.438	4.480	5.300	7.438	.700	2.870
Aug.	88.763	95.779	184.542	6.992	5.224	5.953	8.315	.750	3.188
Sept.	82.714	98.144	180.858	6.588	5.318	6.029	8.579	.800	3.433
Oct.	87.417	93.446	180.863	6.112	5.378	5.834	9.807	.700	3.347
Nov.	83.370	100.211	183.581	7.066	5.487	6.119	10.235	.800	3.255
Dec.	81.211	137.679	218.890	10.564	6.108	7.061	11.478	.350	3.252
Yearly	1,024.249	1,175.759	2,200.008	10.564	4.480	6.029	11.478	0.350	3.128

## RAINFALL ON THE SANTA CRUZ RIVER WATERSHED IN INCHES

Tabulated below are the monthly records of rainfall with averages for their periods of record at stations located in Arizona. Two stations are operated and maintained by the United States Section of the Commission and three 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 United States

Month	San Rafael #2, Arizona		Canelo, Arizona		Patagonia, Arizona		Nogales, Arizona		Nogales Sanitation Plant 6N, Arizona	
	1982	Average 1973-1982	1982	Average 1930-1982	1982	Average 1930-1982	1982	Average 1914-1982	1982	Average 1953-1982
Jan.	1.30	1.42	1.56	1.18	1.42	1.23	0.88	1.05	1.03	1.07
Feb.	.45	1.23	.29	1.05	.35	1.05	.13	.85	.17	.71
Mar.	.52	1.05	.85	.83	.70	.92	.53	.81	.82	.87
Apr.	0	.34	.11	.34	0	.32	.04	.28	.05	.18
May	0	.12	.36	.14	.18	.18	.14	.16	.23	.21
June	0	.36	.02	.79	.04	.50	.02	.45	.19	.38
July	5.62	5.54	2.55	4.18	2.41	4.40	3.08	4.28	3.12	4.67
Aug.	6.18	2.84	5.37	4.18	4.52	3.91	2.99	3.83	5.47	3.85
Sept.	2.05	2.07	2.00	1.71	1.77	1.79	1.22	1.64	1.72	1.57
Oct.	0	1.35	0	.95	0	1.01	0	.89	0	1.24
Nov.	1.05	.85	1.37	.77	1.88	.80	.74	.71	.56	.64
Dec.	4.20	1.16	3.68	1.34	3.34	1.36	4.39	1.29	5.16	1.32
Yearly	21.37	18.33	18.16	17.46	16.61	17.47	14.16	16.24	18.52	16.71

\* Estimated

### LOCATION OF RAINFALL STATIONS ON THE SANTA CRUZ WATERSHED

The precipitation records of the stations listed alphabetically below begin on the date shown and extend through 1982.

### In United States

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Canelo, Arizona	S	31° 33'	110° 32'	5,010	1930	R. E. Ewing
Nogales, Arizona	R	31° 21'	110° 55'	3,808	1914	Milford L. Noon
Nogales Sanitation Plant 6N, Arizona	S	31° 25'	110° 57'	3,560	June 1952	I. B. & W. C.
Patagonia, Arizona	S	31° 33'	110° 45'	4,190	1930	George R. Proctor
San Rafael #2, Arizona	S	31° 22'	110° 38'	4,860	Jan. 1973	I. B. & W. C.

S Standard 8" rain gage

R Recording rain gage

## TEMPERATURE, HUMIDITY, EVAPORATION, AND WIND IN THE SANTA CRUZ RIVER BASIN

Tabulated below are monthly records of temperature, humidity, evaporation and wind at the station located at the Nogales Sanitation Plant in Arizona 6 miles (9.7 km) north of the international boundary. December 18, 1971 the station was moved to correspond with a new Nogales Sanitation Plant. Prior to this date, the station was located 2 miles (3.2 km) north of the international boundary at the old Nogales Sanitation Plant. This station is operated and maintained by the United States Section of the Commission. The equipment at the Nogales Sanitation Plant - 6N consists of: Standard 8-inch (203 mm) rain gage, 48-inch (1,219 mm) evaporation pan with stillwell and hook gage, maximum and minimum thermometer, anemometer (registers miles), hygrothermograph, and psychrometer, hand turbine type.

