

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

UNITED STATES SECTION

JOSEPH F. FRIEDKIN, *Commissioner*
El Paso, Texas
WALDEMAR A. VON SCHOELER, *Resident Engineer*
Yuma, Arizona
WILLARD L. ERICSON, *Resident Engineer*
San Diego, California

MEXICAN SECTION

DAVID HERRERA JORDAN, *Commissioner*
Cd. Juárez, Chihuahua
EDUARDO ARGUELLES C., *Resident Engineer*
Mexicali, Baja California

WESTERN WATER BULLETIN 1964

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

COLORADO RIVER
TIJUANA RIVER
SANTA CRUZ RIVER
WHITEWATER DRAW

1964

CONTENTS

	Page
Foreword and Acknowledgments	4
General Hydrologic Conditions for 1964	6
Map of Western Boundary	54

I - Colorado River - Imperial Dam to Gulf of California

Map of Colorado River Basin below Imperial Dam	Following Page	105
--	----------------	-----

Quantity of Water

Stream-Flow and Stage Records		
Colorado River at Yuma, Arizona - Discharges		8
at Yuma, Arizona - Stages		9
Tributary - Reservation Canal Main Drain No. 4 (California Drain)		10
Yuma Main Canal Wasteway to Colorado River at Yuma, Arizona		11
Colorado River below Yuma Main Canal Wasteway at Yuma, Arizona - Discharges		12
below Yuma Main Canal Wasteway at Yuma, Arizona - Stages		13
Tributary - 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
immediately above Morelos Dam - Stages		18
Diversions from the Colorado River - Intake Canal at Morelos Diversion Structure - Discharges		19
at Morelos Diversion Structure - Stages		20
Colorado River immediately below Morelos Dam - Stages		21
Tributary - Cooper Wasteway (Valley Division, Yuma Project)		22
Colorado River at Morelos Gaging Station - Discharges		23
at Morelos Gaging Station - Stages		24
Tributary - Eleven Mile Wasteway (Valley Division, Yuma Project)		25
Colorado River at Eleven Mile Gage - Stages		26
Tributary - Twenty-one Mile Wasteway (Valley Division, Yuma Project)		27
Diversions by Pumps in the United States - Limitrophe Section		28
East Main Canal Wasteway (Valley Division, Yuma Project)		29
Yuma Main Drain (Valley Division, Yuma Project)		30
Total Flows Crossing International Boundary into Mexico near San Luis, Sonora		31
Colorado River at Southerly International Boundary - Discharges		32
at Southerly International Boundary - Stages		33
Diversions from Colorado River in Mexico to Sánchez Mejorada - San Luis Canals near San Luis, Sonora		34
Tributary - Wasteway to Colorado River at Kilometer 27 in Mexico		35
Wasteway to Colorado River at Colonia Elias in Mexico		36
Colorado River at Miguel C. Rodríguez in Mexico - Discharges		37
at Miguel C. Rodríguez in Mexico - Stages		38
Diversions from Colorado River to Zacatecas Canal in Mexico		39
Tributary - Wasteway to Colorado River at Unión in Mexico		40
Diversions by Individual Pumps in Mexico		41
Colorado River at El Marfímo in Mexico - Discharges		42
at El Marfímo in Mexico - Stages		43
Santa Clara Estuary at Railroad Crossing in Mexico		44
Stored Water in Large Reservoirs of the Colorado River		45

Quality of Water

Suspended Silt in Colorado River and Intake Canal at Morelos Diversion Structure	46
Chemical Analyses of Water Samples	48
Electrical Conductivity of Water Samples	50

Climatological Data and Irrigated Areas

Rainfall on the Colorado River Watershed	52
Location of Rainfall Stations on the Colorado River Watershed	53
Evaporation in the Colorado River Basin	56
Temperature in the Colorado River Basin	57
Irrigated Areas along Colorado River below Imperial Dam	59

II - Alamo and New Rivers

Quantity of Water

Stream-Flow and Stage Records		
Mesa Drain near Cudahy in Mexico		60
Alamo River at International Boundary		61
New River at International Boundary		62
Tributary - Volcano Drain to New River in Mexico		63
Siñón Wasteway to New River in Mexico		64
Wisteria Wasteway to New River in Mexico		65
Wisteria Drain to New River in Mexico		66
Rivera Drain to New River in Mexico		67
Pueblo Nuevo Wasteway to New River in Mexico		68
Waste Waters from Mexican System of Canals entering the United States		69
Salton Sea - Elevations of Water Surface		70

CONTENTS

Quality of Water

Page

Chemical Analyses of Water Samples 71

III - Tijuana River

Map of Tijuana River Basin 72

Quantity of Water

Stream-Flow Records
 Cottonwood Creek above Morena Dam, California 73
 below Morena Dam, California 74
 above Barrett Dam, California 75
 Diversions from Cottonwood Creek - Dulzura Conduit below Barrett Dam, California 76
 Cottonwood Creek below Barrett Dam, California 77
 above Tecate Creek near Dulzura, California 78
 Tributary - Campo Creek near Campo, California 79
 Cottonwood Creek near International Boundary 80
 Inflows to Rodríguez Reservoir, Baja California 81
 Diversions from Rodríguez Reservoir, Baja California 82
 Tijuana River at International Boundary 83
 near Nestor, California 84
 Stored Water in Reservoirs, Tijuana River Basin 85

Climatological Data and Drainage Basin and Irrigated Areas

Rainfall and Location of Rainfall Stations on the Tijuana River Watershed 86
 Evaporation in the Tijuana River Basin 88
 Temperature in the Tijuana River Basin 89
 Drainage Areas above Gaging Stations and Irrigated Areas along Tijuana River and Tributaries 91

IV - Whitewater Draw, San Pedro and Santa Cruz Rivers

Map of Western Boundary - Whitewater Draw, San Pedro River, and Santa Cruz River Basins 92

Quantity of Water

Stream-Flow Records
 Whitewater Draw near Douglas, Arizona 93
 Sewage Effluent, Douglas, Arizona and Agua Prieta, Sonora International Treatment Plant 94
 San Pedro River at Palominas, Arizona 95
 Santa Cruz River near Lochiel, Arizona 98
 at El Cajón, Sonora 99
 near Nogales, Arizona 100
 Sewage Effluent, Nogales International Treatment Plant 101

Climatological Data and Drainage Basin and Irrigated Areas

Rainfall and Location of Rainfall Stations on the Santa Cruz River Watershed 102
 Temperature, Humidity, Evaporation, and Wind in the Santa Cruz River Basin 103
 Drainage Areas above Gaging Stations and Irrigated Areas along Santa Cruz River and Whitewater Draw 104

Corrections to Previous Water Bulletins

Corrections to Previous Water Bulletins 105

FOREWORD

This bulletin is the fifth annual compilation of stream discharges and other hydrographic data relating to the international aspects of the Colorado River below Imperial Dam, the Tijuana River and other streams crossing the western land boundary. The compilation was prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission, and includes 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 the information for the year 1964.

Stream gaging on the Colorado River below Imperial Dam began in 1902 when the station at Yuma, Arizona was established. Stage records have been obtained at this station since January 1878. 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, not including 5,500 square miles in the Bill Williams River watershed. In addition, flows ranging from usually minor amounts to infrequent torrential floods may enter the lower Colorado River from the Bill Williams River 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 1964.

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 but are included in the deliveries of Treaty waters to Mexico.

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 all of Mexico's guaranteed treaty allotment of Colorado River water has been delivered in the limitrophe section of the river. The greater portion of such deliveries has 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 Río de las Palmas, which rises in Mexico. Cottonwood Creek crosses the international land boundary 21 miles from the Pacific Ocean to join the Río 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 Río 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.

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.

FOREWORD

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 returns 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, 349 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 U. S. Weather Bureau, Department of Commerce; the Yuma County Water Users' Association, the Imperial Irrigation District, the city of San Diego, California, the California Water and Telephone Company, and the Ministry of 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 our appreciation.

Units of Measure

Records of stream flow collected by the Mexican Section are initially computed in metric units, but are reported in this bulletin in equivalent English units. Conversion of the mean daily discharges, the monthly average discharge and the monthly 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.

Rounding procedures, agreed upon by the United States and Mexican Sections of the International Boundary and Water Commission, are applied to data received from other agencies.

GENERAL HYDROLOGIC CONDITIONS FOR 1964

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 1964. The average seasonal (October 1963-September 1964) rainfall over the upper basin, as gaged at 13 index stations, was about 12.76 inches compared to a seasonal average of about 13.70 inches for the 42 seasons (1923-1964). In the lower basin of the Colorado River in Mexico, from Morelos Diversion Dam to the Gulf of California, the average precipitation (1964) measured at 6 index stations was 0.67 inch compared to an average of 1.61 inches during the last six years (1959-1964).

The flow of the Colorado River reaching Imperial Dam was 5,903,000 acre-feet, about 66% of the 30-year average (1935-1964) of 8,952,281 acre-feet. At the northerly international boundary, the total flow of the river during 1964 was 1,501,747 acre-feet, about 34% of the 1935-1964 average of 4,441,142 acre-feet. At the southerly international boundary, the flow during 1964 was only 98,204 acre-feet, or about 3% of the 1935-1964 average of 3,738,124 acre-feet. The total flow of the Colorado River reaching the El Marfítmico gaging station, 47.9 miles downstream from the southerly international boundary, and 18.6 miles downstream from the Sonora-Baja California railroad bridge, was 118,927 acre-feet in 1964, about 45% of the 1960-1964 average of 265,069 acre-feet.

The total scheduled treaty waters of the Colorado River delivered to Mexico during 1964 amounted to 1,500,000 acre-feet pursuant to the annual schedules by months for 1964 furnished by Mexico. All deliveries were made in the limitrophe section of the Colorado River in accordance with the request of Mexico.

The total of all flows of the Colorado River entering Mexico in 1964 amounted to 1,655,430 acre-feet, 32% of the 1935-1964 average of 5,169,332 acre-feet, as measured 1) in the Colorado River at the northerly international boundary, 2) in the wasteways that discharge into the limitrophe section of the river from the United States bank, and 3) in the canal which discharges waste and drainage waters from the Yuma Project across the southerly land boundary into Mexico near San Luis, Arizona, less diversions in the United States by pumps in the limitrophe section.

No flood peaks of importance occurred in streams of the lower Colorado River basin during 1964. A maximum instantaneous flow of 4,790 second-feet occurred in the Colorado River at the northerly boundary station on March 29 and August 2, 1964.

Stored waters at the end of the year in the three major reservoirs on the Colorado River below Lee's Ferry amounted to 13,260,300 acre-feet, 45% of the usable capacity of 29,636,000 acre-feet. The greater part (11,133,000 acre-feet) of the storage was contained in Lake Mead (Hoover Dam). There were no reported shortages of Colorado River water for irrigation during 1964 due to drought or accident to the irrigation system.

The total reported acreage irrigated from waters of the Colorado River below Imperial Dam in 1964 was 1,107,804 acres; 650,889 acres in the United States and 456,915 acres in Mexico. An estimated one-third of acreage in Mexico is served by pumping from ground water.

The suspended sediment load passing the northerly boundary station in 1964 was 114.9 acre-feet, about 25% of the 1956-1964 average of 451.4 acre-feet.

Tijuana River Basin

The year 1964 was one of very low rainfall and the twelfth consecutive year of runoff below the 1937-1964 mean. It was the seventeenth dry year in the past eighteen years. The temperatures at Barrett Dam, California (elevation 1,750 feet) in the upper portion of the basin in the United States averaged 2 degrees below the 34-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 3 degrees below the long-term average and Rodríguez Dam, Baja California (elevation 459 feet), the recorded temperatures were 2 degrees below the 19-year normal.

At Barrett Dam in the upper portion of the basin in the United States, the recorded precipitation was 14.44 inches, 83% of normal, and at Chula Vista near the lower end of the basin, 6.66 inches, or 69% of normal. The recorded precipitation at San Juan de Dios in the upper portion of the basin in Mexico, was 8.88 inches, approximately 53% of the normal during the 9-year period, and at Rodríguez Dam in the lower portion of the basin in Mexico, 5.04 inches, 65% of the 27-year average.

Runoff in the basin during 1964 averaged less than 2% of normal. Above Morena Reservoir the runoff was 162.2 acre-feet, or about 2% of the 28-year 1937-1964 mean of 7,022.5 acre-feet. At Rodríguez Reservoir the runoff was 314.7 acre-feet, or about 2% of the 27-year mean of 17,006 acre-feet.

The flow of the Tijuana River at the international boundary was 127.7 acre-feet during 1964. There has been no flow in the Tijuana River near Nestor since March 1963.

Whitewater Draw

During 1964, the average annual temperature over the watershed was slightly below normal, while the annual precipitation was about normal. Runoff for the year at the gaging station near Douglas, Arizona, of 9,440 acre-feet was about 135% of average.

GENERAL HYDROLOGIC CONDITIONS FOR 1964

San Pedro River

During 1964, the average annual temperature was below normal. The annual precipitation, as measured at Coronado National Monument Headquarters, was 114% of the 1961-1964 mean of 19.07 inches. The stream flow at the international boundary was 37,673 acre-feet, 156% of the 1951-1964 normal.

Santa Cruz River

During 1964, the average annual temperature over the watershed was somewhat below normal and the annual precipitation was about 109% of the 26-year 1939-1964 mean. Runoff measured at the Nogales gaging station where the stream re-enters the United States was 29,430 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 6,510 acre-feet. Therefore, neglecting stream flow depletions in Mexico, the records indicate a contribution of about 22,920 acre-feet from the loop of the river lying in Mexico, or approximately 78% of the flows reaching the Nogales station.

Alamo and New Rivers

During 1964, the average annual temperature over the drainage areas of the Alamo and New Rivers, as recorded at El Centro, California, and at Mexicali, Baja California, was 70.6 and 70.0 degrees, respectively, 1.8 and 3.6 degrees below the respective normals.

At El Centro, the precipitation was about 27% of the long-term mean and in Mexicali the annual precipitation was 25% of the 39-year average. The total flow of the New River at the international boundary in 1964 was 105,087 acre-feet which was about 162% of the 1943-1964 normal.

Salton Sea

During 1964, the average annual temperature around the Salton Sea was about 96% of the long-term average while the annual precipitation recorded at Brawley, California, was approximately 43% of the long-term mean of 2.23 inches. The water surface of the Salton Sea lowered approximately 0.6 foot during the year. The maximum stage, 231.3 feet below mean sea level, was recorded on several days during April 1964. The minimum stage, 232.8 feet below mean sea level, was recorded on several days during November and December 1964.

COLORADO RIVER AT YUMA, ARIZONA - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.25	11.72	10.84	10.98	11.14	11.34	10.86	11.57	10.95	10.48	10.82	10.95
2	11.24	11.79	10.94	11.02	11.07	11.12	10.84	11.66	10.80	10.42	10.83	11.00
3	11.38	11.88	11.64	11.05	11.30	11.24	10.85	11.47	10.84	10.59	10.81	10.92
4	11.19	11.68	10.94	11.64	11.46	11.37	10.83	12.20	10.87	10.55	10.78	10.71
5	11.18	11.69	10.93	11.17	11.45	11.10	10.92	12.32	10.94	10.51	10.83	10.67
6	11.40	11.70	10.96	11.00	11.47	11.23	11.02	12.14	10.94	10.54	10.83	10.92
7	11.52	11.67	10.93	11.02	11.25	11.34	10.92	11.78	10.98	10.59	10.80	10.82
8	11.27	11.69	11.15	11.01	11.43	11.31	10.94	11.52	10.99	10.57	10.80	10.82
9	10.71	11.72	11.40	10.98	11.56	11.31	10.94	11.46	11.01	10.58	10.81	10.75
10	10.68	11.72	11.12	10.96	11.21	11.30	11.14	11.47	10.93	10.55	10.77	10.74
11	10.70	11.66	11.01	10.92	11.32	11.38	10.97	11.50	10.92	10.56	10.80	10.74
12	11.11	11.66	10.91	10.98	11.19	11.37	10.89	11.49	11.29	10.56	10.87	10.75
13	11.66	11.64	10.92	10.94	11.16	10.94	11.16	11.46	11.10	10.54	10.98	10.73
14	12.04	11.69	10.92	10.93	11.02	10.66	11.10	11.42	11.06	10.55	10.96	10.72
15	12.44	12.02	10.91	10.95	10.93	10.58	11.20	11.42	11.36	10.78	10.83	10.76
16	12.48	12.12	10.96	11.48	10.88	10.56	11.09	11.48	11.15	11.44	11.12	10.73
17	12.51	12.32	10.92	11.03	10.87	10.60	11.39	11.54	11.05	10.86	10.89	10.72
18	12.77	12.23	10.96	10.97	10.88	10.70	11.23	11.44	11.02	10.91	11.07	10.68
19	12.69	12.18	10.98	10.95	10.89	10.80	11.08	11.43	11.01	11.31	11.13	10.78
20	12.41	11.71	11.50	10.94	10.92	10.89	11.36	11.48	11.02	11.26	11.34	10.80
21	11.90	11.80	10.97	10.94	10.98	10.98	11.02	11.51	10.97	11.38	11.31	10.88
22	11.54	11.06	10.98	10.95	10.94	11.24	10.93	11.49	10.97	11.33	11.33	10.83
23	11.19	11.04	11.10	11.21	10.92	11.62	10.90	11.48	10.98	11.00	11.71	10.83
24	10.89	11.11	11.08	11.51	10.95	11.03	10.90	11.50	11.02	10.89	11.64	10.85
25	10.79	11.13	11.04	11.29	10.96	10.99	10.98	11.50	11.07	10.87	11.63	10.91
26	10.80	11.08	11.05	11.38	10.96	10.95	11.07	11.43	11.06	10.89	11.23	10.94
27	10.85	10.89	11.06	11.04	10.98	10.91	11.12	11.40	11.06	10.85	10.79	11.00
28	11.38	11.00	11.07	11.02	11.05	10.95	11.04	11.04	11.10	10.84	10.69	11.06
29	11.40	11.34	11.06	11.09	11.70	10.91	11.45	10.88	11.47	10.82	10.79	11.01
30	10.93		11.01	11.43	11.82	10.87	11.50	10.87	10.83	10.82	10.81	10.97
31	11.64		10.99		11.56		11.44	10.84		10.80		10.97
Avg.	11.48	11.62	11.04	11.09	11.17	11.05	11.07	11.49	11.03	10.79	11.00	10.84

RESERVATION CANAL MAIN DRAIN NO. 4 (CALIFORNIA DRAIN)

DESCRIPTION: Water-stage recorder, 500 feet upstream from the U. S. Highway No. 80 culvert, one half mile upstream from the mouth of the canal, and 1 mile northwest of Yuma, Arizona. Discharge measurements are made from a foot-bridge immediately below the gage. The drainage canal discharges into the outfall channel of the Yuma Main Canal Wasteway, and thence into the Colorado River on the right bank 6.5 miles upstream from the northerly international land boundary, and one half mile below the Yuma Gaging Station. Prior to October 1955, published as "California Drain-age Canal near Yuma, Arizona."

RECORDS: Based on 51 current meter measurements during the year and a continuous record of gage heights. Records are computed and furnished by the U. S. Bureau of Reclamation. 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 December 1964.

REMARKS: Reservation Canal Main Drain No. 4 collects drainage and waste water from the Reservation Division of the Yuma Project, located in California. The drain discharges to the river by gravity, except during high stages of the Colorado River, when pumping is necessary. Average annual flow prior to 1937 was 12,800 acre-feet. Monthly and annual averages since 1937 are shown in the table below.

EXTREMES: Prior to 1937: Maximum annual flow 20,190 acre-feet, 1916; minimum annual flow 8,920 acre-feet, 1913.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	57	59	56	64	75	62	67	69	58	52	53	52
2	56	51	58	65	80	60	63	69	58	52	51	48
3	76	49	60	59	66	64	64	67	61	52	50	50
4	64	53	59	59	57	63	67	66	56	51	53	62
5	55	66	57	70	64	69	64	67	58	51	52	52
6	54	60	66	62	66	63	66	64	56	50	52	48
7	73	67	71	59	79	63	77	62	52	52	51	46
8	53	60	56	71	72	66	69	60	51	51	52	50
9	57	56	53	60	69	61	71	60	52	52	49	57
10	58	51	71	63	60	59	69	64	54	54	49	48
11	56	58	71	59	55	59	78	69	54	50	50	46
12	52	63	63	61	61	62	69	72	54	50	55	48
13	53	62	69	63	74	62	68	68	55	53	56	45
14	64	75	71	60	68	62	66	64	54	53	54	45
15	68	76	63	63	64	61	74	64	55	53	52	44
16	67	64	59	61	59	70	75	60	54	56	51	48
17	65	59	66	63	54	65	73	60	55	57	50	48
18	58	62	65	57	54	69	71	65	58	55	52	47
19	63	74	77	58	61	63	66	61	55	58	53	46
20	57	72	62	62	60	64	65	60	60	57	49	45
21	53	63	63	67	72	68	67	63	57	60	51	50
22	56	65	57	66	65	73	70	63	62	55	50	60
23	63	63	56	69	59	67	67	59	52	56	49	46
24	59	57	57	83	60	65	68	62	54	56	47	46
25	56	56	72	79	62	64	70	61	55	58	48	46
26	59	63	69	63	59	63	72	64	62	57	51	44
27	63	58	79	60	64	63	75	60	62	60	51	44
28	75	61	72	66	71	63	71	65	54	62	50	43
29	60	63	54	61	71	65	69	67	53	62	45	53
30	64	63	53	74	65	73	75	60	55	64	46	67
31	65	65	65	61	61	61	74	62	59	59	50	50
Sum	1,879	1,786	1,970	1,927	2,006	1,931	2,160	1,977	1,676	1,708	1,522	1,524
Current Year 1964									Period 1937-1964			
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	76	12	52	60.6	3,727	3,374	4,780	877	
Feb.			15	76	3	49	61.6	3,542	3,210	4,320	563	
Mar.			27	79	†	53	63.5	3,907	3,880	5,240	1,240	
Apr.			24	83	18	57	64.2	3,822	3,932	5,250	1,160	
May			2	80	†	54	64.7	3,979	4,029	5,590	992	
June			†22	73	†	59	64.4	3,830	3,904	5,580	885	
July			11	78	2	63	69.7	4,284	4,229	6,550	816	
Aug.			12	72	23	59	63.8	3,921	4,187	6,810	861	
Sept.			†22	62	8	51	55.9	3,324	3,991	6,220	889	
Oct.			30	64	†	50	55.1	3,388	3,961	5,740	1,040	
Nov.			13	56	29	45	50.7	3,019	3,713	5,490	994	
Dec.			30	67	28	43	49.2	3,023	3,615	4,960	966	
Yearly				83		43	60.3	43,766	46,025	63,700	12,840	

† And other days

∅ Mean daily

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 upstream from the intake of the Colorado River siphon and 3.2 miles downstream from the Siphon Drop Power Plant. This wasteway discharges into the Colorado River on the California side 0.4 mile downstream from the Yuma Gaging Station, and 6.5 miles 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. 1964 records good, except those below 100 second-foot, which are poor. Records obtained and furnished by U. S. Geological Survey. Records available: April 1913 through December 1964.

REMARKS: The wasteway discharges to the river the flow in excess of irrigation water in the Yuma Main Canal. This excess flow, in addition to the irrigation water, was diverted from the All-American Canal into the Yuma Main Canal and utilized for power purposes at the Siphon Drop Power Plant.

EXTREMES: Prior to 1935 when storage began in Lake Mead: Average annual flow, 297,800 acre-feet; maximum annual flow, 913,700 acre-feet, 1932; minimum annual flow, 114,900 acre-feet, 1917. Since 1935: Maximum mean daily discharge, 2,020 second-feet, December 24-25, 1948; minimum mean daily discharge, no flow on numerous occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	16	46	46	25	314	320	48	61	52	40	26	106
2	34	54	54	46	226	555	32	54	70	61	14	14
3	21	57	42	67	638	480	26	72	56	97	26	167
4	25	38	30	74	699	275	28	40	47	61	29	157
5	116	50	38	61	635	492	28	40	54	50	45	156
6	430	46	50	38	570	750	28	45	58	40	29	46
7	613	21	57	25	220	822	18	42	61	23	14	30
8	814	34	30	42	222	835	16	47	54	14	42	91
9	25	46	25	57	210	841	20	54	61	29	23	237
10	42	34	38	61	265	891	29	32	47	42	38	192
11	34	25	21	38	74	997	45	17	112	34	24	220
12	46	34	21	64	25	550	20	26	835	14	17	262
13	54	74	64	54	25	67	32	54	612	14	25	235
14	25	105	50	42	95	71	29	45	483	20	15	240
15	25	126	38	25	109	36	17	23	177	23	40	228
16	42	54	25	38	109	47	32	40	296	32	141	153
17	46	34	30	34	105	61	45	50	456	32	329	151
18	64	21	34	16	156	51	20	32	471	29	692	136
19	61	16	30	38	190	44	20	37	465	52	704	252
20	61	42	38	30	232	40	17	29	461	32	988	251
21	61	208	38	42	245	40	23	20	471	17	706	314
22	50	57	38	54	218	205	45	20	482	17	92	332
23	30	54	38	324	176	615	42	63	486	34	13	376
24	25	54	11	744	213	36	47	58	506	50	18	418
25	46	46	11	420	240	36	42	42	517	50	11	506
26	57	21	38	170	242	36	32	32	460	20	15	552
27	21	11	78	65	288	36	37	23	486	23	77	600
28	34	16	38	196	324	36	29	20	485	52	288	602
29	81	16	21	334	345	14	14	32	448	34	494	577
30	57		30	592	363	18	26	29	479	32	342	618
31	42		34		153		56	26		29		646
Sum	3,098	1,440	1,136	3,817	7,926	9,297	943	1,205	9,748	1,097	5,317	8,865
Current Year 1964										Period 1935-1964		
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High		Day			Average	Maximum	Minimum	
				Day	Low							
Jan.			8	814	1	16	99.9	6,145	73,779	110,700	3,230	
Feb.			21	208	27	11	49.7	2,856	64,138	89,140	2,856	
Mar.			27	78	† 24	11	36.6	2,253	68,993	90,190	2,253	
Apr.			24	744	18	16	127	7,571	68,573	86,580	2,500	
May			4	699	+ 12	25	256	15,721	70,881	88,280	5,480	
June			11	997	29	14	310	18,440	66,365	86,960	3,330	
July			31	56	29	14	30.4	1,870	68,563	91,220	1,870	
Aug.			3	72	11	17	38.9	2,390	68,922	89,890	2,390	
Sept.			12	835	10	47	325	19,335	65,500	83,660	17,240	
Oct.			3	97	† 8	14	35.4	2,176	64,780	90,050	2,176	
Nov.			20	988	25	11	177	10,546	65,273	101,500	3,850	
Dec.			31	646	2	14	286	17,583	72,667	108,800	2,440	
Yearly				997		11	147	106,886	818,434	1,042,850	75,950	

† And other days ∅ Mean daily

**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 downstream from the mouth of the Yuma Main Canal Wasteway, 0.6 mile downstream from the abandoned gaging station on the Colorado River at Yuma, 5.2 miles downstream from the mouth of the Gila River, 19.6 miles downstream from Imperial Dam and 6.4 miles upstream from the northerly international boundary. Zero of gage is 101.99 feet above mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 30 current meter measurements during the year, 19 by the United States Geological Survey, 11 by the United States Section of the Commission, 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 December 1964. Records from January 1951 through September 1963, deduced from "Colorado River at Yuma" plus flows from "Reservation Canal Main Drain No. 4", and "Yuma Main Canal Wasteway."

REMARKS: Reservoirs on the Colorado River, including Lake Mead where storage began in 1935, 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 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,230	1,600	961	1,020	1,310	1,450	961	1,350	919	668	828	1,010
2	1,230	1,660	1,020	1,090	1,220	1,450	933	1,460	884	656	807	996
3	1,370	1,730	1,680	1,120	1,590	1,490	940	1,290	891	782	807	1,030
4	1,200	1,570	1,030	1,620	1,750	1,420	933	1,910	912	704	807	905
5	1,260	1,570	1,020	1,250	1,720	1,410	982	2,010	947	668	849	877
6	1,610	1,600	1,040	1,110	1,720	1,620	1,030	1,810	954	680	828	961
7	1,820	1,540	1,040	1,110	1,360	1,740	982	1,470	961	674	800	877
8	1,710	1,560	1,130	1,100	1,470	1,730	989	1,280	968	650	835	905
9	870	1,610	1,290	1,070	1,570	1,740	982	1,270	989	656	828	968
10	898	1,590	1,150	1,090	1,330	1,750	1,100	1,250	940	662	814	926
11	912	1,540	1,060	1,050	1,280	1,860	1,020	1,260	947	656	835	926
12	1,160	1,550	996	1,110	1,150	1,590	919	1,260	1,620	632	891	933
13	1,560	1,560	1,020	1,090	1,170	1,010	1,080	1,250	1,370	626	954	891
14	1,930	1,690	1,030	1,080	1,140	856	1,060	1,220	1,260	638	954	877
15	2,280	1,900	989	1,060	1,090	788	1,110	1,180	1,270	740	863	891
16	2,360	2,000	1,020	1,420	1,080	788	1,050	1,220	1,230	1,180	1,110	814
17	2,390	2,150	1,010	1,090	1,050	807	1,260	1,260	1,260	800	1,090	788
18	2,640	2,130	1,030	1,030	1,020	849	1,140	1,210	1,240	835	1,400	764
19	2,560	2,060	1,040	1,020	1,070	884	1,020	1,200	1,240	1,100	1,460	912
20	2,320	1,680	1,370	1,000	1,080	947	1,210	1,230	1,260	1,080	1,770	912
21	1,840	1,780	1,030	1,000	1,180	996	1,010	1,250	1,220	1,150	1,620	1,000
22	1,540	1,180	1,030	1,010	1,160	1,270	961	1,230	1,230	1,120	1,360	996
23	1,260	1,110	1,100	1,260	1,090	1,900	933	1,270	1,220	919	1,450	1,030
24	1,040	1,140	1,080	1,800	1,130	1,030	926	1,280	1,280	870	1,410	1,070
25	975	1,140	1,040	1,490	1,140	996	968	1,260	1,320	870	1,420	1,180
26	975	1,100	1,070	1,370	1,150	975	1,000	1,220	1,300	849	1,160	1,230
27	968	975	1,100	1,080	1,200	954	1,010	1,220	1,300	814	912	1,310
28	1,280	1,020	1,070	1,140	1,280	996	996	1,010	1,320	849	989	1,360
29	1,360	1,220	1,030	1,290	1,790	954	1,200	933	1,610	835	1,130	1,350
30	1,060		1,020	1,660	1,910	947	1,300	912	1,160	828	1,070	1,350
31	1,500		1,040		1,510		1,290	884		821		1,350
Sum	47,108	44,955	33,536	35,630	40,710	37,197	32,295	39,859	35,022	25,012	32,051	31,389

Month	Extreme Gage Feet		Current Year 1964				Period 1951-1964				
	High	Low	Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
			Day	Day			Average	Maximum	Minimum		
Jan.			18	2,640	9	870	1,520	93,437	345,537	979,890	59,860
Feb.			17	2,150	27	975	1,550	89,167	252,795	826,600	52,970
Mar.			3	1,680	1	961	1,082	66,518	276,184	1,073,270	65,530
Apr.			24	1,800	† 20	1,000	1,188	70,671	259,973	843,010	70,671
May			30	1,910	18	1,020	1,313	80,747	234,425	863,860	77,650
June			23	1,900	† 15	788	1,240	73,779	226,564	833,970	68,720
July			30	1,300	12	919	1,042	64,056	250,958	649,820	64,056
Aug.			5	2,010	31	884	1,286	79,059	259,695	670,050	79,059
Sept.			12	1,620	2	884	1,167	69,465	209,076	775,930	69,465
Oct.			16	1,180	13	626	807	49,611	174,579	802,210	49,611
Nov.			20	1,770	7	800	1,068	63,572	209,082	911,370	53,690
Dec.			28	1,360	18	764	1,013	62,259	273,714	1,114,550	53,120
Yearly				2,640		626	1,188	862,341	2,972,582	10,220,870	862,341

∅ Mean daily

† And other days

COLORADO RIVER BELOW YUMA MAIN CANAL WASTEWAY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.05	11.47	10.79	10.81	11.29	11.36	10.58	11.28	10.73	10.28	10.54	10.84
2	11.05	11.54	10.88	10.89	11.17	11.36	10.54	11.42	10.68	10.26	10.51	10.82
3	11.22	11.61	11.45	10.91	11.59	11.40	10.55	11.26	10.68	10.47	10.51	10.87
4	11.01	11.46	10.86	11.48	11.75	11.31	10.54	11.94	10.71	10.34	10.51	10.70
5	11.09	11.46	10.84	11.07	11.72	11.30	10.61	12.06	10.76	10.28	10.57	10.66
6	11.47	11.50	10.87	10.90	11.72	11.52	10.68	11.85	10.76	10.30	10.54	10.79
7	11.68	11.44	10.88	10.90	11.35	11.63	10.61	11.50	10.77	10.29	10.51	10.67
8	11.57	11.46	10.99	10.88	11.47	11.61	10.62	11.27	10.77	10.25	10.56	10.72
9	10.56	11.51	11.19	10.85	11.56	11.62	10.62	11.25	10.80	10.26	10.55	10.82
10	10.60	11.49	11.02	10.87	11.30	11.62	10.80	11.21	10.73	10.27	10.54	10.77
11	10.62	11.44	10.90	10.82	11.23	11.73	10.70	11.21	10.73	10.26	10.57	10.77
12	10.96	11.45	10.81	10.90	11.06	11.45	10.57	11.20	11.54	10.22	10.65	10.79
13	11.42	11.46	10.85	10.87	11.07	10.76	10.81	11.18	11.27	10.21	10.75	10.74
14	11.79	11.59	10.86	10.86	11.04	10.54	10.79	11.14	11.13	10.23	10.75	10.72
15	12.14	11.80	10.80	10.84	10.96	10.44	10.87	11.09	11.14	10.40	10.62	10.75
16	12.22	11.90	10.84	11.30	10.95	10.44	10.80	11.14	11.09	11.03	10.98	10.64
17	12.25	12.05	10.83	10.92	10.91	10.47	11.07	11.20	11.13	10.50	10.95	10.60
18	12.50	12.03	10.86	10.86	10.87	10.53	10.93	11.13	11.10	10.55	11.33	10.56
19	12.42	11.97	10.88	10.87	10.94	10.58	10.79	11.12	11.10	10.93	11.40	10.78
20	12.18	11.60	11.29	10.86	10.95	10.66	11.04	11.16	11.13	10.90	11.71	10.78
21	11.70	11.70	10.86	10.88	11.08	10.72	10.79	11.18	11.07	10.99	11.56	10.91
22	11.40	11.05	10.86	10.90	11.05	11.07	10.73	11.16	11.09	10.95	11.29	10.90
23	11.08	10.98	10.95	11.23	10.96	11.72	10.69	11.21	11.08	10.67	11.38	10.93
24	10.81	11.03	10.93	11.80	11.01	10.74	10.68	11.22	11.14	10.60	11.34	10.96
25	10.71	11.03	10.88	11.49	11.03	10.68	10.74	11.20	11.19	10.60	11.35	11.09
26	10.71	10.99	10.91	11.36	11.04	10.64	10.79	11.15	11.15	10.57	11.04	11.13
27	10.70	10.81	10.96	11.00	11.10	10.60	10.80	11.15	11.16	10.52	10.70	11.20
28	11.11	10.87	10.91	11.07	11.20	10.65	10.78	10.87	11.17	10.57	10.81	11.24
29	11.20	11.14	10.86	11.26	11.73	10.58	11.05	10.76	11.48	10.55	11.00	11.20
30	10.83		10.84	11.66	11.85	10.56	11.18	10.73	10.97	10.54	10.93	11.18
31	11.36		10.86		11.44		11.18	10.69		10.53		11.18
Avg.	11.34	11.44	10.92	11.04	11.24	11.01	10.77	11.22	11.01	10.49	10.88	10.86

DRAIN NO. 8-B (ARAZ DRAIN)

DESCRIPTION: This drain discharges into the Colorado River 4.5 miles downstream from the Yuma Gaging Station and 2.5 miles upstream from the northerly international boundary. Prior to October 1955, published as "Araz Drain."

RECORDS: Daily discharge records computed and furnished by Bureau of Reclamation from 53 current meter measurements by Imperial Irrigation District at a footbridge one-fourth mile above the mouth. Monthly records furnished by the U. S. Geological Survey. Records available: May 1948 through December 1964.

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 upstream, is affected by backwater from the river during ordinary high stages.

EXTREMES: Mean daily discharge: Maximum, 24 second-feet on September 1, 1953; minimum, less than 1 second-foot during March and April 1948.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4	5	4	4	4	4	4	6	4	5	5	4
2	4	5	4	4	4	4	4	6	4	5	5	4
3	4	5	4	4	4	3	4	6	4	5	5	4
4	4	4	4	4	5	3	4	7	4	6	5	4
5	4	4	4	4	5	3	4	7	4	6	5	4
6	4	4	4	4	5	3	4	7	4	6	5	4
7	4	4	4	5	5	4	5	8	4	6	5	4
8	4	4	4	5	5	4	5	7	4	7	5	4
9	5	4	4	5	4	4	5	6	4	7	4	4
10	5	4	4	5	4	5	5	5	4	7	4	4
11	5	4	4	5	4	5	5	4	4	7	4	3
12	5	3	4	5	3	5	5	4	4	7	4	3
13	5	3	4	5	3	5	5	4	4	6	4	3
14	4	3	4	5	3	5	5	4	5	6	4	3
15	4	3	4	5	3	4	6	4	5	6	4	3
16	4	3	4	5	3	4	6	4	5	6	4	3
17	4	4	4	5	3	4	6	5	5	6	5	3
18	4	4	4	5	3	4	6	5	5	5	5	3
19	4	4	4	5	3	4	6	5	5	5	5	3
20	4	4	4	5	3	4	5	5	5	5	5	3
21	3	4	4	5	3	4	5	5	5	5	5	3
22	3	4	4	5	3	4	5	5	5	5	5	3
23	3	5	4	5	4	3	5	5	5	5	5	3
24	3	5	4	5	4	3	5	5	5	5	5	3
25	3	5	5	5	4	3	5	5	5	5	4	3
26	4	5	5	4	4	3	5	5	5	5	4	3
27	4	5	5	4	5	3	5	5	5	5	4	3
28	4	5	5	4	5	3	6	4	5	5	4	3
29	4	5	5	4	5	4	6	4	5	5	4	3
30	4	5	5	4	5	4	6	4	5	5	4	3
31	5		5		5		6	4		5		3
Sum	125	121	131	139	123	115	158	160	137	174	136	103
Current Year 1964									Period May 1948-1964			
Month	Extreme Gage Feet		β Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day		Day	Low			Average	Maximum	Minimum	
Jan.			† 9	5	† 21	3	4.0	248	509	899	248	
Feb.			† 1	5	† 12	3	4.2	240	446	746	240	
Mar.			† 25	5	† 1	4	4.2	260	531	853	260	
Apr.			† 7	5	† 1	4	4.6	276	561	1,000	276	
May			† 4	5	† 12	3	4.0	244	556	966	61	
June			† 10	5	† 3	3	3.8	228	579	1,030	89	
July			† 15	6	† 1	4	5.1	313	664	1,260	139	
Aug.			7	8	† 11	4	5.2	317	737	1,350	228	
Sept.			† 14	5	† 1	4	4.6	272	697	1,370	258	
Oct.			† 8	7	† 1	5	5.6	345	712	1,220	345	
Nov.			† 1	5	† 9	4	4.5	270	639	1,240	270	
Dec.			† 1	4	† 11	3	3.3	204	585	1,050	204	
Yearly				8		3	4.4	3,217	7,216	12,429	3,217	

† And other days

β Mean daily

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 downstream from the intake at Imperial Dam, 6 miles west of Yuma, about one mile north of the northerly international boundary and empties into the Alamo Canal in the United States and thence into Colorado River through Rockwood gates, about one mile upstream from the northerly international boundary. Water-stage recorder is located on right bank of the All-American Canal, 550 feet upstream from wasteway gates and 1,800 feet from entrance to the power plant. Datum of gage is 150.00 feet above mean sea level. Tailrace gage is on left bank, 680 feet downstream from power plant with automatic recording equipment in control house. All bypass gates are equipped with calibrated openings which are read on all gate changes. Datum of tailrace gage is at mean sea level; elevation of sill of wasteway gates is 147.88 feet, U. S. C. & G. S. datum. Prior to October 1956, this station 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 December 1964. 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 on January 26, 1958; minimum mean daily discharge, no flow during long periods.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	1,050	1,970	0	0	2,010	2,500	1,520	0	0	0
2	0	0	1,380	2,100	0	0	2,220	2,810	1,570	0	0	0
3	0	0	1,280	2,210	0	0	2,350	2,560	1,580	0	0	0
4	0	0	1,830	1,830	0	0	2,360	2,240	1,530	0	0	0
5	0	0	980	2,150	0	0	2,510	2,250	1,480	0	0	0
6	0	0	951	2,510	0	0	2,710	2,250	1,480	0	0	0
7	0	0	959	2,800	0	0	3,070	2,150	1,470	0	0	0
8	36	0	1,540	2,410	0	0	3,130	2,260	1,450	0	0	0
9	989	0	1,440	2,310	0	0	3,040	2,250	1,360	0	0	0
10	953	0	1,930	2,340	0	0	3,030	2,130	1,180	0	0	0
11	950	0	1,410	2,380	0	0	3,030	2,230	1,010	0	0	0
12	949	0	1,040	2,310	0	560	3,000	2,220	0	0	0	0
13	950	0	978	2,150	0	1,510	2,600	2,110	0	0	0	0
14	771	0	1,230	2,180	0	1,450	2,600	2,290	0	0	0	0
15	0	0	1,280	2,180	0	1,180	2,600	2,350	0	0	0	0
16	0	0	1,500	1,790	0	1,180	2,620	2,360	0	0	0	0
17	0	0	1,540	2,100	0	1,160	2,490	2,130	0	0	0	0
18	0	0	1,520	2,160	0	1,120	2,470	2,220	0	0	0	0
19	892	0	1,470	1,960	0	1,040	2,540	2,230	0	0	0	0
20	59	0	1,150	1,680	0	1,130	2,140	2,210	0	0	0	0
21	0	326	1,470	1,490	0	1,130	2,110	2,200	0	0	0	0
22	0	962	1,610	1,410	0	829	2,200	2,200	0	0	0	0
23	0	1,330	2,150	716	0	250	2,200	1,880	0	0	0	0
24	0	1,120	2,370	0	0	1,140	2,210	1,610	0	0	0	0
25	0	1,050	2,420	0	0	1,170	2,200	1,540	0	0	0	0
26	0	972	2,210	884	0	1,110	2,210	1,500	0	0	0	0
27	0	949	3,050	1,280	0	1,400	2,180	1,490	0	0	0	0
28	0	950	3,050	289	0	1,520	2,180	1,570	0	0	0	0
29	0	1,010	3,350	0	0	1,640	2,160	1,570	0	0	0	0
30	0		1,950	0	0	1,910	1,890	1,620	0	0	0	0
31	0		1,750	0	0		1,870	1,650	0	0	0	0
Sum	6,549	8,669	51,838	49,589	0	22,429	75,930	64,580	15,630	0	0	0

Month	Current Year 1964						Period 1944-1964				
	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	Day			Average	Maximum	Minimum		
Jan.			9	989	† 1	0	211	12,990	43,991	400,200	0
Feb.			23	1,330	† 1	0	299	17,195	13,555	149,500	0
Mar.			29	3,350	6	951	1,670	102,819	50,707	279,300	0
Apr.			7	2,800	† 24	0	1,650	98,358	85,901	260,900	0
May				0	0	0	0	26,392	165,400	0	0
June			30	1,910	† 1	0	748	44,487	67,748	204,300	0
July			8	3,130	31	1,870	2,450	150,605	112,227	260,000	0
Aug.			2	2,810	27	1,490	2,080	128,093	115,001	270,100	0
Sept.			3	1,580	† 12	0	521	31,002	67,151	173,300	0
Oct.				0	0	0	0	0	14,293	51,460	0
Nov.				0	0	0	0	0	20,821	182,600	0
Dec.				0	0	0	0	0	36,838	319,700	0
Yearly				3,350		0	807	585,549	654,625	1,944,700	0

‡ Mean daily † And other days

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank and cableway at the point where the northerly international land boundary (California-Baja California) intersects the Colorado River about 7 miles downstream from the Yuma Gaging Station, 5 miles west of Yuma, Arizona, 1.1 miles upstream from Morelos Diversion Structure, and about one mile downstream from Rockwood Gate. Zero of 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 337 current meter measurements during the year, 218 by the United States Section, 106 by the Mexican Section of the Commission, 13 by the United States Geological Survey, and a continuous record of gage heights. Computations by shifting control methods. Discharges are computed on the basis of a water-stage recorder located 1,680 feet 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 December 1964; daily discharge records available January 1, 1950 through December 1964.

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 1964, the flow at this point represented the total amount of Colorado River water which crossed the northerly international boundary. The flow at this station plus the flow from the three wasteways from the United States in the limitrophe section of the river, less pump diversions from the United States bank in the limitrophe section, plus the flow delivered across the southerly land boundary near San Luis, make up the total Colorado River water delivered to Mexico under terms of the 1944 Water Treaty.

EXTREMES: Prior to January 1935: Maximum instantaneous discharge estimated about 250,000 second-feet, January 22, 1916; minimum discharge, no flow several days during August and September 1934; average annual flow 13,443,000 acre-feet; maximum annual flow 25,480,000 acre-feet, 1907; minimum annual flow 1,174,000 acre-feet, 1934. Since January 1935: Maximum mean daily discharge, about 33,000 second-feet, February 7, 1942; minimum discharge, no flow during April 1935.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,370	1,720	2,130	3,080	1,550	1,620	2,950	3,840	2,500	672	898	1,050
2	1,310	1,720	2,400	3,220	1,320	1,580	3,160	4,390	2,520	689	884	1,020
3	1,430	1,860	2,970	3,330	1,650	1,610	3,340	4,020	2,550	779	894	1,060
4	1,330	1,740	3,020	3,470	1,790	1,560	3,360	4,130	2,490	803	888	958
5	1,350	1,740	2,090	3,430	1,830	1,520	3,520	4,370	2,500	763	902	932
6	1,630	1,750	2,030	3,530	1,820	1,710	3,720	4,220	2,490	774	899	994
7	1,850	1,720	2,060	3,980	1,460	1,810	4,000	3,900	2,510	771	875	934
8	1,770	1,700	2,640	3,560	1,560	1,840	4,130	3,730	2,490	751	903	932
9	1,980	1,740	2,800	3,350	1,640	1,800	3,980	3,680	2,440	757	910	1,020
10	1,850	1,720	3,290	3,400	1,520	1,800	4,080	3,490	2,170	759	895	1,010
11	1,840	1,710	2,590	3,470	1,480	1,940	4,070	3,610	1,940	749	901	954
12	2,030	1,640	2,120	3,450	1,300	2,260	3,940	3,630	1,630	718	925	989
13	2,520	1,650	2,050	3,200	1,270	2,640	3,740	3,530	1,540	708	990	962
14	2,810	1,730	2,310	3,220	1,270	2,360	3,690	3,650	1,350	701	1,000	970
15	2,320	1,980	2,280	3,190	1,220	2,040	3,730	3,640	1,360	732	888	1,000
16	2,570	2,080	2,600	3,120	1,220	1,980	3,720	3,700	1,290	1,270	1,130	942
17	2,500	2,220	2,520	3,160	1,180	2,020	3,790	3,570	1,330	925	1,140	919
18	2,680	2,190	2,570	3,080	1,190	2,050	3,730	3,620	1,340	953	1,410	826
19	3,510	2,150	2,520	2,950	1,240	2,000	3,650	3,560	1,310	1,110	1,490	1,020
20	2,630	1,680	2,590	2,700	1,230	2,130	3,350	3,540	1,340	1,180	1,760	1,010
21	2,000	2,150	2,600	2,470	1,280	2,150	3,200	3,600	1,300	1,180	1,680	1,090
22	1,670	2,120	2,620	2,500	1,280	2,050	3,230	3,600	1,330	1,240	1,430	1,110
23	1,340	2,390	3,300	2,100	1,190	2,320	3,210	3,270	1,300	1,030	1,490	1,130
24	1,170	2,310	3,410	1,910	1,240	2,270	3,210	3,040	1,300	945	1,470	1,140
25	1,050	2,220	3,560	1,660	1,240	2,250	3,180	3,020	1,390	948	1,450	1,270
26	1,130	2,160	3,340	2,320	1,260	2,270	3,250	2,950	1,340	955	1,240	1,310
27	1,070	1,960	4,250	2,500	1,290	2,300	3,250	2,850	1,360	925	911	1,360
28	1,340	2,010	4,310	1,570	1,390	2,560	3,240	2,720	1,370	927	962	1,390
29	1,500	2,380	4,490	1,380	1,730	2,630	3,360	2,560	1,650	884	1,050	1,410
30	1,210		3,230	1,710	2,080	2,840	3,250	2,600	1,290	905	1,200	1,370
31	1,520		2,860		1,640		3,190	2,630		900		1,330
Sum	56,280	56,140	87,550	86,010	44,360	61,910	109,220	108,660	52,720	27,403	33,465	33,412
Current Year 1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1964			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	105.27	103.07	19	3,730	25	1,020	1,820	111,630	526,757	1,644,000	31,900	
Feb.	104.74	103.46	23	3,110	20	1,580	1,940	111,352	437,890	1,378,000	19,400	
Mar.	105.93	103.83	29	4,790	12	1,970	2,820	173,653	412,589	1,120,000	60,400	
Apr.	105.37	102.96	7	4,120	28	1,280	2,870	170,598	309,760	823,850	0	
May	103.81	102.80	30	2,240	17	1,160	1,430	87,987	344,972	1,151,000	77,400	
June	104.41	103.08	30	2,900	4	1,400	2,060	122,797	314,083	1,175,000	8,500	
July	105.49	104.36	7	4,220	1	2,840	3,520	216,635	287,317	763,800	24,400	
Aug.	105.84	104.01	2	4,790	29	2,500	3,510	215,324	306,820	791,600	43,800	
Sept.	104.06	102.40	3	2,580	30	750	1,760	104,569	297,302	1,029,000	60,000	
Oct.	104.15	102.16	19	1,300	1	640	884	54,353	310,374	1,186,000	54,353	
Nov.	103.62	102.43	21	1,960	27	848	1,120	66,377	393,379	1,422,000	56,200	
Dec.	103.13	102.28	29	1,460	18	740	1,080	66,272	499,899	1,832,000	42,000	
Yearly	105.93	102.16		4,790		640	2,070	1,501,747	4,441,142	10,596,900	722,100	

COLORADO RIVER AT NORTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	103.16	104.62	103.93	104.66	103.19	103.29	104.48	105.11	104.00	102.27	102.84	102.67
2	103.12	103.97	104.11	104.72	103.01	103.25	104.62	105.58	104.02	102.24	102.80	102.65
3	103.23	103.69	104.64	104.84	103.35	103.29	104.76	105.26	104.02	102.36	102.79	102.71
4	103.12	103.58	104.70	104.87	103.46	103.24	104.76	105.37	104.01	102.37	102.77	102.57
5	103.13	103.56	103.96	104.88	103.51	103.20	104.90	105.58	104.02	102.28	102.84	102.53
6	103.42	103.59	103.88	104.97	103.49	103.37	105.07	105.45	104.02	102.29	102.87	102.62
7	103.63	103.54	103.89	105.27	103.15	103.48	105.30	105.17	104.03	102.29	102.77	102.53
8	103.55	103.55	104.33	104.98	103.23	103.51	105.38	105.02	103.99	102.28	102.83	102.54
9	103.70	103.59	104.49	104.79	103.33	103.49	105.30	105.00	103.96	102.28	102.82	102.63
10	103.64	103.57	104.91	104.82	103.18	103.49	105.38	104.86	103.73	102.28	102.78	102.63
11	103.66	103.50	104.39	104.78	103.11	103.58	105.39	104.93	103.56	102.28	102.76	102.59
12	103.82	103.51	103.99	104.80	102.94	103.84	105.28	104.93	103.26	102.25	102.85	102.62
13	104.17	103.51	103.88	104.69	102.95	104.19	105.10	104.83	103.16	102.23	103.05	102.56
14	104.38	103.58	104.13	104.66	102.92	103.94	105.06	104.95	103.32	102.22	103.06	102.57
15	104.04	103.81	104.09	104.61	102.86	103.63	105.07	104.96	103.00	102.29	102.74	102.61
16	104.54	103.89	104.38	104.56	102.84	103.61	105.07	105.00	102.94	102.89	102.87	102.51
17	104.57	104.01	104.37	104.59	102.82	103.61	105.14	104.86	102.98	103.06	102.72	102.49
18	104.70	103.98	104.39	104.58	102.82	103.64	105.03	104.88	102.97	103.13	103.02	102.38
19	105.11	103.93	104.33	104.44	102.84	103.58	104.99	104.85	102.97	103.60	103.14	102.62
20	104.53	103.55	104.35	104.23	102.87	103.72	104.75	104.87	102.99	103.88	103.39	102.61
21	104.12	103.95	104.34	104.09	102.96	103.76	104.60	104.86	102.95	103.81	103.35	102.74
22	103.92	103.96	104.36	104.04	102.93	103.69	104.61	104.86	102.96	103.94	103.10	102.74
23	103.73	104.17	104.92	103.72	102.85	103.87	104.61	104.62	102.96	103.37	103.16	102.79
24	103.53	104.11	105.09	103.55	*102.90	103.85	104.60	104.42	102.99	103.15	103.14	102.79
25	103.27	104.03	105.13	103.37	*102.91	103.83	104.63	104.38	103.05	103.07	103.16	102.91
26	103.35	103.98	104.94	103.84	102.93	103.82	104.67	104.31	103.01	103.01	102.94	102.95
27	103.22	103.81	105.53	104.05	102.98	103.85	104.67	104.25	103.01	102.90	102.52	103.02
28	103.82	103.82	105.58	103.22	103.08	104.09	104.65	104.16	103.03	102.94	102.61	103.07
29	104.20	104.11	105.71	103.06	103.40	104.18	104.75	104.06	103.32	102.88	102.71	103.05
30	103.67		104.66	103.36	103.69	104.38	104.67	104.08	102.99	102.87	102.83	103.05
31	104.05		104.45		103.31		104.61	104.08		102.83		103.13
Avg.	103.81	103.81	104.51	104.37	103.09	103.68	104.90	104.82	103.37	102.76	102.91	102.71

* Partly estimated

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 downstream from the northerly international boundary, and about 8 miles downstream from the Yuma Gaging Station. Zero of gage is 0.16 foot below mean sea level, U. S. C. & G. S. datum.

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 December 1964.

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 gage height, 112.86 feet on January 2, 1958; minimum mean daily gage height, 101.67 feet on February 17, 1957.

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	102.23	104.30	102.72	103.35	102.36	102.43	103.25	103.77	103.05	101.74	102.46	101.94
2	102.20	103.25	102.89	103.41	102.23	102.36	103.35	104.07	103.02	101.71	102.43	101.94
3	102.26	102.59	103.25	103.48	102.46	102.43	103.44	103.87	103.02	101.80	102.40	101.97
4	102.20	102.46	103.28	103.51	102.53	102.36	103.44	103.97	103.02	101.80	102.36	101.87
5	102.20	102.46	102.76	103.54	102.56	102.33	103.51	104.10	103.02	101.77	102.46	101.84
6	102.46	102.49	102.69	103.61	102.56	102.46	103.67	104.04	103.02	101.77	102.46	101.90
7	102.59	102.46	102.69	103.81	102.30	102.56	103.81	103.84	103.05	101.80	102.36	101.87
8	102.53	102.46	103.02	103.61	102.36	102.56	103.90	103.74	103.02	101.80	102.43	101.87
9	102.66	102.49	103.15	103.48	102.43	102.53	103.87	103.71	102.99	101.77	102.43	101.94
10	102.59	102.49	103.44	103.51	102.33	102.53	103.94	103.64	102.82	101.77	102.36	101.84
11	102.59	102.43	103.08	103.48	102.26	102.62	103.90	103.71	102.66	101.77	102.36	101.87
12	102.72	102.43	102.79	103.48	102.17	102.82	103.87	103.71	102.46	101.74	102.46	101.90
13	102.99	102.43	102.72	103.41	102.17	103.05	103.74	103.64	102.40	101.74	102.69	101.87
14	103.15	102.49	102.92	103.41	102.13	102.89	103.67	103.71	102.23	101.74	102.69	101.87
15	102.95	102.46	102.89	103.38	102.10	102.66	103.64	103.74	102.26	101.77	102.36	101.90
16	103.77	102.72	103.08	103.35	102.10	102.66	103.67	103.74	102.20	102.20	102.23	101.84
17	103.84	102.82	103.05	103.38	102.07	102.66	103.71	103.64	102.23	102.76	101.97	101.84
18	103.90	102.79	103.08	103.38	102.07	102.66	103.67	103.67	102.23	102.82	102.23	101.74
19	104.10	102.76	103.05	103.28	102.10	102.66	103.64	103.64	102.23	103.31	102.30	101.90
20	103.54	102.49	103.08	103.12	102.13	102.72	103.51	103.64	102.23	103.61	102.46	101.90
21	103.31	102.76	103.08	103.02	102.20	102.76	103.41	103.64	102.20	103.54	102.46	101.97
22	103.22	102.76	103.12	102.99	102.17	102.72	103.41	103.67	102.23	103.67	102.26	102.00
23	103.22	102.92	103.51	102.76	102.10	102.85	103.41	103.48	102.23	103.08	102.26	102.03
24	103.05	102.85	103.67	102.59	102.13	102.85	103.41	103.35	102.23	102.82	102.23	102.03
25	102.69	102.82	103.71	102.46	102.17	102.82	103.44	103.31	102.26	102.72	102.26	102.13
26	102.79	102.79	103.58	102.82	102.17	102.82	103.48	103.25	102.23	102.66	102.13	102.13
27	102.66	102.66	103.97	102.99	102.20	102.85	103.48	103.22	102.23	102.53	101.87	102.20
28	103.35	102.69	104.04	102.36	102.30	102.99	103.44	103.15	102.26	102.59	101.90	102.20
29	103.77	102.89	104.10	102.23	102.46	103.08	103.54	103.08	102.46	102.53	102.00	102.20
30	103.18		103.44	102.46	102.69	103.18	103.48	103.08	102.23	102.53	102.03	102.20
31	103.61		103.18		102.43		103.48	103.08		102.46		102.17
Avg.	102.98	102.70	103.19	103.19	102.27	102.70	103.59	103.61	102.52	102.33	102.31	101.96

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - DISCHARGES

DESCRIPTION: Water-stage recorder and staff gage on left bank of Intake Canal, 200 feet downstream from the intake at Morelos Dam, 1,350 feet upstream from the point where it joins the old Alamo Canal, 2.2 miles upstream from Matamoros Check, and about one mile south of the northerly international boundary. Zero of gage is 0.16 foot below mean sea level, U. S. C. & G. S. datum.

RECORDS: The diversions are computed from the sum of the flows of the Conexión, Alamo, and del Norte Canals below Matamoros Check. Discharges for 1964 based on a continuous record of gage heights and generally daily measurements of the canals described above. Records available; November 8, 1950 through December 1964. 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 do not permit measuring 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. Water for use in Mexico may also 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 under conditions set forth in the 1944 Water Treaty. No diversions of the above nature have been made during the years 1951 through 1964 and consequently the records reported below show the total water diverted from the Colorado River to the Alamo Canal during those years. Other diversions from the Colorado River are made by Mexico downstream from Morelos Dam by means of pumps.

EXTREMES: Maximum mean daily discharge, 6,540 second-feet, August 3, 1958; maximum mean daily gage height, 107.22 feet on November 8, 1950. Minimum daily discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,280	0	2,040	2,970	1,450	1,610	2,930	3,820	2,480	660	0	1,030
2	1,240	1,100	2,160	3,090	1,190	1,560	3,140	4,370	2,510	675	0	1,010
3	1,360	1,800	2,630	3,230	1,550	1,600	3,330	4,000	2,530	766	0	1,050
4	1,250	1,520	3,010	3,320	1,730	1,540	3,350	4,110	2,470	788	0	939
5	1,230	1,680	2,030	3,320	1,830	1,500	3,510	4,360	2,480	749	0	915
6	1,630	1,690	1,960	3,440	1,790	1,690	3,710	4,200	2,470	763	0	978
7	1,770	1,630	1,960	3,810	1,390	1,790	3,990	3,880	2,490	756	0	922
8	1,680	1,650	2,380	3,500	1,460	1,830	4,100	3,710	2,470	738	0	911
9	1,880	1,680	2,300	3,250	1,600	1,790	3,960	3,660	2,420	738	0	1,000
10	1,750	1,630	3,240	3,290	1,430	1,790	4,060	3,470	2,150	742	0	992
11	1,800	1,570	2,490	3,280	1,370	1,930	4,030	3,590	1,920	735	0	939
12	1,980	1,560	2,090	3,270	1,150	2,250	3,920	3,610	1,620	699	0	975
13	2,480	1,550	1,950	3,110	1,150	2,620	3,710	3,510	1,530	692	0	946
14	2,750	1,640	2,290	3,110	1,120	2,350	3,670	3,630	1,340	685	0	953
15	2,270	1,880	2,140	3,060	1,100	2,030	3,720	3,630	1,350	713	0	982
16	2,430	1,990	2,540	3,010	1,090	1,970	3,710	3,680	1,270	1,150	844	922
17	2,300	2,130	2,510	3,060	1,070	2,000	3,780	3,550	1,310	0	1,050	897
18	2,180	2,050	2,530	3,050	1,090	2,030	3,720	3,600	1,320	0	1,380	809
19	2,030	2,060	2,460	2,900	1,110	1,980	3,640	3,540	1,290	0	1,460	1,000
20	2,230	1,660	2,480	2,630	1,130	2,110	3,340	3,520	1,320	0	1,730	992
21	1,950	1,980	2,550	2,510	1,210	2,130	3,190	3,580	1,280	0	1,660	1,070
22	1,650	2,060	2,480	2,460	1,190	2,040	3,210	3,590	1,310	0	1,410	1,090
23	0	2,280	3,210	2,080	1,120	2,310	3,190	3,250	1,280	0	1,470	1,110
24	0	2,220	3,450	1,820	1,170	2,250	3,190	3,030	1,280	0	1,440	1,120
25	0	2,140	3,530	1,600	1,180	2,230	3,160	3,010	1,370	0	1,430	1,250
26	0	2,080	3,280	2,110	1,190	2,250	3,230	2,940	1,320	0	1,220	1,300
27	0	1,890	4,100	2,510	1,210	2,280	3,230	2,840	1,340	0	886	1,350
28	0	1,900	4,130	1,490	1,290	2,540	3,220	2,710	1,350	0	939	1,380
29	0	2,230	4,480	1,280	1,610	2,610	3,340	2,540	1,630	0	1,030	1,390
30	0		3,210	1,580	2,020	2,820	3,230	2,580	1,270	0	1,180	1,360
31	0		2,780		1,580		3,170	2,610		0		1,320
Sum		51,250		83,140		61,430		108,120		12,049		32,902
	41,120		84,390		41,570		108,680		52,170		19,129	
Current Year 1964												
Period Nov. 1950-1964												
Month	Ø Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High		Low			Average	Maximum	Minimum	
				Day	Day		Day					
Jan.	104.10	100.10	14	2,750	†23	0	1,330	81,554	47,667	114,523	966	
Feb.	102.46		23	2,280	1	0	1,770	101,685	44,973	101,685	9,232	
Mar.	103.22	101.90	29	4,480	13	1,950	2,720	167,366	163,133	216,994	97,902	
Apr.	103.15	101.61	7	3,810	29	1,280	2,770	164,908	202,309	264,127	164,908	
May	102.00	101.51	30	2,020	17	1,070	1,340	82,444	104,723	159,010	66,207	
June	102.59	101.61	30	4,100	5	1,500	2,050	121,865	190,120	269,632	121,865	
July	103.48	102.72	8	4,000	1	2,930	3,510	215,628	262,662	304,263	196,351	
Aug.	103.61	102.72	2	4,380	29	2,540	3,490	214,458	258,609	341,044	185,235	
Sept.	102.72	101.61	3	2,530	30	1,270	1,740	103,576	157,158	198,095	97,356	
Oct.	101.08	96.56	16	1,150	†17	0	388	23,906	52,674	90,639	14,129	
Nov.	101.80	96.56	20	1,730	†1	0	639	37,986	31,946	103,954	7,516	
Dec.	101.41	100.49	29	1,390	18	809	1,060	65,254	50,099	131,440	8,825	
Yearly	104.10			4,480		0	1,900	1,380,630	1,569,022	1,961,556	1,380,630	

† And other days Ø Mean daily

INTAKE CANAL AT MORELOS DIVERSION STRUCTURE - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	101.74	*	102.30	102.72	101.94	101.64	102.72	103.28	102.69	100.95	96.56	101.38
2	101.77	*	102.36	102.76	101.94	101.64	102.79	103.44	102.72	100.75	96.56	101.28
3	101.77	*	102.59	102.79	102.00	101.67	102.85	103.28	102.66	100.92	96.56	101.31
4	101.71	101.71	102.66	102.72	102.00	101.61	102.82	103.38	102.69	100.56	96.56	101.28
5	101.87	101.15	102.30	102.76	102.00	101.61	102.92	103.61	102.72	100.66	96.56	101.25
6	102.17	101.18	102.30	102.89	102.00	101.64	102.92	103.51	102.72	100.69	96.56	101.28
7	102.20	101.02	102.26	103.15	101.97	101.71	103.18	103.28	102.69	100.72	96.56	101.21
8	102.13	101.02	102.43	102.95	101.97	101.67	103.48	103.22	102.69	100.66	96.56	101.21
9	102.26	101.02	102.49	102.79	101.97	101.67	103.48	103.25	102.69	100.69	96.56	101.35
10	102.20	101.02	102.76	102.79	101.90	101.71	103.48	103.18	102.43	100.66	96.59	101.35
11	102.20	100.98	102.59	102.79	101.80	101.71	103.44	103.22	102.33	100.66	96.59	101.35
12	102.30	100.95	102.20	102.82	101.57	101.94	103.48	103.18	102.03	100.62	96.56	101.31
13	102.49	100.98	101.90	102.76	101.57	102.20	103.41	103.05	101.94	100.62	96.56	101.25
14	102.62	100.98	101.97	102.76	101.57	102.20	103.35	103.12	101.61	100.59	96.56	101.28
15	102.56	101.15	102.03	102.76	101.57	101.97	103.22	103.12	101.67	100.75	96.56	101.28
16	103.77	101.08	102.07	102.79	101.57	102.00	103.18	103.18	101.64	101.08	99.48	101.25
17	103.81	101.28	102.07	102.79	101.54	102.00	103.22	103.05	101.67	96.69	101.41	101.25
18	103.90	101.41	102.30	102.79	101.57	102.00	103.18	103.08	101.64	96.59	101.61	101.18
19	104.10	101.38	102.26	102.76	101.51	102.00	103.15	103.08	101.61	96.59	101.71	101.28
20	103.51	101.21	102.26	102.69	101.54	102.03	103.12	103.12	101.64	96.59	101.80	101.28
21	103.31	101.44	102.30	102.66	101.57	102.03	103.05	103.12	101.61	96.59	101.80	101.31
22	103.18	101.41	102.33	102.66	101.57	101.97	103.05	103.12	101.64	96.59	101.74	101.31
23	101.41	101.90	102.72	102.46	101.57	102.10	103.05	102.95	101.64	96.59	101.71	101.31
24	101.18	102.46	102.85	102.30	101.57	102.03	103.05	102.85	101.67	96.59	101.67	101.31
25	101.28	102.36	102.82	102.13	101.57	102.00	103.08	102.82	101.64	96.59	101.67	101.38
26	101.35	102.30	102.72	102.40	101.57	102.03	103.08	102.79	101.67	96.59	101.61	101.38
27	101.44	102.26	102.89	102.33	101.54	102.03	103.08	102.79	101.67	96.59	101.18	101.41
28	101.48	102.30	103.05	101.61	101.61	102.26	103.08	102.76	101.64	96.59	101.28	101.25
29	101.57	102.33	103.22	101.90	101.77	102.40	103.15	102.72	101.84	96.56	101.57	100.95
30	101.21		102.82	101.97	101.87	102.59	103.08	102.72	101.80	96.56	101.51	100.79
31	100.10		102.53		101.74		103.08	102.72		96.56		100.49
Avg.	102.21		102.46	102.62	101.72	101.94	103.14	103.10	102.04	98.72	99.01	101.24

* Water surface below gage

COLORADO RIVER IMMEDIATELY BELOW MORELOS DAM - STAGES

DESCRIPTION: Gage painted on sloping concrete apron immediately downstream from Morelos Dam, on the right bank of the river, 1.1 miles downstream from the northerly international boundary, and about 8.0 miles downstream from the Yuma Gaging Station. Zero of gage is 0.16 foot below mean sea level, U. S. C. & G. S. datum.

RECORDS: Mean daily gage heights obtained from hourly gage readings. Records obtained and furnished by the Mexican Section of the Commission. Records available: Gage heights only, February 20, 1951 through December 1964.

EXTREMES: Maximum mean daily gage height, 112.80 feet, January 2, 1958; minimum mean daily gage height, 98.65 feet, several days in December 1963 and January 1964.

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	98.65	104.33	99.61	99.54	99.38	99.28	99.38	99.31	99.31	99.38	102.62	98.88
2	98.69	101.64	99.67	99.54	99.21	99.31	99.31	99.25	99.34	99.38	102.56	98.85
3	98.65	99.08	99.15	99.51	99.21	99.31	99.31	99.31	99.44	99.34	102.56	98.79
4	98.65	99.08	98.98	99.48	99.21	99.38	99.25	99.28	99.28	99.38	102.53	98.75
5	98.65	99.02	99.61	99.44	99.25	99.38	99.25	99.25	99.28	99.41	102.62	98.75
6	98.65	98.98	99.61	99.44	99.25	99.34	99.25	99.28	99.31	99.41	102.62	98.75
7	98.69	98.95	99.54	99.44	99.25	99.31	99.25	99.28	99.31	99.38	102.49	98.79
8	98.65	98.95	99.51	99.44	99.28	99.31	99.25	99.31	99.31	99.31	102.56	98.75
9	98.65	98.95	99.54	99.44	99.21	99.31	99.28	99.31	99.28	99.38	102.56	98.79
10	98.69	98.95	99.54	99.44	99.25	99.31	99.28	99.31	99.28	99.31	102.53	98.75
11	98.65	98.95	99.64	99.44	99.25	99.31	99.28	99.31	99.28	99.34	102.49	98.75
12	98.65	98.95	99.57	99.44	99.28	99.38	99.34	99.31	99.21	99.38	102.59	98.75
13	98.69	98.95	99.61	99.41	99.31	99.38	99.28	99.31	99.21	99.38	102.85	98.75
14	98.69	98.95	99.51	99.44	99.34	99.21	99.28	99.34	99.21	99.34	102.85	98.79
15	98.69	98.95	99.44	99.41	99.34	99.25	99.31	99.31	99.21	99.34	102.53	98.75
16	100.36	98.95	99.44	99.44	99.25	99.28	99.28	99.31	99.21	99.74	100.75	98.79
17	98.95	98.95	99.48	99.48	99.21	99.31	99.25	99.31	99.28	102.89	99.44	98.79
18	100.13	98.95	99.51	99.41	99.25	99.34	99.21	98.95	99.38	103.02	99.05	98.75
19	103.58	98.95	99.51	99.34	99.28	99.31	99.15	98.85	99.38	103.41	98.98	98.75
20	102.10	98.95	99.51	99.34	99.31	99.31	99.15	98.95	99.38	103.77	98.95	98.75
21	99.11	98.95	99.48	99.34	99.34	99.31	99.18	99.28	99.41	103.71	98.88	98.75
22	99.08	99.70	99.51	99.44	99.34	99.31	99.25	99.21	99.41	103.84	98.85	98.75
23	103.22	99.64	99.54	99.38	99.28	99.21	99.31	99.25	99.41	103.25	98.85	98.75
24	103.05	99.64	99.54	99.44	99.28	99.28	99.34	99.31	99.38	102.95	98.88	98.75
25	102.69	99.61	99.51	99.44	99.41	99.28	99.34	99.31	99.41	102.85	98.85	98.75
26	102.82	99.57	99.48	99.48	99.25	99.31	99.31	99.25	99.41	102.79	98.85	98.75
27	102.66	99.67	99.51	99.42	99.21	99.41	99.28	99.25	99.41	102.69	98.88	98.75
28	103.31	99.67	99.51	99.31	99.18	99.38	99.31	99.25	99.41	102.72	98.85	98.79
29	103.81	99.70	99.51	99.28	99.18	99.38	99.38	99.28	99.44	102.66	98.85	98.75
30	103.22		99.51	99.28	99.31	99.38	99.34	99.28	99.41	102.66	98.92	98.75
31	103.58		99.54	99.34	99.34		99.38	99.31		102.59		98.75
Avg.	100.38	99.43	99.50	99.42	99.27	99.31	99.28	99.25	99.33	101.16	100.83	98.77

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 1.5 miles downstream from the northerly international boundary and 0.4 mile downstream from Morelos Diversion Dam. This is one of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, March 1950 through December 1964, 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, January 1940; minimum monthly discharge, zero for various months. Since March 1950, maximum instantaneous discharge, 50.1 second-feet, August 16, 1958, at maximum gage height of 113.32 feet; minimum instantaneous discharge, zero during parts of each month.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	1.5	0.4	8.8	3.8	2.6	1.2	2.8	0	6.0	4.6	0.1
2	1.0	7.7	0	2.1	.6	.3	.5	3.9	7.3	4.1	.6	0
3	2.6	.1	0	2.7	.7	1.6	.8	3.5	3.7	1.6	.9	0
4	2.5	0	.4	.4	.1	4.8	.4	1.1	.7	5.7	4.0	1.8
5	5.4	0	5.5	0	0	2.0	.4	3.1	3.7	2.4	4.0	3.0
6	.3	1.4	4.0	0	0	.2	.3	1.7	.5	5.2	2.7	.6
7	.3	2.8	.7	0	3.4	1.0	.6	.3	5.2	.4	1.4	0
8	.1	8.8	1.1	0	4.6	4.0	.2	1.0	.1	0	3.0	0
9	.1	5.7	.3	1.5	3.6	.9	1.7	1.9	0	2.9	3.3	0
10	.1	3.3	.3	.2	.5	.3	4.2	1.5	.3	0	3.9	0
11	1.8	2.8	4.9	2.5	.4	2.5	4.7	.2	.4	2.2	2.2	0
12	6.4	2.6	2.0	2.5	1.3	11.7	.1	0	.9	.4	3.6	2.9
13	5.0	7.1	4.0	.2	1.7	1.1	0	0	1.2	.3	.1	2.2
14	1.8	5.3	0	.4	.4	.3	3.3	.1	.3	.2	.8	.1
15	0	5.4	0	.4	.4	1.2	4.8	4.1	.3	.2	.4	.7
16	4.1	.8	0	3.3	1.8	.8	.1	4.6	.4	3.5	.4	.5
17	4.0	1.7	2.2	.7	4.9	0	2.8	5.7	.4	2.4	.4	1.8
18	3.0	7.4	.6	.3	3.5	0	0	1.8	.5	2.9	1.1	5.2
19	.6	2.4	4.6	.5	4.7	3.4	1.2	1.8	.9	1.3	1.0	.6
20	9.5	2.1	6.1	5.6	3.7	1.2	.4	1.9	1.0	.3	.4	.4
21	5.3	4.2	1.6	3.2	2.9	0	.3	1.8	.2	.4	.2	1.1
22	1.3	11.1	5.7	6.5	1.3	.4	1.7	.5	.6	.1	5.8	1.7
23	2.1	2.3	4.8	2.5	.3	2.2	2.2	.5	.2	1.0	.1	.4
24	2.1	.8	4.0	4.4	3.9	1.7	.8	6.1	.2	4.0	0	0
25	1.2	1.9	4.0	6.9	11.1	.8	.3	1.2	.4	1.3	0	3.2
26	.4	1.2	4.4	12.8	3.8	1.9	1.9	1.6	2.6	1.7	.2	4.4
27	1.1	2.9	.4	3.8	2.3	2.4	2.5	.8	1.9	.8	6.4	3.0
28	10.6	1.8	3.7	.9	.6	1.7	3.0	0	.1	3.9	.9	2.0
29	.9	9.5	.2	.7	2.4	1.6	1.7	0	0	.3	1.2	.3
30	1.2	0	1.0	5.6	.9	2.2	.1	0	0	0	1.0	0
31	1.6	5.6	5.6	1.9	1.9	2.4	2.4	2.4	0	0	0	0
Sum	78.8	104.6	71.5	74.8	76.2	53.5	46.7	56.0	34.0	55.5	54.6	36.0

Month	Extreme Gage Feet		Current Year 1964				Average Second Feet	Total Acre Feet	Period 1935-1964			
	High	Low	Extreme Second Feet		Day	Day			Acre Feet			
			High	Low			Average	Maximum	Minimum			
Jan.	112.57	111.00	13	27.4	†	8	0	2.5	156	212	914	0
Feb.	112.53	111.00	8	26.4	†	2	0	3.6	207	184	400	6
Mar.	112.49	111.00	28	25.4	†	2	0	2.3	142	195	517	0
Apr.	112.48	111.00	24	25.1	†	5	0	2.5	148	213	425	40
May	112.54	111.00	9	26.6	†	4	0	2.5	151	199	440	76
June	112.53	111.00	†	26.4	†	2	0	1.8	106	187	595	47
July	112.48	111.00	9	25.1	†	2	0	1.5	92.6	171	516	0
Aug.	112.61	111.00	31	28.4	†	9	0	1.8	111	130	617	0
Sept.	112.53	111.00	26	26.4	†	1	0	1.1	67.4	133	462	0
Oct.	112.45	111.00	1	24.4	†	1	0	1.8	110	162	490	0
Nov.	112.54	111.00	22	26.6	†	1	0	1.8	108	190	462	9
Dec.	112.53	111.00	12	26.4	†	1	0	1.2	71.4	227	592	71.4
Yearly	112.61	111.00		28.4			0	2.0	1,470	2,203	4,500	1,178

† And other days

COLORADO RIVER AT MORELOS GAGING STATION - DISCHARGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of the river, and cableway 1.8 miles downstream from the northerly international boundary, 0.7 mile downstream from Morelos Diversion Dam, and about 9 miles downstream from Yuma, Arizona, along the river levee. The cableway and recorder are 1,260 feet and 1,300 feet, respectively, below the mouth of Cooper Wasteway. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 110 current meter measurements during the year, 97 by the United States Section and 13 by the Mexican Section, and a continuous record of gage heights. Computations by shifting control methods. Records available: Daily discharges, January 1, 1954 through December 1964; continuous record of gage heights, July 20, 1952 through December 1964.

REMARKS: Reservoirs, diversions in United States and Mexico, drainage returns, and waste flows modify the river flow at this station. The record at this station, less that of Cooper Wasteway, represents the river flow passing Morelos Diversion Dam.