For specific location of these two stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 91 of this bulletin.

### In United States

#### Temperature - Degrees Fahrenheit

Month	Nogales Sanitation Plant - 6N		
	1982		
	Mean	Max.	Min.
Jan.	47.1	81	20
Feb.	50.3	83	17
Mar.	54.0	87	21
Apr.	60.2	89	29
May	64.7	93	36
June	72.4	103	43
July	79.4	104	54
Aug.	78.0	99	56
Sept.	73.7	102	43
Oct.	60.1	92	27
Nov.	53.2	81	26
Dec.	45.1	78	19
Yearly	61.5	104	17

#### Mean Relative Humidity - Percent

Month	Nogales Sanitation Plant - 6N	
	1982	
	Max.	Min.
Jan.	93	66
Feb.	92	41
Mar.	93	41
Apr.	90	48
May	100	42
June	95	54
July	100	62
Aug.	95	58
Sept.	100	64
Oct.	94	39
Nov.	94	26
Dec.	99	30
Yearly	100	26

#### Evaporation - Inches

Month	Nogales Sanitation Plant - 6N	
	1982	Average 1953-1982
	Jan.	* 3.74
Feb.	* 4.70	4.58
Mar.	* 7.68	7.19
Apr.	* 9.72	9.52
May	* 11.88	12.19
June	* 14.95	13.77
July	* 12.97	10.54
Aug.	* 10.92	8.49
Sept.	* 9.37	8.20
Oct.	* 10.56	7.14
Nov.	* 4.62	4.60
Dec.	* 4.85	3.51
Yearly	105.96	93.33

#### Mean Wind Speed - Miles per Hour

Month	Nogales Sanitation Plant - 6N	
	1982	Average 1953-1982
	Jan.	# 1.9
Feb.	* .6	2.2
Mar.	* 1.3	2.5
Apr.	* 1.6	2.5
May	* 1.8	2.4
June	* 1.5	2.2
July	* 1.4	1.6
Aug.	* 1.0	1.1
Sept.	* 1.3	1.2
Oct.	* 1.1	1.5
Nov.	* 1.4	1.6
Dec.	* 1.5	1.7
Yearly	1.4	1.9

### In Mexico

#### Temperature - Degrees Fahrenheit

Month	San Lazaro, Sonora			
	1982		1961-1982	
	Max.	Min.	Max.	Min.
Jan.				
Feb.				
Mar.				
Apr.				
May				
June				
July				
Aug.				
Sept.				
Oct.				
Nov.				
Dec.				
Yearly				

STATION DISCONTINUED IN 1982

#### Evaporation - Inches

Month	San Lazaro, Sonora	
	1982	Average 1961-1982
	Jan.	
Feb.		
Mar.		
Apr.		
May		
June		
July		
Aug.		
Sept.		
Oct.		
Nov.		
Dec.		
Yearly		

STATION DISCONTINUED IN 1982

# Estimated

\* One or more days missing

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

**1982**

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

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

Designation of Areas	Drainage Basin - Square Miles			Irrigated Areas - Acres		
	United States	Mexico	Total	United States	Mexico	Total
Santa Cruz River:						
Above Lochiel, Arizona Gaging Station	82	0	82	100	0	100
Above El Cajon, Mexico Gaging Station	179	125	304	100	2,352	2,452
Above Nogales, Arizona Gaging Station	185	348	533	100	2,696	2,796
San Pedro River:						
Above Palominas, Arizona Gaging Station	92	649 *	741	1,000	3,459	4,459
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	26,500	0	26,500

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