EXTREMES: Maximum instantaneous discharge, 22,240 second-feet on January 4, 1955; maximum gage height, 112.18 feet on January 28, 1958. Minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	18.2	1,760	13.4	22.9	20.7	17.1	20.2	20.7	16.6	17.6	913	21.8
2	17.0	842	29.3	20.2	16.6	17.1	17.1	19.0	18.9	17.6	880	15.0
3	17.0	34.5	39.3	20.7	16.6	17.1	16.6	19.0	23.1	16.2	870	16.0
4	17.0	23.0	17.7	18.5	16.6	21.2	14.3	16.2	19.0	18.5	858	18.2
5	20.6	20.6	20.8	15.7	17.6	19.6	13.8	17.1	19.6	18.0	878	20.6
6	15.0	18.2	18.0	19.6	17.1	18.0	16.2	17.6	18.5	17.1	900	16.0
7	16.0	20.6	14.7	20.2	19.0	17.6	16.6	17.6	22.5	14.7	872	15.0
8	13.0	27.8	14.7	20.2	19.6	18.5	17.6	18.0	18.5	15.7	885	19.4
9	15.0	23.0	15.7	21.2	17.1	16.2	20.2	18.0	18.0	19.6	890	18.2
10	16.0	23.0	17.6	21.2	15.7	12.2	22.4	19.0	16.6	16.2	889	17.0
11	16.0	20.6	20.2	22.9	17.6	14.7	22.9	19.6	14.7	17.1	902	16.0
12	21.8	18.2	18.0	22.9	20.2	23.4	18.5	20.7	12.2	17.6	930	18.2
13	27.8	24.2	20.7	20.7	21.8	18.0	17.6	18.5	13.8	15.7	981	17.0
14	21.8	20.6	15.7	21.2	20.7	11.0	16.6	19.0	11.8	16.2	1,000	17.0
15	15.0	20.6	13.4	21.2	20.2	13.8	20.2	19.0	13.0	16.6	892	19.4
16	339	15.0	14.3	23.4	13.8	15.2	14.7	20.7	14.3	118	431	20.6
17	56.8	18.2	15.7	24.6	15.7	18.0	15.7	21.1	16.2	915	88.4	21.8
18	301	20.6	16.2	20.2	17.6	18.0	12.6	20.7	18.0	954	29.0	23.0
19	1,410	23.0	18.5	16.6	19.0	18.5	12.6	20.7	18.5	1,080	27.8	19.4
20	445	17.0	19.6	19.0	19.6	19.0	14.3	18.6	17.6	1,190	26.1	17.0
21	37.6	16.0	15.7	23.4	20.2	17.1	13.4	18.0	19.0	1,180	17.0	19.4
22	20.3	* 26.0	20.7	26.6	18.0	15.2	18.0	14.3	19.0	1,230	24.9	20.6
23	1,240	14.7	20.2	22.4	16.6	16.6	21.2	17.1	20.2	1,020	19.8	18.2
24	1,200	15.2	18.0	22.4	17.1	20.7	19.0	20.2	20.2	939	23.5	18.2
25	1,060	14.3	17.6	24.0	25.3	18.0	17.6	15.7	21.2	926	21.2	19.4
26	1,090	12.6	19.0	28.6	15.7	19.6	17.6	14.3	19.0	926	22.4	19.4
27	1,030	16.2	20.2	24.0	17.1	21.2	19.6	15.7	20.2	916	29.9	18.2
28	1,320	15.7	20.7	19.6	14.7	19.0	22.4	13.8	18.0	903	20.8	17.0
29	1,530	18.2	18.5	19.0	15.7	21.2	22.4	15.7	18.0	901	16.0	14.0
30	1,280		17.1	19.6	20.2	20.7	23.4	17.1	18.0	896	20.9	15.0
31	1,400		20.2		19.0		22.9	21.8		892		14.0
Sum	14,026.9	3,139.6	581.4	642.7	562.4	533.5	558.2	564.5	534.2	15,240.4	14,358.7	560.0
Current Year 1964									Period 1954-1964			
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.	103.33	97.85	19	1,680	8	11.0	452	27,822	273,828	969,540	27,822	
Feb.	103.55	97.96	1	1,800	26	10.6	108	6,227	137,066	414,310	6,227	
Mar.	100.59	98.04	2	250	2	11.8	18.8	1,153	88,337	630,230	780	
Apr.	99.59	99.10	17	45.8	5	15.2	21.4	1,275	68,851	532,320	899	
May	99.41	99.02	15	34.8	16	13.0	18.1	1,116	81,007	375,970	460	
June	99.41	99.00	12	32.6	14	10.2	17.8	1,058	18,074	119,980	834	
July	99.40	98.98	1	31.2	19	11.4	18.0	1,107	17,570	89,430	654	
Aug.	99.48	97.98	12	39.1	26	12.2	18.2	1,120	30,787	125,590	702	
Sept.	99.57	99.01	7	46.7	14	10.2	17.8	1,060	22,754	87,830	113	
Oct.	103.38	99.10	22	1,280	7	12.2	492	30,229	65,075	172,940	9,750	
Nov.	102.49	98.02	16	1,160	29	16.0	479	28,480	131,340	356,390	4,869	
Dec.	98.14	97.93	12	33.8	31	13.0	18.1	1,111	181,234	643,850	1,111	
Yearly	103.55	97.85		1,800		10.2	140	101,758	1,115,923	3,957,730	101,758	

* Partly estimated

COLORADO RIVER AT MORELOS GAGING STATION - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	97.94	103.45	99.43	99.40	99.16	99.16	99.22	99.14	99.10	99.21	102.00	98.07
2	97.93	100.95	99.48	* 99.33	99.08	99.16	99.15	99.11	99.14	99.21	101.92	98.00
3	97.93	98.29	98.28	* 99.32	99.08	99.16	99.14	99.12	99.22	99.18	101.92	98.00
4	97.93	98.23	98.45	* 99.28	99.08	99.24	99.08	99.06	99.15	99.24	101.88	98.02
5	97.95	98.18	99.42	* 99.21	99.10	99.21	99.06	99.10	99.16	99.23	101.94	98.03
6	97.90	98.13	99.45	* 99.28	99.09	99.18	99.10	99.12	99.14	99.21	102.01	97.98
7	97.91	98.14	99.37	99.29	99.13	99.16	99.11	99.14	99.22	99.16	101.88	97.96
8	97.88	98.19	99.36	99.27	99.14	99.18	99.12	99.15	99.15	99.17	101.91	97.99
9	97.89	98.14	99.38	* 99.28	99.10	99.13	99.16	99.15	99.15	99.25	101.91	97.99
10	97.90	98.13	99.41	± 99.28	99.08	99.04	99.19	99.18	99.12	99.18	101.86	97.98
11	97.90	98.11	99.47	± 99.30	99.12	99.10	99.20	99.19	99.09	99.20	101.84	97.98
12	97.95	98.11	99.43	± 99.30	99.18	99.27	99.12	99.20	99.04	99.21	101.93	98.01
13	98.00	98.17	99.46	* 99.25	99.21	99.17	99.09	99.16	99.09	99.17	102.17	98.01
14	97.95	98.13	99.35	99.26	99.19	99.02	99.07	99.16	99.05	99.18	102.18	98.01
15	97.89	98.12	99.28	99.25	99.18	99.09	99.15	99.16	99.09	99.20	101.88	98.03
16	99.69	98.06	99.29	99.28	99.04	99.12	99.05	99.19	99.13	99.47	100.21	98.03
17	98.26	98.07	99.30	99.29	99.08	99.17	99.07	98.85	99.17	102.35	98.76	98.03
18	99.32	98.08	99.35	99.21	99.12	99.16	99.00	98.02	99.22	102.44	98.25	98.04
19	102.73	98.07	99.38	99.14	99.15	99.17	99.01	98.02	99.23	102.82	98.22	98.00
20	99.99	98.00	99.40	99.20	99.16	99.18	99.05	98.36	99.22	103.19	98.19	97.98
21	98.24	98.36	99.31	99.28	99.18	99.14	99.04	99.11	99.25	103.03	98.10	98.00
22	98.10	99.56	99.41	99.32	99.14	99.10	99.14	99.03	99.25	103.16	98.14	98.01
23	102.40	99.48	99.39	99.24	99.11	99.13	99.20	99.08	99.28	102.62	98.07	97.99
24	102.32	99.49	99.35	99.24	99.12	99.21	99.16	99.13	99.28	102.33	98.09	97.98
25	102.00	99.47	99.33	99.26	99.27	99.16	99.13	99.04	99.30	102.22	98.06	97.99
26	102.06	99.42	99.35	99.32	99.09	99.19	99.12	99.03	99.27	102.17	98.06	97.99
27	101.90	99.49	99.37	99.24	99.12	99.23	99.16	99.08	99.29	102.06	98.12	97.98
28	102.55	99.48	99.38	99.15	99.07	99.19	99.21	99.06	99.26	102.09	98.05	97.97
29	102.99	99.53	99.33	99.13	99.10	99.23	99.19	99.10	99.26	102.03	98.02	97.94
30	102.49		99.30	99.14	99.20	99.23	99.18	99.12	99.24	102.01	98.06	97.95
31	102.76		99.36		99.19		99.17	99.20		101.99		97.94
Avg.	99.57	98.79	99.31	99.26	99.13	99.16	99.12	99.02	99.19	100.77	100.12	98.00

* Partly estimated

± 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 downstream from the northerly international boundary and 3.2 miles downstream from Morelos Diversion Dam. It is the largest of three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through December 1964, obtained by the United States Section; monthly discharge, January 1924 through December 1950, by Bureau of Reclamation.

EXTREMES: Prior to January 1951, maximum monthly discharge, 9,740 acre-feet in August 1940; minimum monthly discharge, zero in April 1941. Since January 1, 1951, maximum instantaneous discharge, 800 second-feet on December 3, 1961, at a maximum gage height of 117.60 feet; minimum instantaneous discharge, zero during parts of most years.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	23.6	10.8	109	5.5	31.6	23.4	1.2	2.2	12.7	4.4	2.3	1.5
2	28.5	76.4	20.2	20.4	34.9	14.6	1.0	11.7	8.1	3.3	3.0	18.9
3	6.3	36.7	2.4	18.6	88.8	1.4	1.2	7.3	2.9	2.5	1.3	13.0
4	2.4	4.8	2.0	22.3	30.8	3.4	1.0	3.3	1.6	2.6	2.2	9.7
5	23.8	9.4	6.4	78.0	2.6	11.6	1.2	10.6	1.6	3.6	6.5	4.8
6	30.8	10.0	21.1	38.6	7.6	18.7	4.3	11.0	3.3	8.2	4.8	73.1
7	6.0	16.7	16.3	4.4	2.7	6.7	1.0	1.3	5.0	5.0	3.3	37.2
8	7.0	6.6	26.4	10.3	8.5	7.4	1.2	1.2	1.5	6.2	23.7	3.8
9	7.9	3.7	27.5	32.9	19.1	10.4	8.1	7.0	1.8	5.4	8.8	1.8
10	6.4	18.5	3.1	28.5	8.3	9.5	4.8	2.0	1.3	1.6	4.2	1.4
11	14.4	29.5	7.3	5.4	15.6	11.7	1.2	1.8	4.6	1.5	2.2	1.4
12	18.4	23.5	27.1	27.0	4.4	3.4	3.0	1.7	1.3	1.5	5.3	8.6
13	18.8	11.2	13.3	28.1	2.7	12.9	1.4	1.6	2.8	1.5	11.5	1.9
14	6.9	20.2	18.2	18.2	3.9	6.4	1.3	1.6	5.4	12.7	6.1	1.6
15	11.4	18.8	27.8	7.4	6.9	3.2	12.2	1.5	1.6	17.3	1.6	1.5
16	11.8	38.0	13.1	6.6	2.6	8.5	16.3	1.5	8.3	8.9	1.7	1.6
17	36.2	16.0	1.7	19.0	9.6	1.0	8.3	6.4	1.6	11.1	1.7	1.5
18	33.4	10.8	5.1	8.8	8.4	1.1	1.7	12.7	1.5	9.9	9.9	1.6
19	4.0	17.0	14.5	20.0	16.8	.9	1.7	2.6	1.5	8.5	5.4	1.6
20	17.6	15.4	27.0	8.2	6.1	.8	2.6	10.2	1.5	1.6	2.4	1.6
21	37.1	2.6	30.9	27.4	23.5	.9	1.3	1.4	1.5	2.9	3.1	1.5
22	3.8	16.4	25.4	29.1	8.0	1.0	1.3	1.6	1.3	5.5	95.4	4.6
23	25.8	38.7	7.7	36.0	2.5	1.0	1.3	17.0	1.5	13.9	34.3	1.6
24	34.8	42.1	2.0	46.2	1.3	.9	1.3	18.5	6.6	5.4	20.5	1.3
25	12.9	5.1	7.1	27.9	7.0	1.2	3.2	1.7	1.2	1.5	9.0	1.8
26	7.5	3.3	17.0	23.0	9.4	1.2	1.5	41.4	1.2	5.9	3.7	1.3
27	3.1	20.0	29.9	12.7	14.3	1.0	1.9	41.7	4.1	1.3	38.4	1.2
28	16.8	6.1	21.9	3.5	13.4	1.2	15.1	2.1	6.8	56.5	11.1	1.3
29	29.6	8.9	38.8	10.6	23.3	1.2	2.9	2.0	1.4	33.1	1.6	1.3
30	19.1		5.7	8.1	6.4	1.2	1.6	1.5	1.3	2.8	5.4	1.3
31	8.6		2.1		32.9		5.4	7.3		4.7		1.8
Sum		537.2		632.7	453.9	167.8		230.4	96.8	250.8	330.4	207.1
	514.7		578.0				111.5					
Current Year 1964								Period 1935-1964				
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.	113.03	111.84	21	73.3	4	1.7	16.6	1,021	4,383	9,570	263	
Feb.	114.80	111.84	2	179	†24	1.7	18.5	1,066	3,502	8,430	657	
Mar.	116.38	111.78	1	376	4	.9	18.6	1,146	3,291	6,230	1,000	
Apr.	116.15	111.83	5	332	†11	1.6	21.1	1,255	3,039	6,300	0	
May	115.69	111.80	3	264	†26	1.2	14.6	900	3,698	9,320	101	
June	112.87	111.77	5	62.9	†20	.8	5.6	333	3,498	7,440	333	
July	113.59	111.78	28	103	2	.9	3.6	221	3,535	8,320	221	
Aug.	115.19	111.76	26	209	29	.6	7.4	457	2,967	9,740	457	
Sept.	112.66	111.80	1	48.2	†10	1.2	3.2	192	2,198	6,140	192	
Oct.	116.03	111.77	31	314	31	.8	8.1	497	2,952	5,680	497	
Nov.	116.25	111.80	22	350	†1	1.2	11.0	655	3,514	8,220	655	
Dec.	115.96	111.78	6	304	9	.9	6.7	411	4,720	9,430	411	
Yearly	116.38	111.76		376		0.6	11.2	8,154	41,297	82,900	8,154	

† And other days

COLORADO RIVER AT ELEVEN MILE GAGE - STAGES

DESCRIPTION: Water-stage recorder on the left (Arizona) bank of river, 4.3 miles downstream from northerly international boundary, 3.2 miles downstream from Morelos Diversion Dam, about 50 feet downstream from the mouth of Eleven Mile Wasteway of the Yuma Project, and 11 miles downstream from Yuma, Arizona along the river levee. Zero of 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 December 1964; 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 limnographic section of the river.

EXTREMES: Since November 1947, maximum mean daily gage height, 108.20 feet, January 2, 1958; minimum mean daily gage height, 95.37 feet, August 31, 1963 and July 3, 1964.

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	95.60	100.49	96.28	95.62	95.75	95.72	95.44	95.53	95.71	95.80	99.35	95.73
2	95.62	98.74	95.78	95.73	95.77	95.62	95.43	95.63	95.61	95.80	99.28	95.76
3	95.48	96.20	96.01	95.68	96.07	95.50	95.40	95.58	95.73	95.76	99.29	95.75
4	95.44	95.95	95.56	95.70	95.80	95.55	95.39	95.48	95.64	95.81	99.26	95.73
5	95.58	95.90	95.56	95.99	95.58	95.61	95.37	95.62	95.63	95.86	99.35	95.71
6	95.66	95.85	95.69	95.84	95.55	95.68	95.47	95.65	95.66	95.93	99.38	96.08
7	95.49	95.89	95.67	95.63	95.54	95.57	95.46	95.54	95.74	95.85	99.28	95.82
8	95.46	95.85	95.70	95.63	95.57	95.57	95.47	95.55	95.69	95.88	99.39	95.69
9	95.46	95.79	95.74	95.80	95.68	95.59	95.51	95.62	95.67	95.92	99.37	95.67
10	95.46	95.85	95.54	95.77	95.58	95.53	95.56	95.58	95.66	95.84	99.31	95.65
11	95.50	95.91	95.56	95.63	95.66	95.55	95.52	95.58	95.66	95.83	99.28	95.64
12	95.58	95.87	95.71	95.78	95.56	95.50	95.51	95.57	95.60	95.84	99.38	95.72
13	95.64	95.85	95.64	95.77	95.56	95.55	95.48	95.57	95.62	95.84	99.61	95.69
14	95.50	95.86	95.66	95.67	95.54	95.38	95.44	95.56	95.65	95.94	99.64	95.66
15	95.47	95.84	95.68	95.62	95.56	* 95.40	95.57	95.56	95.57	96.06	99.34	95.67
16	96.94	95.97	95.60	95.65	95.49	95.50	95.63	95.59	95.69	96.01	98.07	95.67
17	96.14	95.81	95.46	95.75	95.57	95.41	95.52	95.74	95.71	99.68	96.52	95.66
18	96.75	95.77	95.54	95.64	95.55	95.44	95.44	95.79	95.72	99.92	96.00	95.67
19	99.64	95.82	95.64	95.72	95.60	95.45	95.43	95.67	95.74	100.23	95.91	95.65
20	97.75	95.76	95.75	95.60	95.48	95.47	95.46	95.66	95.75	100.54	95.84	95.63
21	96.18	95.60	95.75	95.78	95.70	95.45	95.43	95.55	95.77	100.42	95.77	95.65
22	95.75	95.70	95.79	95.76	95.57	95.44	95.46	95.54	95.71	100.52	96.32	95.68
23	99.37	95.88	95.62	95.79	95.50	95.42	95.49	95.71	95.70	100.02	95.96	95.64
24	99.49	95.93	95.51	95.89	95.48	95.47	95.49	95.74	95.82	99.70	95.86	95.63
25	99.10	95.61	95.50	95.78	95.60	95.48	95.49	95.59	95.77	99.57	95.78	95.64
26	99.16	95.60	95.63	95.77	95.58	95.47	95.47	95.78	95.79	99.52	95.74	95.63
27	99.00	95.76	95.72	95.68	95.56	95.51	95.49	95.92	95.84	99.41	95.99	95.62
28	99.58	95.67	95.71	95.55	95.52	95.49	95.59	95.53	95.87	99.53	95.78	95.62
29	100.07	95.71	95.78	95.61	95.61	95.50	95.54	95.59	95.80	99.45	95.67	95.60
30	99.59		95.58	95.58	95.56	95.46	95.50	95.58	95.79	99.36	95.72	95.60
31	99.74		95.56	95.72	95.72		95.53	95.65		99.32		95.62
Avg.	97.01	96.08	95.67	95.71	95.61	95.51	95.48	95.62	95.71	97.78	97.71	95.68

† Estimated

* Partly estimated

TWENTY-ONE 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 18.5 miles downstream from the northerly international boundary, 17.4 miles downstream from Morelos Diversion Dam, and 2.2 miles upstream from the southerly international boundary. It is the farthest downstream of the three wasteways discharging waste water from the Valley Division of the Yuma Project in the United States into the limitrophe section of the Colorado River and is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Flow is computed from head on the weir measured by the water-stage recorder and weir rating determined by monthly current meter measurements. Station operated by the United States Section of the Commission. Records available: Daily discharge, January 1951 through December 1964, obtained by the United States Section; monthly discharge, March 1939 through December 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.

EXTREMES: Prior to January 1951, maximum monthly discharge, 2,860 acre-feet, January 1946; minimum monthly discharge, 122 acre-feet, September 1950. Since January 1, 1951, maximum instantaneous discharge, 102 second-feet, January 24, 1954 at maximum gage height of 95.46 feet (present datum); minimum instantaneous discharge, zero during a part of most months.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.9	3.9	31.7	2.0	25.7	5.2	0	0.3	7.0	1.0	0.7	6.1
2	6.6	16.9	18.3	11.3	25.4	.8	0	7.5	1.4	5.2	7.6	.7
3	12.6	24.3	1.6	4.4	21.7	.4	1.8	15.3	13.1	4.3	8.1	.2
4	4.4	1.9	.7	13.0	23.8	.5	.8	5.9	4.2	.2	14.8	2.0
5	17.7	.5	8.8	16.1	2.7	9.4	2.5	2.1	.2	0	.4	8.8
6	15.1	1.7	21.4	26.1	.8	10.7	4.1	5.4	.7	5.7	1.9	21.4
7	4.6	3.3	9.5	5.3	4.7	8.0	4.1	1.3	.1	4.2	.9	20.1
8	22.6	9.7	15.2	3.4	30.3	10.8	3.8	9.1	2.9	3.1	.3	1.4
9	13.5	6.0	8.4	9.0	19.6	2.7	8.1	5.6	3.2	2.1	8.2	.5
10	19.2	6.4	17.8	7.8	25.0	4.9	1.1	1.2	5.8	8.0	.3	.7
11	13.9	6.8	28.9	7.3	21.2	5.5	2.5	2.9	.1	5.2	.3	1.6
12	11.2	5.2	21.3	4.7	5.4	6.7	4.0	.1	5.0	1.6	.2	11.3
13	20.2	1.5	8.5	6.5	4.0	5.6	8.0	.4	1.2	4.2	5.3	8.3
14	14.9	4.1	25.1	12.7	15.3	13.2	2.5	.4	2.2	.3	.3	6.4
15	7.4	.3	19.3	10.7	16.1	5.4	6.2	1.1	.9	5.8	.1	3.1
16	7.3	18.1	19.3	3.3	12.5	3.1	.7	3.9	5.1	1.9	4.8	2.4
17	8.5	19.7	4.4	15.8	14.7	1.5	1.4	.3	.7	6.0	3.8	.4
18	10.4	11.4	9.7	7.9	8.5	2.8	4.0	7.5	1.4	3.2	15.1	.3
19	9.7	5.4	24.0	10.0	9.2	3.4	.9	1.5	1.3	2.7	6.9	4.2
20	14.4	2.9	5.1	2.5	6.2	7.7	.8	.4	1.9	.4	.7	6.1
21	5.1	12.5	14.3	7.3	4.9	3.0	1.6	5.3	.6	.3	5.6	4.6
22	4.7	9.2	10.6	4.4	1.2	11.5	.2	2.4	.3	.3	17.8	14.4
23	12.8	23.0	13.2	1.9	5.5	.8	.2	8.8	2.2	2.9	25.3	4.0
24	5.7	8.7	15.9	11.8	8.9	11.9	.2	.1	1.4	.2	2.4	5.9
25	7.6	5.5	21.8	19.9	3.6	6.9	.3	7.0	3.6	.4	.5	1.0
26	3.1	3.7	24.0	23.3	7.9	1.0	2.2	37.1	.1	.8	.2	7.3
27	9.4	7.4	19.6	9.6	9.3	.2	.2	24.0	.1	.4	.2	.7
28	2.1	12.1	5.5	2.7	2.4	.2	.2	1.1	.8	9.5	20.5	4.3
29	3.4	5.0	19.7	10.5	7.9	1.5	.2	.3	.2	27.6	11.2	1.3
30	2.2	17.0	18.2	12.5	.1	.2	.2	.2	3.9	1.4	4.8	1.4
31	.1	2.8	2.8	11.3	11.3	.1	1.4	.1		.3		5.5
Sum	296.3	237.1	463.4	289.4	368.2	145.4	64.2	158.6	71.6	109.2	169.2	156.4
Current Year 1964									Period 1939-1964			
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.	94.32	92.93	12	35.5	31	0	9.6	588	1,111	2,860	397	
Feb.	94.65	92.92	3	47.0	6	0	8.2	470	939	2,510	470	
Mar.	94.65	92.96	1	47.0	13	.2	14.9	919	860	1,660	293	
Apr.	94.51	92.95	24	42.2	†27	.2	9.6	574	933	1,940	326	
May	94.89	92.98	8	55.9	7	.3	11.9	730	1,165	2,470	183	
June	95.18	92.93	24	67.2	30	0	4.8	288	1,014	2,350	288	
July	94.38	92.92	7	37.6	†2	0	2.1	127	876	1,950	127	
Aug.	95.18	92.92	5	67.2	†5	0	5.1	315	910	2,530	200	
Sept.	94.62	92.92	24	46.0	24	0	2.4	142	810	2,180	122	
Oct.	94.72	92.92	28	49.5	31	0	3.5	217	972	2,100	217	
Nov.	94.51	92.92	28	42.2	1	0	5.6	336	1,135	2,380	327	
Dec.	94.26	92.94	5	33.4	†17	.1	5.0	310	1,293	2,680	310	
Yearly	95.18	92.92		67.2		0	6.9	5,016	12,018	24,370	5,016	

† And other days

DIVERSIONS BY PUMPS IN THE UNITED STATES - LIMITROPHE SECTION

DESCRIPTION: Approximately 11 pumps located along the left bank of the Colorado River in the limitrophe section operated by individuals to pump water for irrigating land in the river floodway in the United States.

RECORDS: Quantities of water pumped are estimated by the United States Section of the Commission from WEEKLY readings of running time meters attached to the pumps, and pump capacities. Records available: January 1956 through December 1964.

REMARKS: These records are used in the computations of water delivered to Mexico under provisions of the 1944 Water Treaty.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4	1	5	8	8	17	13.6	0	8.7	0	0	11.7
2	4	1	7	8	9	26	16.6	0	2.3	0	0	13.1
3	4	3	7	9	9	6	18.8	3.0	3.5	0	0	5.1
4	4	2	7	9	7	12	13.7	11.7	6.5	0	1.8	4.2
5	3	2	7	9	7	10	9.3	2.1	6.5	0	0	12.8
6	5	2	8	16	7	6	4.2	0	0	6.4	0	7.8
7	5	2	8	16	7	0	2.7	5.0	9.5	2.8	0	0
8	5	2	8	16	7	11	3.0	1.5	8.0	0	0	0
9	5	2	4	16	7	11	7.9	8.3	0	0	0	0
10	4	6	4	16	6	9	17.4	.5	0	0	0	0
11	4	6	4	15	17	0	12.3	0	0	0	0	1.8
12	4	6	4	15	17	4	4.1	3.0	0	0	0	0
13	6	6	4	8	17	9	13.6	17.8	2.7	1.8	0	0
14	5	6	4	8	17	16	6.0	17.6	4.0	0	0	0
15	5	7	5	8	17	8.5	3.1	4.6	6.6	0	0	0
16	5	7	5	7	17	10.0	15.8	0	10.3	0	0	0
17	5	4	5	7	18	12.0	12.0	3.0	0	0	0	0
18	5	4	5	7	4	7.0	13.4	8.5	1.8	0	0	0
19	5	4	5	7	22	10.2	0	1.5	1.8	0	0	0
20	5	4	4	15	18	9.1	8.0	0	1.5	0	1.8	0
21	6	3	4	15	23	0	6.0	9.9	.9	0	0	0
22	1	3	4	15	31	4.5	7.8	4.8	3.7	5.8	0	0
23	1	3	8	14	7	7.5	.8	1.5	12.5	17.5	0	9.2
24	1	5	8	14	6	2.5	0	3.8	8.7	15.3	0	9.0
25	0	5	8	14	27	0	2.2	5.2	4.4	0	0	0
26	0	5	8	14	5	12.3	2.6	5.5	3.8	0	0	0
27	2	5	8	8	16	12.3	4.9	10.6	6.5	0	0	7.7
28	2	5	9	8	16	4.1	6.0	.9	6.5	0	13.1	3.6
29	2	5	9	8	3	1.5	0	3.0	6.5	0	13.1	3.4
30	2	5	8	8	0	9.1	16.0	4.0	5.1	0	12.4	4.0
31	2	5	8	8	0	0	17.5	4.0	0	0	0	3.7
Sum	111	116	192	338	372	247.6	259.3	141.3	132.3	49.6	42.2	97.1
Current Year 1964								Period 1956-1964				
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	6	† 25	0	3.6	220	166	280	80	
Feb.			† 15	7	† 1	1	4.0	230	318	500	210	
Mar.			† 28	9	† 9	4	6.2	381	403	600	317	
Apr.			† 6	16	† 16	7	11.3	670	494	670	389	
May			22	31	† 30	0	12.0	738	546	770	400	
June			2	26	† 7	0	8.3	491	592	800	385	
July			3	18.8	† 19	0	8.4	514	603	820	460	
Aug.			13	17.8	† 1	0	4.6	280	430	800	280	
Sept.			23	12.5	† 6	0	4.4	262	394	940	194	
Oct.			23	17.5	† 1	0	1.6	98.4	284	390	98.4	
Nov.			† 28	13.1	† 1	0	1.4	83.7	220	330	83.7	
Dec.			2	13.1	† 7	0	3.1	193	168	230	99.2	
Yearly				31		0	5.7	4,161	4,618	6,480	3,941	

† And other days β Mean daily

EAST MAIN CANAL WASTEWAY (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorder and control weir located about 300 feet north of the southerly international land boundary and 1.5 miles east of the Colorado River. This is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

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 December 1964. Records of monthly discharges also are available for the periods January 1924 through June 1928, January 1932 through December 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. Beginning in January 1956, flows from this canal discharging into Mexico have been included in deliveries to Mexico in the same manner as waste flows arriving in the bed of the limnographic section of Colorado River, under terms of an agreement between the two Sections of the Commission.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10.7	11.7	30.1	10.3	15.8	6.6	0	3.6	1.5	2.5	16.7	2.4
2	7.4	20.2	13.2	3.3	27.9	9.0	8.5	24.6	1.0	0	23.4	9.7
3	6.6	22.6	15.3	7.9	18.6	11.9	1.2	8.7	11.1	1.2	16.6	13.0
4	3.4	13.4	12.7	19.2	20.6	15.9	1.5	.3	2.9	6.2	10.5	.3
5	17.2	23.6	22.3	4.2	40.1	13.7	8.9	4.5	3.6	7.6	13.3	6.4
6	16.6	22.8	22.8	9.5	33.4	29.8	1.1	1.6	15.4	0	11.2	3.5
7	24.3	28.9	33.2	15.5	28.2	32.8	.2	.4	12.4	1.1	6.9	.7
8	6.5	28.9	20.8	13.5	34.0	35.2	0	5.6	3.4	.4	21.5	0
9	6.2	* 9.1	24.4	31.7	9.2	14.9	3.0	0	0	7.3	14.3	0
10	12.3	* 9.1	16.4	* 39.7	13.2	14.0	12.1	0	18.0	.3	3.9	.2
11	12.9	20.7	25.1	† 40.8	4.0	13.7	2.1	7.2	4.6	3.5	6.8	2.9
12	18.0	23.9	6.8	† 19.4	0	37.0	0	1.6	5.8	8.9	.5	4.4
13	19.5	21.8	33.4	* 25.7	0	23.5	18.4	3.0	7.2	8.6	6.7	20.3
14	2.0	25.5	12.1	14.2	.1	6.5	28.4	5.8	1.8	5.8	9.3	4.9
15	18.4	10.6	* 21.6	2.4	4.3	14.3	13.7	6.0	3.6	21.9	11.5	7.6
16	15.0	18.3	* 47.5	6.1	9.1	13.7	4.4	7.4	1.6	17.8	26.2	8.3
17	15.3	* 33.6	14.2	7.6	13.6	1.4	7.1	3.8	7.1	13.6	9.9	4.0
18	17.9	17.1	13.2	38.2	7.5	3.1	3.8	3.5	2.4	17.6	2.7	.4
19	24.9	24.0	9.2	14.5	29.0	4.4	.4	2.4	7.6	16.6	7.8	6.2
20	24.0	17.5	23.3	12.6	11.5	2.9	1.1	.5	1.7	15.3	14.2	27.8
21	18.2	9.0	21.3	3.9	7.7	0	.8	.8	7.6	2.7	11.6	26.2
22	11.3	2.0	11.8	.2	27.3	0	6.2	0	6.5	0	14.8	12.5
23	12.4	25.4	44.4	4.9	8.3	7.0	9.9	3.8	2.3	2.0	14.3	3.9
24	10.0	10.3	20.7	7.7	15.2	2.1	9.0	27.3	7.3	11.6	3.1	1.8
25	22.5	3.2	* 22.0	20.1	18.7	.6	3.7	6.6	5.9	17.8	1.5	17.6
26	24.6	1.4	† 22.0	46.2	23.3	0	7.5	.1	0	11.6	0	* 12.2
27	16.4	5.6	† 9.5	39.6	18.3	0	15.2	0	0	6.6	0	† 9.9
28	23.0	19.0	† 20.0	40.2	21.6	0	1.5	1.4	0	1.1	2.8	* 11.5
29	28.3	10.8	† 26.8	32.5	4.1	0	0	0	0	2.5	3.4	2.2
30	15.5	0	* 16.9	21.4	0	1.1	1.4	.5	9.3	.4	12.4	5.8
31	6.8	0	9.5	0	0	0	2.9	0	0	5.1	0	4.2
Sum	468.1	494.9	642.5	553.0	464.6	315.1	174.0	131.0	151.6	217.6	297.8	230.8
Current Year 1964								Period 1935-1964				
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.	91.07	90.15	† 28	49.9	† 4	0	15.1	928	1,454	3,360	† 383	
Feb.	91.26	90.15	16	69.2	† 25	0	17.1	982	1,201	3,170	† 383	
Mar.	* 91.16	90.15	16	58.5	† 2	0	20.7	1,274	1,401	2,920	190	
Apr.	91.17	90.15	24	59.5	† 2	0	18.4	1,097	1,370	3,170	197	
May	91.45	90.15	5	92.2	† 5	0	15.0	922	1,511	3,040	385	
June	91.21	90.15	23	63.6	† 2	0	10.5	625	1,291	3,660	175	
July	91.28	90.15	5	71.6	† 1	0	5.6	345	1,396	3,590	198	
Aug.	91.27	90.15	18	70.4	† 1	0	4.2	260	1,413	3,960	169	
Sept.	91.20	90.15	15	62.5	† 1	0	5.1	301	1,262	3,170	159	
Oct.	90.87	90.15	† 14	32.3	† 1	0	7.0	432	1,324	3,280	432	
Nov.	90.88	90.15	19	33.2	† 7	0	9.9	591	1,469	3,570	430	
Dec.	91.02	90.15	20	45.2	† 4	0	7.4	458	1,433	3,080	438	
Yearly	91.45	90.15		92.2		0	11.3	8,215	16,525	38,310	* 4,800	

† And other days † Estimated * Partly estimated

YUMA MAIN DRAIN (VALLEY DIVISION, YUMA PROJECT)

DESCRIPTION: Water-stage recorders located in the forebay and afterbay of the Boundary Pumping Plant on the Main Drain about 200 feet north of the southerly international boundary near San Luis, Arizona, 1.3 miles east of the Colorado River. This is one of six measurement points for deliveries of Colorado River water to Mexico pursuant to provisions of the 1944 Water Treaty.

RECORDS: Main Drain discharges are lifted 10 to 12 feet at the pumping plant and are computed from pump ratings and the differential head measured by the two gages. Pump ratings are checked by monthly current meter measurements. During the year 13 measurements were made by the United States Section of the Commission. Records obtained and computed by the United States Section of the Commission. Records available: Monthly discharges June 1919 through December 1951; daily discharges January 1952 through December 1964.

REMARKS: Flows in the Main Drain are principally drainage waters from the Valley Division of the Yuma Project. Both the Main Drain and the East Main Canal Wasteway 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. Beginning in January 1956 the flows from this drain discharging into Mexico have been included in deliveries to Mexico in the same manner as waste flows arriving in the bed of the limitrophe section of Colorado River under terms of an agreement between the two Sections of the Commission.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	171	200	204	192	186	204	177	178	163	182	188	178
2	164	204	222	196	185	192	180	186	161	188	190	173
3	179	197	214	198	203	184	176	187	159	198	191	175
4	171	197	221	205	200	186	167	180	159	185	195	171
5	174	200	206	210	192	205	167	180	164	191	188	168
6	175	202	197	208	187	201	168	178	152	185	191	178
7	165	201	191	207	187	194	179	185	157	183	187	174
8	169	210	207	208	195	189	171	189	162	181	194	169
9	177	203	209	203	195	207	178	172	161	186	191	172
10	164	203	201	208	190	201	171	177	147	185	186	178
11	171	205	189	210	230	195	186	177	149	191	177	169
12	165	208	203	203	193	191	176	180	163	181	181	169
13	173	214	198	189	186	192	183	162	159	192	190	160
14	163	211	203	196	190	188	176	167	156	190	181	163
15	174	217	203	184	192	187	180	178	167	207	183	168
16	187	207	226	177	194	186	193	168	169	185	195	174
17	196	246	201	197	193	191	195	174	161	197	189	169
18	188	216	198	201	194	190	183	165	165	188	200	171
19	178	196	210	210	192	184	176	169	165	195	194	167
20	177	213	194	209	186	181	184	163	161	194	192	168
21	183	209	197	197	196	176	185	167	158	180	195	186
22	195	203	208	192	202	196	174	174	173	178	196	164
23	192	205	193	196	205	183	177	184	169	185	189	165
24	189	204	191	205	200	175	175	168	178	188	182	162
25	189	215	206	209	200	180	182	163	175	191	182	163
26	198	210	201	208	199	189	171	166	165	181	176	167
27	202	211	204	188	197	175	173	166	157	187	173	167
28	194	219	193	198	195	177	178	166	173	182	183	152
29	209	218	189	194	192	187	174	166	170	189	166	163
30	212	194	194	194	194	182	158	164	183	197	171	154
31	204	194	194	191	191	167	167	164	164	196	162	162
Sum	5,648	6,044	6,267	5,992	6,041	5,668	5,480	5,363	4,901	5,838	5,596	5,219
Current Year 1964									Period 1935-1964			
Month	Extreme Gage Feet		Extreme Second Feet				Average Second	Total	Acre Feet			
	High	Low	Day	High		Day	Feet	Acre Feet	Average	Maximum	Minimum	
				Day	Low							
Jan.			30	212	14	163	182	11,203	7,398	11,203	1,740	
Feb.			17	246	19	196	208	11,988	7,336	11,988	1,640	
Mar.			16	226	† 11	189	202	12,430	8,377	12,430	1,940	
Apr.			† 5	210	16	177	200	11,885	8,130	11,890	1,920	
May			11	230	2	185	195	11,982	8,183	13,140	1,950	
June			9	207	† 24	175	189	11,242	7,510	12,040	2,290	
July			17	195	30	158	177	10,869	7,241	11,830	2,530	
Aug.			8	189	13	162	173	10,637	7,136	11,960	2,560	
Sept.			30	183	10	147	163	9,721	7,235	11,560	2,280	
Oct.			15	207	22	178	188	11,580	8,315	12,385	2,940	
Nov.			18	200	29	166	187	11,100	8,188	12,010	2,800	
Dec.			21	186	28	152	168	10,352	7,942	11,480	2,450	
Yearly				246		147	186	134,989	92,991	139,380	27,040	

† And other days

Ø Mean daily

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

DESCRIPTION: The tabulated data below is the combined flows of the East Main Canal Wasteway and the Yuma Main Drain and represents the total water crossing the international land boundary into the Sánchez Mejorada Canal near San Luis, Arizona. Descriptions and flows of the individual stations are published separately in this bulletin on pages 29 and 30. The Mexican Section maintains a water-stage recorder in Mexico on right bank of Sánchez Mejorada Canal and obtains check measurements on a bridge located 0.2 mile downstream from the international boundary, 1.2 miles east of the Colorado River and 0.6 mile west of San Luis, Sonora.

RECORDS: Records obtained and computed by the United States Section of the Commission. Records available: January 1935 through 1964.

REMARKS: Beginning in January 1956, the flows from the Yuma Main Drain and East Main Canal Wasteway discharging into Mexico have been included in deliveries to Mexico in the same manner as return flows arriving in the bed of the limitrophe section of the Colorado River, under the terms of an agreement between the two Sections of the Commission.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	182	212	234	202	202	211	177	182	164	184	205	180
2	171	224	235	199	213	201	188	211	162	188	213	183
3	186	220	229	206	222	196	177	196	170	199	208	188
4	174	210	234	224	221	202	168	180	162	191	206	171
5	191	224	228	214	232	219	176	184	168	199	201	174
6	192	225	220	218	220	231	169	180	167	185	202	182
7	189	230	224	222	215	227	179	185	169	184	194	175
8	176	239	228	222	229	224	171	195	165	181	216	169
9	183	* 217	233	235	204	222	181	172	161	193	205	172
10	176	* 212	217	* 248	203	215	183	177	165	185	190	178
11	184	226	214	* 251	234	209	188	184	154	194	184	172
12	183	232	210	* 222	193	228	176	182	169	190	182	173
13	192	236	231	* 215	186	216	201	165	166	201	197	180
14	165	236	215	210	190	194	204	173	158	196	190	168
15	192	228	* 225	186	196	201	194	184	171	229	194	176
16	202	225	* 274	183	203	200	197	175	171	203	221	182
17	211	* 280	215	205	207	192	202	178	168	211	199	173
18	206	233	211	239	202	193	187	168	167	206	203	171
19	203	220	219	224	221	188	176	171	173	212	202	173
20	201	230	217	222	198	184	185	164	163	209	206	196
21	201	218	218	201	204	176	186	168	166	183	207	212
22	206	205	220	192	229	196	180	174	180	178	211	176
23	204	230	237	201	213	190	187	188	171	187	203	169
24	199	214	212	213	215	177	184	195	185	200	185	164
25	212	218	* 228	229	219	181	186	170	181	209	184	181
26	223	211	* 223	254	222	189	178	166	165	193	176	* 179
27	218	217	* 214	228	215	175	188	166	157	194	173	* 177
28	217	238	* 213	238	217	177	180	167	173	183	186	* 164
29	237	229	* 216	226	196	187	174	166	170	192	169	165
30	228		211	215	194	183	159	164	192	197	183	160
31	211		204		191		170	164		201		166
Sum	6, 115	6, 539	6, 909	6, 544	6, 506	5, 984	5, 651	5, 494	5, 053	6, 057	5, 895	5, 449
Current Year 1964										Period 1935-1964		
Month	Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	High		Low	Average			Maximum	Minimum		
			Day	Day								
Jan.			29	237	14	165	197	12, 131	8, 852	12, 131	* 2, 123	
Feb.			17	* 280	22	205	225	12, 970	8, 537	12, 970	* 2, 023	
Mar.			16	* 274	31	204	223	13, 704	9, 778	13, 704	* 2, 322	
Apr.			26	254	16	183	218	12, 982	9, 500	12, 982	2, 117	
May			11	234	13	186	210	12, 904	9, 694	13, 900	2, 473	
June			6	231	27	175	200	11, 867	8, 801	12, 570	2, 525	
July			14	204	30	159	183	11, 214	8, 637	12, 420	2, 927	
Aug.			2	211	† 20	164	177	10, 897	8, 549	12, 657	2, 989.	
Sept.			30	192	11	154	168	10, 022	8, 497	12, 450	2, 602	
Oct.			15	229	22	178	195	12, 012	9, 639	13, 898	3, 444	
Nov.			16	221	29	169	197	11, 691	9, 657	12, 712	3, 407	
Dec.			21	212	30	160	175	10, 810	9, 375	12, 050	2, 888	
Yearly				* 280		154	197	143, 204	109, 516	149, 010	31, 840	

* Partly estimated Ø Mean daily † 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 upstream from the southerly international boundary, 2 miles west of San Luis, Arizona, and 19.4 miles downstream from Morelos Dam. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: During the period January 1 through October 19, 1964, a diversion dike across the river channel 2.8 miles below the southerly international boundary caused backwater at this station, and discharges are based on the summation of flows in the Colorado River at R. S. 18-S, 4.7 miles upstream from the southerly international boundary, and the Twenty-one Mile Wasteway, 2.2 miles upstream from the southerly international boundary. Computations by shifting control methods. Records available: Daily discharges, January 1950 through December 1964; continuous record of gage heights, January 1947 through December 1964. Monthly flows for this station have been derived for the period January 1935 through December 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. The river flow past this station is depleted by numerous pumps and gravity diversions before it reaches the Gulf of California.

EXTREMES: Since January 1950: Maximum instantaneous discharge, 28,610 second-feet on December 18, 1952; maximum gage height, 84.84 feet on November 29, 1957. Minimum discharge, no flow on several occasions since September 1, 1956.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	55.7	1,610	93.1	15.0	49.1	41.2	0	0	0	0	770	39.9
2	55.2	1,470	123	49.3	71.8	10.8	0	0	0	0	784	38.6
3	53.8	276	71.3	43.5	76.1	8.4	0	0	0	0	784	35.8
4	41.4	110	39.7	54.2	115	8.5	0	0	0	0	784	35.8
5	57.9	91.5	35.5	54.1	31.1	19.1	0	0	0	0	764	33.4
6	69.5	85.7	56.5	104	19.6	25.3	0	0	0	0	833	46.6
7	51.0	87.3	57.0	34.7	20.9	24.2	0	0	0	0	784	89.9
8	56.8	87.2	50.3	16.4	60.7	27.5	0	0	0	0	770	66.8
9	45.7	74.6	69.8	27.8	55.6	16.1	0	0	0	0	791	44.0
10	52.4	72.6	55.8	31.2	68.3	20.6	0	0	0	0	770	37.2
11	49.9	69.4	61.1	23.5	55.4	28.9	0	0	0	0	743	35.8
12	53.4	58.4	46.9	36.0	24.7	22.9	0	0	0	43.5	743	39.9
13	72.3	59.3	46.5	58.6	20.7	17.2	0	0	0	0	847	39.9
14	62.4	69.1	56.4	51.8	32.0	22.9	0	0	0	0	814	41.2
15	47.6	61.7	51.4	39.1	27.1	10.2	0	0	0	0	796	33.4
16	199	94.3	61.5	29.2	21.1	7.7	0	0	0	0	694	35.8
17	186	77.5	31.1	52.8	33.0	5.2	0	0	0	43.5	268	33.4
18	82.5	53.6	33.1	43.0	32.7	5.2	0	0	0	626	168	33.4
19	877	50.8	46.8	50.2	38.6	5.6	0	0	0	746	118	35.8
20	904	61.9	37.3	35.7	21.3	9.6	0	0	0	804	91.8	35.8
21	196	63.5	65.3	34.8	21.6	5.2	0	0	0	906	80.8	37.2
22	90.3	46.2	52.8	43.5	12.8	15.7	0	0	0	961	77.2	37.2
23	661	80.8	51.2	43.1	14.7	6.1	0	0	0	994	140	37.2
24	1,200	78.5	42.6	57.2	17.8	17.7	0	0	0	852	82.5	22.6
25	1,030	57.6	37.5	64.3	13.9	12.7	0	0	0	784	66.8	22.6
26	1,030	39.7	41.2	66.6	17.9	6.5	0	0	0	791	61.6	33.4
27	1,010	47.6	40.5	64.0	22.7	5.7	0	0	0	791	53.1	31.2
28	1,100	54.3	47.7	22.0	19.1	5.7	0	0	0	770	82.5	32.3
29	1,410	37.2	65.1	27.7	23.0	0	0	0	0	852	66.8	26.8
30	1,410		68.0	38.3	29.7	0	0	0	0	770	45.3	26.8
31	1,190		29.5		29.0		0	0	0	764		30.1
Sum	13,400.8	5,126.3	1,665.5	1,311.6	1,097.0	412.4	0	0	0	11,454.5	13,873.4	1,169.8

Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1935-1964 Acre Feet		
	High	Low	Day	High		Low	Feet	Acre Feet	Average	Maximum	Minimum
				Day	Day						
Jan.	78.00	74.86	30	1,490	11	45.0	432	26,580	507,552	1,672,000	26,580
Feb.	78.14	74.92	2	1,720	29	31.7	177	10,168	422,459	1,385,000	10,168
Mar.	76.93	74.81	2	208	19	14.0	53.7	3,303	340,064	1,127,000	3,303
Apr.	77.25	74.70	6	141	8	9.6	43.7	2,602	217,003	700,900	977
May	77.84	74.61	4	167	26	2.3	35.4	2,176	297,934	1,160,000	2,176
June	76.18	73.89	24	73.2	† 22	0	13.7	818	229,387	1,180,000	818
July				0	0	0	0	0	167,739	772,800	0
Aug.				0	0	0	0	0	186,921	796,000	0
Sept.				0	0	0	0	0	225,868	1,033,000	0
Oct.	77.28		23	1,020	† 1	0	370	22,720	286,856	1,192,000	9,120
Nov.	77.05	74.87	13	940	30	35.8	462	27,517	378,780	1,428,000	7,180
Dec.	75.32	74.70	7	113	25	20.1	37.7	2,320	477,561	1,839,000	2,320
Yearly	78.14	73.89		1,720		0	135	98,204	3,738,124	10,688,800	98,204

† And other days

COLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	74.93	77.91	75.04	74.75	76.75	76.01					76.86	74.89
2	74.99	78.06	*75.36	74.79	77.22	76.00					76.87	74.88
3	74.97	76.23	75.10	74.86	77.29	75.39					76.86	74.85
4	74.91	75.47	75.42	75.07	76.88	74.79					76.87	74.86
5	74.89	75.34	76.16	75.32	74.98	74.81					76.85	74.85
6	76.26	*75.26	75.29	76.85	74.77	75.60					76.90	74.95
7	75.68	#	75.00	77.08	74.70	75.71					76.89	75.21
8	75.12	#	74.98	76.70	74.92	75.85					76.87	75.08
9	75.00	#	74.99	76.38	74.94	75.55					76.91	74.94
10	74.94	*75.17	75.01	76.36	74.98	75.04					76.89	74.89
11	74.97	75.14	74.99	76.31	74.96	74.92					76.86	74.87
12	74.94	75.22	74.98	*76.22	74.80	75.12					76.88	74.90
13	75.10	75.12	74.90	*76.55	74.69	74.84					76.96	74.89
14	75.28	*75.15	74.99	76.86	74.72	75.19					77.04	74.90
15	75.69	#	74.95	76.86	74.74	75.41					77.03	74.84
16	75.44	#	74.99	76.64	74.81	74.86					76.88	74.85
17	76.20	*75.18	74.88	76.68	74.94	75.16				75.50	75.97	74.82
18	76.10	75.30	74.92	76.86	75.60	74.99				76.28	75.63	74.82
19	76.60	75.56	76.01	76.87	75.84	74.75				76.60	75.42	74.84
20	77.69	*75.05	76.36	76.88	75.99	74.63				76.93	75.29	74.84
21	76.26	#	76.53	76.56	75.56	74.37				77.10	75.22	74.85
22	75.38	#	75.04	76.53	75.39	74.51				77.19	75.19	74.85
23	76.00	#	75.23	76.68	74.84	74.89				77.24	75.47	74.86
24	77.54	#	76.24	76.79	74.96	74.74				77.02	75.20	74.73
25	77.64	#	76.49	*77.16	74.82	75.00				76.92	75.11	74.73
26	77.51	#	76.68	*77.11	74.80	75.04				76.92	75.07	74.83
27	77.47	#	76.64	*77.20	75.39	74.74				76.91	75.02	74.80
28	77.46	#	76.65	76.95	75.26	74.21				76.88	75.18	74.81
29	77.80	#	76.41	76.61	75.27	73.89				77.00	75.08	74.76
30	77.94	#	75.06	76.70	75.55	73.89				76.88	74.94	74.76
31	77.57	#	74.86		75.86					76.86		74.78
Avg.	76.07		75.49	76.44	75.36	75.00					76.14	74.86

‡ Estimated * Partly estimated # Recorder inoperative

DIVERSIONS FROM COLORADO RIVER IN MEXICO TO SANCHEZ MEJORADA - SAN LUIS CANALS NEAR SAN LUIS, SONORA

DESCRIPTION: Pumping plant, operated by the Ministry of Hydraulic Resources, located on the left bank of the Colorado River immediately downstream from the Mexicali-San Luis highway bridge and about 1,300 feet downstream from the southerly international boundary. Pumping equipment consists of 3 pumps in the Sánchez Mejorada system (2 of 30-inch diameter and 1 of 40-inch diameter) and 2 pumps of 30-inch diameter in the Ejido San Luis system.

RECORDS: Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1964.

REMARKS: Flow in the Colorado River available for diversion at this point consists of water that is permitted to pass Morelos Dam and of return flows from the Yuma Project in the United States at Cooper, Eleven Mile and Twenty-one Mile Wasteways, less depletions by pumps on both banks of the limitrophe section of the river.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	0	4.2	0	0	12.4	10.6	12.4	0	0	0	0	0	
2	0	3.5	16.6	0	14.1	9.2	12.4	0	0	0	0	0	
3	0	6.0	6.4	0	15.9	9.2	0	0	0	0	44.8	0	
4	0	7.4	11.3	12.0	10.6	7	0	0	0	0	10.6	0	
5	0	8.8	14.1	15.9	10.6	2.8	0	0	0	0	7.4	0	
6	0	15.2	14.1	17.7	10.6	10.6	14.1	0	0	0	38.5	0	
7	5.7	12.0	14.1	15.9	7.1	12.4	17.7	0	0	0	16.2	0	
8	8.8	8.5	14.1	14.1	0	10.6	0	0	0	0	0	0	
9	7.1	0	14.8	14.1	0	10.6	0	0	0	0	0	0	
10	0	0	12.4	14.1	0	9.9	0	0	0	0	0	0	
11	0	0	12.4	12.4	0	4.6	8.5	0	0	0	0	0	
12	0	7.1	12.4	12.4	0	10.6	9.9	0	0	0	0	0	
13	0	3.5	12.4	15.9	0	4.2	7.1	0	0	0	0	0	
14	0	0	14.1	17.7	0	8.8	25.4	0	0	0	0	0	
15	0	0	14.1	15.9	0	10.6	26.8	0	0	0	0	0	
16	0	0	12.7	12.4	3.9	12.4	25.4	0	0	0	0	0	
17	0	0	12.4	12.4	10.2	13.4	6.7	0	0	0	0	0	
18	11.3	10.2	14.1	14.1	10.6	0	4.9	0	0	0	0	0	
19	3.9	14.1	15.9	14.1	10.6	0	2.8	0	0	0	0	0	
20	1.4	13.8	15.9	12.4	10.6	13.4	21.9	0	0	0	0	0	
21	10.6	14.8	12.4	12.4	10.6	13.4	20.5	0	0	0	0	0	
22	10.2	20.5	12.4	12.4	10.6	0	21.9	0	0	0	0	0	
23	14.5	12.4	14.1	12.4	4.9	0	6.7	0	0	0	0	0	
24	3.9	14.8	12.4	14.1	4.2	0	4.6	0	0	0	0	0	
25	3.9	13.4	15.9	14.1	7.1	12.0	4.9	0	0	0	0	0	
26	4.2	15.2	14.1	17.7	5.3	13.8	3.5	0	0	0	0	0	
27	4.6	5.7	15.9	17.7	10.6	14.1	4.9	0	0	0	0	0	
28	3.9	0	15.9	14.1	12.4	14.1	8.1	0	0	0	0	0	
29	0	0	12.4	14.1	12.4	14.1	18.7	0	0	0	0	0	
30	0	0	12.4	12.4	10.6	12.4	18.4	0	0	0	0	0	
31	0	0	10.6	0	9.9	0	0	0	0	0	0	0	
Sum	94.0	211.1	402.8	384.9	225.8	258.5	308.2	0	0	0	117.5	0	
	Current Year 1964								Period 1958-1964				
Month	Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Low	Day	Acre Feet	Average	Maximum	Minimum			
Jan.			23	14.5	† 1	0	3.2	186	499	2,675	0		
Feb.			22	20.5	† 9	0	7.4	419	294	820	0		
Mar.			2	16.6	1	0	13.1	799	977	1,828	399		
Apr.			† 6	17.7	† 1	0	12.7	763	796	1,107	0		
May			3	15.9	† 8	0	7.4	448	645	1,016	448		
June			† 27	14.1	† 18	0	8.5	512	950	1,562	473		
July			15	26.8	† 3	0	9.9	611	2,659	12,724	0		
Aug.				0	0	0	0	0	2,024	6,612	0		
Sept.				0	0	0	0	0	676	1,660	0		
Oct.				0	0	0	0	0	137	409	0		
Nov.			3	44.8	† 1	0	3.9	233	33.2	233	0		
Dec.				0	0	0	0	0	70.5	342	0		
Yearly				44.8		0	5.7	3,972	9,667	22,963	3,972		

Ø Mean daily

† 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 de Conexión wasteway, immediately upstream from where it discharges into the Colorado River, 0.6 mile downstream from the wasteway gates on Canal de Conexión, 16.8 miles downstream from Morelos Dam, and 0.2 mile 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 Hydraulic Resources and furnished by the Mexican Section of the Commission. Records shown in table below are waste returns to the Colorado River. 1964 records good. Records available: April 1956 through December 1964.

REMARKS: The Colorado River Irrigation District transports water for irrigation of land on the left bank of the Colorado River by the Canal de Conexión 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 Sánchez Mejorada Siphon, which was placed in operation on June 28, 1963.

Mean Daily Discharge in Second Feet 1964 — 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	1	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	985	0	0	0	0	0	0	0	0	0	0	0
6	459	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	343	0	0	0	0	0	0	0	0	0	0	0
15	3.2	0	0	0	0	0	0	0	0	0	0	0
16	117	0	0	0	0	0	0	0	0	0	0	0
17	385	0	0	0	0	0	0	0	0	0	0	0
18	180	0	0	0	0	0	0	0	0	0	0	0
19	129	0	0	0	0	0	0	0	0	0	0	0
20	91.1	0	0	0	0	0	0	0	0	0	0	0
21	9.2	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	2,701.5	0	0	0	0	0	0	0	0	0	0	0
Current Year 1964								Period 1956-1964				
Month	Extreme Gage Feet		Ø Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Day			Low	Average	Maximum	Minimum	
Jan.			5	985	† 1	0	87.2	5,361	11,413	69,527	0	
Feb.				0		0	0	0	1,463	8,679	0	
Mar.				0		0	0	0	13,645	35,492	0	
Apr.				0		0	0	0	29,408	68,714	0	
May				0		0	0	0	12,688	22,072	0	
June				0		0	0	0	20,260	28,915	0	
July				0		0	0	0	31,786	46,139	0	
Aug.				0		0	0	0	34,341	55,497	0	
Sept.				0		0	0	0	20,686	37,194	0	
Oct.				0		0	0	0	7,489	20,512	0	
Nov.				0		0	0	0	17,608	69,415	0	
Dec.				0		0	0	0	10,698	70,213	0	
Yearly				985		0	7.4	5,361	208,438	346,339	5,361	

† And other days Ø Mean daily

WASTEWAY TO COLORADO RIVER AT COLONIA ELIAS IN MEXICO

DESCRIPTION: Wasteway structure located at Kilometer 7+570 of the Barrote Canal on the right bank of the Colorado River in Colonia Elias about 20.5 miles downstream from the southerly international boundary and the town of San Luis Río Colorado, Sonora; about 10 miles upstream from the Sonora-Baja California railroad bridge and 4.3 miles upstream from the Miguel C. Rodriguez Gaging Station. The wasteway gates are located about 2,500 feet from the right bank of the Colorado River.

RECORDS: Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through December 1964.

REMARKS: The wasteway structure has 3 manually operated rectangular gates which discharge directly from the Barrote Canal into a wasteway leading to the Colorado River.

Mean Daily Discharge in Second Feet 1964 — 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	43.1	0	0	0	0	0	0	0	0	0	0	0
7	14.1	0	0	0	0	0	0	0	0	0	0	0
8	14.1	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	24.7	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	96.0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1964												
Month	Extreme Gate Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1957-1964			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.			6	43.1	† 1	0	3.2	191	944	3,201	0	
Feb.				0		0	0	0	650	4,097	0	
Mar.				0		0	0	0	1,039	6,850	0	
Apr.				0		0	0	0	801	3,707	0	
May				0		0	0	0	182	1,163	0	
June				0		0	0	0	94.9	625	0	
July				0		0	0	0	537	4,296	0	
Aug.				0		0	0	0	516	1,926	0	
Sept.				0		0	0	0	623	1,548	0	
Oct.				0		0	0	0	186	791	0	
Nov.				0		0	0	0	418	1,891	0	
Dec.				0		0	0	0	550	3,047	0	
Yearly				43.1		0	0.4	191	6,539	13,429	191	

† And other days

Ø Mean daily

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 downstream from the southerly international boundary, 44.5 miles downstream from Morelos Dam, and 4.5 miles upstream from the Sonora-Baja California railroad bridge. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 93 current meter measurements made during the year, 43 double and 50 single, 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 December 1964.

REMARKS: Diversions and return flows modify the flow of the river at this station. On many occasions the flow at this station consists solely of seepage from canals which run parallel and adjacent to the river at a higher elevation.

EXTREMES: Since January 1, 1952: Maximum mean daily gage height, 53.28 feet on January 4, 1958 with a discharge of 18,500 second-feet; minimum mean daily gage height, 37.96 feet on January 8, 1964 with a discharge of 19.4 second-feet; maximum mean daily discharge, 20,200 second-feet on December 19, 1952 with a gage height of 52.30 feet; minimum mean daily discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	26.1	1,050	0	0	0	0	8.5	4.6	0	0	939	49.4
2	26.1	1,150	0	0	0	0	8.5	8.5	0	0	897	38.8
3	25.8	1,150	0	0	0	0	8.5	8.5	0	0	893	31.8
4	25.8	519	0	0	0	0	8.5	8.5	0	0	844	24.7
5	24.0	290	0	0	0	0	8.5	8.5	0	0	840	17.7
6	22.2	206	0	0	0	0	8.5	8.5	0	0	802	14.1
7	33.5	146	0	0	0	0	8.5	8.5	0	0	837	14.1
8	19.4	109	0	0	0	0	8.5	8.5	0	0	788	10.6
9	27.5	126	0	0	0	0	8.5	8.5	0	0	727	10.6
10	36.4	120	0	0	0	0	8.5	8.5	0	0	752	14.1
11	26.1	106	0	0	0	0	6.4	8.5	0	0	689	14.1
12	29.0	102	0	0	0	0	6.4	8.5	0	0	667	7.1
13	28.3	85.8	0	0	0	0	6.4	8.5	0	0	664	7.1
14	36.4	85.5	0	0	0	0	8.5	6.4	0	0	720	7.1
15	43.4	102	0	0	0	0	8.5	4.6	0	0	865	7.1
16	70.6	0	0	0	0	0	8.5	4.6	0	0	876	7.1
17	29.0	0	0	0	0	0	8.5	4.6	0	0	657	7.1
18	388	0	0	0	0	0	8.5	8.5	0	0	371	7.1
19	501	0	0	0	0	0	8.5	8.5	0	0	258	7.1
20	1,190	0	0	0	0	0	8.5	6.4	0	0	194	7.1
21	992	0	0	0	0	0	8.5	4.6	0	0	159	7.1
22	477	0	0	0	0	0	8.5	8.5	0	268	162	3.5
23	283	0	0	0	0	0	8.5	8.5	0	540	120	3.5
24	351	0	0	0	0	0	8.5	8.5	0	929	117	3.5
25	780	0	0	0	0	0	8.5	8.5	0	939	124	3.5
26	968	0	0	0	0	0	8.5	8.5	0	922	91.8	3.5
27	1,030	0	0	0	0	0	8.5	8.5	0	939	77.7	3.5
28	985	0	0	0	0	0	6.4	8.5	0	943	63.6	3.5
29	975	0	0	0	0	0	6.4	8.5	0	932	56.5	3.5
30	1,110	0	0	0	0	0	6.4	4.6	0	957	60.0	3.5
31	1,190	0	0	0	0	0	4.6	4.6	0	946		3.5
Sum	11,749.6	5,347.3	0	0	0	0	247.0	232.0	0	8,315	15,311.6	346.0
Current Year 1964										Period June 1951-1964		
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Day			Average	Maximum	Minimum		
Jan.	45.57	37.86	31	1,230	8	17.7	378	23,293	366,608	1,047,732	23,293	
Feb.	44.26	38.78	3	1,230	†16	0	173	10,609	230,405	696,461	10,609	
Mar.	43.70	41.96		0	0	0	0	0	162,323	807,342	0	
Apr.	42.29	41.86		0	0	0	0	0	107,431	588,983	0	
May	42.22	41.86		0	0	0	0	0	149,779	732,815	0	
June	42.06	38.25		0	0	0	0	0	63,352	555,460	0	
July	38.29	38.09	†1	8.5	31	4.6	7.8	488	33,991	264,561	0	
Aug.	38.32	38.06	†2	8.5	†1	4.6	7.4	459	50,469	309,320	352	
Sept.	38.68	37.93		0	0	0	0	0	78,919	572,551	0	
Oct.	42.06	38.29	31	964	†1	0	268	16,496	128,582	769,939	2,859	
Nov.	41.90	38.55	1	939	29	53.0	512	30,372	213,896	909,399	29,335	
Dec.	38.55	38.19	1	56.5	†22	3.5	11.3	687	287,952	1,060,767	687	
Yearly	45.57	37.86		1,230		0	113	82,404	1,839,868	7,923,600	82,404	

† And other days

COLORADO RIVER AT MIGUEL C. RODRIGUEZ IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	38.19	42.91	43.14	41.93	42.03	41.93	38.25	38.12	38.06	38.71	41.90	38.52
2	38.19	43.34	43.21	41.99	42.09	41.80	38.22	38.22	37.99	38.71	41.86	38.45
3	38.19	43.44	43.34	42.09	42.09	41.73	38.25	38.25	38.12	38.71	41.86	38.39
4	38.19	41.24	43.54	42.19	42.13	41.67	38.25	38.25	38.16	38.71	41.80	38.35
5	38.16	40.19	43.64	42.16	42.06	41.57	38.22	38.25	38.22	38.75	41.80	38.32
6	38.12	39.76	43.57	42.19	41.99	41.57	38.19	38.22	38.39	38.75	41.77	38.25
7	38.55	39.44	43.27	42.19	41.99	41.70	38.22	38.25	38.39	38.75	41.80	38.25
8	37.96	39.21	43.08	42.19	42.06	41.80	38.22	38.32	38.42	38.62	41.77	38.25
9	38.12	39.34	42.98	42.22	42.06	41.80	38.19	38.29	38.42	38.45	41.70	38.25
10	38.25	39.30	42.95	42.16	42.06	41.73	38.19	38.32	38.45	38.35	41.73	38.29
11	38.09	39.21	42.91	42.06	42.09	41.77	38.16	38.29	38.42	38.48	41.67	38.25
12	38.19	39.17	42.91	42.03	42.19	41.93	38.16	38.22	38.48	38.58	41.63	38.22
13	38.25	39.04	42.88	41.99	42.16	42.03	38.16	38.19	38.48	38.71	41.63	38.22
14	38.58	39.04	42.81	41.96	42.06	42.03	38.19	38.16	38.48	38.75	41.70	38.22
15	38.78	39.17	42.68	41.96	42.06	41.86	38.19	38.12	38.45	38.78	41.83	38.22
16	39.47	41.11	42.49	41.90	42.09	41.73	38.19	38.06	38.45	38.78	41.83	38.22
17	39.90	42.81	42.32	41.90	42.03	41.73	38.25	38.12	38.45	38.81	41.50	38.22
18	40.52	43.77	42.22	41.93	42.03	41.77	38.22	38.25	38.45	38.85	40.42	38.22
19	41.01	44.23	42.16	41.96	41.99	41.77	38.22	38.22	38.65	38.85	39.73	38.22
20	43.37	44.06	42.16	42.03	42.06	41.70	38.22	38.16	38.52	38.85	39.37	38.22
21	42.78	43.77	42.22	42.16	42.09	41.60	38.22	38.12	38.58	38.85	39.17	38.22
22	40.91	43.60	42.29	42.26	42.16	41.67	38.25	38.22	38.58	39.57	39.17	38.19
23	40.03	43.54	42.32	42.22	42.13	41.70	38.25	38.25	38.58	41.27	38.94	38.19
24	40.35	43.44	42.36	42.16	42.03	41.77	38.22	38.25	38.62	41.90	38.94	38.19
25	41.86	43.34	42.32	42.19	42.03	41.83	38.25	38.25	38.62	41.90	38.98	38.19
26	42.22	43.31	42.32	42.22	42.09	41.21	38.25	38.29	38.65	41.86	38.78	38.19
27	42.19	43.24	42.39	42.22	41.96	39.93	38.25	38.25	38.65	41.90	38.71	38.19
28	42.19	43.14	42.49	42.19	41.90	39.27	38.16	38.19	38.62	41.93	38.58	38.19
29	42.29	43.08	42.42	42.09	41.93	38.58	38.16	38.19	38.65	41.90	38.55	38.19
30	42.81		42.19	42.03	41.99	38.29	38.16	38.12	38.68	41.99	38.58	38.19
31	43.21		41.99		42.06		38.12	38.12		41.93		38.22
Avg.	39.97	41.73	42.70	42.09	42.05	41.38	38.21	38.21	38.46	39.64	40.59	38.25

DIVERSIONS FROM COLORADO RIVER TO ZACATECAS CANAL IN MEXICO

DESCRIPTION: Pumping plant, operated by the Ministry of Hydraulic Resources, located on the left bank of the Colorado River in the Colonia Sánchez Corral about 1.2 miles upstream from the Sonora-Baja California railroad bridge and about 29 miles downstream from the southerly international boundary. Plant discharge is into Zacatecas Canal. Pumping equipment consists of 6 pumps, 4 of 36-inch diameter, 1 of 42-inch diameter, and 1 of 48-inch diameter.

RECORDS: Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1964.

REMARKS: The flows of the Colorado River arriving at this pumping plant consist of the flows which pass Miguel C. Rodriguez Gaging Station, 4.5 miles upstream from the pumping plant.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	17.7	0	0	2.5	10.6	0	0	8.8	7.1	5.3	0	0
2	17.7	0	28.3	7.1	17.7	0	14.1	8.8	0	0	0	0
3	17.7	0	35.3	14.1	14.1	0	12.4	12.4	7.1	6.4	0	0
4	17.7	0	0	14.1	12.4	0	12.4	7.1	7.1	7.1	0	6.4
5	17.7	0	0	17.7	10.6	0	10.6	12.4	5.3	7.1	0	10.6
6	17.7	0	10.6	24.7	10.6	0	10.6	8.8	5.3	5.3	0	8.8
7	25.4	0	0	21.2	10.6	0	14.1	7.1	5.3	7.1	0	8.8
8	17.7	0	0	21.2	10.6	0	10.6	7.1	0	7.1	0	8.8
9	17.7	0	0	17.7	10.6	0	10.6	7.1	8.8	5.3	0	8.8
10	17.7	0	0	17.7	10.6	0	8.8	10.6	5.3	6.4	0	7.1
11	28.3	0	0	14.1	10.6	0	8.8	7.1	7.1	6.4	0	7.1
12	28.3	0	0	17.7	14.1	0	8.1	7.1	0	6.0	0	7.1
13	21.2	0	0	14.1	10.6	0	10.6	7.1	7.1	7.1	0	7.1
14	1.4	0	0	8.8	14.1	0	10.6	7.1	0	6.4	0	7.1
15	0	0	0	14.1	14.1	35.3	10.6	7.1	7.1	6.4	0	7.1
16	0	0	0	12.4	14.1	24.7	8.8	10.6	6.4	0	0	5.7
17	0	0	0	8.8	14.1	12.4	8.8	7.1	6.4	6.4	0	5.3
18	0	0	0	14.1	14.1	12.4	8.8	10.6	5.3	0	0	6.7
19	0	0	0	10.6	14.1	10.6	7.1	0	7.1	0	0	6.7
20	17.7	0	0	14.1	14.1	9.2	10.6	10.6	6.4	0	0	7.1
21	0	0	0	14.1	14.1	7.1	8.8	10.6	7.1	0	0	10.6
22	0	0	0	10.6	10.6	6.7	10.6	10.6	6.4	0	0	10.6
23	0	0	24.7	10.6	0	7.1	10.6	8.8	7.1	0	0	8.8
24	0	0	21.2	10.6	0	15.5	8.8	8.8	7.1	0	0	8.8
25	0	0	24.7	10.6	0	0	8.8	8.8	7.1	0	0	8.8
26	0	0	24.7	14.1	0	24.7	8.8	8.8	6.4	0	0	6.7
27	0	0	10.6	12.4	0	17.7	8.8	8.8	6.4	0	0	6.4
28	0	0	0	13.4	0	21.2	0	7.1	6.4	0	0	0
29	0	0	0	10.6	10.6	0	14.1	8.8	7.1	5.3	0	0
30	0	0	17.7	10.6	0	14.1	8.8	7.1	6.4	0	0	0
31	0	0	21.2	10.6	0	0	7.1	7.1	0	0	0	0
Sum	281.6	0	229.6	404.4	277.1	232.8	286.9	258.2	169.9	95.8	0	187.0
Current Year 1964									Period 1958-1964			
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.			†11	28.3	†15	0	9.2	558	5,260	10,045	558	
Feb.				0	0	0	0	0	3,509	8,063	0	
Mar.			3	35.3	†1	0	7.4	456	3,275	6,641	456	
Apr.			6	24.7	†1	2.5	13.4	802	2,477	5,884	802	
May			2	17.7	†23	0	8.8	550	610	2,459	0	
June			15	35.3	†1	0	7.8	461	1,243	2,259	461	
July			†2	14.1	†1	0	9.2	569	1,698	2,606	569	
Aug.			†3	12.4	†9	0	8.5	512	2,896	6,144	512	
Sept.			9	8.8	†2	0	5.7	336	2,227	5,104	336	
Oct.			†4	7.1	†2	0	3.2	189	1,561	6,461	0	
Nov.				0	0	0	0	0	172	1,054	0	
Dec.			†5	10.6	†1	0	6.0	370	3,029	9,512	0	
Yearly				35.3		0	6.7	4,803	25,961	43,674	4,803	

† And other days Ø Mean daily

WASTEWAY TO COLORADO RIVER AT UNION IN MEXICO

DESCRIPTION: Wasteway structure located at Kilometer 21+736 of the Barrote Canal in the Colonia Hidalgo about 1,500 feet from right bank of the Colorado River. The wasteway discharges into the Colorado River at a point about 0.6 mile upstream from the Sonora-Baja California railroad bridge and 30 miles downstream from the southerly international boundary.

RECORDS: Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on gate openings. Records available: January 1957 through December 1964.

REMARKS: The wasteway structure has 3 manually operated rectangular gates which discharge from the Barrote Canal into a wasteway leading to the Colorado River.

Mean Daily Discharge in Second Feet 1964 — 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	66.0	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	26.1	0	0	0	0	0	0	0	0	0	0	0
14	20.8	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	7.1	0	0	0	0	0	0	0	0	0	0	0
19	26.1	8.8	0	0	0	0	0	0	0	0	0	0
20	46.3	0	0	0	0	0	0	0	0	0	0	0
21	52.3	0	0	0	0	0	0	0	0	0	0	0
22	40.3	15.9	0	0	0	0	0	0	0	0	0	0
23	24.4	33.5	0	0	0	0	0	0	0	0	0	0
24	19.1	27.9	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	328.5	86.1	0	0	0	0	0	0	0	0	0	0
Current Year 1964								Period 1957-1964				
Month	Extreme Gage Feet		Day	Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low		High	Low			Average	Maximum	Minimum		
Jan.			6	66.0	† 1	0	10.6	652	1,449	3,166	0	
Feb.			23	33.5	† 1	0	2.8	171	809	2,788	0	
Mar.				0	0	0	0	0	2,016	7,074	0	
Apr.				0	0	0	0	0	1,468	4,462	0	
May				0	0	0	0	0	1,814	4,413	0	
June				0	0	0	0	0	377	1,505	0	
July				0	0	0	0	0	821	4,296	0	
Aug.				0	0	0	0	0	439	1,857	0	
Sept.				0	0	0	0	0	617	1,800	0	
Oct.				0	0	0	0	0	1,343	6,997	0	
Nov.				0	0	0	0	0	426	3,413	0	
Dec.				0	0	0	0	0	490	1,205	0	
Yearly				66.0		0	1.1	823	12,071	24,526	823	

† And other days

Ø Mean daily

DIVERSIONS BY INDIVIDUAL PUMPS IN MEXICO

DESCRIPTION: Pumps operated by private individuals under the control and supervision of the Ministry of Hydraulic Resources, located along the Colorado River, 8 pumps being on the right bank in the limitrophe section and the others along both banks of the river downstream from the southerly international boundary.

RECORDS: Data obtained by the Ministry of Hydraulic Resources and furnished by the Mexican Section of the Commission are based on pump capacities and operation time. Records available: August 1958 through December 1964.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	0	0	2.8	14.5	9.5	6.0	10.6	12.4	0	0	0
2	3.9	0	0	9.9	14.5	13.1	10.6	9.9	10.6	0	0	0
3	1.1	0	6.0	9.9	14.5	17.3	10.6	9.9	10.6	3.5	0	0
4	6.0	0	6.0	9.9	9.9	21.9	10.6	14.1	8.8	4.2	0	0
5	6.0	0	6.0	9.9	13.4	20.1	10.6	25.4	9.9	8.8	0	0
6	6.0	6.0	6.0	9.9	13.4	14.8	10.6	25.1	3.9	4.6	0	0
7	6.0	6.0	6.0	9.9	11.7	13.8	10.6	31.8	3.9	7.8	0	0
8	6.0	8.8	0	11.7	12.4	16.2	10.2	21.9	3.9	11.3	0	0
9	6.0	9.9	4.2	11.7	6.0	14.5	10.2	22.6	3.9	9.5	0	0
10	6.0	9.9	4.2	13.4	6.0	9.9	7.8	19.8	7.4	9.5	0	0
11	6.0	9.9	5.3	7.4	.7	9.9	9.5	9.2	3.9	7.8	0	0
12	3.9	9.2	6.4	7.4	1.8	9.9	9.5	12.7	3.9	6.0	0	0
13	3.9	3.9	4.2	13.1	1.8	9.9	11.7	12.7	3.9	6.0	0	0
14	3.9	3.9	0	14.5	0	6.7	13.4	12.0	7.4	2.5	0	0
15	1.8	3.9	0	12.0	0	3.9	13.4	15.5	4.6	0	0	0
16	1.4	2.8	3.5	9.9	0	6.7	13.4	13.8	3.5	0	0	0
17	0	0	3.5	11.7	0	14.1	9.9	10.2	6.4	0	0	0
18	0	9.2	5.3	6.4	3.5	16.6	9.9	4.2	13.4	0	0	0
19	0	9.9	13.4	7.8	3.9	17.3	9.9	5.3	12.7	0	0	0
20	0	9.9	13.4	6.0	7.8	18.4	6.4	11.3	7.8	0	0	0
21	0	3.9	13.4	6.0	6.0	13.1	7.4	15.9	6.0	0	0	0
22	0	1.8	13.4	0	6.0	9.5	6.0	16.6	6.0	0	0	0
23	0	0	10.2	6.0	6.0	9.5	10.6	16.2	6.0	0	0	0
24	0	0	8.5	6.0	6.0	9.5	4.6	15.9	3.9	0	0	0
25	0	1.1	8.5	6.0	6.0	7.1	11.3	9.9	0	0	0	0
26	0	1.1	12.0	5.7	6.0	6.0	12.7	4.9	0	0	0	0
27	0	2.1	12.0	5.7	6.0	17.0	18.0	5.3	0	0	0	0
28	0	0	12.0	3.9	6.0	22.2	19.8	5.3	0	0	0	0
29	0	0	5.7	7.1	6.0	22.2	11.3	6.7	0	0	0	0
30	0	0	3.5	3.9	2.5	18.7	10.2	11.3	0	0	0	0
31	0	0	3.5	0	0	0	11.3	11.3	0	0	0	0
Sum	71.8	113.2	196.1	245.5	192.3	399.3	328.0	417.3	164.7	81.5	0	0
Current Year 1964									Period 1958-1964			
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	6.0	† 17	0	2.5	142	147	358	0	
Feb.			† 9	9.9	† 1	0	3.9	224	229	791	0	
Mar.			† 19	13.4	† 1	0	6.4	389	199	389	0	
Apr.			14	14.5	22	0	8.1	486	264	486	0	
May			† 1	14.5	† 14	0	6.4	381	295	440	112	
June			† 28	22.2	15	3.9	13.4	792	441	792	175	
July			28	19.8	24	4.6	10.6	651	490	651	371	
Aug.			7	31.8	18	4.2	13.4	828	648	1,648	322	
Sept.			18	13.4	† 25	0	5.7	327	411	1,240	199	
Oct.			8	11.3	† 1	0	2.5	162	103	186	0	
Nov.				0	0	0	0	0	31.6	112	0	
Dec.				0	0	0	0	0	98.9	255	0	
Yearly				31.8		0	6.0	4,382	3,030	4,382	2,022	

Ø Mean daily † And other days

COLORADO RIVER AT EL MARITIMO IN MEXICO - DISCHARGES

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

RECORDS: Based on 37 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. Records available: Mean daily stages and discharges from January 1, 1960 through December 1964. 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. When affected by tides in the Gulf of California, the discharge is deduced from stage-discharge curves based on measurements at low tide and the discharge at Miguel C. Rodriguez, taking into consideration the pumps and wasteways between the two stations.

REMARKS: The flow past this station is affected by the tides in the Gulf of California. Measurements for basic computations are taken near the date of the first or third quarter moon (neap tide).

EXTREMES: Maximum discharge, 4,410 second-feet, January 21, 1960; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	77.7	1,370	111	100	107	69.9	65.0	60.0	80.2	50.9	473	33.5
2	79.8	1,370	112	103	106	69.2	66.4	63.9	75.2	50.5	512	35.7
3	77.0	1,380	113	106	104	72.0	65.0	68.2	78.4	52.3	530	30.4
4	74.9	1,330	114	107	103	72.4	61.1	64.6	80.2	47.0	544	35.0
5	66.4	964	115	109	103	70.6	61.1	61.1	81.2	41.7	562	33.2
6	57.9	692	116	110	103	73.5	61.4	66.7	78.0	39.6	600	33.5
7	67.5	498	117	115	103	81.9	62.9	67.5	74.9	38.1	629	33.5
8	77.7	424	118	120	103	90.8	65.0	72.7	78.4	39.6	667	33.2
9	74.9	392	119	125	103	66.4	69.6	78.0	75.9	40.6	692	34.6
10	72.7	353	115	130	104	69.6	66.4	83.0	76.3	41.7	703	33.5
11	77.0	353	112	123	104	77.7	70.3	81.6	67.5	42.0	724	34.6
12	81.6	292	117	117	105	78.0	70.6	84.0	66.4	42.4	752	43.8
13	85.5	292	123	110	113	76.6	71.0	78.8	66.0	39.6	766	37.8
14	107	85.5	123	108	107	78.8	78.8	79.1	65.7	41.0	780	37.1
15	130	84.8	124	107	98.2	80.9	78.4	77.7	66.7	39.2	802	36.7
16	122	84.0	123	109	96.1	80.9	79.1	78.4	66.4	44.8	791	39.6
17	113	83.3	121	111	93.9	85.1	72.0	79.1	66.0	44.1	784	36.4
18	108	91.8	119	111	91.8	80.2	78.8	75.9	61.8	42.4	802	36.4
19	103	100	117	112	83.0	78.4	76.3	81.6	62.2	41.0	766	39.6
20	97.8	101	115	113	83.0	76.6	74.2	78.0	58.6	39.2	724	35.3
21	1,080	102	115	123	78.8	75.6	68.2	82.3	55.4	38.1	632	31.1
22	1,010	103	116	133	81.2	74.9	68.2	78.8	55.1	37.1	438	32.8
23	484	104	116	121	72.0	75.6	61.4	82.3	54.4	34.6	261	31.8
24	309	105	110	109	70.3	73.5	63.2	85.8	57.9	80.2	34.6	31.4
25	374	106	103	106	68.2	68.2	60.0	84.8	50.1	130	40.6	33.5
26	706	107	98.9	103	69.2	73.1	59.3	91.1	55.8	191	37.1	36.0
27	890	108	93.9	101	68.2	71.7	58.6	89.7	53.0	252	37.1	37.4
28	992	109	95.7	106	68.5	73.1	59.7	91.8	50.1	293	36.4	38.8
29	1,030	110	97.8	111	66.0	74.5	61.1	85.8	52.3	341	33.9	35.7
30	1,120		99.6	109	65.0	65.7	55.4	82.3	55.4	378	31.4	36.4
31	1,250		99.9		67.5		56.5	78.8		406		38.5
Sum	10,996.4	11,294.4	3,489.8	3,368	2,788.9	2,255.4	2,065.0	2,413.4	1,965.5	3,038.7	15,185.1	1,096.8
Current Year 1964												
Period 1960-1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low	Average			Maximum	Minimum		
Jan.	16.24	15.03	31	1,250	6	57.9	353	21,810	69,158	225,224	1,111	
Feb.	16.40	15.12	3	1,470	17	83.3	388	22,405	34,908	55,735	12,045	
Mar.	15.22	14.80	15	Ø 124	27	Ø 93.9	113	6,927	8,534	16,226	98.9	
Apr.	14.83	14.53	22	Ø 133	1	Ø 100	112	6,678	5,019	9,978	269	
May	14.53	14.34	13	Ø 113	30	Ø 65.0	90.1	5,531	16,821	31,886	128	
June	14.37	14.14	8	Ø 90.8	30	Ø 65.7	75.2	4,473	2,364	6,600	0	
July	14.17	14.11	16	Ø 79.1	30	Ø 55.4	66.7	4,096	819	4,096	0	
Aug.	14.24	14.11	28	Ø 91.8	1	Ø 60.0	77.7	4,787	957	4,787	0	
Sept.	14.21	14.11	5	Ø 81.2	†25	Ø 50.1	65.7	3,899	7,289	23,532	0	
Oct.	14.96	14.04	31	452	23	34.6	98.2	6,028	21,737	57,672	1,549	
Nov.	15.49	14.83	16	819	30	31.4	505	30,120	58,314	94,442	30,120	
Dec.	15.06	14.67	12	Ø 43.8	3	Ø 30.4	35.3	2,174	39,149	97,155	2,174	
Yearly	16.40	14.04		1,470		Ø 30.4	165	118,928	265,069	503,260	84,799	

† And other days

Ø Mean daily

COLORADO RIVER AT EL MARITIMO IN MEXICO - STAGES

(See Preceding Page For Description)

Mean Daily Gage Height in Feet 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15.22	16.27	15.16	14.76	14.53	14.34	14.14	14.14	14.11	14.11	14.99	15.03
2	15.22	16.31	15.12	14.76	14.50	14.34	14.14	14.14	14.14	14.11	15.09	14.99
3	15.16	16.34	15.06	14.73	14.50	14.30	14.14	14.14	14.14	14.11	15.09	14.99
4	15.12	16.34	15.09	14.73	14.50	14.30	14.11	14.14	14.14	14.11	15.12	14.96
5	15.09	16.11	15.19	14.70	14.50	14.30	14.11	14.14	14.14	14.11	15.16	14.93
6	15.09	15.94	15.19	14.70	14.50	14.30	14.11	14.14	14.17	14.11	15.22	14.90
7	15.09	15.81	15.12	14.70	14.47	14.27	14.11	14.14	14.17	14.11	15.26	14.86
8	15.06	15.75	15.03	14.67	14.44	14.27	14.11	14.17	14.17	14.11	15.29	14.83
9	15.06	15.72	15.03	14.67	14.47	14.27	14.14	14.17	14.17	14.11	15.32	14.83
10	15.06	15.68	15.03	14.67	14.47	14.27	14.14	14.17	14.17	14.11	15.35	14.83
11	15.03	15.68	15.09	14.67	14.47	14.27	14.11	14.21	14.17	14.07	15.39	14.83
12	15.03	15.62	15.06	14.67	14.50	14.27	14.11	14.21	14.17	14.07	15.39	14.80
13	15.03	15.62	15.06	14.63	14.50	14.30	14.14	14.21	14.17	14.07	15.42	14.73
14	15.03	15.55	15.03	14.63	14.50	14.30	14.14	14.21	14.14	14.07	15.42	14.76
15	15.03	15.52	14.99	14.63	14.50	14.30	14.14	14.21	14.14	14.07	15.49	14.83
16	15.03	15.52	14.99	14.67	14.47	14.27	14.11	14.17	14.14	14.07	15.45	14.83
17	15.03	15.45	14.93	14.63	14.47	14.27	14.11	14.17	14.14	14.11	15.42	14.80
18	15.06	15.42	14.93	14.57	14.44	14.27	14.11	14.17	14.11	14.11	15.45	14.83
19	15.12	15.39	14.96	14.60	14.47	14.27	14.11	14.17	14.11	14.11	15.42	14.80
20	15.22	15.32	14.93	14.60	14.47	14.27	14.11	14.17	14.11	14.07	15.35	14.80
21	15.94	15.32	14.96	14.60	14.47	14.27	14.14	14.14	14.11	14.07	15.26	14.80
22	15.91	15.35	14.93	14.60	14.44	14.24	14.11	14.14	14.11	14.07	14.96	14.76
23	15.65	15.29	14.93	14.57	14.44	14.24	14.11	14.11	14.11	14.07	14.86	14.76
24	15.52	15.29	14.90	14.57	14.40	14.24	14.14	14.14	14.11	14.14	14.90	14.76
25	15.58	15.26	14.86	14.57	14.40	14.24	14.14	14.17	14.11	14.27	14.96	14.76
26	15.81	15.19	14.83	14.57	14.37	14.24	14.14	14.14	14.11	14.44	14.99	14.76
27	15.91	15.19	14.83	14.57	14.37	14.24	14.11	14.14	14.11	14.57	15.03	14.76
28	15.98	15.19	14.83	14.57	14.37	14.21	14.11	14.17	14.11	14.67	15.03	14.73
29	16.01	15.16	14.83	14.53	14.34	14.17	14.14	14.14	14.11	14.76	15.03	14.70
30	16.08		14.83	14.53	14.34	14.14	14.14	14.14	14.11	14.83	15.03	14.70
31	16.17		14.83		14.34		14.14	14.17		14.90		14.70
Avg.	15.37	15.61	14.99	14.64	14.45	14.27	14.12	14.16	14.13	14.22	15.20	14.82

SANTA CLARA ESTUARY AT RAILROAD CROSSING IN MEXICO

DESCRIPTION: A measuring section was located at the entrance to a road culvert approximately 100 feet downstream from the Sonora-Baja California railroad bridge at Kilometer 66.2, 400 feet west of Monument C.I.L.A. F.C. 49, and 1.2 miles to the southwest along the road from the village of Riito. Beginning August 31, 1964, measurements obtained at a new drain constructed by the Ministry of Hydraulic Resources at a road which crosses the railroad at Kilometer 66, approximately 800 feet below the old station. The measuring site is located between the railroad culvert (Kilometer 66-A) and the highway culvert. No gage has been installed.

RECORDS: Based on 20 double current meter measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1958 through December 1964.

REMARKS: The flow at this station consists of return flows from the wasteways on the left bank of the Colorado River and from the Bolsa Drain through an old channel of the Colorado River into the Gulf of California.

EXTREMES: Maximum discharge, 91.8 second-feet on November 10, 1958; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — 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	8.1	3.5	1.4	6.7
2	0	0	0	0	0	0	0	0	7.8	3.5	1.4	6.7
3	0	0	0	0	0	0	0	0	7.8	3.5	1.4	6.4
4	0	0	0	0	0	0	0	0	7.4	3.5	1.8	6.4
5	0	0	0	0	0	0	0	0	7.1	3.5	1.8	6.0
6	0	0	0	0	0	0	0	0	7.1	3.2	2.1	6.0
7	0	0	0	0	0	0	0	0	6.7	3.2	2.1	6.0
8	0	0	0	0	0	0	0	0	6.7	2.8	2.5	6.0
9	0	0	0	0	0	0	0	0	6.7	2.8	2.5	6.0
10	0	0	0	0	0	0	0	0	6.4	2.8	2.8	6.0
11	0	0	0	0	0	0	0	0	6.4	2.8	2.8	6.0
12	0	0	0	0	0	0	0	0	6.4	2.8	2.8	6.0
13	0	0	0	0	0	0	0	0	6.0	2.8	3.2	6.0
14	0	0	0	0	0	0	0	0	6.0	2.8	3.2	6.0
15	0	0	0	0	0	0	0	0	6.0	2.8	3.5	6.0
16	0	0	0	0	0	0	0	0	5.7	2.5	3.5	6.0
17	0	0	0	0	0	0	0	0	5.7	2.5	3.5	5.7
18	0	0	0	0	0	0	0	0	5.3	2.5	3.9	5.7
19	0	0	0	0	0	0	0	0	5.3	2.1	3.5	5.7
20	0	0	0	0	0	0	0	0	4.9	2.1	3.5	5.7
21	0	0	0	0	0	0	0	0	4.9	2.1	3.2	5.7
22	0	0	0	0	0	0	0	0	4.9	2.1	3.2	5.3
23	0	0	0	0	0	0	0	0	4.6	1.8	2.8	5.3
24	0	0	0	0	0	0	0	0	4.2	1.8	3.5	5.3
25	0	0	0	0	0	0	0	1.1	4.2	1.8	4.2	5.3
26	0	0	0	0	0	0	0	2.5	4.2	1.8	4.6	5.3
27	0	0	0	0	0	0	0	3.5	3.9	1.4	5.3	5.3
28	0	0	0	0	0	0	0	4.6	3.5	1.4	5.7	5.3
29	0	0	0	0	0	0	0	6.0	3.5	1.4	6.4	5.3
30	0	0	0	0	0	0	0	7.1	3.5	1.4	6.7	5.3
31	0	0	0	0	0	0	0	8.1		1.4		5.3
Sum	0	0	0	0	0	0	0	32.9	170.9	76.4	98.8	179.7
Current Year 1964									Period 1958-1964			
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	731	1,981	0		
Feb.				0		0	0	578	1,892	0		
Mar.				0		0	0	653	2,031	0		
Apr.				0		0	0	1,177	2,706	0		
May				0		0	0	1,338	2,615	0		
June				0		0	0	829	1,677	0		
July				0		0	0	139	683	0		
Aug.				0		0	0	290	998	0		
Sept.			31	8.1	† 1	0	1.1	65.2	763	2,058	0	
Oct.			1	8.1	†28	3.5	5.7	339	1,424	4,610	0	
Nov.			† 1	3.5	†27	1.4	2.5	152	1,004	4,088	122	
Dec.			30	6.7	† 1	1.4	3.2	196	1,089	1,089	73.5	
Dec.			† 1	6.7	†22	5.3	5.7	356				
Yearly				8.1		0	1.4	1,108	9,306	24,595	1,108	

∅ Mean daily

† And other days

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 United States Geological Survey.

In Thousands of Acre-Feet

Month	LAKE MEAD (Capacity 27,207.0)		LAKE MOHAVE (Capacity 1,810.0)		HAVASU LAKE (Capacity 619.4)		TOTAL IN UNITED STATES RESERVOIRS (Capacity 29,636.4)	
	1964	Average 1935-1964	1964	Average 1951-1964	1964	Average 1939-1964	1964	Estimated Average
Jan.	15,441.0	16,769.6	1,696.0	1,640.1	549.5	559.3	17,686.5	18,969.0
Feb.	15,081.0	16,391.0	1,674.0	1,679.6	539.6	565.2	17,294.6	18,635.8
Mar.	14,607.0	16,061.8	1,664.0	1,678.3	548.6	580.1	16,819.6	18,320.2
Apr.	14,561.0	16,272.8	1,717.0	1,696.5	600.0	607.5	16,878.0	18,576.8
May	14,138.0	17,573.8	1,792.0	1,734.9	615.2	600.8	16,545.2	19,909.5
June	13,445.0	19,393.5	1,655.0	1,600.6	583.2	605.1	15,683.2	21,599.2
July	12,602.0	19,662.9	1,536.0	1,459.5	575.6	595.2	14,713.6	21,717.6
Aug.	12,101.0	19,325.4	1,414.0	1,391.8	555.4	578.1	14,070.4	21,295.3
Sept.	11,628.0	18,876.6	1,340.0	1,400.1	546.3	573.8	13,514.3	20,850.5
Oct.	11,319.0	18,483.2	1,417.0	1,424.3	550.4	580.1	13,286.4	20,487.6
Nov.	11,218.0	18,104.6	1,484.0	1,504.6	543.8	567.1	13,245.8	20,176.3
Dec.	11,133.0	17,650.1	1,588.0	1,611.3	539.3	562.2	13,260.3	19,823.6
Avg.	13,106.2	17,880.4	1,581.4	1,568.5	562.2	581.2	15,249.8	20,030.1
Max.	15,441.0	27,780.0	1,792.0	1,808.0	615.2	688.7	17,686.5	28,235.0
Min.	11,133.0	* 10,727.0	1,340.0	1,186.0	539.3	76.9	13,245.8	13,062.6

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

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

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

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	1964						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 1956-1964

Jan.	151,705,000	16,400	13	0.0108	0.0187	0.0010	8.9	61.4	336	1.6
Feb.	151,327,000	21,200	12	.0140	.0290	.0076	11.5	25.9	116	1.6
Mar.	235,994,000	53,600	14	.0227	.0715	.0058	29.0	79.4	499	8.8
Apr.	231,843,000	24,000	13	.0103	.0149	.0060	13.0	75.0	434	9.4
May	119,574,000	7,400	12	.0062	.0075	.0032	4.0	28.8	201	4.0
June	166,881,000	12,000	12	.0072	.0091	.0043	6.5	26.4	92.6	6.3
July	294,407,000	35,500	14	.0120	.0264	.0047	19.2	35.9	89.3	12.8
Aug.	292,897,000	23,600	13	.0080	.0200	.0019	12.8	32.9	103	8.4
Sept.	142,109,000	7,400	12	.0052	.0076	.0025	4.0	14.8	43.6	2.9
Oct.	73,866,000	3,200	12	.0043	.0128	.0021	1.7	7.1	20.0	1.6
Nov.	90,206,000	4,400	12	.0049	.0101	.0017	2.4	21.8	89.9	1.0
Dec.	90,064,000	3,600	8	.0040	.0080	.0026	1.9	42.1	174	.6
Yearly	2,040,873,000	212,300	147	0.0104	0.0715	0.0010	114.9	451.5	2,198	98.1

Samples by U. S. Section, and Analyses by Mexican Section, Method A

Colorado River at Southerly International Boundary

Period 1946-1964

Jan.	36,122,000	1,000	1	0.0028	0.0030	0.0015	0.5			
Feb.	13,818,000		0							
Mar.	4,489,000		0							
Apr.	3,536,000		0							
May	2,957,000		0							
June	1,112,000		0							
July	0		0							
Aug.	0		0							
Sept.	0		0							
Oct.	30,876,000	1,300	4	.0042	.0073	.0023	.7			
Nov.	37,396,000	800	4	.0021	.0027	.0010	.4			
Dec.	3,153,000		0							
Yearly	133,459,000		9							

Samples by U. S. Section, and Analyses by Mexican Section, Method A

" Estimated

SUSPENDED SILT

Month	1964						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

Intake Canal at Morelos Diversion Structure

Period 1952-1964

Jan.	110,887,000	22,882	3	0.0206	0.0443	0.0054	12.3	7.1	22.3	0.2
Feb.	138,258,000	15,153	4	.0110	.0218	.0066	8.2	7.2	19.4	.9
Mar.	227,563,000	62,854	5	.0276	.0427	.0122	34.0	63.2	154	11.1
Apr.	224,221,000	39,250	4	.0175	.0288	.0050	21.2	57.6	121	16.1
May	112,096,000	7,027	4	.0063	.0094	.0048	3.8	16.5	51.2	3.8
June	165,697,000	13,703	5	.0083	.0096	.0066	7.4	48.7	109	7.4
July	293,183,000	74,242	4	.0253	.0602	.0089	40.1	68.0	156	25.9
Aug.	291,593,000	34,986	5	.0120	.0177	.0046	18.9	61.6	135	15.4
Sept.	140,830,000	11,023	5	.0078	.0101	.0033	5.9	25.9	64.7	2.8
Oct.	32,505,000	1,289	2	.0040	.0082	.0026	.7	5.8	12.0	.3
Nov.	51,648,000	3,092	2	.0060	.0076	.0032	1.7	2.4	9.3	.2
Dec.	88,724,000	2,686	5	.0030	.0048	.0011	1.5	5.4	14.8	1.1
Yearly	1,877,205,000	288,187	48	0.0124	0.0602	0.0011	155.7	369.4	696.3	155.7

Samples and Analyses by Mexican Section, Method B

Colorado River at Miguel C. Rodriguez Gaging Station

Period 1960-1964

Jan.	310,553,000	7,819	10	0.0247	0.0550	0.0050	4.2	55.5	251	4.2
Feb.	14,425,000	1,781	8	.0123	.0182	.0039	1.0	7.7	13.9	1.0
Mar.	0	0					0	1.1	4.1	0
Apr.	0	0					0	.2	1.1	0
May	0	0					0	.9	1.5	0
June	0	0					0	.1	.1	0
July	664,000	53		u .0080	u .0073	u .0042	0	0	.1	0
Aug.	624,000	49	2	.0078	.0073	.0042	0	.1	.2	0
Sept.	0	0					0	1.0	4.5	0
Oct.	22,428,000	1,456	3	.0065	.0970	.0040	.8	5.5	20.8	.1
Nov.	41,295,000	2,407	8	.0058	.0356	.0020	1.3	9.1	36.0	.7
Dec.	934,000	36	5	.0039	.0870	.0010	0	6.6	13.0	0
Yearly	390,923,000	13,601	36				7.3	87.8	289	7.3

• Samples and Analyses by Mexican Section, Method C

u Estimated

CHEMICAL ANALYSES OF WATER SAMPLES

The tables below for the years 1962, 1963, and 1964, are based on chemical analyses of weekly samples from the Colorado River at the Northerly International Boundary taken by the United States Section of this Commission and analyzed by the United States Geological Survey. Samples from the Intake Canal at Morelos Diversion Structure were taken by the Mexican Section of this Commission and analyzed by the Ministry of Hydraulic Resources.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20; Mg, 12.16; Na, 23; (CO₃ plus HCO₃) expressed as CO₃, 30; SO₄, 48; Cl, 35.5; NO₃, 62. 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 ECx10⁶ at 25°C, is a relative measure of the total salt concentration.

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

Colorado River at Northerly International Boundary

1962

Jan.	4	2.38	383,000	2,880		8.1	55	53	8.20	4.85	16.00	3.62	10.04	15.41
Feb.	4	3.12	211,000	3,650		7.8	55	58	10.45	6.91	21.26	3.92	12.29	22.37
Mar.	4	1.75	359,000	2,110		7.9	50	46	6.65	4.03	10.61	3.18	8.40	9.80
Apr.	5	1.74	351,000	2,120		7.8	51	45	6.60	3.78	10.87	3.16	8.37	9.61
May	4	2.38	298,000	2,820		7.9	54	51	8.22	5.15	15.66	3.49	10.65	14.90
June	3	1.94	299,000	2,320		7.9	51	49	7.00	4.61	12.23	3.18	9.08	11.57
July	6	1.75	346,000	2,020		7.9	52	46	6.39	3.96	11.02	3.00	8.55	9.80
Aug.	4	1.69	317,000	2,020		7.8	51	45	6.17	3.93	10.34	2.93	8.25	9.26
Sept.	4	2.68	271,000	3,210		7.7	56	56	8.85	5.65	18.41	3.59	11.05	18.28
Oct.	5	2.56	231,000	3,100		7.7	55	55	8.40	5.66	17.33	3.58	10.67	17.15
Nov.	4	1.88	336,000	2,330		7.8	52	49	6.73	4.27	11.96	3.20	8.60	11.17
Dec.	7	2.18	308,000	2,620		7.7	54	51	7.61	4.70	14.35	3.40	9.79	13.48
Mean @	Ø54	2.05	Ø3,710,000	2,460		7.8	53	50	7.28	4.54	13.21	3.28	9.29	12.45
Thousands of Tons of Constituents 1962									359	136	748	242	1,098	1,088

1963

Jan.	4	2.64	309,000	3,230		7.7	55	56	8.66	5.88	17.87	3.77	10.59	18.05
Feb.	4	2.09	257,000	2,560		7.8	53	50	7.31	4.78	13.62	3.34	9.52	12.85
Mar.	4	1.84	336,000	2,240		7.7	52	48	6.72	4.10	11.61	3.25	8.48	10.67
Apr.	5	1.81	360,000	2,200		7.8	51	46	6.76	3.96	11.36	3.21	8.60	10.26
May	4	2.49	256,000	3,030		7.8	55	54	8.11	5.61	16.83	3.60	10.34	16.60
June	3	1.81	323,000	2,240		7.8	52	48	6.54	4.14	11.42	3.21	8.34	10.56
July	5	1.69	355,000	1,980		7.7	53	43	5.75	3.89	10.81	3.03	8.62	8.79
Aug.	4	1.70	408,000	1,990		7.9	54	43	5.76	3.68	10.99	2.98	8.72	8.75
Sept.	6	1.74	310,000	2,140		7.9	53	48	6.16	3.71	11.34	3.03	7.99	10.18
Oct.	5	1.50	138,000	1,770		7.8	51	40	5.71	3.09	9.29	3.09	7.82	7.18
Nov.	4	1.88	204,000	2,320		7.9	53	48	6.73	4.17	12.16	3.49	8.48	11.09
Dec.	5	1.99	203,000	2,390		7.9	53	48	7.01	4.34	12.88	3.62	8.96	11.63
Mean @	Ø53	1.89	Ø3,459,000	2,280		7.8	53	48	6.62	4.18	12.18	3.25	8.78	10.95
Period Avg.		1.97	3,584,000	2,370		7.8	53	49	6.95	4.36	12.70	3.26	9.04	11.70
Thousands of Tons of Constituents 1963									330	127	699	243	1,051	969
Avg. Thousands of Tons Period 1962-1963									344	132	724	242	1,074	1,028

1964

Jan.	5	2.04	228,000	2,610		7.8	54	52	7.35	4.44	13.91	3.48	8.94	13.32
Feb.	4	1.91	213,000	2,250		7.9	52	46	6.55	4.19	11.74	3.33	8.73	10.45
Mar.	7	1.92	334,000	2,440		7.7	54	49	6.70	4.44	13.17	3.26	9.02	12.03
Apr.	4	1.82	310,000	2,220		7.8	54	47	6.45	3.70	11.74	3.13	8.50	10.34
May	4	1.95	172,000	2,430		7.7	53	47	7.05	4.44	12.91	3.57	9.42	11.49
June	5	1.71	210,000	2,050		7.8	50	44	6.30	3.87	10.35	3.18	8.46	8.99
July	4	1.56	339,000	1,810		8.0	50	40	5.75	3.29	9.09	2.92	7.85	7.30
Aug.	5	1.58	340,000	1,920		7.8	52	42	5.85	3.54	10.09	2.98	8.23	8.20
Sept.	4	1.88	197,000	2,330		7.9	53	47	6.70	4.19	12.43	3.28	9.06	11.07
Oct.	4	2.81	153,000	3,610		7.9	58	58	9.20	6.25	21.43	4.08	11.48	21.24
Nov.	6	2.79	185,000	3,080		7.9	58	53	8.25	5.26	18.40	3.74	11.19	17.01
Dec.	4	2.05	136,000	2,450		7.9	52	46	7.65	4.28	13.17	3.66	9.85	11.63
Mean @	Ø56	1.87	Ø2,817,000	2,280		7.8	53	47	6.64	4.07	12.16	3.26	8.85	10.77
Period Avg.		1.94	3,329,000	2,340		7.8	53	48	6.85	4.26	12.52	3.26	8.97	11.39
Thousands of Tons of Constituents 1964									271	101	571	200	868	781
Avg. Thousands of Tons Period 1962-1964									320	121	673	228	1,006	946

** Percent of total cations

*** Percent of total anions

Ø Weighted mean

Ø Total

CHEMICAL ANALYSES OF WATER SAMPLES

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

Intake Canal at Morelos Diversion Structure

1962

Jan.	31	2.09	240,000	2,430		8.2	51		6.78	4.84	12.33	3.61	8.39	11.95
Feb.	7	2.20	47,200	2,930		8.1	53		8.09	5.83	15.56	3.89	9.09	16.50
Mar.	31	1.71	345,000	2,090		8.1	50		5.86	4.44	10.42	3.30	7.69	9.77
Apr.	30	1.75	358,000	2,090		8.0	51		5.51	4.58	10.64	3.31	7.56	9.86
May	21	2.05	189,000	2,460		8.1	52		6.48	5.30	12.89	3.57	8.39	12.71
June	30	1.96	299,000	2,330		8.1	50		6.40	5.25	11.67	3.45	8.29	11.60
July	31	1.78	350,000	2,110		8.1	49		6.26	4.32	10.29	3.19	7.89	9.79
Aug.	31	1.81	334,000	2,150		8.1	51		5.84	4.69	10.93	3.19	8.06	10.17
Sept.	30	2.34	228,000	2,870		8.0	53		7.45	5.95	15.55	3.58	9.30	16.05
Oct.	7	2.71	38,300	3,270		8.0	54		8.31	6.57	17.81	3.69	10.13	18.89
Nov.	14	1.79	141,000	1,990		7.9	47		5.76	4.36	9.51	3.17	7.78	8.65
Dec.	30	2.13	280,000	2,550		8.0	51		7.30	5.19	12.87	3.55	8.84	12.96
Mean @	Ø293	2.03	Ø2,849,500	2,440		8.1	51		6.67	5.11	12.54	3.46	8.45	12.41
Thousands of Tons of Constituents 1962									256	118	539	376	793	804

1963

Jan.	20	2.00	134,000	2,400		8.0	49		6.85	5.09	11.80	3.40	8.48	11.87
Feb.	28	2.12	185,000	2,510		8.0	50		6.98	5.19	12.52	3.47	8.80	12.61
Mar.	31	1.78	263,000	2,120		8.0	49		6.15	4.42	10.33	3.21	8.16	9.52
Apr.	30	1.77	328,000	2,190		8.0	49		6.25	4.66	10.50	3.32	8.15	9.94
May	31	2.43	209,000	3,000		8.0	53		7.90	6.00	16.11	3.74	9.55	16.69
June	30	1.82	315,000	2,210		8.0	50		6.25	4.58	11.04	3.28	8.19	10.40
July	31	1.70	344,000	2,020		8.0	50		5.83	4.09	9.84	3.10	7.65	9.01
Aug.	31	1.56	360,000	1,890		8.1	48		5.49	4.16	8.82	2.99	7.34	8.13
Sept.	30	1.81	250,000	2,310		8.0	50		6.17	4.99	11.74	3.23	8.11	11.56
Oct.	31	1.55	126,000	1,190		8.0	46		5.28	4.57	8.76	3.38	7.24	7.99
Nov.	30	1.94	202,000	2,300		8.0	51		5.83	5.32	11.66	3.51	8.32	10.95
Dec.	31	2.00	194,000	2,410		8.0	50		6.27	5.43	11.82	3.63	8.37	11.50
Mean @	Ø354	1.88	Ø2,910,000	2,210		8.0	50		6.27	4.88	11.24	3.36	8.20	10.85
Period Avg.		1.96	2,879,000	2,320		8.0	50		6.47	5.00	11.89	3.41	8.32	11.63
Thousands of Tons of Constituents 1963									267	123	542	409	842	799
Avg. Thousands of Tons Period 1962-1963									261	121	540	392	818	801

1964

Jan.	22	1.96	160,000	2,400		7.8	51		5.98	5.57	12.00	3.50	8.44	11.62
Feb.	28	1.97	201,000	2,330					5.69	5.44	11.75	3.43	8.52	10.94
Mar.	30	2.00	334,000	2,420		8.1	52		5.84	5.43	12.48	3.47	8.46	11.83
Apr.	30	1.88	309,000	2,260		8.1	52		5.45	5.27	11.44	3.37	8.12	10.67
May	30	2.01	166,000	2,400		8.2	52		5.84	5.63	12.26	3.69	8.46	11.68
June	30	1.82	222,000	2,140		8.0	50		5.35	5.13	10.56	3.39	8.07	9.58
July	31	1.69	363,000	1,960		8.0	49		5.25	4.63	9.47	3.21	7.63	8.52
Aug.	31	1.66	355,000	1,930		8.0	50		5.11	4.48	9.46	3.09	7.67	8.30
Sept.	30	1.94	201,000	2,280		7.9	51		6.21	4.85	11.43	3.39	8.38	10.73
Oct.	16	2.11	50,500	2,430		8.0	52		6.55	5.38	13.27	3.72	8.89	12.59
Nov.	15	1.97	74,800	2,290		8.0	51		6.56	4.51	11.59	3.56	8.50	10.64
Dec.	31	2.03	132,000	2,340		8.0	51		6.67	4.75	11.96	3.72	8.55	10.92
Mean @	Ø324	1.92	Ø2,568,300	2,260		8.0	51		5.88	5.09	11.47	3.46	8.31	10.67
Period Avg.		1.94	2,775,000	2,303		8.0	51		6.27	5.03	11.75	3.43	8.32	11.31
Thousands of Tons of Constituents 1964									212	114	477	379	734	679
Avg. Thousands of Tons Period 1962-1964									245	118	519	388	789	761

Ø Total ** Percent of total cations *** Percent of total anions @ Weighted mean

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1964

The following tables show electrical conductivity, expressed in mhos per centimeter cube x 10⁶ at 25°C, of individual water samples taken at Colorado River stations. The determinations for the Northerly and Southerly International Boundary stations were made by the United States Section of this Commission. The determinations for the Intake Canal at Morelos Dam station were made by the Mexican Section of this Commission.

Date	ECx10 ⁶ @25°C												
------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------

Colorado River at Northerly International Boundary

January		February		March		May		June		August		September		November	
1	2,670	12	2,420	25	2,140	2	2,890	10	2,290	3	1,760	24	2,320	9	4,700
2	2,790	13	2,570	26	2,280	2	2,810	11	2,200	4	1,780	25	2,340	10	5,050
2	2,940	14	2,480	27	2,050	3	2,330	12	2,200	5	1,760	26	2,380	12	4,880
3	2,920	15	2,240	30	2,380	3	2,100	13	1,800	6	1,790	27	2,400	13	4,460
4	3,110	17	2,260	31	2,430	4	2,380	14	1,720	7	1,810	28	2,330	15	4,280
5	3,150	18	2,240			5	2,170	15	1,530	10	1,910	29	2,190	15	3,990
5	3,090	19	2,240	1	2,270	6	2,340	16	1,510	11	1,900	30	2,080	16	2,430
6	2,690	20	2,480	2	2,260	7	2,480	17	1,470	12	1,850			16	2,500
6	2,650	21	2,320	3	2,250	8	2,340	18	1,690	13	1,840	1	2,510	17	2,500
7	2,350	22	2,250	4	2,270	9	2,250	19	1,880	14	1,900	2	2,530	18	2,470
8	2,550	23	2,150	5	2,200	10	2,340	20	2,120	17	1,900	3	2,500	19	2,270
9	2,280	23	2,220	6	2,210	11	2,300	21	2,240	18	1,880	4	2,250	20	2,270
10	2,310	24	2,220	7	2,180	12	2,470	22	2,290	19	1,870	5	2,380	23	2,240
11	2,210	25	2,350	8	2,100	13	2,520	23	2,280	20	1,880	6	2,370	24	2,280
12	2,320	26	2,400	9	2,200	14	2,490	24	2,200	21	1,880	7	2,440	25	2,280
13	2,090	27	2,390	10	2,100	15	2,600	25	2,170	24	2,030	8	2,360	27	2,630
14	1,930	28	2,440	11	2,100	16	2,580	26	2,190	25	2,020	9	2,450	28	2,400
15	2,180	29	2,150	12	2,100	17	2,660	29	2,080	26	2,000	10	2,440	30	2,160
16	2,120			13	2,140	18	2,620	30	1,990	27	2,020	11	2,420		
17	2,230	2	2,480	14	2,100	19	2,600			28	2,030	12	2,500	1	2,390
18	2,180	3	2,360	15	2,180	20	2,550	1	2,100	31	2,130	13	2,450	2	2,340
19	1,850	4	1,920	16	2,300	21	2,420	2	2,110			14	2,470	3	2,410
20	2,080	5	2,470	17	2,200	22	2,440	6	1,890	1	2,190	15	2,310	4	2,320
21	2,130	6	2,530	18	2,240	23	2,640	7	1,830	2	2,090	16	3,540	7	2,460
22	2,300	7	2,610	19	2,310	24	2,640	8	1,810	3	2,110	19	4,700	8	2,540
23	3,380	8	2,660	20	2,490	25	2,580	9	1,760	4	2,180	20	3,940	9	2,470
24	3,590	9	2,560	21	2,380	25	2,580	10	1,740	8	2,290	21	3,900	10	2,350
27	3,860	10	2,050	22	2,340	26	2,540	13	1,870	9	2,410	22	3,750	11	2,370
28	3,530	11	2,440	23	2,340	27	2,420	14	1,890	10	2,170	23	3,750	14	2,420
29	3,170	12	2,560	24	2,290	28	2,200	15	1,870	11	2,170	24	3,840	15	2,410
30	3,360	13	2,720	25	2,280	29	2,160	16	1,870	12	2,240	25	4,050	16	2,370
31	3,200	14	2,640	26	2,260	30	1,880	17	1,890	13	2,230	26	4,050	17	2,420
		15	2,740	27	1,970	31	2,020	20	1,450	14	2,320	27	3,980	18	2,560
		16	2,500	28	2,300			21	1,880	15	2,330	28	4,230	21	2,370
		2	2,450	28	2,780	1	2,220	22	1,990	16	2,240	29	4,140	22	2,360
		3	2,170	28	2,380	29	2,930	2	2,280	23	1,990	17	2,390	30	4,510
		4	2,280	19	2,440	29	2,540	3	2,310	24	2,020	18	2,490		
		5	2,330	20	2,470	30	2,640	4	2,170	27	2,000	19	2,520	2	4,790
		6	2,280	21	2,390	30	2,600	5	2,260	28	1,930	20	2,550	3	4,700
		7	2,350	22	2,410	30	2,270	6	2,250	29	2,000	21	2,460	4	4,900
		9	2,290	23	2,260			7	2,340	30	1,960	22	2,460	5	4,730
		10	2,260	24	2,040	1	2,480	8	2,320	31	1,970	23	2,410	6	4,600
		11	2,330			1	2,760	9	2,280						

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1964

Date	ECx10 ⁶ @25°C										
------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------	------	-----------------------------

Colorado River at Southerly International Boundary

January		February		March		April		May		October		November		December	
3	1,660	7	2,730	6	1,670	3	2,110	1	1,560	20	4,360	10	4,830	1	2,860
10	1,800	14	1,960	13	1,890	10	1,640	7	1,640	22	4,090	17	3,030	8	1,700
17	2,240	21	1,900	20	1,730	17	1,750	22	1,750	29	3,980	19	3,370	15	2,280
24	3,560	27	1,700	27	1,560	24	1,830	June		November		24	2,000	22	2,210
31	3,660							12	1,620	3	4,940	27	2,820	31	2,200
								19	1,670						

Intake Canal at Morelos Diversion Structure

January		February		April		May		July		August		October		November	
1	2,700	16	2,250	2	2,250	18	2,600	2	2,150	17	1,950	1	2,450	17	2,450
2	2,800	17	2,200	3	2,250	19	2,500	3	2,100	18	1,900	2	2,450	18	2,450
3	2,950	18	2,300	4	2,250	20	2,500	4	2,050	19	1,900	3	2,450	19	2,300
4	3,050	19	2,200	5	2,200	21	2,450	5	2,050	20	1,920	4	2,200	20	2,300
5	3,100	20	2,500	6	2,250	22	2,400	6	2,000	21	1,850	5	2,300	21	2,100
6	2,650	21	2,350	7	2,050	23	2,550	7	1,900	22	1,900	6	2,300	22	2,350
7	2,300	22	2,450	8	2,100	24	2,550	8	1,900	23	1,950	7	2,250	23	2,100
8	2,550	23	1,950	9	2,150	25	2,550	9	1,850	24	2,020	8	2,300	24	2,200
9	2,350	24	2,350	10	2,150	26	2,550	10	1,900	25	2,020	9	2,400	25	2,200
10	2,350	25	2,400	11	2,100	27	2,420	11	1,850	26	2,000	10	2,400	26	2,250
11	2,350	26	2,400	12	2,100	28	2,180	12	1,900	27	2,000	11	2,450	27	2,500
12	2,350	27	2,450	13	2,100	29	2,050	13	1,900	28	2,050	12	2,400	28	2,300
13	2,050	28	2,500	14	2,100	30	1,900	14	1,950	29	2,100	13	2,450	29	2,300
14	2,000	29	2,300	15	2,100	31	2,050	15	1,950	30	2,100	14	2,400	30	2,200
15	2,150	March		16	2,150	June		16	1,950	31	2,100	15	2,300	December	
16	2,250	1	2,500	17	2,250	1	2,350	17	1,950	September		16	3,400	1	2,350
17	2,200	2	2,450	18	2,300	2	2,250	18	1,900	1	2,150	17	4,250	2	2,300
18	2,150	3	2,600	19	2,200	3	2,250	19	1,450	2	2,120	19	4,300	3	2,200
19	1,800	4	2,000	20	2,420	4	2,200	20	1,500	3	2,100	20	3,850	4	2,200
20	2,050	5	2,500	21	2,350	5	2,280	21	1,950	4	2,200	21	4,000	5	2,300
21	2,250	6	2,600	22	2,400	6	2,300	22	2,050	5	2,300	22	3,650	6	2,300
22	2,400	7	2,600	23	2,280	7	2,350	23	2,100	6	2,350	23	3,500	7	2,400
23	3,500	8	2,800	24	2,300	8	2,300	24	2,000	7	2,250	24	3,700	8	2,450
24	3,650	9	2,400	25	2,500	9	2,300	25	2,100	8	2,250	25	3,700	9	2,400
25	3,850	10	2,250	26	2,100	10	2,300	26	2,020	9	2,300	26	3,750	10	2,300
26	3,800	11	2,400	27	2,020	11	2,280	27	2,100	10	2,350	27	3,900	11	2,300
27	3,800	12	2,800	28	2,300	12	2,250	28	2,020	11	2,100	28	3,800	12	2,250
28	3,400	13	2,800	29	2,750	13	1,950	29	2,050	12	2,200	29	3,850	13	2,300
29	3,200	14	2,550	30	2,600	14	1,800	30	2,000	13	2,250	30	4,300	14	2,300
30	3,250	15	2,700	May		15	1,600	31	2,050	14	2,300	31	4,500	15	2,400
31	3,000	16	2,550	1	2,400	16	1,600	August		15	2,250	November		16	2,300
February		18	2,450	2	2,800	17	1,520	1	2,000	16	2,250	1	4,500	17	2,450
1	2,800	19	2,550	3	2,300	18	1,850	2	1,800	17	2,350	2	4,600	18	2,550
2	2,300	20	2,450	4	2,400	19	1,950	3	1,850	18	2,400	3	4,400	19	2,300
3	2,200	21	2,450	5	2,200	20	2,200	4	1,820	19	2,450	4	4,500	20	2,300
4	2,250	22	2,550	6	2,300	21	2,300	5	1,800	20	2,480	5	4,400	21	2,300
5	2,300	23	2,300	7	2,400	22	2,400	6	1,850	21	2,450	6	4,400	22	2,400
6	2,300	24	2,100	8	2,300	23	2,250	7	1,850	22	2,400	7	4,500	23	2,350
7	2,350	25	2,100	9	2,300	24	2,200	8	1,920	23	2,400	8	4,400	24	2,350
8	2,350	26	2,400	10	2,300	25	2,200	9	1,920	24	2,350	9	4,300	25	2,350
9	2,300	27	2,000	11	2,200	26	2,300	10	2,000	25	2,300	10	4,300	26	2,350
10	2,250	28	2,000	12	2,500	27	2,250	11	1,920	26	2,350	11	4,550	27	2,400
11	2,350	29	2,050	13	2,500	28	2,250	12	1,900	27	2,350	12	4,400	28	2,450
12	2,400	30	2,200	14	2,500	29	2,200	13	1,900	28	2,250	13	4,100	29	2,420
13	2,500	31	2,450	15	2,550	30	2,000	14	1,850	29	2,050	14	4,100	30	2,300
14	2,450	April		16	2,500	July		15	1,820	30	2,020	15	3,900	31	2,350
15	2,300	1	2,250	17	2,550	1	2,150	16	1,900			16	2,400		

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 this Commission. For location, elevation, period of record, and the observer, see alphabetical listings of these stations on page 53 in this bulletin.

In United States

Month	Brawley, California		El Centro, California		Blythe, California		Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1964	Average 1931-1964	1964	Average 1931-1964	1964	Average 1931-1964	1964	Average 1955-1964	1964	Average 1931-1964
Jan.	0.08	0.32	T	0.38	0	0.47	0.03	0.46	0	0.38
Feb.	.40	.33	.21	.37	T	.44	0	.40	.10	.35
Mar.	T	.12	0	.18	.35	.37	.12	.28	.05	.20
Apr.	T	.07	0	.11	.09	.12	.06	.16	T	.10
May	T	.01	T	0	T	.02	.02	.09	T	.01
June	0	.01	0	.01	.12	.03	0	0	0	.02
July	.01	.02	0	.09	.04	.19	.22	.20	.02	.17
Aug.	T	.30	T	.35	0	.81	.05	.59	.28	.45
Sept.	T	.29	0	.26	0	.34	.09	.32	T	.35
Oct.	.06	.22	.22	.24	.33	.28	0	.38	1.22	.44
Nov.	.38	.11	.24	.10	.38	.23	.19	.35	.20	.14
Dec.	.03	.43	.02	.45	.17	.53	.02	.26	.07	.39
Yearly	0.96	2.23	0.69	2.54	1.48	3.83	0.80	3.49	1.94	3.00

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Ampac, Baja California		Bataques, Baja California		San Luis, R. C., Sonora	
	1964	Average 1948-1964	1964	Average 1926-1964	1964	Average 1949-1964	1964	Average 1948-1964	1964	Average 1949-1964
Jan.	T	0.43	T	0.39	0	0.28	0	0.43	0	0.28
Feb.	.04	.16	.04	.35	.31	.16	T	.08	.16	.08
Mar.	T	.08	T	.20	0	.12	0	.04	T	.08
Apr.	0	.04	0	.08	0	.08	0	.04	T	.04
May	0	0	T	0	0	0	0	0		# 0
June	0	0	0	0	0	0	0	0		# 0
July	T	.04	T	.08	.08	.04	0	0		# .16
Aug.	.59	.20	T	.31		# .43	0	.08		# .43
Sept.	0	.16	0	.35	0	.08	.12	.08		# .16
Oct.	.20	.31	.31	.28	1.14	.20	.43	.24	.39	.16
Nov.	.20	.12	.35	.12	.24	.04	.16	.08	.08	.04
Dec.	.04	.24	.04	.87	.04	.16	.04	.16	.04	.24
Yearly	1.07	1.77	0.74	3.03		# 1.54	0.75	1.10		# 1.54

Month	Delta, Baja California		Kilometer 50, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1964	Average 1948-1964	1964	⊖Average 1952-1964	1964	Average 1959-1964	1964	Average 1949-1964	1964	Average 1948-1964
Jan.	0	0.39	0	0.75	0	0.28	0	0.20	0	0.28
Feb.	0	.04	.12	.24	.04	0	0	.08	T	.08
Mar.	0	.08	0	.28	T	0	0	.12	0	.20
Apr.	0	.04	0	.16	T	0	0	.04	0	.12
May	0	0	T	.04	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	.08
July	.20	.04	0	.20	T	0	.47	.08	0	.12
Aug.	0	.12	0	.47	T	.16	.04	.39	0	.35
Sept.	T	.12	0	.24	0	.24	0	.43	T	.24
Oct.	0	.20	0	.51	.24	.12	0	.24	.47	.39
Nov.	.16	.04	0	.20	.55	.12	0	.04	.94	.08
Dec.	.08	.28	0	.24	.08	.55	0	.31	0	.35
Yearly	0.44	1.34	0.12	1.57	0.91	1.06	0.51	2.01	1.41	2.36

T Trace

1949-1963 Averages

⊖ Based on records for the period 1952-1959 and 1961-1964

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 1964. The state in which each station is located follows the name of the station.

In the United States

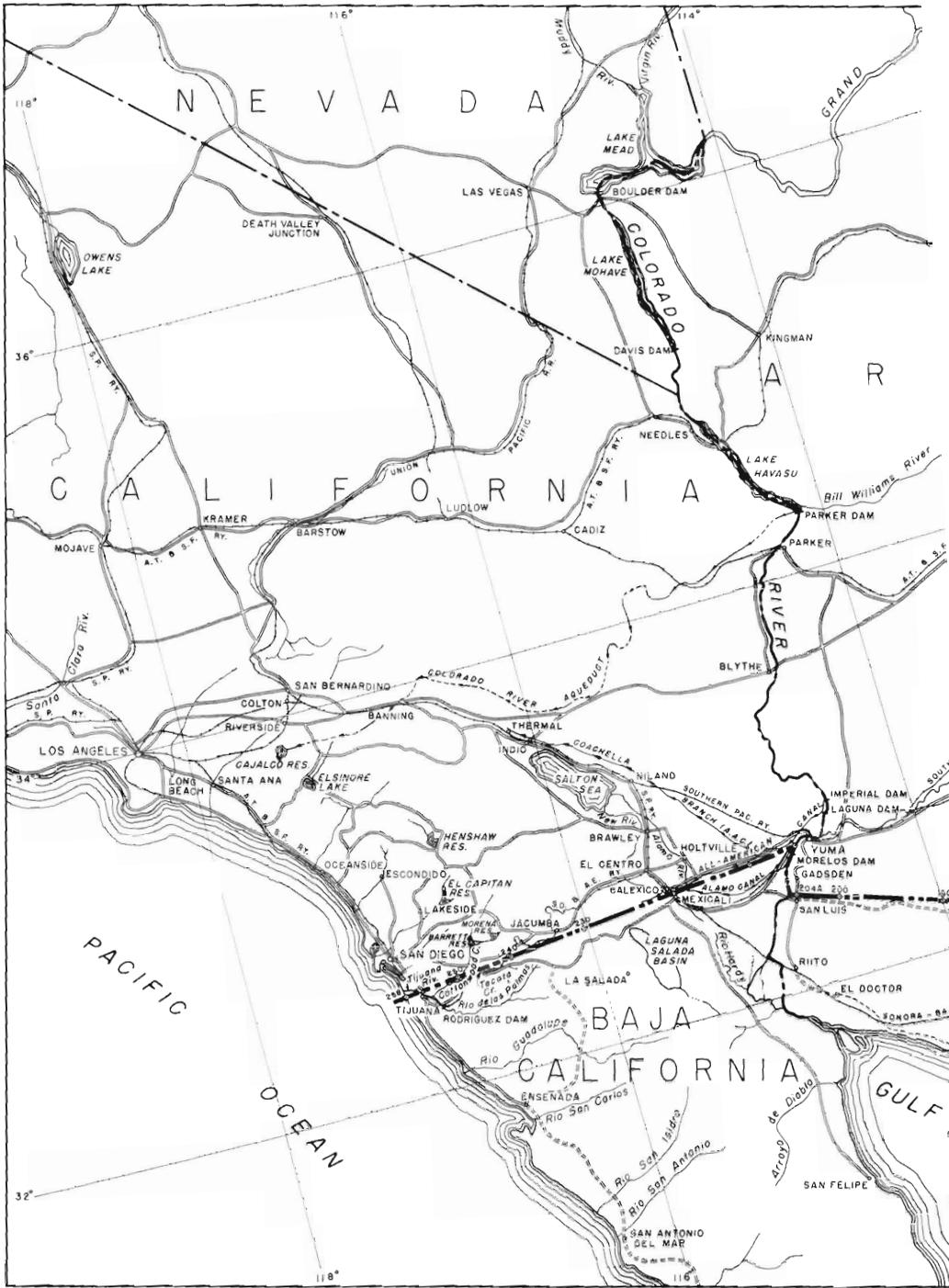
NAME OF STATION	LATI- TUDE	LONGI- TUDE	Ø ELEV. (FT.)	RECORD BEGAN	OBSERVER
Blythe, California *	33° 37'	114° 36'	268	1909	State Division of Forestry
Brawley, California	32° 57'	115° 33'	100	1908	Agricultural Research Service
Davis Dam No. 2, Arizona *	35° 12'	114° 34'	657	1954	U. S. Bureau of Reclamation
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	Ø ELEV. (FT.)	RECORD BEGAN	OBSERVER
Ampac, Baja California	32° 34'	115° 26'	16	1949	Jabonera del Pacifico
Bataques, Baja California	32° 33'	115° 04'	** 66	1948	Hydraulic Resources
Delta, Baja California	32° 21'	115° 11'	** 39	1948	Hydraulic Resources
El Mayor, Baja California	32° 08'	115° 15'	** 33	1949	Hydraulic Resources
Kilometer 50, Baja California	32° 15'	115° 03'	49	1952	Hydraulic Resources
Los Algodones, Baja California	32° 42'	114° 44'	115	1948	Hydraulic Resources
Mexicali, Baja California	32° 40'	115° 28'	13	1926	Hydraulic Resources
Riito, Sonora	32° 10'	114° 57'	** 39	1959	Hydraulic Resources
San Felipe, Baja California *	31° 02'	114° 53'	33	1948	Hydraulic Resources
San Luis, R. C., Sonora	32° 28'	114° 47'	131	1949	Hydraulic Resources

* Not shown on map Ø 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



EVAPORATION IN THE COLORADO RIVER BASIN IN INCHES

Tabulated below are records of evaporation observed at two stations in Arizona and at nine stations in Baja California and Sonora, Mexico. The stations in the United States are operated by the U. S. Bureau of Reclamation and by the University of Arizona Experimental Farm. The stations in Mexico are operated by the Ministry of Hydraulic Resources with the exception of Ampac, which is operated by the Jabornera del Pacifico. The type of pan used at all these stations was the U. S. Weather Bureau standard pan, four feet in diameter. For specific location of these stations, refer to data opposite the same station name shown in "Location of Rainfall Stations," page 53 in this bulletin.

In United States

Month	Davis Dam No. 2, Arizona		Yuma Citrus Station, Arizona	
	1964	Average 1955-1964	1964	Average 1931-1964
Jan.	7.38	7.50	3.11	3.94
Feb.	10.28	7.57	5.18	4.94
Mar.	10.34	10.51	7.45	
Apr.	13.19	13.78	9.80	10.35
May	16.18	17.24	11.34	13.45
June	20.29	20.41	14.85	14.70
July	20.00	21.01	13.71	16.02
Aug.	18.23	18.60	12.32	14.03
Sept.	15.07	15.00	9.18	11.21
Oct.	12.17	12.00	6.36	8.03
Nov.	7.78	9.39	3.43	5.16
Dec.	5.89	8.61	2.88	3.74
Total	156.80	161.62	99.61	

In Mexico

Month	Los Algodones, Baja California		Mexicali, Baja California		Ampac, Baja California		Bataques, Baja California	
	1964	Av. 1949-55 1961-1964	1964	Average 1926-1964	1964	Average 1953-1964	1964	Average 1963-1964
Jan.	3.70	4.17	2.56	2.64		# 2.76	5.16	3.86
Feb.	7.64	5.28	3.98	3.46		# 3.78	6.81	5.75
Mar.	8.15	7.05	5.67	5.83	5.31	5.98	8.66	8.19
Apr.	11.18	9.49	7.91	7.91	8.03	8.70	10.04	9.84
May	13.39	12.09	9.80	10.51	11.22	11.50	12.83	12.24
June	15.12	12.60	11.93	11.46	13.74	11.69	13.03	12.60
July	15.28	12.76	11.85	11.73	12.52	11.69	13.23	12.83
Aug.	11.50	11.61	7.95	9.96		# 9.76	6.46	8.35
Sept.	9.57	9.45	7.68	8.11	8.62	7.48		
Oct.	7.56	7.72	5.55	5.59		# 5.00	2.44	4.65
Nov.	4.69	4.72	3.07	3.39	3.82	3.35	5.00	4.25
Dec.	4.17	4.06	2.40	2.44	2.95	2.99	3.82	4.21
Total	111.95	103.15	80.35	83.03		# 83.31		

Month	San Luis, R. C., Sonora		Delta, Baja California		Riito, Sonora		El Mayor, Baja California		San Felipe, Baja California	
	1964	Average 1953-1964	1964	Average 1959-1964	1964	Average 1963-1964	1964	Average 1953-1964	1964	Average 1952-1964
Jan.	2.99	3.31	2.99	3.50	3.58	2.87	5.55	3.58	4.69	5.16
Feb.	2.91	4.09	4.61	4.53	5.63	5.67	4.61	4.29	6.89	5.87
Mar.	3.27	6.14	5.98	6.46	5.87	6.77	6.85	6.42	7.05	6.89
Apr.		# 8.58	7.60	8.35	6.18	7.56	7.01	8.39	8.35	8.46
May		# 11.02	9.88	10.35	6.81	8.82	9.41	10.00		# 10.67
June		# 12.87	10.75	11.22	11.10	10.63	9.76	11.65	11.10	11.10
July		# 14.61	10.87	11.69	8.98	10.94	11.18	12.99	11.54	11.77
Aug.		# 13.15	8.74	9.65	8.27	8.90	11.65	12.01	10.67	10.71
Sept.		# 10.31	7.64	7.80	6.10	6.10	11.69	10.75	9.45	10.16
Oct.		# 6.89	4.88	5.59	5.35	4.06	7.24	8.11	7.32	8.54
Nov.	5.28	4.49	2.91	3.74	2.99	3.62	5.94	5.12		6.34
Dec.	4.76	3.70	2.56	3.11	2.52	3.11	6.61	3.70		5.28
Total		#101.54	79.41	85.55	73.38	73.38	97.50	96.77		# 101.30

1953-1963 Averages

1952-1963 Averages

**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 maximums and minimums 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 53 in this bulletin.

In United States

Month	Blythe, California				Davis Dam No. 2, Arizona				Yuma Citrus Station, Arizona			
	1964			Average 1931-64	1964			Average 1955-64	1964			Average 1931-64
	Mean	Max.	Min.		Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	48.6	# 77	20	52.5	49.8	# 73	31	52.8	48.7	75	24	53.1
Feb.	53.8	78	26	57.1	52.9	# 76	# 29	56.7	51.3	79	26	57.0
Mar.	60.1	91	30	63.1	57.7	# 91	# 34	62.2	57.2	89	28	
Apr.	67.1	99	38	70.8	67.5	97	43	70.7	65.5	101	36	69.4
May	75.0	103	42	77.4	76.0	# 103	# 46	78.6	72.0	# 101	# 38	76.1
June	83.2	113	55	85.0	86.4	# 114	# 61	89.1	81.1	113	54	83.7
July	91.9	114	64	92.0	95.2	# 118	# 68	94.9	90.4	# 114	65	91.4
Aug.	90.2	111	64	91.0	93.2	# 114	# 72	93.3	89.2	110	67	90.7
Sept.	82.6	108	56	85.3	85.1	# 109	# 63	86.4	82.3	107	57	85.5
Oct.	77.1	105	49	73.4	79.3	# 104	# 57	75.3	77.0	# 105	# 45	74.1
Nov.	56.6	85	30	60.0	58.3	# 82	# 37	61.3	56.5	86	29	61.5
Dec.	53.1	78	27	53.6	53.4	# 75	# 30	55.5	53.7	80	26	55.1
Yearly	69.9	114	20	71.8	71.2	# 118	# 29	73.1	68.7	# 114	24	

Month	Brawley, California				El Centro, California			
	1964			Average 1931-64	1964			Average 1931-64
	Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	50.0	76	24	53.7	50.3	77	26	53.5
Feb.	54.4	80	30	58.1	54.4	81	30	57.8
Mar.	59.3	90	30	63.6	59.8	93	33	63.2
Apr.	66.6	101	42	71.2	67.2	101	41	70.5
May	73.6	102	40	78.1	75.0	104	43	77.6
June	82.0	113	54	85.7	83.1	115	52	85.1
July	90.6	116	67	92.6	91.3	115	65	92.0
Aug.	89.6	113	63	92.1	90.3	113	60	91.1
Sept.	82.3	108	56	87.1	83.0	110	56	86.0
Oct.	78.0	106	52	75.8	78.7	106	50	74.9
Nov.	58.9	88	32	62.5	58.7	87	30	62.0
Dec.	55.1	84	27	55.6	55.4	86	27	55.1
Yearly	70.0	116	24	73.0	70.6	115	26	72.4

In Mexico

Month	Los Algodones, Baja California				Mexicali, Baja California				Ampac, Baja California			
	1964		1948-1964		1964		1926-1964		1964		1949-1964	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.	81	32	86	23	75	27	93	19	77	25	88	21
Feb.	81	34	95	28	77	30	93	23	79	28	91	23
Mar.	91	36	100	32	90	32	100	32	91	30	95	28
Apr.	104	43	106	37	99	41	106	34	100	43	106	27
May	102	46	117	43	104	43	117	43	106	41	115	41
June	117	59	126	52	113	55	120	52	117	52	120	52
July	115	72	118	61	115	66	118	55	117	64	120	54
Aug.	109	72	120	61	111	64	118	54	118	54	118	55
Sept.	108	63	122	54	109	59	122	48	109	59	118	48
Oct.	106	50	111	32	106	54	109	39	106	50	108	32
Nov.	86	34	100	27	86	30	99	28	86	21	93	21
Dec.	81	30	88	28	84	28	90	25	86	25	88	21
Yearly	117	30	126	23	115	27	122	19		21	120	21

One or more days missing

IRRIGATED AREAS ALONG COLORADO RIVER BELOW IMPERIAL DAM 1964

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 State of California Department of Water Resources; 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 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
IN UNITED STATES:	
Imperial Dam	
Yuma Valley Division	46,345
Reservation Division	11,334
Yuma Mesa	17,082
Yuma Aux. Project Unit "B" (Yuma Mesa)	3,110
South Gila Valley	9,831
North Gila Valley	5,360
Wellton-Mohawk	58,100
Coachella Valley	60,028
Imperial Valley	431,708
Warren Act	2,091
Non-Project lands adjacent to Colorado River	5,900
Total in United States	650,889
IN MEXICO:	
Morelos Dam	
Mexicali Valley	* 456,915
Total in United States and Mexico	1,107,804

* An estimated one-third of total acreage is served by pumping from ground water in Mexicali Valley.

MESA DRAIN NEAR CUDAHY IN MEXICO

DESCRIPTION: Staff gage located at Kilometer 18.0, about 0.9 mile upstream from the pumping plant on the Alamo Canal above Cudahy check. Measurements are made at Kilometer 1+500.

RECORDS: Based on 47 double meter measurements made during the year from the bridge or by wading. Data obtained and furnished by the Mexican Section of the Commission. Records available: July 25, 1956 through December 1964.

REMARKS: Mesa Drain is located immediately south of the sand hills. Flow in the drain, consisting of ground water and agricultural returns, is modified by pumping for agricultural and domestic use in Mexico above the station.

EXTREMES: Maximum measured discharge, 78.0 second-feet on February 22, 1960; minimum measured discharge, 2.5 second-feet on August 14, 1963.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	49.8	48.0	45.2	38.5	50.5	40.3	25.4	33.2	27.9	36.4	34.3	42.7
2	49.1	47.0	45.2	38.5	50.1	41.0	25.4	33.9	27.2	36.0	33.9	45.2
3	48.0	46.3	45.2	38.5	50.1	41.7	25.8	34.3	29.0	35.3	33.5	44.1
4	47.0	45.2	45.2	38.5	50.1	41.3	25.8	35.0	30.7	34.6	32.8	43.4
5	46.3	44.5	45.2	38.5	49.8	41.0	26.1	35.3	32.5	33.9	32.1	42.4
6	45.2	43.4	45.2	38.1	49.8	40.6	26.1	36.0	34.3	33.5	31.4	41.7
7	44.1	42.7	45.2	38.1	49.4	40.3	26.5	36.4	36.0	32.8	31.1	40.6
8	43.1	43.1	45.2	38.1	49.4	40.3	26.5	36.7	37.8	32.1	30.4	41.3
9	42.4	43.4	45.2	38.1	49.4	39.9	26.8	37.4	38.1	31.8	29.7	41.7
10	41.3	43.8	45.2	38.1	49.1	39.6	26.8	37.8	38.1	31.4	29.0	42.4
11	40.3	43.8	45.2	37.8	49.1	38.8	27.2	38.1	38.1	31.1	28.6	43.1
12	39.2	44.5	44.5	37.4	48.7	38.5	27.2	38.1	38.1	30.7	28.6	43.4
13	38.1	44.5	43.8	37.4	48.7	38.1	27.5	38.1	38.5	30.4	28.3	44.1
14	37.4	44.5	43.1	37.1	48.7	37.4	27.5	38.1	38.5	30.0	28.3	44.5
15	36.4	44.1	42.4	36.7	48.0	37.1	27.9	38.1	38.5	29.7	28.3	45.2
16	37.8	44.1	41.7	36.7	47.3	36.4	27.9	37.8	37.8	29.7	27.9	45.9
17	39.6	43.8	41.3	36.7	46.6	33.5	28.3	37.8	36.7	29.3	27.9	45.9
18	41.0	43.8	40.6	36.7	46.3	30.4	28.3	37.8	36.0	29.0	27.9	46.3
19	42.7	43.4	39.9	36.7	45.6	27.5	28.6	37.1	35.0	28.6	27.9	46.3
20	44.1	43.8	39.6	36.7	44.8	24.7	29.0	36.4	33.9	28.3	27.9	46.6
21	45.9	44.1	39.6	36.7	43.8	21.5	29.0	35.7	33.2	27.9	27.9	46.6
22	47.3	44.1	39.2	38.5	42.7	18.7	29.3	35.0	32.1	29.3	27.9	47.0
23	49.1	44.5	38.8	40.3	41.7	15.5	29.7	34.3	33.2	30.7	27.9	47.0
24	49.1	44.5	38.5	42.0	40.6	12.7	29.7	33.5	33.9	32.1	27.9	46.6
25	49.4	44.8	38.5	43.8	39.6	14.5	30.0	32.8	34.6	33.5	27.9	45.9
26	49.8	45.2	38.5	45.6	38.5	16.2	30.4	32.1	35.3	35.0	30.4	45.6
27	50.1	45.2	38.5	47.3	37.4	18.0	30.7	31.4	36.0	36.0	32.8	45.2
28	50.5	45.2	38.5	49.1	37.8	19.8	30.7	30.7	37.1	35.7	35.3	44.5
29	50.9	45.2	38.5	50.9	38.5	21.9	31.1	30.0	37.8	35.3	37.8	44.1
30	49.8		38.5	50.5	39.2	23.7	31.8	29.3	37.1	35.0	40.3	43.8
31	48.7		38.5		39.6		32.5	28.6		34.6		43.8
Sum	1,393.5	1,290.5	1,299.7	1,197.6	1,410.9	930.9	875.5	1,086.8	1,053.0	999.7	915.9	1,376.9
Current Year 1964										Period 1956-1964		
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Low	Average			Maximum	Minimum		
Jan.			29	50.9	15	36.4	2,763	2,797	3,072	2,443		
Feb.			1	48.0	7	42.7	2,559	2,681	3,439	2,269		
Mar.			† 1	45.2	† 24	38.5	2,573	2,770	3,225	2,392		
Apr.			29	50.9	† 15	36.7	2,373	2,624	3,381	2,054		
May			1	50.5	27	37.4	2,799	2,706	3,365	2,147		
June			3	41.7	24	12.7	1,846	2,066	3,324	1,231		
July			31	32.5	1	25.4	1,736	1,875	3,268	803		
Aug.			† 11	38.1	† 1	28.6	2,156	2,155	3,468	522		
Sept.			† 13	38.5	2	27.2	2,088	2,219	2,720	1,731		
Oct.			1	36.4	21	27.9	1,984	2,482	3,414	1,984		
Nov.			30	40.3	† 16	27.9	1,814	2,449	3,416	1,708		
Dec.			† 22	47.0	7	40.6	2,732	2,755	3,155	2,260		
Yearly				50.9		12.7	37.8	27,423	28,930	34,661	25,283	

∅ Mean daily

† And other days

ALAMO RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Staff gage located on the right bank of the river, about 7 miles 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 Cipolletti weir set 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. 1964 records excellent. Records available: June 1942 through December 1964.

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 (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 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.89	2.00	2.32	2.79	2.32	2.00	3.54	1.68	3.41	3.15	1.79	2.44
2	1.89	2.10	2.21	2.67	2.44	2.00	3.41	1.58	3.67	3.15	1.79	3.03
3	1.89	2.10	2.21	2.55	2.21	1.89	3.54	2.00	3.41	3.03	1.89	2.91
4	1.89	2.10	2.67	2.55	2.67	1.89	3.54	1.58	3.67	3.15	2.00	2.44
5	2.00	2.10	2.55	2.55	2.44	2.00	3.41	3.15	3.54	3.15	2.00	2.44
6	2.00	2.10	2.21	2.55	2.44	2.21	3.54	2.91	3.67	3.28	2.00	2.10
7	2.00	2.00	2.10	2.44	2.44	2.44	3.54	2.67	3.67	2.55	1.89	2.00
8	1.89	2.10	2.21	2.44	2.55	2.32	3.93	3.41	3.67	2.67	1.89	1.89
9	1.89	2.21	2.44	2.44	2.67	2.44	3.80	2.91	3.67	2.79	1.79	2.00
10	2.00	2.00	2.10	2.55	2.67	2.00	3.67	2.67	3.67	3.28	1.79	2.00
11	2.10	2.10	3.15	2.44	2.67	2.10	3.15	2.91	2.91	3.03	2.00	2.44
12	2.00	3.15	3.03	3.15	2.44	2.21	3.41	3.41	3.15	2.79	2.10	2.44
13	2.00	2.67	2.79	2.44	2.00	2.21	2.67	3.15	3.15	2.55	2.00	2.00
14	2.00	2.32	2.67	2.91	2.21	2.21	2.91	3.15	3.67	4.34	2.00	2.10
15	2.00	2.32	2.67	2.91	2.21	2.21	2.21	3.41	3.67	4.20	2.00	2.21
16	2.44	2.32	2.67	3.15	2.21	2.21	2.00	3.15	3.67	4.07	1.89	2.10
17	2.44	2.21	2.55	3.15	2.21	2.21	2.10	3.41	3.67	3.93	2.00	2.21
18	2.44	2.21	3.15	2.67	2.32	2.21	2.00	2.91	3.03	4.20	2.00	1.89
19	2.00	2.44	3.15	2.55	2.21	2.21	2.21	2.91	3.15	3.80	2.00	2.00
20	2.00	2.44	3.15	2.67	2.21	2.21	2.32	3.03	3.41	3.80	2.10	1.89
21	2.10	2.32	2.91	2.44	2.21	2.55	2.21	3.15	3.54	3.54	2.00	2.00
22	2.10	2.21	1.89	2.67	2.21	2.44	2.00	3.28	3.67	3.41	2.10	2.00
23	2.10	2.21	1.89	2.67	2.21	2.32	2.10	3.03	3.03	3.28	2.00	1.89
24	2.00	2.32	1.79	2.67	2.21	2.91	2.10	2.91	3.03	3.41	1.89	1.89
25	2.10	2.32	1.79	2.32	2.21	2.44	2.10	2.79	3.15	3.03	2.67	2.00
26	2.10	2.10	1.79	2.44	2.21	2.91	2.00	3.15	3.15	3.28	2.55	2.00
27	2.10	2.21	2.21	2.44	2.21	2.91	2.00	3.03	3.15	3.28	2.21	1.89
28	2.10	2.32	2.21	2.44	2.21	3.03	2.00	3.03	3.03	2.21	2.21	1.89
29	2.10	2.21	2.10	2.21	1.89	3.03	1.89	2.91	3.03	2.21	2.67	2.10
30	2.10	2.00	2.00	2.21	2.00	2.91	1.58	3.67	3.28	2.00	2.55	2.32
31	2.10	2.00	2.00	2.21	1.79	2.91	1.89	3.54	3.28	2.00	2.55	2.32
Sum	63.76	65.21	74.58	78.08	70.90	70.63	82.77	90.49	101.59	98.56	61.77	66.72
Current Year 1964												
Period 1943-1964												
Month	Ø Extreme Gage Feet		Ø Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	0.32	0.27	† 16	2.44	† 1	1.89	2.06	126	467	2,790	99	
Feb.	.38	.28	12	3.15	† 1	2.00	2.25	129	422	2,822	100	
Mar.	.38	.26	† 11	3.15	† 24	1.79	2.41	148	473	3,154	111	
Apr.	.38	.30	† 12	3.15	† 29	2.21	2.60	155	517	2,222	97	
May	.34	.26	† 4	2.67	31	1.79	2.29	141	390	1,799	73	
June	.37	.27	† 28	3.03	† 3	1.89	2.35	140	389	1,686	61	
July	.44	.24	8	3.93	30	1.58	2.67	164	352	1,712	59	
Aug.	.42	.24	30	3.67	† 2	1.58	2.92	179	431	1,672	83	
Sept.	.42	.36	† 2	3.67	11	2.91	3.39	202	400	1,406	91	
Oct.	.47	.28	14	4.34	† 30	2.00	3.18	195	433	1,845	102	
Nov.	.34	.26	† 25	2.67	† 1	1.79	2.06	123	446	2,080	86	
Dec.	.37	.27	2	3.03	† 8	1.89	2.15	132	407	1,686	80	
Yearly	0.47	0.24		4.34		1.58	2.53	1,834	5,127	22,146	1,251	

Ø Mean daily † And other days

NEW RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder located on the right (east) bank of the river in the limits of the city of Calexico, California, 1,400 feet downstream (north) of 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. Measurements are also made generally once each month by the United States Section of the Commission. Records computed and furnished by the District. 1964 records good. Records available: June 1942 through December 1964.

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 during any successive five-year period under the provisions of Minute No. 197 of the Commission.

EXTREMES: Maximum mean daily discharge, 691 second-feet on December 3, 1962; minimum mean daily discharge, 2 second-feet 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 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	149	138	180	207	147	136	126	139	157	145	122	130
2	148	120	190	202	147	139	127	169	150	144	116	127
3	144	111	186	198	145	141	122	167	154	139	116	130
4	146	108	187	168	144	139	121	153	159	132	112	133
5	143	110	189	162	149	137	120	138	159	127	113	136
6	144	116	185	161	148	123	121	141	161	120	116	136
7	142	118	180	160	151	122	120	120	162	112	114	139
8	141	121	178	158	149	125	120	114	166	115	115	133
9	144	127	176	154	168	126	122	119	160	116	114	127
10	139	133	173	155	92	125	125	133	156	121	117	128
11	141	136	169	154	155	125	128	156	155	127	115	130
12	141	140	170	155	158	129	128	159	145	132	113	131
13	137	147	170	174	155	130	129	161	141	128	112	133
14	144	150	155	170	203	131	129	157	141	123	113	132
15	162	150	151	171	190	128	131	160	135	120	113	129
16	163	151	149	173	20	129	133	158	127	119	114	127
17	157	186	150	163	123	129	136	156	133	115	117	127
18	166	192	151	159	168	131	141	161	136	113	122	127
19	172	195	151	162	172	133	145	169	127	116	118	124
20	172	194	151	162	173	137	193	170	112	120	125	121
21	176	192	151	171	169	140	225	170	119	126	123	127
22	193	188	150	172	163	140	221	165	119	125	124	120
23	221	186	148	167	159	141	188	161	147	123	128	123
24	202	188	148	165	152	141	129	162	155	119	133	121
25	205	181	147	164	158	140	127	174	156	118	137	120
26	195	179	149	161	147	137	122	203	148	118	134	117
27	183	178	154	156	144	134	116	195	145	117	134	110
28	164	174	161	154	140	132	122	186	141	119	134	112
29	153	172	163	151	141	127	127	157	145	119	133	109
30	147	169	149	141	141	125	131	156	148	120	133	111
31	155	197	197	138	138		139	156		120		108
Sum	4,989	4,481	5,128	4,978	4,609	3,972	4,264	4,885	4,359	3,808	3,630	3,878
Current Year 1964									Period 1943-1964			
Month	β Extreme Gage ** Feet		β Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.	40.16	41.00	23	221	13	137	161	9,896	6,439	20,160	1,751	
Feb.	40.43	41.32	19	195	4	108	155	8,888	5,132	17,845	1,258	
Mar.	40.53	40.95	31	197	25	147	165	10,171	5,401	12,960	1,008	
Apr.	40.45	40.91	1	207	30	149	166	9,874	5,610	14,489	1,390	
May	40.36		14	203	16	20	149	9,142	4,928	10,618	629	
June	41.08	41.33	† 3	141	7	122	132	7,878	4,385	9,689	1,087	
July	40.45	41.41	21	225	27	116	138	8,458	4,180	9,086	817	
Aug.	40.72	41.39	26	203	8	114	158	9,689	5,213	10,921	1,139	
Sept.	41.00	41.56	8	166	20	112	145	8,646	5,503	12,688	1,795	
Oct.	41.14	41.41	1	145	7	112	123	7,553	6,042	11,710	2,081	
Nov.	41.19	41.46	25	137	† 4	112	121	7,200	5,812	12,323	2,483	
Dec.	41.15	41.46	7	139	31	108	125	7,692	6,329	21,205	1,763	
Yearly	40.16			225		20	145	105,087	64,974	138,906	24,573	

† And other days β Mean daily ** Feet below mean sea level

VOLCANO DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Volcano Drain is measured at a point about 1,000 feet downstream from the highway bridge at the junction of the Tijuana-San Felipe highway, 5.8 miles upstream from the international boundary and 3.7 miles south of Mexicali, Baja California. Measurements obtained at a point near the crossing of the siphon of the West Main Canal and Volcano Drain.

RECORDS: Based on 54 current meter measurements, 39 double and 15 single, made by wading during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1964.

REMARKS: Volcano Drain carries agricultural return flow from a large part of the Mexicali Valley. Cofferdams and other structures in the Laguna Mexico and other points upstream which are not subject to control affect the return flows, which results in an irregular discharge.

EXTREMES: Maximum measured discharge, 249 second-feet on July 22, 1964; minimum measured discharge, 8.1 second-foot on May 16, 1964.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	124	108	130	163	192	132	93.6	94.6	111	112	89.0	96.4
2	124	103	128	164	176	127	95.3	101	107	109	87.6	96.1
3	120	98.2	126	165	159	121	96.8	107	108	108	85.8	96.1
4	117	93.2	123	165	142	117	98.5	113	108	106	84.0	95.7
5	113	88.3	121	166	142	112	100	119	109	104	82.6	95.7
6	109	83.3	121	167	142	106	102	120	109	102	80.9	95.3
7	106	78.4	123	168	142	101	103	120	109	99.9	78.0	95.0
8	102	81.6	123	168	143	96.4	105	121	110	97.8	75.2	95.0
9	103	85.1	124	169	144	91.1	107	122	111	96.1	72.7	95.0
10	105	88.3	125	179	145	86.2	109	123	110	97.1	70.3	94.3
11	106	91.8	126	189	148	86.5	110	123	109	98.2	72.0	93.2
12	108	95.0	124	199	152	87.2	112	124	108	99.6	73.8	92.5
13	109	98.5	123	209	151	87.6	114	123	107	101	75.9	91.5
14	111	108	122	219	210	87.9	115	121	107	102	77.7	90.8
15	112	118	120	229	202	88.3	117	120	106	103	79.5	89.7
16	116	127	119	228	8.1	89.0	119	119	105	104	81.2	89.0
17	120	137	118	227	86.5	89.3	120	117	105	105	83.0	87.2
18	123	147	117	226	165	89.3	146	116	106	106	85.1	85.1
19	127	157	115	225	162	89.7	172	115	108	107	86.9	83.3
20	131	154	121	224	158	89.7	198	117	109	109	88.6	81.2
21	134	152	128	223	154	89.7	224	119	111	110	90.4	79.5
22	138	150	134	222	150	89.7	249	121	112	108	92.2	77.3
23	142	147	140	220	147	90.1	225	123	114	106	94.3	75.6
24	138	145	146	219	144	90.1	200	125	114	103	96.1	76.3
25	135	142	152	217	142	90.4	175	126	114	102	97.8	77.3
26	132	140	158	215	140	91.1	150	129	114	99.6	97.5	78.0
27	129	138	159	214	138	91.5	126	125	113	97.5	97.5	79.1
28	126	135	160	212	136	92.2	101	123	113	95.7	97.1	79.8
29	123	133	161	210	135	92.5	76.3	119	113	94.3	96.8	80.9
30	118		161	209	133	93.2	82.3	117	113	92.5	96.8	81.6
31	113		162		132		88.6	113		90.8		82.6
Sum	3,714	3,422.7	4,110	6,010	4,520.6	2,884.7	4,030.4	3,675.6	3,293	3,166.1	2,566.3	2,706.1
Current Year 1964												
Period 1957-1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day		Low	Average			Maximum	Minimum		
			High	Low								
Jan.			23	142	8	102	120	7,369	6,749	9,142	4,076	
Feb.			19	157	7	78.4	118	6,791	6,159	8,165	3,536	
Mar.			31	162	19	115	133	8,155	7,227	9,347	4,491	
Apr.			15	229	1	163	200	11,914	8,174	11,914	4,373	
May			14	210	16	8.1	146	8,971	7,186	8,971	4,675	
June			1	132	10	86.2	96.1	5,721	6,205	7,676	3,547	
July			22	249	29	76.3	130	7,996	6,139	7,996	2,809	
Aug.			26	129	1	94.6	119	7,286	6,349	8,367	3,647	
Sept.			23	114	17	105	110	6,532	6,997	9,027	4,912	
Oct.			1	112	31	90.8	102	6,277	6,536	8,118	4,570	
Nov.			25	97.8	10	70.3	85.5	5,090	5,881	7,511	3,570	
Dec.			1	96.4	23	75.6	87.2	5,368	6,390	7,528	4,511	
Yearly				249		8.1	120	87,468	79,992	95,812	50,244	

Estimated Mean daily

SIFON WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Water-stage recorder and control weir located in the wasteway from the West Main Canal to New River about 650 feet downstream from the wasteway structure, 1,300 feet upstream from the confluence with Volcano Drain, 0.5 mile downstream from the crossing of the West Main Canal and the Mexicali-San Felipe highway, 450 feet north of the crossing of the Tijuana-San Felipe highway and New River, 5.7 miles upstream from the international land boundary, and 3.7 miles south of Mexicali, Baja California. The Cipolletti-type wooden control weir has a 13.45-foot crest and is set in the left bank of the wasteway and near the right bank of Volcano Drain. The elevation of the zero of the gage has not been determined.

RECORDS: Based on a continuous record of gage heights and a rating curve for the weir. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1952 through April 1964. Records reported below are part of the waste flows from the Mexican system of canals discharging into the territory of the United States, which wastes are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

REMARKS: Beginning May 1964, all of the flow from this wasteway was used for irrigation and no measurable flow reached the Volcano Drain, and on May 20 measurements were suspended and the recorder removed.

EXTREMES: Maximum instantaneous discharge, 102 second-feet on March 30, 1953 and March 5, 1956; minimum discharge, no flow on numerous occasions during most years.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0.7	1.1	0.7								
2	0	.4	1.1	.7								
3	.4	0	1.1	.7								
4	.4	0	1.1	.7								
5	.4	0	.7	.7								
6	.4	0	.7	.7								
7	.4	0	.7	.7								
8	.4	0	.7	.4								
9	.4	0	.7	.4								
10	.4	0	.4	.7								
11	0	0	.4	.7								
12	.4	0	.4	.7								
13	.4	0	0	.7								
14	0	0	0	.7								
15	0	0	0	.7								
16	0	0	0	.7								
17	0	0	0	.7								
18	0	0	0	0								
19	0	.4	.4	0								
20	0	.7	.7	0								
21	0	.7	1.1	0								
22	0	1.4	.7	0								
23	0	2.1	.7	0								
24	0	3.2	.7	0								
25	0	2.1	.7	0								
26	0	2.1	.7	0								
27	.4	1.8	.7	0								
28	.4	1.4	.4	0								
29	0	1.4	.7	0								
30	.4		.7	0								
31	.7		.7									
Sum	5.9	18.4	18.0	11.3								
Current Year 1964									Period 1952-1964			
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.			31	1.4	† 1	0	0	10.5	51.9	292	1.6	
Feb.			24	3.2	† 3	0	.7	36.4	44.3	96.5	.8	
Mar.			29	1.4	† 13	0	.7	35.0	163	597	0	
Apr.			† 7	1.4	† 17	0	.4	22.4	72.8	659	0	
May												
June												
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												
Yearly												

† And other days

WISTERIA WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Staff gage located near operator's house upstream from wasteway gates, 1,000 feet downstream from the confluence of the Cerro Prieto and West Main Canals of the Colorado River Irrigation District in Colonia Wisteria, 4.3 miles upstream from the international boundary, 1.9 miles east of the highway to Tijuana at the Tijuana-San Felipe junction, 3.0 miles west of the highway to San Felipe, and 3.1 miles south of Mexicali. The wasteway structure is composed of three rectangular gates, two of which operate manually and one automatically.

RECORDS: Based on gate openings and water surface elevations upstream from the wasteway gates obtained by the Ministry of Hydraulic Resources and 34 check measurements during the year at various locations by the Mexican Section of the Commission. Records computed and furnished by the Mexican Section of the Commission. Records available: January 1951 through December 1964. Records reported below are part of the waste flows from the Mexican system of canals discharging into the territory of the United States, which wastes are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

EXTREMES: Maximum instantaneous discharge, 675 second-feet on January 24, 1962; minimum discharge, no flow on various occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	2.8	0	0.7	0.4	0.4	0.4	0.4
2	0	0	0	0	0	2.8	0	.4	.4	.4	.4	.4
3	0	0	0	0	0	2.8	0	.4	.4	.4	.4	.4
4	0	0	0	0	0	2.5	0	.4	.4	.4	.4	.4
5	0	0	0	0	0	2.5	0	.4	.4	.4	.4	.4
6	0	0	0	0	0	2.1	0	.4	.4	.4	.4	.4
7	0	0	0	0	0	1.8	0	.4	.4	.4	.4	.4
8	0	0	0	0	0	1.4	0	.4	.4	.4	.4	.4
9	0	0	0	0	0	1.4	0	.4	.4	.4	.4	.4
10	0	0	0	0	0	1.1	.4	.4	.4	.4	.4	.4
11	0	0	0	0	0	1.1	.4	.4	.4	.4	.4	.4
12	0	0	0	0	0	1.1	.4	.4	.4	.4	.4	.4
13	0	0	0	0	0	1.1	.4	.4	.4	.4	.4	.4
14	17.7	0	0	0	0	.7	.4	.4	.4	.4	.4	.4
15	21.9	0	0	0	0	.7	.4	.4	.4	.4	.4	.4
16	11.7	0	0	0	0	.7	.4	.4	.4	.4	.4	.4
17	0	1.8	0	0	0	.7	.4	.4	.4	.4	.4	.4
18	0	1.8	0	0	0	.7	.4	.4	.4	.4	.4	.4
19	0	0	0	0	0	.4	.4	.4	.4	.4	.4	.4
20	0	0	0	0	0	.4	.7	.4	.4	.4	.4	.4
21	0	0	0	0	0	.4	.7	.4	.4	.4	.4	.4
22	17.7	0	0	0	0	.4	.7	.4	.4	.4	.4	.4
23	38.8	0	0	0	0	0	.7	.4	.4	.4	.4	.4
24	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
25	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
26	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
27	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
28	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
29	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
30	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
31	0	0	0	0	0	0	.7	.4	.4	.4	.4	.4
Sum	107.8	3.6	0	0	0	29.6	12.4	12.7	12.0	12.4	12.0	12.4
Current Year 1964									Period 1951-1964			
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.			23	38.8	† 1	0	3.5	214	2,452	8,735	214	
Feb.			† 17	1.8	† 1	0	.1	7.0	1,492	7,218	7.0	
Mar.				0		0	0	0	1,111	2,568	0	
Apr.				0		0	0	0	1,093	4,433	0	
May				0		0	0	0	757	1,892	0	
June			† 1	2.8	† 23	0	1.1	58.1	449	1,450	0	
July			† 20	.7	† 1	0	.4	23.8	345	2,040	0	
Aug.				.7	† 2	.4	.4	22.4	690	1,926	22.4	
Sept.			† 1	.4	† 1	.4	.4	21.0	952	2,915	21.0	
Oct.			† 1	.4	† 1	.4	.4	21.7	1,303	2,993	21.7	
Nov.			† 1	.4	† 1	.4	.4	21.0	1,457	3,768	21.0	
Dec.			† 1	.4	† 1	.4	.4	21.7	1,797	8,669	21.7	
Yearly				38.8		0	0.7	411	13,897	27,083	411	

† And other days Ø Mean daily † Estimated on days of observation

WISTERIA DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Wisteria Drain discharges into the stilling basin above the weir of Wisteria Wasteway immediately downstream from the spillway structure of Cerro Prieto and West Main Canals through a 20-inch pipe and thence into New River. The pipe outlet is located in the right bank of the basin in Colonia Wisteria, 4.3 miles upstream from the international boundary, and about 1.9 miles east of the Tijuana highway from the Tijuana-San Felipe junction.

RECORDS: Based on weekly readings of water surface elevation, discharges are computed from horizontal pipe formula. Data furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1964.

EXTREMES: Maximum mean daily discharge, 2.1 second-feet, January 22, 1964; minimum, no flow on various occasions. Maximum monthly volume, 58.1 acre-feet, January 1964; minimum monthly volume, 4.9 acre-feet, July 1963.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1	0.4	0.7	1.4	0.4	0.7	0	0	0.4	0	0.4	0	0.7		
2	.4	.7	1.4	.4	.4	0	0	.4	0	.4	0	.7		
3	.4	.4	1.4	.7	.4	0	0	.4	0	.4	0	.7		
4	.4	.4	1.4	.7	.4	0	.4	0	.4	.4	0	.4		
5	.4	.4	1.8	.7	.4	0	.4	0	.4	0	0	.4		
6	.4	.4	1.4	.7	.4	0	.4	0	.4	0	0	.4		
7	.4	.4	1.4	1.1	.4	0	.4	.4	.4	0	0	.4		
8	.4	.4	1.1	1.1	.4	0	.4	.4	.4	0	0	.4		
9	.4	.4	1.1	1.4	.4	0	.4	.4	.4	0	0	.4		
10	.4	.4	.7	1.1	.4	0	.4	.4	.4	0	0	.4		
11	.4	.4	.7	1.1	.4	0	.4	.4	.4	0	0	.4		
12	.7	.4	.7	1.1	.4	0	.4	.4	.4	0	0	.4		
13	.7	.4	.7	.7	.4	.4	.4	.4	.4	0	0	.4		
14	.7	.4	.7	.7	.4	.4	.4	.4	.4	0	0	.4		
15	.7	.4	.7	.7	0	.4	.4	.4	0	0	0	.4		
16	1.1	.4	.7	.7	0	.4	.4	.4	0	.4	0	.4		
17	1.1	.4	.7	.7	0	.4	.4	0	0	.4	0	.4		
18	1.4	.4	.7	.4	.4	.4	.4	0	0	.4	0	.4		
19	1.4	.4	.7	.4	.4	.4	.4	0	0	.4	.4	.4		
20	1.8	.7	.7	.4	.4	.4	.4	0	0	0	.4	.4		
21	1.8	.7	.7	.4	.4	.4	0	0	0	0	.4	.7		
22	2.1	.7	.7	.4	0	.7	0	0	0	0	.4	.7		
23	2.1	.7	.4	.4	0	.7	0	0	0	0	.4	.7		
24	2.1	.7	.4	.4	0	.7	0	0	0	0	.4	.7		
25	1.8	.7	.4	.4	0	.7	0	0	0	0	.4	.4		
26	1.4	1.1	.4	.4	0	.7	0	0	0	0	.4	.4		
27	1.4	1.1	.4	.7	0	.4	0	0	0	0	.4	.4		
28	1.1	1.1	.4	.7	0	.4	0	0	0	0	.4	.4		
29	.7	1.1	.4	.7	0	.4	0	0	.4	0	.4	.4		
30	.7	.4	.4	.7	0	.4	0	0	.4	0	.7	0		
31	.7	.4	.4	.7	0	0	0	0	0	0	0	0		
Sum	29.9	16.8	25.1	20.4	7.5	8.7	6.8	5.2	5.2	3.2	5.1	13.7		
Current Year 1964												Period 1957-1964		
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet					
	High	Low	Day	High	Low	Average			Maximum	Minimum				
Jan.			†22	2.1	†1	0.4	1.1	58.1	30.1	58.1	13.0			
Feb.			†26	1.1	†3	.4	.7	31.5	20.7	32.2	12.2			
Mar.			5	1.8	†23	.4	.7	49.0	27.4	52.5	8.4			
Apr.			9	1.4	†1	.4	.7	39.2	32.8	47.7	13.0			
May			1	.7	†15	0	.4	13.3	15.6	19.6	13.0			
June			†22	.7	†1	0	.4	16.1	19.1	27.6	13.0			
July			†4	.4	†1	0	.4	11.9	19.9	35.7	4.9			
Aug.			†1	.4	†4	0	0	9.1	23.3	55.9	9.1			
Sept.			†4	.4	†1	0	0	9.1	17.6	31.5	6.3			
Oct.			†1	.4	†5	0	0	5.6	16.8	26.6	5.6			
Nov.			30	.7	†1	0	0	9.1	21.2	46.2	9.1			
Dec.			†1	.7	†30	0	.4	25.2	25.2	49.0	13.0			
Yearly				2.1		0	0.4	277	269	357	155			

∅ Mean daily

† And other days

RIVERA DRAIN TO NEW RIVER IN MEXICO

DESCRIPTION: Parshall flume located 5.0 miles from the confluence of the drain with the New River and 328 feet south of the point where the Mexicali-Compuertas Highway crosses the drain.

RECORDS: Based on 50 double measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1957 through December 1964. Prior to January 1963, measurements were obtained at a rectangular control section in the channel of the drain between "K" and "L" Streets in the city of Mexicali.

REMARKS: Rivera Drain begins near the right bank of the West Main Canal, 0.9 mile south of Sharpe Heading, and runs westward across Mexicali, Baja California, and discharges into New River 0.9 mile upstream from the international boundary. Flow at the station consists mainly of agricultural drainage with a small amount of sewage from Mexicali, Baja California.

EXTREMES: Since January 1963: Maximum measured discharge, 3.9 second-feet on March 6, 1963; minimum measured discharge, 0.7 second-foot on September 17, 1964.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.1	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.4	1.8
2	2.1	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.4	1.8
3	2.1	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.4	1.8
4	2.1	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.4	1.8
5	1.8	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.1	1.8
6	1.8	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.1	1.8
7	1.8	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.1	1.8
8	1.4	1.8	2.1	2.1	1.8	1.1	1.1	1.1	1.1	1.1	1.1	1.8
9	1.4	1.8	2.1	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.1	1.8
10	1.8	1.8	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.1	1.1	1.8
11	1.8	2.1	1.8	1.8	1.4	1.1	1.1	1.1	1.1	1.1	1.4	1.8
12	1.8	2.1	1.8	1.8	1.4	1.1	1.1	1.4	.7	1.1	1.4	1.8
13	1.8	2.1	2.1	1.8	1.4	1.1	1.4	1.4	.7	1.1	1.4	1.8
14	1.8	2.1	2.1	2.1	1.4	1.1	1.4	1.4	.7	1.1	1.4	1.8
15	1.8	2.1	2.1	2.1	1.4	1.1	1.4	1.4	.7	1.1	1.4	1.8
16	1.8	2.1	2.1	1.8	1.4	1.4	1.4	1.4	.7	1.1	1.4	1.8
17	1.8	2.1	2.1	1.8	1.4	1.4	1.4	1.4	.7	1.1	1.4	1.8
18	1.8	2.1	2.1	1.8	1.4	1.4	1.4	1.8	.7	1.1	1.4	1.8
19	2.1	2.1	2.1	1.8	1.4	1.4	1.4	1.8	.7	1.1	1.4	1.4
20	2.1	2.1	2.1	1.8	1.8	1.4	1.4	1.4	.7	1.1	1.4	1.4
21	2.1	2.1	2.1	1.8	1.8	1.4	1.4	1.4	.7	1.4	1.8	1.4
22	2.1	2.1	2.1	1.8	1.8	1.4	1.4	1.4	1.1	1.4	1.8	1.4
23	2.1	2.1	2.1	1.8	1.4	1.1	1.1	1.4	1.1	1.4	1.8	1.4
24	2.1	2.5	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
25	2.1	2.5	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
26	2.1	2.5	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
27	2.1	2.5	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
28	2.1	2.5	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
29	2.1	2.1	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
30	2.1	2.1	2.1	1.8	1.4	1.1	1.1	1.1	1.1	1.4	1.8	1.4
31	2.1	2.1	2.1	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.4	1.4
Sum	60.1	59.9	64.5	57.0	47.5	35.1	37.1	38.5	29.0	37.4	44.2	50.6
Current Year 1964												
Period 1963-1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	High		Low	Average			Maximum	Minimum		
			Day	Day								
Jan.			† 1	2.1	† 8	1.4	1.8	119	109	119	98.1	
Feb.			† 24	2.5	† 1	1.8	2.1	118	114	118	110	
Mar.			† 1	2.1	† 11	1.8	2.1	129	138	146	129	
Apr.			† 1	2.1	† 9	1.8	1.8	112	101	112	88.4	
May			† 1	1.8	31	1.1	1.4	94.0	92.4	94.0	90.0	
June			† 16	1.4	† 1	1.1	1.1	67.9	75.3	82.7	67.9	
July			† 13	1.4	† 1	1.1	1.1	72.2	74.9	77.7	72.2	
Aug.			† 18	1.8	† 1	1.1	1.1	74.9	75.6	76.4	74.9	
Sept.			† 1	1.1	† 12	.7	1.1	56.0	66.2	76.4	56.0	
Oct.			† 21	1.4	† 1	1.1	1.1	72.9	78.2	83.5	72.9	
Nov.			† 21	1.8	† 5	1.1	1.4	86.7	87.6	88.4	86.7	
Dec.			† 1	1.8	† 19	1.4	1.8	99.7	104	108	99.7	
Yearly				2.5		0.7	1.4	1,103	1,114	1,125	1,103	

∅ Mean daily

† And other days

PUEBLO NUEVO WASTEWAY TO NEW RIVER IN MEXICO

DESCRIPTION: Staff gage and control weir located in Mexicali, Baja California on the south side of International Avenue between Morelia and Chilpancingo Streets in Colonia Pueblo Nuevo about 1,000 feet west of New River and 80 feet south of the international land boundary.

RECORDS: Discharges are computed from head on the control weir based on staff gage readings. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 1956 through December 1964. Records reported below are part of the waste flows from the Mexican system of canals discharging into the territory of the United States, which wastes are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197 of the Commission.

REMARKS: The discharges of this wasteway are usually small and consist of overflow from the canal leading to the city pumping plant.

EXTREMES: Maximum monthly volume, 136 acre-feet, January 1956; minimum monthly volume, zero during some months of each year. Estimated maximum discharge, 3.5 second-feet, June 9, 1958; minimum discharge, no flow on numerous occasions.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	0.7	0.4	0	0	0	1.1	0.7	0	0	0	0
2	.4	.7	.4	0	0	0	1.1	.7	0	0	0	0
3	.4	.7	0	0	0	0	1.1	.7	0	0	0	0
4	.4	.7	0	.4	0	0	1.1	.7	0	0	0	0
5	.4	.7	0	.4	0	0	1.1	.7	0	0	0	0
6	.4	.7	0	.4	0	0	1.1	.7	0	0	0	0
7	.4	.7	.4	.4	0	0	1.1	.7	0	0	0	0
8	.4	.7	.4	.7	0	0	.7	.7	0	0	0	0
9	.4	.7	.4	.7	0	0	.7	.7	0	0	.4	0
10	.4	.7	.7	.7	.4	0	.7	.7	0	0	.4	0
11	.4	.7	.7	.4	.4	0	.7	.7	0	0	.4	0
12	.7	.7	.7	.4	.4	0	.7	.7	0	0	.4	0
13	.7	.7	.7	.4	.4	0	.7	.7	0	0	.4	0
14	.7	.7	.7	0	.7	0	.7	.7	0	0	.4	0
15	.7	.7	.7	0	.7	0	.7	.7	0	0	.4	0
16	.7	.7	.7	0	.7	0	.7	.4	0	0	.4	0
17	.7	.7	.7	0	.7	0	.7	.4	0	0	0	0
18	.7	.7	.7	0	1.1	0	.7	.4	0	0	0	0
19	.7	.7	.7	0	1.1	0	.7	.4	0	0	0	0
20	1.1	.7	.7	0	1.1	0	.7	.4	0	0	0	0
21	1.1	.7	.7	0	1.1	0	.7	.4	0	0	0	0
22	1.1	.7	.7	0	.7	0	.7	.4	0	0	0	0
23	1.1	.7	.7	0	.7	0	.7	0	0	0	0	0
24	1.1	.7	.7	0	.4	0	.7	0	0	0	0	0
25	1.1	.7	.7	0	.4	0	.7	0	0	0	0	0
26	.7	.7	.7	0	0	.4	.7	0	0	0	0	0
27	.7	.7	.7	0	0	.4	.7	0	0	0	0	0
28	.7	.4	.4	0	0	.7	.7	0	0	0	0	0
29	.7	.4	.4	0	0	.7	.7	0	0	0	0	0
30	.7	.4	.4	0	0	1.1	.7	0	0	0	0	0
31	.7		0	0	0		.7	0	0	0	0	0
Sum	20.8	19.7	15.8	4.9	11.0	3.3	24.5	13.3	0	0	3.2	0
Current Year 1964									Period 1956-1964			
Month	Extreme Gage Feet		β Extreme Second Feet				Average Second Feet	Total Acre Feet	Acre Feet			
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum	
Jan.			†20	1.1	†1	0.4	0.7	39.9	40.0	136	0	
Feb.			†1	.7	†28	.4	.7	39.2	39.1	92.4	0	
Mar.			†10	.7	†3	0	.4	30.8	28.0	62.5	0	
Apr.			†8	.7	†1	0	0	9.1	25.1	59.7	4.2	
May			†18	1.1	†1	0	.4	21.0	24.6	69.7	0	
June			30	1.1	†1	0	0	6.3	18.2	63.7	0	
July			†1	1.1	†8	.7	.7	48.3	22.5	48.3	0	
Aug.			†1	.7	†23	0	.4	25.9	19.4	49.0	0	
Sept.				0		0	0	0	11.6	32.2	0	
Oct.				0		0	0	0	25.3	50.4	0	
Nov.			†9	.4	†1	0	0	5.6	33.5	61.6	5.6	
Dec.				0		0	0	0	21.5	44.8	0	
Yearly				1.1		0	0.4	226	309	640	141	

† And other days

β Mean daily

WASTE WATERS FROM MEXICAN SYSTEM OF CANALS ENTERING THE UNITED STATES

DESCRIPTION: The three wasteways from the Mexican system of canals, Sifón, Wisteria, and Pueblo Nuevo, discharge into New River near Mexicali, Mexico, 5.7, 4.3 and 0.01 miles, respectively, upstream from the international boundary.

RECORDS: Data based on records obtained and furnished by the Mexican Section of the Commission. Flows from the Sifón and Wisteria Wasteways were computed on basis of head on control weirs as measured by water-stage recorders and weir ratings as determined by periodic meter measurements. Flows from the Pueblo Nuevo Wasteway were computed on basis of head on a control weir as measured by two staff gage readings daily and weir ratings as determined by periodic meter measurements. Waste flows tabulated below are not to exceed an average annual quantity of 35,000 acre-feet during any successive five-year period under the provisions of Minute No. 197. Records available: Sifón Wasteway, January 1952 through April 1964; Wisteria Wasteway, January 1951 through December 1964, and Pueblo Nuevo Wasteway, January 1956 through December 1964.

REMARKS: Records for Sifón Wasteway were discontinued April 30, 1964, as flows in El Sifón are used for irrigation and do not reach New River. For combined flows not previously published, reference table below.

Monthly Discharge in Acre-Feet

Month	1960	1961	1962	1963	1964	Period 1956-1964		
						Average	Maximum	Minimum
Jan.	1,918	396	8,757	5,427	264	2,694	8,757	264
Feb.	1,944	508	976	7,281	82.7	1,750	7,281	82.7
Mar.	735	227	2,610	1,887	65.7	982	2,610	65.7
Apr.	2,843	250	469	16.2	31.6	750	2,843	16.2
May	609	165	1,030	10.5	21.1	444	1,141	10.5
June	317	178	305	0	64.0	325	1,477	0
July	199	172	218	0	72.2	161	348	0
Aug.	191	195	218	252	48.6	510	1,413	48.6
Sept.	795	177	182	2,081	21.1	616	2,081	21.1
Oct.	684	812	190	1,274	21.9	892	2,024	21.9
Nov.	683	875	3,784	1,352	26.8	1,353	3,784	26.8
Dec.	544	1,589	8,691	365	21.9	1,981	8,691	21.9
Yearly	11,462	5,544	27,430	19,946	742	12,458	27,430	742

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 northwest of Westmoreland, California. The Salton Sea is situated in Imperial and Riverside counties of California in the United States, 125 miles northwest of the Gulf of California, 18 miles northwest of Brawley, California, and 42 miles north of the international boundary between the United States and Mexico. The sea lies in the bottom of a closed basin known as the Salton Sink, which has a drainage area of 8,360 square miles. Zero of gage is 250.00 feet below mean sea level, U. S. C. & G. S. datum.

RECORDS: Records of water surface elevations available from November 1904 through December 1964. From January 1925 to October 22, 1951, records were collected by Imperial Irrigation District and based generally upon one water surface reading each month, determined from a bench mark at Figtree John's Spring about 22 miles 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 a new gaging station published as "Salton Sea near Westmoreland, California." The elevation of the old station is at a datum of one foot higher than that of the present station, therefore to make the records comparable it is necessary to subtract one foot from the elevations of the records obtained at the old station. All records reported below and the area and capacity table are adjusted to the datum of the present station. The area and capacity table, dated January 8, 1965, is based on resurveys made in 1957 above elevation -240 feet and in 1962 below elevation -236 feet.

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 River and New River channels. The bottom of the sea is 277.7 feet below mean sea level, U. S. C. & G. S. datum.

EXTREMES: Maximum elevation during year 231.3 feet below mean sea level. Minimum elevation during year 232.8 feet below mean sea level. Prior to 1935 and since the sea was filled by flood waters of the Colorado River 1905-1906, maximum elevation 195.9 feet below mean sea level (present datum), February 10 to March 29, 1907; minimum elevation 251.6 feet below mean sea level in November 1924.

Mean Daily Water Surface in Feet Below Mean Sea Level 1964

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	232.1	231.9	231.7	231.4	231.5	231.6	231.8	232.0	232.4	232.6	232.6	232.8
2	232.1	231.9	231.7	231.4	231.5	231.6	231.8	232.1	232.4	232.6	232.6	232.8
3	232.1	231.9	231.7	231.4	231.5	231.6	231.8	232.1	232.4	232.6	232.7	232.8
4	232.1	231.9	231.7	231.4	231.6	231.6	231.8	232.1	232.4	232.6	232.7	232.8
5	232.1	231.9	231.7	231.4	231.6	231.6	231.9	232.1	232.4	232.6	232.7	232.8
6	232.1	231.9	231.6	231.4	231.6	231.6	231.9	232.1	232.4	232.6	232.7	232.8
7	232.1	231.9	231.6	231.4	231.6	231.7	231.9	232.1	232.5	232.5	232.7	232.8
8	232.1	231.9	231.6	231.4	231.5	231.7	231.9	232.1	232.5	232.5	232.7	232.8
9	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.1	232.4	232.5	232.7	232.8
10	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.1	232.4	232.5	232.8	232.8
11	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.1	232.4	232.5	232.8	232.8
12	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.1	232.4	232.5	232.8	232.8
13	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.1	232.4	232.5	232.8	232.8
14	232.1	231.8	231.6	231.3	231.5	231.7	231.9	232.1	232.4	232.5	232.8	232.8
15	232.1	231.8	231.6	231.3	231.5	231.7	231.9	232.1	232.5	232.5	232.8	232.8
16	232.1	231.8	231.6	231.3	231.5	231.7	231.9	232.1	232.5	232.6	232.8	232.8
17	232.1	231.8	231.6	231.3	231.5	231.7	231.9	232.1	232.5	232.6	232.8	232.8
18	232.1	231.8	231.6	231.4	231.5	231.7	231.9	232.2	232.5	232.6	232.8	232.8
19	232.0	231.8	231.6	231.4	231.5	231.7	231.9	232.2	232.5	232.6	232.8	232.8
20	232.0	231.7	231.6	231.4	231.5	231.7	231.9	232.2	232.5	232.6	232.8	232.8
21	232.0	231.7	231.5	231.4	231.5	231.7	231.9	232.2	232.6	232.6	232.8	232.7
22	232.0	231.7	231.5	231.4	231.5	231.8	232.0	232.2	232.6	232.6	232.8	232.7
23	232.0	231.7	231.5	231.4	231.5	231.8	232.0	232.2	232.6	232.6	232.8	232.7
24	232.0	231.7	231.5	231.4	231.5	231.8	232.0	232.2	232.6	232.6	232.8	232.7
25	232.0	231.7	231.5	231.4	231.6	231.8	232.0	232.3	232.6	232.6	232.8	232.7
26	232.0	231.7	231.5	231.4	231.6	231.8	232.0	232.3	232.6	232.6	232.8	232.7
27	232.0	231.7	231.5	231.4	231.6	231.8	232.0	232.3	232.6	232.6	232.8	232.7
28	231.9	231.7	231.5	231.4	231.6	231.8	232.0	232.3	232.6	232.6	232.8	232.7
29	231.9	231.7	231.5	231.4	231.6	231.8	232.0	232.3	232.6	232.6	232.8	232.7
30	231.9		231.4	231.4	231.6	231.8	232.0	232.4	232.6	232.6	232.8	232.7
31	231.9		231.4		231.6		232.0	232.4		232.6		232.7
Avg.	232.05	231.79	231.57	231.39	231.54	231.71	231.92	232.17	232.49	232.57	232.76	232.76

Month	Current Year 1964		Period 1935-1964			Area and Capacity Table		
	Ø Extreme Elev. Feet		Elevation Feet			Elevation	Area	Capacity
	High	Low	# Average	# Maximum	‡ Minimum	Feet below M. S. L.	Acres	Acre-Feet
Jan.	231.9	232.1	240.06	232.05	249.3	277.7	0	0
Feb.	231.7	231.9	239.72	231.79	248.8	274.0	20,600	25,700
Mar.	231.4	231.7	239.45	231.57	248.6	270.0	62,900	188,700
Apr.	231.3	231.4	239.25	231.39	248.7	266.0	94,600	510,600
May	231.5	231.6	239.24	231.54	248.5	260.0	122,600	1,170,000
June	231.6	231.8	239.41	231.71	248.8	256.0	134,700	1,684,000
July	231.8	232.0	239.58	231.92	249.1	252.0	148,800	2,250,000
Aug.	232.0	232.4	239.78	232.17	249.4	244.0	179,700	3,562,000
Sept.	232.4	232.6	239.96	232.49	249.4	240.0	196,900	4,315,000
Oct.	232.5	232.6	240.03	232.49	249.8	235.0	221,800	5,360,000
Nov.	232.6	232.8	240.02	232.30	250.0	230.0	235,800	6,504,000
Dec.	232.7	232.8	239.84	232.23	249.6	220.0	262,000	8,993,000
						210.0	288,500	11,740,000
						200.0	315,500	14,760,000
Yearly	231.3	232.8	239.70	232.06	250.0			

Ø Mean daily # Mean monthly ‡ Reading near first day of month

CHEMICAL ANALYSIS OF WATER SAMPLES

1964

The tables below are based on bi-monthly samples from the Alamo and New Rivers taken and analyzed by the State of California Department of Water Resources.

Samples from the Alamo River are taken near the international boundary upstream from seepage pipes from the All-American Canal. Samples from New River are taken from the right bank at road bridge 150 yards north of international boundary. Records of sampling extend from April 1951 through December 1964.

To convert milligram equivalents to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20; Mg, 12.16; Na, 23; (CO₃ plus HCO₃) expressed as CO₃, 30; SO₄, 48; Cl, 35.5; NO₃, 62. 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 ECx10⁶ at 25°C, is a relative measure of the total salt concentration.

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

Alamo River

Jan.	1	4.06		4,219	1.12	7.7	58	49	10.18	9.95	28.28	5.56	18.42	23.69	0.16
Feb.															
Mar.	1	2.93		3,137	.88	7.8	56	43	7.98	6.58	19.14	4.76	14.63	14.78	.08
Apr.															
May	1	1.51		1,599	.25	7.4	47	29	5.34	3.70	8.18	3.48	8.68	5.10	.03
June															
July	1	2.65		2,809	.74	7.8	56	45	7.09	6.00	17.05	4.30	12.56	13.76	.05
Aug.															
Sept.	1	3.17		3,436	.96	7.5	57	49	8.08	7.64	21.32	4.49	14.48	18.33	.24
Oct.															
Nov.	1	5.23		5,546	1.46	7.7	59	54	12.03	12.42	35.50	5.65	21.90	32.63	.35
Dec.															
Total	6														

New River

Jan.	1	4.94		5,464	1.12	7.4	65	67	10.43	8.96	38.06	4.84	14.05	39.06	0.08
Feb.															
Mar.	1	4.76		5,288	1.12	8.0	65	66	10.68	8.55	38.02	5.32	13.95	37.79	.06
Apr.															
May	1	5.54		6,090	1.45	7.5	67	68	10.38	10.69	43.85	5.02	16.04	44.53	.02
June															
July	1	7.19		7,825	1.80	7.4	69	76	12.38	11.51	57.42	3.73	15.92	62.60	.32
Aug.															
Sept.	1	7.00		7,813	1.80	7.2	68	73	13.07	11.75	57.03	6.07	16.45	62.04	.20
Oct.															
Nov.	1	6.63		7,698	2.00	7.3	70	77	11.58	9.54	55.33	4.37	13.57	60.07	.25
Dec.															
Total	6														

** Percent of total cations

*** Percent of total anions



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 upstream from the mouth of Hauser Creek, 8.5 miles upstream from Barrett Dam, and about 20 miles upstream from the international boundary. Zero of gage is 2,882.4 feet 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 available: April 1911 through December 1964.

REMARKS: Storage began in Morena Reservoir March 1910. Reservoir capacity and area ratings date from 1910 when Morena Dam was completed. Records for 1964 computed on basis of area-capacity curves determined from 1948 re-survey. Various changes have been made to the spillway section since construction of the dam. Elevation of present crest of ungated spillway is 157.00 feet, gage datum. Reservoir capacity at spillway crest, 1948 survey, is 50,210 acre-feet. 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: Prior to 1937, maximum monthly inflow, 37,200 acre-feet, January 1916; minimum, no flow during parts of many years.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1937-1964		
		Average	Maximum	Minimum
January	23.9	539	3,520	4.8
February	18.6	1,301	16,700	8
March	47.8	2,012	13,220	25.3
April	27.8	1,292	11,490	3.3
May	12.2	455	3,550	0
June	3.9	236	1,660	0
July	1.7	168	1,010	0
August	1.0	119	1,260	0
September	.8	82.7	1,070	0
October	1.9	96.8	1,270	0
November	8.9	170	1,380	0
December	13.7	551	3,590	4.4
Yearly	162	7,022	39,439	121

Note: For months when inflow to the reservoir was small and other quantities were large, discordant figures of inflow may appear. This arises primarily from the difficulty of computing inflow as the residual of several larger quantities, which are not susceptible to measurement with a precision necessary to produce a final answer within desirable limits of accuracy.

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 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 December 1964.

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: Prior to 1937, maximum monthly discharge, 21,400 acre-feet, February 1916; minimum, zero during December 1936.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1937-1964		
		Average	Maximum	Minimum
January	1.7	154	1,700	1
February	1.6	422	4,260	1.5
March	1.7	291	1,490	1.7
April	1.7	1,078	12,950	1
May	1.7	294	3,040	1
June	1.7	404	7,360	0
July	1.7	229	2,340	.8
August	1.7	191	1,550	.6
September	.6	374	5,880	0
October	.6	112	529	0
November	1.1	150	1,260	0
December	1.7	417	5,350	1
Yearly	17.5	4,116	24,825	17.5

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 downstream from Morena Dam, 1 mile downstream from the mouth of Pine Valley Creek and about 12 miles upstream from the international boundary. Zero of gage is 1,446.12 feet 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 December 1964. 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. Capacity of reservoir at top of flash gates on spillway (gage height 168.88 feet) is 44,755 acre-feet. Capacity at spillway crest (gage height 160.88 feet) is 37,950 acre-feet. Dead storage, 719 acre-feet below lowest outlet (gage height 58.88 feet) 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: Prior to 1937, maximum monthly discharge, 54,800 acre-feet, February 1927; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1937-1964		
		Average	Maximum	Minimum
January	23.7	646	3,430	5.2
February	7.6	1,796	26,790	7.6
March	40.4	3,133	18,860	20
April	12.8	2,133	21,630	10.2
May	6.6	651	5,130	0
June	.5	265	1,730	0
July	.2	173	1,010	0
August	.4	106	579	0
September	6.8	121	759	0
October	1.3	75.8	645	.6
November	13.5	129	1,200	0
December	20.0	472	3,380	5.5
Yearly	134	9,701	59,387	129

Note: For months when inflow to the reservoir was small and other quantities were large, discordant figures of inflow may appear. This arises primarily from the difficulty of computing inflow as the residual of several larger quantities, which are not susceptible to measurement with a precision necessary to produce a final answer within desirable limits of accuracy.

DULZURA CONDUIT BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder 0.5 mile downstream from Barrett Dam on right bank of Dulzura Conduit 50 feet 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 U. S. Geological Survey. Records at present location are good. Records available: January 1909 through December 1964. Records January 1909 to April 1940 from city of San Diego, California.

REMARKS: Barrett Dam was completed in 1921. Prior to this date the intake of Dulzura Conduit was located 1.5 miles 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 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 losses in the reach from the reservoir to the gaging station.

EXTREMES: Since 1937: Maximum mean daily discharge, 55 second-feet on March 15, 1954; minimum discharge, no flow for long periods on many occasions.

Mean Daily Discharge in Second Feet 1964 — 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	.3	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	.4	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0.4	0.3	0
Current Year 1964									Period 1937-1964			
Month	Extreme Gage Feet		Ø 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	462	2,350	0	
Feb.				0		0	0	0	466	2,130	0	
Mar.				0		0	0	0	622	2,330	0	
Apr.				0		0	0	0	979	2,860	0	
May				0		0	0	0	1,089	3,040	0	
June				0		0	0	0	1,049	2,920	0	
July				0		0	0	0	922	2,920	0	
Aug.				0		0	0	0	852	2,820	0	
Sept.				0		0	0	0	591	2,320	0	
Oct.			27	.4	† 1	0	# 0	.8	452	2,450	0	
Nov.			18	.3	† 1	0	# 0	.6	623	2,760	0	
Dec.				0		0	0	0	544	2,305	0	
Yearly				0.4		0	# 0	1.4	8,651	27,170	0	

† And other days

Ø Mean daily

Average less than 0.05 second-foot

COTTONWOOD CREEK BELOW BARRETT DAM, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located about 2.5 miles downstream from Barrett Dam and 0.5 mile 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 (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 this Commission. The recorder is to be operated only when Barrett Reservoir is near or above spillway level. There have been no spillway discharges since May 1943. 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 December 1964. 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: Prior to 1937, maximum monthly discharge 38,400 acre-feet, February 1927; minimum, no flow during several months of various years.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1937-1964		
		Average	Maximum	Minimum
January	0	21.5	590	0
February	0	36.7	990	0
March	0	989	13,390	0
April	0	1,451	33,400	0
May	0	329	7,520	0
June	0	46.3	890	0
July	0	2.5	21	0
August	0	2.2	21	0
September	0	1.8	21	0
October	0	1.6	21	0
November	0	1.2	15	0
December	0	1.8	21	0
Yearly	0	2,884.6	50,364	0

COTTONWOOD CREEK ABOVE TECATE CREEK NEAR DULZURA, CALIFORNIA

DESCRIPTION: Water-stage recorder and cableway located 1.6 miles upstream from the international land boundary between the United States and Mexico, 0.8 mile upstream from the mouth of Tecate Creek, and 5.1 miles 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 downstream from the gage. Zero of gage is 569.40 feet 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 generally made twice each month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through December 1964.

REMARKS: Flow is largely controlled by Barrett and Morena Reservoirs, 10 and 18 miles, respectively, upstream from this station. During 1964, there were no releases or spills to the natural channel of Cottonwood Creek at Barrett Dam, the lowermost dam in Cottonwood Creek Basin.

EXTREMES: Maximum discharge 4,340 second-feet February 7, 1937 (gage height 9.65 feet), from rating curve extended above 1,500 second-feet by logarithmic plotting. Minimum discharge, no flow during part of each year.

Mean Daily Discharge in Second Feet 1964 — 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
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1937-1964			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.							0	227	1,190	0		
Feb.							0	711	9,940	0		
Mar.							0	2,062	20,880	0		
Apr.							0	2,000	40,240	0		
May							0	466	10,040	0		
June							0	89.6	1,590	0		
July							0	10.0	206	0		
Aug.							0	.5	7.7	0		
Sept.							0	2.6	72	0		
Oct.							0	5.1	101	0		
Nov.							0	12.5	203	0		
Dec.							0	115	1,110	0		
Yearly							0	5,701.3	66,700	0		

CAMPO CREEK NEAR CAMPO, CALIFORNIA

DESCRIPTION: Water-stage recorder and broad-crested weir 0.5 mile upstream from the international land boundary between the United States and Mexico, on left bank just upstream from California State Highway 94 bridge, 3.5 miles southwest of Campo, California. Low water discharge measurements are made by wading at the gage; high water measurements are made from the bridge. Zero of gage is 2,179.08 feet 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. 1964 records poor. Records available: October 1936 through December 1964.

REMARKS: Campo Creek originates in the United States and flows southwestward into Mexico where it joins Tecate Creek. The flow at this station is partially regulated by a small conservation reservoir a quarter of a mile upstream, completed in August 1956.

EXTREMES: Maximum discharge 880 second-feet, February 6, 1937 (gage height 4.80 feet, present datum), from rating curve extended above 110 second-feet on basis of velocity-depth relation and cross-section area at the control. Minimum discharge, no flow during most months since 1960.

Mean Daily Discharge in Second Feet 1964 — 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	.1
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	0	0	0	0	0	0	0	0	0	0	0	0.1
Current Year 1964									Period 1937-1964			
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.	1.13		22	0.2	† 1	0	0	167	906	0		
Feb.				0	0	0	0	294	1,730	0		
Mar.				0	0	0	0	421	2,360	0		
Apr.				0	0	0	0	295	3,250	0		
May				0	0	0	0	135	1,540	0		
June				0	0	0	0	52.6	719	0		
July				0	0	0	0	21.2	361	0		
Aug.				0	0	0	0	15.3	321	0		
Sept.				0	0	0	0	14.5	264	0		
Oct.				0	0	0	0	26.0	543	0		
Nov.				0	0	0	0	48.1	542	0		
Dec.			27	0	† 1	0	.003	.2	133	808	0	
Yearly				0.2		0	0.0003	0.2	1,623	11,141	0	

† And other days

‡ Mean daily

COTTONWOOD CREEK NEAR INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder and cableway, 0.6 mile upstream from the international land boundary between the United States and Mexico, 0.5 mile downstream from the confluence of Cottonwood Creek and Tecate Creek, and 5.5 miles south of Dulzura, California. Low water discharge measurements are made by wading at the gage. Zero of gage is 542.42 feet 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 generally made twice each month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1936 through December 1964.

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

EXTREMES: Maximum discharge 4,700 second-feet February 7, 1937 (gage height 8.50 feet), from rating curve extended above 300 second-feet on basis of velocity-mean depth and area computations. Minimum discharge, no flow at times during most years.

Mean Daily Discharge in Second Feet 1964 — 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
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1964								Period 1937-1964				
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Day			Average	Maximum	Minimum		
Jan.						0	489	2,750	0			
Feb.						0	1,284	13,680	0			
Mar.						0	3,268	27,140	0			
Apr.						0	2,732	51,060	0			
May						0	691	14,110	0			
June						0	141	2,630	0			
July						0	21.9	312	0			
Aug.						0	7.6	171	0			
Sept.						0	10.9	152	0			
Oct.						0	28.4	705	0			
Nov.						0	55.7	839	0			
Dec.						0	322	3,330	0			
Yearly						0	9,052	97,900	0			

INFLOWS TO RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

DESCRIPTION: Rodriguez Dam is located in Mexico on Río de las Palmas, the principal tributary to the Tijuana River, about 5.5 miles upstream from its confluence with Cottonwood Creek, 11 miles upstream from the point where the Tijuana River crosses the international boundary between the United States and Mexico, and 10 miles southeast of Tijuana, Baja California.

RECORDS: Computed from monthly reservoir records of storage, releases, spills, leakage, evaporation and rainfall. Records obtained by the Ministry of Hydraulic Resources through May 1961 and from June 1961 by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California, which agency took over operation of Rodriguez Dam. Records furnished by the Mexican Section of the Commission. Records available: May 1937 through December 1964. 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 above mean sea level; at top of spillway gates 410.10 feet above mean sea level. Reservoir capacity at spillway crest 76,210 acre-feet; at top of spillway gates 111,070 acre-feet.

EXTREMES: Maximum monthly inflow, 77,320 acre-feet, April 1941; minimum, no flow during part of most years.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1938-1964		
		Average	Maximum	Minimum
January	22.4	1,005	6,569	0
February	38.3	2,747	41,295	5.8
March	21.2	7,403	68,321	4.2
April	25.3	3,857	77,790	0
May	26.2	477	9,962	0
June	19.3	85.1	891	0
July	24.9	91.6	326	0
August	24.9	56.7	770	0
September	24.1	56.1	466	0
October	24.9	69.3	344	0
November	24.1	113	1,013	0
December	39.2	953	15,686	12.8
Yearly	315	16,914	177,668	254

DIVERSIONS FROM RODRIGUEZ RESERVOIR, BAJA CALIFORNIA

DESCRIPTION: Sparling flow meter located immediately below the dam in the pipe line which carries water released from Rodriguez Reservoir to the North and South Canals.

RECORDS: Direct recording by Sparling flow meter. Records obtained by the Ministry of Hydraulic Resources through May 1961 and from June 1961, by the Junta de Agua Potable y Alcantarillado del Distrito Urbano of Tijuana, Baja California. Records furnished through the Mexican Section of the Commission. Records available: May 1937 through December 1964.

REMARKS: Since the dam was completed in 1937, water has been diverted directly into the aqueduct for domestic use for Tijuana, Baja California and into the North and South Canals for irrigation in Mexico. The North Canal delivers water to lands in the Tijuana Valley north of the Río de las Palmas and the South Canal delivers water to lands in the valley south of the Río de las Palmas and the Tijuana River. During 1964 no water was released for irrigation of farm lands.

EXTREMES: Maximum monthly diversion, 1,963 acre-feet, July 1944; minimum, no flow March and April 1941, August 1960, and December 1962.

Monthly Discharge in Acre-Feet

Month	Current Year 1964	Period 1938-1964		
		Average	Maximum	Minimum
January	6.2	274	782	2.3
February	30.2	307	1,132	1.9
March	18.5	374	1,223	0
April	13.9	546	1,602	0
May	14.6	758	1,676	1.8
June	18.8	884	1,857	1.9
July	24.9	927	1,963	1.9
August	24.9	794	1,859	0
September	24.1	640	1,420	1.9
October	24.9	549	1,187	1.9
November	24.1	418	1,037	2.3
December	39.1	362	981	0
Yearly	264	6,833	15,317	59.6

TIJUANA RIVER AT INTERNATIONAL BOUNDARY

DESCRIPTION: Water-stage recorder on right bank about 550 feet downstream from the international boundary and about 0.8 mile west of the international gate at San Ysidro, California. Zero of gage is at mean sea level, U. S. C. & G. S. datum.

RECORDS: Based on 2 current meter measurements and observations of no flow and a continuous record of gage heights. Records obtained and furnished by the United States Section of the Commission. Records available: May 1947 through December 1964.

EXTREMES: Since May 1947: Maximum instantaneous discharge, 2,570 second-feet, March 15, 1952; minimum discharge, no flow during part or all of each year since 1951.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0.2	1.0	0	0	0	0	0	0	0	0
2	0	0	.6	* .1	0	0	0	0	0	0	0	0
3	0	0	* .1	* .1	0	0	0	0	0	0	0	0
4	0	0	* .1	* .1	0	0	0	0	0	0	0	0
5	0	0	* .1	0	0	0	0	0	0	0	0	0
6	0	0	* .1	0	.5	0	0	0	0	0	0	0
7	0	0	* .1	0	1.7	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	.3	0	0	0	0	0	0	0	0	0
11	0	* .1	.1	0	0	0	0	0	0	0	0	0
12	0	* .1	.1	0	0	0	0	0	0	0	0	0
13	0	* .1	.2	0	0	0	0	0	0	0	0	0
14	0	* .1	.1	0	0	0	0	0	0	0	0	0
15	0	* .1	.1	0	0	0	0	0	0	0	0	0
16	0	* .1	0	0	0	0	0	0	0	0	0	0
17	0	* .1	0	0	0	0	0	0	0	0	2.4	0
18	0	* .1	0	0	0	0	0	0	0	0	1.2	0
19	.1	* .1	0	0	0	0	0	0	0	0	0	0
20	0	* .1	0	0	0	0	0	0	0	0	0	0
21	11.3	* .1	0	0	0	0	0	0	0	0	0	0
22	17.7	0	0	0	0	0	0	0	0	0	0	0
23	.8	0	8.5	0	0	0	0	0	0	0	0	0
24	.2	0	10.6	0	0	0	0	0	0	0	0	0
25	.1	0	1.0	0	0	0	0	0	0	0	0	0
26	.1	0	* .3	0	0	0	0	0	0	0	0	0
27	.1	0	* .2	0	0	0	0	0	0	0	0	0
28	0	0	* .1	0	0	0	0	0	0	0	0	0
29	0	2.9	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
Sum	30.4	4.0	22.9	1.3	2.2	0	0	0	0	0	3.6	0
Current Year 1964								Period 1947-1964				
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.	46.57		22	59.0	† 1	0	1.0	60.3	531	4,603	0	
Feb.	45.90		29	20.5	† 1	0	.1	7.9	192	1,496	0	
Mar.	46.23		24	44.0	† 8	0	.7	45.4	1,063	13,309	0	
Apr.	45.47		1	2.5	† 5	0	0	2.6	322	2,926	0	
May	45.54		6	3.9	† 1	0	.1	4.4	56.6	312	0	
June				0		0	0	0	37.1	309	0	
July				0		0	0	0	29.2	239	0	
Aug.				0		0	0	0	25.4	193	0	
Sept.				0		0	0	0	33.0	216	0	
Oct.				0		0	0	0	48.9	305	0	
Nov.	45.82		17	12.2	† 1	0	.1	7.1	74.6	480	0	
Dec.				0		0	0	0	148	1,447	0	
Yearly	46.57			59.0		0	0.2	127	2,561	19,882	0	

† And other days * Partly estimated

TIJUANA RIVER NEAR NESTOR, CALIFORNIA

DESCRIPTION: Water-stage recorder on county road bridge 4.1 miles downstream from the international land boundary between the United States and Mexico, 2.9 miles upstream from mouth of the river, and 1.7 miles south of Nestor, California. Zero of gage is 15.14 feet above mean sea level, U. S. C. & G. S. datum. From April 10, 1953 to August 5, 1958, station was located 2 miles upstream at different datum. There are no significant inflows to the river between the old and new locations of the gage.

RECORDS: Based on current meter measurements or observation of no flow generally made twice a month. Records obtained and furnished by the U. S. Geological Survey. Records available: October 1914 to September 1915, and October 1922 to December 1964 (October 1922 to September 1936 are from city of San Diego, California).

REMARKS: The flow at this station is partially controlled by Morena and Barrett Reservoirs on Cottonwood Creek in the United States and by Rodriguez Reservoir on Río de las Palmas in Mexico. Some diversions for irrigation are normally made in Mexico whenever surface runoff occurs in the river or in its two principal tributaries.

EXTREMES: Since October 1, 1936: Maximum discharge, 17,700 second-feet, February 7, 1937 (gage height 8.20 feet), obtained from rating curve extended above 2,000 second-feet on basis of velocity-depth relationship, and cross section after peak of the flood. Minimum discharge, no flow during parts of most years.

Mean Daily Discharge in Second Feet 1964 — 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
Sum	0	0	0	0	0	0	0	0	0	0	0	0
Current Year 1964								Period 1937-1964				
Month	Extreme Gage Feet		Extreme Second Feet			Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	Day	High	Day			Average	Maximum	Minimum		
Jan.						0	917	4,070	0			
Feb.						0	4,977	66,920	0			
Mar.						0	8,812	107,000	0			
Apr.						0	7,573	181,900	0			
May						0	845	18,340	0			
June						0	143	3,060	0			
July						0	28.4	523	0			
Aug.						0	20.1	242	0			
Sept.						0	29.6	234	0			
Oct.						0	101	1,340	0			
Nov.						0	161	1,490	0			
Dec.						0	832	7,930	0			
Yearly						0	24,439	332,749	0			

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 Dam, 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 Water Department, the U. S. Geological Survey, and the U. S. Weather Bureau. Records for Rodriguez Reservoir obtained and furnished by the Ministry of Hydraulic Resources, Government of Mexico, through May 1961, and beginning June 1961 through December 1964, records obtained and furnished by the Junta de Agua Potable y Alcantarillado del Distrito Urbano de Tijuana, Baja California.

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)	
	1964	Average 1937-1964	1964	Average 1937-1964	1964	Average 1937-1964	1964	Average 1937-1964
Jan.	352	19,730	1,246	13,654	15.4	39,919	1,613	73,303
Feb.	357	20,496	1,238	15,260	13.5	40,666	1,608	76,422
Mar.	390	22,044	1,262	16,967	0	44,484	1,652	83,495
Apr.	401	22,014	1,254	17,638	0	44,484	1,655	84,136
May	384	21,823	1,231	16,880	0	44,300	1,615	83,003
June	352	21,227	1,191	16,114	0	42,992	1,543	80,333
July	312	20,671	1,138	15,232	0	41,623	1,450	77,526
Aug.	279	20,156	1,094	14,349	0	40,381	1,373	74,886
Sept.	252	19,511	1,057	13,999	0	39,318	1,309	72,828
Oct.	235	19,233	1,029	13,561	0	38,426	1,264	71,220
Nov.	235	19,091	1,029	13,080	0	37,751	1,264	69,922
Dec.	243	19,115	1,043	13,344	0	38,006	1,286	70,465
Avg.	316	20,426	1,151	15,006	2.4	41,029	1,469	76,461
Max.	401	≅ 61,670	1,262	≅ 45,920	15.4	109,608	1,655	213,600
Min.	235	10	1,029	106	0	0	1,264	1,264

≅ March 31, 1941 - Prior to removal of spillway gates

θ April 30, 1937 - Sandbags were placed on crest of spillway

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 this Commission. For location, elevation, period of record, and the observer, see alphabetical listing of these stations on the following page.

In United States

Month	Morena Dam, California		Barrett Dam, California		Marron Valley, California		Potrero, California	
	1964	Average 1906-1964	1964	Average 1907-1964	1964	Average 1951-1964	1964	Average 1914-1964
Jan.	2.28	3.94	2.06	3.45	1.49	2.84	2.69	3.52
Feb.	1.27	4.03	1.16	3.56	.90	2.11	1.11	3.95
Mar.	4.39	3.52	4.09	3.00	2.98	2.43	3.63	3.05
Apr.	.85	1.79	1.33	1.55	.98	1.26	1.71	1.79
May	1.12	.67	.88	.60	.68	.53	1.01	.70
June	0	.14	.07	.06	0	.05	0	.08
July	0	.39	T	.09	0	.02	0	.20
Aug.	.15	.53	0	.20	0	.17	0	.19
Sept.	.15	.35	0	.27	0	.25	0	.26
Oct.	.53	.93	.22	.74	.02	.36	.28	.77
Nov.	2.49	1.42	2.29	1.16	2.00	1.15	2.17	1.26
Dec.	1.89	3.25	2.34	2.79	2.03	1.55	1.23	3.14
Yearly	15.12	20.96	14.44	17.47	11.08	12.72	13.83	18.91

Month	Campo, California						Sawday Ranch, California		Chula Vista, California	
	1960	1961	1962	1963	1964	Average 1900-1964	1964	Average 1950-1964	1964	Average 1930-1964
Jan.	2.97	1.09	3.61	0.42	2.12	3.10	2.49	3.29	1.55	1.91
Feb.	4.10	.16	4.53	3.03	1.34	3.50	1.16	2.42	.50	1.88
Mar.	.45	2.28	2.12	1.72	3.22	2.84	4.84	3.05	1.25	1.51
Apr.	1.95	T	0	1.86	.95	1.46	1.22	1.63	.51	.79
May	.49	.02	.90	T	.67	.57	.97	.56	.20	.27
June	0	0	.11	.13	T	.07	0	.05	.05	.05
July	.17	T	0	T	T	.54	.25	.54	0	.01
Aug.	.03	.62	T	.63	.03	.51	.20	.76	T	.08
Sept.	1.59	T	0	2.45	.07	.33	0	.43	0	.18
Oct.	.16	.37	.07	1.35	.39	.66	.41	.44	T	.44
Nov.	1.67	.77	T	1.77	1.88	1.22	2.49	1.31	1.62	.84
Dec.	.07	2.08	.65	.31	1.83	2.49	1.97	1.72	.98	1.69
Yearly	13.65	7.39	11.99	13.67	12.50	17.29	16.00	16.20	6.66	9.65

In Mexico

Month	La Rumorosa, Baja California		Tecate, Baja California		Tijuana, Baja California	
	1964	Average 1946-1964	1964	Av. 1946-59 & 1961-1964	1964	Av. 1948-59 & 1961-1964
Jan.		0.83	1.77	2.48	0.87	1.93
Feb.	0.39	.43	1.10	1.22	.47	1.26
Mar.	.39	.55	3.70	1.81	1.42	1.10
Apr.	0	.20	.79	.91		.59
May	T	.08	.94	.35	.28	.28
June	0	.04	0	.08	0	.04
July	.24	.24	0	.08	0	0
Aug.	.94	.83	0	.16	0	.08
Sept.	0	.24	0	.12	0	.16
Oct.	1.50	.43	0	.35	0	.31
Nov.	.63	.28	2.24	.91	1.61	.79
Dec.	0	.67	.16	1.50	.79	.83
Yearly		4.49	10.70	10.55		7.95

T Trace

RAINFALL ON THE TIJUANA RIVER WATERSHED IN INCHES

In Mexico

Month	Rodríguez Dam, Baja California		Valle de las Palmas, Baja California		El Pinal, Baja California		San Juan de Dios, Baja California	
	1964	Average 1938-1964	1964	Average 1948-1964	1964		1964	Average 1956-1964
Jan.	0.98	1.50	1.10	1.73			1.89	2.36
Feb.	.39	1.34	.47	.98			.71	2.17
Mar.	1.18	1.42	1.18	1.18			2.17	2.01
Apr.	.16	.67	.16	.55			.55	1.02
May	.28	.12	.16	.16			.71	.39
June	T	0	0	0				.31
July	T	0	0	.04			.12	.91
Aug.	T	.08	.08	.04				.59
Sept.	T	.28	0	.20	0		0	.47
Oct.	T	.31	0	.20	.12		.20	.59
Nov.	1.30	.63	.98	.63	2.20		1.46	.94
Dec.	.75	1.57	.55	.87	2.36		.98	.75
Yearly	5.04	7.80	4.68	6.85				# 16.42

T Trace # 1957-1961

LOCATION OF RAINFALL STATIONS

In United States

NAME OF STATION	LATI- TUDE	LONGI- TUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Barrett Dam, California	32° 41'	116° 40'	1,750	1907	City of San Diego
Campo, California	32° 37'	116° 28'	2,630	1877	Archie C. Leach
Chula Vista, California	32° 36'	117° 06'	9	1930	Western Salt Company
Marron Valley, California	32° 34'	116° 46'	550	1951	Fred Mellor
Morena Dam, California	32° 41'	116° 32'	3,010	1906	City of San Diego
Potrero, California	32° 37'	116° 37'	2,390	1914	Thor Nelson
Sawday Ranch, California	32° 45'	116° 29'	3,200	1950	William Tulloch

In Mexico

NAME OF STATION	LATI- TUDE	LONGI- TUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
El Pinal, Baja California	32° 12'	116° 17'	4,429	1964	Hydraulic Resources
La Rumorosa, Baja California	32° 33'	116° 03'	3,937	1946	Hydraulic Resources
Rodríguez Dam, Baja California	32° 26'	116° 55'	459	1938	Hydraulic Resources
San Juan de Dios, Baja California	32° 08'	116° 10'	3,280	1956	Hydraulic Resources
Tecate, Baja California	32° 32'	116° 39'	1,690	1946	Hydraulic Resources
Tijuana, Baja California	32° 31'	117° 02'	180	1948	Hydraulic Resources
Valle de las Palmas, Baja California	32° 23'	116° 40'	148	1948	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 this Commission; those in Baja California are observed by the Ministry of Hydraulic Resources. For specific location of these stations, refer to data opposite same station name shown in "Location of Rainfall Stations," page 87 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 December 1964, square 3-foot by 3-foot by 18-inch deep land pan set 15 inches in ground.

2. Chula Vista: September 1918 through December 1964, U. S. Weather Bureau 4-foot diameter pan, 10 inches deep, set on 2-inch by 4-inch timber grill.

3. Marron Valley: February 1951 to April 30, 1956, 2-foot diameter screened pan, 36 inches deep with automatic level attachment. From April 30, 1956 to April 30, 1963, same type of pan 22.5 inches in diameter. From April 30, 1963 to date, 2-foot diameter screened pan, same type.

4. 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 December 1964, 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		Marron Valley, California		Chula Vista, California	
	1964	Average 1916-1964	1964	Average 1921-1964	1964	Average 1951-1964	1964	Average 1919-1964
Jan.	1.70	2.32	1.68	1.90	2.93	2.83	3.43	2.81
Feb.	2.78	2.37	2.78	2.24	4.08	3.32	4.56	3.32
Mar.	2.97	3.69	3.11	3.64	3.89	4.11	6.12	4.98
Apr.	3.25	4.99	3.93	4.95			6.67	5.86
May	5.96	6.98	5.62	7.13	7.89	6.94	6.85	6.89
June	7.69	9.00	7.50	8.75			6.40	7.03
July	9.55	10.53	10.50	10.43			7.77	7.64
Aug.	8.19	9.75	9.00	9.73	* 8.85		7.23	7.27
Sept.	6.77	7.96	9.00	8.03	7.49	8.30	6.24	6.06
Oct.	4.57	5.54	5.42	5.60	6.85	6.55	5.32	4.82
Nov.	2.21	3.75	2.21	3.60	5.18	4.74	3.56	3.64
Dec.	1.14	2.69	1.26	2.23			2.33	2.75
Total	56.78	69.57	62.01	68.23			66.48	63.07

In Mexico

Month	Tecate, Baja California		Tijuana, Baja California		Rodríguez Dam, Baja California		Valle de las Palmas, Baja California		San Juan de Dios, Baja California	
	1964	Average 1961-1964	1964	Av. 1952-59 1961-1964	1964	Av. 1939-42 1946-1964	1964	Average 1952-1964	1964	Av. 1956 1960-1964
Jan.	2.13	3.31	3.86	2.83	4.80	3.90	4.29	3.58		1.93
Feb.	3.82	3.19	4.84	3.31	6.34	3.98	6.50	3.58		2.44
Mar.	3.90	3.66		4.06	5.87	5.16	5.79	5.12		3.98
Apr.	4.25	5.59		4.76	7.24	5.94	6.46	6.81	3.98	3.86
May	6.26	6.30	5.51	5.71		7.56	8.54	7.91	6.38	5.63
June	7.05	5.59	6.50	5.59	6.93	8.27	10.55	9.72	5.35	5.43
July	10.31	9.61	7.32	6.50	8.46	9.25	12.76	11.18	7.76	7.95
Aug.	8.35	8.66	6.97	6.54	7.64	8.35	10.87	10.31	4.65	6.57
Sept.	6.61	7.32	6.30	5.94	6.42	7.24	8.94	8.78	8.23	6.54
Oct.	5.87	6.26	5.04	4.33	5.67	5.94		6.34	5.12	4.13
Nov.	3.90	3.70	3.78	3.54	3.82	5.43	4.80	4.69	1.42	2.83
Dec.	2.80	3.11	2.60	2.95	2.83	4.53	3.82	4.21		3.50
Total	65.25	52.24		55.51		76.22		80.75		# 56.30

* Partly estimated # 1957-1960

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 maximums and minimums 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 87 in this bulletin.

In United States

Month	Barrett Dam, California				* Chula Vista, California			
	1964			Average 1931- 1964	1964			Average 1931- 1964
	Mean	Max.	Min.		Mean	Max.	Min.	
Jan.	45.5	85	22	48.5	52.4	77	36	52.3
Feb.	47.3	78	24	50.4	53.4	76	36	53.6
Mar.	49.8	84	27	53.3	54.2	78	37	55.1
Apr.	54.8	92	32	58.2	57.5	83	43	58.0
May	59.2	90	37	62.8	57.6	70	45	60.6
June	66.3	102	42	68.3	61.2	69	49	63.0
July	76.4	104	46	76.2	65.2	73	53	
Aug.	75.1	102	49	76.1		75	59	
Sept.	# 68.1	98	41	72.6	65.6	78	53	
Oct.	68.5	102	38	64.4	66.3	95	50	62.7
Nov.	51.8	85	26	55.9	56.5	82	34	
Dec.	49.8	84	26	51.0	54.0	73	36	54.4
Yearly	59.4	104	22	61.4		95	34	

Month	Campo, California							
	Mean				1964			Average 1951-64
	1960	1961	1962	1963	Mean	Max.	Min.	
Jan.	43.5	50.1	47.7	44.6	44.7	82	17	46.4
Feb.	45.7	49.0	47.4	# 54.3	45.2	75	17	47.8
Mar.	# 53.4	49.7	46.0	47.9	46.5	77	21	48.9
Apr.	56.0	55.6	57.0	50.4	51.1	89	24	δ 53.9
May	59.7	56.2	56.1	58.4	56.8	90	31	57.8
June	69.8	69.2	64.4	62.6	64.4	102	33	64.8
July	75.0	74.3	70.3	71.5	74.2	102	40	73.2
Aug.	73.3	74.7	75.0	73.3	72.8	100	39	73.0
Sept.	72.3	65.7	69.5	72.3	66.6	97	36	69.5
Oct.	59.9	59.6	60.3	62.6	65.8	97	34	61.1
Nov.	51.4	δ 50.9	53.0	51.8	49.9	79	23	52.2
Dec.	46.5	47.5	48.9	48.4	47.9	73	24	48.4
Yearly	58.9	58.6	58.0	58.2	57.2	102	17	δ 58.1

In Mexico

Month	La Rumorosa, Baja California				Tecate, Baja California				Tijuana, Baja California			
	1964		1946-1964		1964		1946-59&61-64		1964		1948-59&61-64	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Jan.			81	5	84	25	86	21	81	32	90	30
Feb.	70	34	82	10	79	25	90	21	82	32	102	32
Mar.	73	23	88	16	84	27	88	27	86	36	90	34
Apr.	70	39	91	23	93	36	99	32	82	43	90	34
May	88	34	97	28	88	39	100	36	90	45	97	43
June	93	41	113	34	93	37	104	37	86	48	99	41
July	99	57	104	50	106	43	115	36	99	54	120	46
Aug.	97	54	102	46	97	46	113	34	102	52	106	52
Sept.	97	50	104	34	97	43	115	37	97	48	120	46
Oct.	91	37	91	25	100	37	106	34	106	52	117	43
Nov.	72	21	88	14	88	27	97	27	100	34	100	34
Dec.	68	32	81	10	72	25	90	23	86	37	99	25
Yearly			113	5	106	25	115	21	106	32	120	25

* Chula Vista temperature not read on most week ends or holidays

One or more days missing

δ 1956 record missing

**DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS
ALONG TIJUANA RIVER AND TRIBUTARIES
1964**

The total area within 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 United States Department of Agriculture and the State Engineer, State of California, or estimated from aerial photographs. Those in Mexico were furnished by the Ministry of Hydraulic Resources of Mexico through the Mexican Section of the Commission. All irrigation in the Tijuana Basin in 1964 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	a) 75	0	a) 75
Morena Dam to Barrett Dam	133	0	133	0	0	0
above Barrett Dam	247	0	247	a) 75	0	a) 75
below Barrett Dam and above						
Tecate Creek	65	0	65	a) 145	0	a) 145
above Tecate Creek	312	0	312	a) 220	0	a) 220
Campo Creek						
above International Boundary	82	4	86	a) 320	0	a) 320
Tecate Creek						
above International Boundary (do not include Campo Creek)	19	64	83	0	0	0
Cottonwood Creek						
above International Boundary Station	413	68	481	a) 540	0	a) 540
Río de las Palmas						
above Rodriguez Dam	7	981	988	0	b) 0	0
Tijuana River						
above Nestor Gaging Station	458	1,266	1,724			
above the Mouth	462	1,269	1,731	3,000	c) 350	3,350

a) Estimated as of 1948. During extremely dry years these areas may be materially reduced.

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

c) There was no irrigation in 1964 in the Tijuana Irrigation District, Tijuana Valley, Baja California, Mexico, from the Rodriguez Reservoir, but an estimated area of about 350 acres was irrigated by pumping from ground water. Depending upon the availability of water this acreage varies considerably from year to year.



WHITEWATER DRAW NEAR DOUGLAS, ARIZONA

DESCRIPTION: Water-stage recorder located on U. S. Highway 80 bridge between Douglas and Bisbee, Arizona, about 450 feet upstream from the Southern Pacific Railroad bridge, 1.5 miles upstream from the international boundary, and 2 miles west of Douglas, Arizona. Zero of gage is 3,906.94 feet above mean sea level, U. S. C. & G. S. datum of 1929.

RECORDS: Based on 18 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. Records fair except for periods of fragmentary or no gage height record, which are 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 December 1964 (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 smelter waste water entering the stream a short distance below this station.

EXTREMES: Prior to 1936: Maximum recorded discharge, 3,450 second-feet August 10, 1931 (gage height 12.15 feet); maximum estimated discharge, 4,050 second-feet July 27, 1919; minimum discharge, no flow for several days of many years. Since 1936: Maximum discharge, 5,060 second-feet August 7, 1955; maximum gage height 14.93 feet July 27, 1959; minimum daily discharge, no flow at times during most years.

Mean Daily Discharge in Second Feet 1964 — 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	732	" 0.7	" 0.4	0	0.1
2	0	0	0	0	0	0	0	140	" .7	" .4	0	.1
3	0	0	0	0	0	0	0	75	" .7	" .4	0	.1
4	0	0	0	0	0	0	0	" 8	" .6	" .4	0	.1
5	0	0	0	0	0	0	0	" 4	" .6	" .4	0	.1
6	0	0	0	0	0	0	0	" 16	" .5	" .4	0	.1
7	0	0	0	0	0	0	0	" 10	" .5	" .3	0	.1
8	0	0	0	0	0	0	0	" 2	6.0	" .3	0	.1
9	0	0	0	0	0	0	70	" 23	" 2	" .3	0	.1
10	0	0	0	0	0	0	.7	" 8	" 34	" .3	0	.1
11	0	0	0	0	0	0	0	" .5	" 8.6	" .3	0	.1
12	0	0	0	0	0	0	0	366	51	" .3	0	.1
13	0	0	0	0	0	0	146	224	52	" .2	0	.1
14	0	0	0	0	0	0	43	229	51	" .2	0	.1
15	0	0	0	0	0	0	41	" 7	175	" .2	0	.1
16	0	0	0	0	0	0	0	7.9	89	" .2	.1	.1
17	0	0	0	0	0	0	2.0	26	28	" .2	.1	.1
18	0	0	0	0	0	0	2.2	" 5	" 2	" .2	.1	.2
19	0	0	0	0	0	0	14	51	" 7	" .1	.1	.2
20	0	0	0	0	0	0	5.3	46	" 2	" .1	.1	.1
21	0	0	0	0	0	0	.2	32	" .7	" .1	.1	.1
22	0	0	0	0	0	0	37	" .8	" 2.6	" .1	.1	.1
23	0	0	0	0	0	0	551	" .7	36	" .1	.1	.1
24	0	0	0	0	0	0	155	" .7	13	" .1	.1	.1
25	0	0	0	0	0	0	28	" .6	" 2	" .1	.1	.2
26	.1	0	0	0	0	0	75	" .6	20	" .1	.1	.2
27	.1	0	0	0	0	0	" 13	42	" .7	" .1	.1	.2
28	.1	0	0	0	0	0	" 2	100	" 12	" .1	.1	.2
29	.1	0	0	0	0	0	5.0	63	" .6	" .1	.1	.2
30	.1	0	0	0	0	0	130	" 20	" .5	" .1	.1	.2
31	0	0	0	0	0	0	567	" 3	0	" 0	.1	.1
Sum	0.5	0	0	0	0	0	1,895.3	2,253.9	600.0	* 6.6	1.5	3.8

Month	Current Year 1964						Period 1936-1964				
	Extreme Gage Feet		Extreme Second Feet		Average Second Feet	Total Acre Feet	Acre Feet				
	High	Low	High	Low			Average	Maximum	Minimum		
Jan.			†26	0.1	† 1	0	0.02	1.0	50.2	451	1.0
Feb.				0	† 1	0	0	0	28.6	132	0
Mar.				0	† 1	0	0	0	31.1	130	0
Apr.				0	† 1	0	0	0	28.6	173	0
May				0	† 1	0	0	0	21.3	138	0
June				0	† 1	0	0	0	183	1,590	0
July			31	567	† 1	0	61.1	3,759	# 2,248	8,110	39
Aug.			1	732	" 11	" .5	72.7	4,471	# 3,590	14,480	.3
Sept.			15	175	" 6	" .5	20.0	1,190	# 751	3,170	.8
Oct.			† 1	" .4	† 1	0	* .21	* 13.1	176	2,210	.4
Nov.			† 16	.1	† 1	0	.05	3.0	52.5	352	.2
Dec.			† 18	.2	† 1	.1	.12	7.5	90.7	1,050	.4
Yearly				732		0	13.0	9,445		22,321	900

" Estimated Ø Mean daily # 1947 Records not available † And other days
 * Partly estimated

**SEWAGE EFFLUENT, DOUGLAS, ARIZONA AND AGUA PRIETA, SONORA
INTERNATIONAL TREATMENT PLANT**

DESCRIPTION: Flume in influent line at treatment plant, equipped with stilling well and staff gage, for measuring combined flows of Douglas, Arizona and Agua Prieta, Sonora, and Parshall flume with recording flow meter for measuring flows from the city of Douglas. Flows from Mexico are deduced from total flows and city of Douglas flows.

RECORDS: Combined discharges are computed from daily 11:00 a.m. readings of the staff gages by applying an 11:00 a.m. index determined from 7 days of hourly measurements during which the relationship between mean daily readings and 11:00 a.m. readings was developed. Records available; Continuous monthly records since March 1948; daily records March 18, 1948 through December 1950 and January 1952 through December 1964.

REMARKS: Douglas-Agua Prieta international treatment plant was constructed by the Governments of the United States and Mexico in 1947 to correct a serious international sanitation problem and is located in the United States adjacent to the international boundary about one mile west of the Douglas-Agua Prieta Port of Entry. The effluent from the plant is treated in oxidation ponds in Mexico.

Month	Total Monthly Flows			Mean Daily Flows-Millions of Gallons Per Day					
	Millions of Gallons			Current Year 1964			Period 1952-1964		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	27.751	9.390	37.141	1.342	0.982	1.198	1.368	0.619	0.973
Feb.	25.741	10.110	35.851	1.413	1.159	1.236	1.784	.584	.979
Mar.	27.972	10.985	38.957	1.346	1.137	1.257	1.346	.590	.974
Apr.	27.198	11.625	38.823	1.403	1.186	1.294	1.403	.619	.991
May	29.705	9.089	38.794	1.395	1.143	1.251	1.428	.619	.998
June	31.056	6.823	37.879	1.435	1.097	1.263	1.692	.626	1.064
July	33.646	12.509	46.155	1.723	1.300	1.489	1.723	.619	1.115
Aug.	29.153	15.492	44.645	1.681	1.178	1.440	1.829	.619	1.141
Sept.	29.465	14.491	43.956	1.662	1.325	1.465	1.884	.626	1.135
Oct.	27.339	14.362	41.701	1.410	1.223	1.345	1.667	.626	1.072
Nov.	26.169	14.487	40.656	1.448	1.295	1.355	1.448	.619	1.031
Dec.	27.369	11.149	38.518	1.411	1.100	1.243	1.582	.619	1.025
Yearly	342.564	140.512	483.076	1.723	0.982	1.320	1.884	0.584	1.042

SAN PEDRO RIVER AT PALOMINAS, ARIZONA

DESCRIPTION: Water-stage recorder located near left bank on the downstream side of pier on bridge on State Highway No. 92, 0.7 mile east of Palominas, 2.5 miles upstream from Green Brush Draw, 4.5 miles downstream from international boundary, and 12 miles southwest of Bisbee, Arizona. Zero of gage is 4,187.62 feet 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 December 1964. Records obtained and furnished by U. S. Geological Survey.

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 on August 14, 1940 (gage height, 16.16 feet present datum), from rating curve extended above 5,600 second-feet 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 present datum, from floodmarks; discharge not determined). For data not previously published see following two pages.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.8	0.1	0.5	0.5	0.1	0.1	0.1	464	11	4.5	3.7	3.3
2	2.0	.1	.5	.5	.1	.1	.1	490	11	4.1	3.7	3.3
3	1.5	.1	.8	.5	.2	.1	.1	" 224	11	3.7	4.1	3.3
4	1.3	.1	.8	.6	.2	.1	.1	" 70	11	3.7	4.1	3.7
5	1.5	.1	.8	.5	.1	.1	.1	2,660	11	3.0	4.1	4.1
6	1.5	.1	.8	.3	.1	.1	.1	295	17	3.0	4.1	3.7
7	1.5	.2	.8	.3	.1	.1	.1	95	" 6	3.0	4.5	3.7
8	1.0	.6	.8	.5	.1	.1	.1	" 50	" 6	3.0	5.0	3.7
9	.6	.6	1.0	.5	.1	.1	.1	" 30	" 138	2.6	5.0	4.1
10	.6	1.3	1.3	.6	.1	.1	.1	519	1,100	2.6	5.4	4.1
11	.5	1.3	.8	.6	.1	.1	.1	111	120	2.6	4.5	3.7
12	.6	1.3	1.0	.6	.1	.1	22	532	61	3.3	4.1	3.7
13	.6	1.3	1.0	.6	.1	.1	80	142	149	3.7	4.1	3.7
14	.6	1.0	1.3	.6	.1	.1	16	5,220	82	3.7	4.1	3.7
15	.6	1.0	1.5	.6	.1	.1	1.6	928	46	3.7	4.1	3.7
16	.5	1.0	1.3	.6	.1	.1	15	212	33	4.5	5.4	4.1
17	.2	1.5	1.5	.6	.1	.1	1.0	144	30	6.8	5.4	3.7
18	.1	1.3	6.5	.6	.1	.1	.5	111	27	6.8	5.0	4.1
19	.1	1.3	7.2	.5	.1	.1	6.2	88	29	6.8	4.1	3.7
20	.1	1.3	3.3	.2	.1	.1	3.6	85	23	6.3	3.3	3.3
21	.1	1.3	2.6	.2	.1	.1	164	79	8.4	5.9	3.0	3.3
22	.1	1.0	2.3	.2	.1	.1	492	74	6.3	5.4	2.6	3.7
23	.1	1.3	2.0	.1	.1	.1	518	64	8.4	5.0	2.6	3.7
24	.1	1.0	2.0	.1	.1	.1	" 70	50	16	4.5	2.6	3.3
25	.1	.8	1.8	.1	.1	.1	" 148	35	11	4.1	2.6	3.3
26	.1	.8	1.3	.1	.1	.1	" 30	28	7.9	4.5	2.6	3.3
27	.2	.8	1.0	.1	.1	.1	" 10	353	7.4	5.0	2.3	3.3
28	.1	.6	.6	.1	.1	.1	6.3	375	6.8	4.5	2.3	3.3
29	.1	.5	.5	.1	.1	.1	6.3	46	6.3	4.1	2.3	3.3
30	.1	.5	.5	.1	.1	.1	369	24	5.9	3.7	3.0	3.3
31	.1	.5	.5	.1	.1	.1	947	16		3.7		3.3
Sum	18.4	23.7	48.6	11.5	3.3	3.0	2,907.6	13,614	2,006.4	131.8	113.7	111.5
Current Year 1964									Period 1951-1964			
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.			2	Ø	2.0	†18	0.1	0.6	36.5	815	7,813	2.6
Feb.			17	Ø	1.5	†1	.1	.8	47.0	274	1,367	3.0
Mar.			19	Ø	7.2	†1	.5	1.6	96.4	230	580	39.3
Apr.			†4	Ø	.6	†23	.1	.4	22.8	92.0	330	8.1
May			†3	Ø	.2	†1	.1	.1	6.5	22.7	68.8	.4
June			†1	Ø	.1	†1	.1	.1	6.0	260	1,391	0
July	8.02		22	Ø	3,460	†1	.1	93.8	5,767	7,339	17,238	523
Aug.	12.84		14	Ø	11,000	31	16	439	27,003	12,550	36,369	165
Sept.	7.96		10	Ø	2,640	30	5.9	66.9	3,980	2,037	16,344	28.4
Oct.			†17	Ø	6.8	†9	2.6	4.2	261	182	1,201	2.2
Nov.			†10	Ø	5.4	†27	2.3	3.8	226	155	609	1.9
Dec.			†5	Ø	4.1	†1	3.3	3.6	221	206	484	6.2
Yearly					11,000		0.1	51.9	37,673	24,163	55,364	4,400

" Estimated Ø Mean daily † And other days

SAN PEDRO RIVER AT PALOMINAS, ARIZONA
Mean Daily Discharge in Second Feet

1963

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.5	0.9	0.1	1.2	0.1	0	0	121	169	0.3	0.1	0.1
2	.6	.9	.1	1.2	.1	0	.1	114	380	.2	.1	.1
3	.8	.9	.1	1.2	0	0	.1	131	429	.1	.1	.1
4	.9	.9	.1	1.0	0	0	.1	130	103	.1	.1	.1
5	.9	.8	.2	1.0	0	0	.1	140	185	.1	.1	.1
6	.9	.8	.2	.9	0	0	25	131	73	.1	.2	.1
7	.8	.8	.2	.9	0	0	.5	27	20	.1	.2	.1
8	.8	.8	.2	.8	0	0	.2	13	77	.1	.2	.1
9	.8	.8	.2	.8	0	0	.2	5.0	15	.1	.2	.2
10	.8	.9	.2	.7	0	0	190	49	12	.1	.2	1.0
11	1.0	1.2	.3	.6	0	0	52	13	9.0	.1	.1	1.8
12	1.0	1.4	.4	.5	0	0	.7	32	7.4	.1	.1	1.8
13	.8	1.2	.4	.5	0	0	.4	128	5.9	.1	.1	1.8
14	.7	1.0	.5	.4	0	0	" .3	75	3.3	.1	.1	1.8
15	.6	1.0	.4	.3	0	0	20	28	69	.1	.1	1.8
16	.7	1.0	.4	.2	0	0	135	74	" 12	.1	.1	1.8
17	.7	1.2	.5	.2	0	0	72	10	5.0	.1	.1	2.0
18	.8	.9	.6	.2	0	0	7.1	6.4	" 3.5	.1	.1	2.0
19	.8	.4	.6	.2	0	0	3.2	68	" 3.0	.2	.1	2.0
20	.7	.2	.9	.1	0	0	97	40	7.7	.7	.1	2.0
21	.6	.2	.9	.1	0	0	23	90	" 7.3	.1	.3	2.0
22	.7	.2	.9	.1	0	0	101	113	" 3.7	.1	1.5	2.0
23	.7	.2	.9	.1	0	0	13	82	2.6	.1	1.5	1.8
24	.7	.1	.9	.1	0	0	6.8	24	1.8	.1	1.0	1.8
25	.8	.1	1.2	.1	0	0	12	100	1.5	.1	1.0	1.8
26	.8	.1	1.2	.1	0	0	40	347	.8	.1	1.0	1.8
27	.9	.1	1.2	.1	0	0	1,390	286	.5	.1	.8	2.0
28	.9	.1	1.2	.1	0	0	289	88	.5	.1	.2	2.0
29	.9		1.3	.1	0	0	717	90	.3	.1	.1	1.8
30	.9		1.3	.1	0	0	1,730	173	.3	.1	.1	1.3
31	.9		2.2		0	0	195	127		.1		1.8
Sum	24.4	19.1	19.8	13.9	0.2	0	5,120.8	2,855.4	1,608.1	4.1	10.0	40.9
Avg.	0.8	0.7	0.6	0.5	0	0	165	92.1	53.6	0.1	0.3	1.3
A. F.	48.4	37.9	39.3	27.6	0.4	0	10,157	5,664	3,190	8.1	19.8	81.1

1962

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.0	13	4.7	1.9	0.2	0	0	3.6	0	0.1	0	0.1
2	5.0	12	3.8	1.4	.1	0	0	18	0	.1	0	.1
3	5.3	10	3.3	1.0	.1	0	0	51	0	.1	0	.1
4	5.3	10	3.1	1.3	.1	0	0	5.4	0	.1	0	.1
5	5.0	9.5	3.1	1.3	.1	0	26	" 1.0	0	.1	0	.1
6	5.0	8.7	3.3	.8	.1	0	" .5	" .3	0	.1	0	.1
7	4.7	7.1	3.8	.6	.1	0	" .1	" .2	" 11	.1	0	.1
8	4.4	6.7	57	.5	.1	0	" .1	" .2	" .5	.1	0	.1
9	4.1	6.0	52	.5	.1	0	" .3	" .2	" .1	.1	0	.1
10	2.8	6.7	30	.5	.1	0	" .1	" .2	0	.1	0	.1
11	3.3	6.0	21	.5	.1	0	" .1	.2	0	.1	0	.1
12	3.6	5.6	15	.5	.1	0	" .1	.1	0	0	0	.2
13	4.4	5.6	10	.5	.1	0	" .1	.1	9.4	0	0	.2
14	5.3	6.0	8.3	.9	.1	0	" .1	.1	6.1	0	.1	.2
15	4.1	6.3	6.7	.9	.1	0	" 0	.1	1.7	0	.1	.2
16	4.4	6.3	6.0	1.2	.1	0	" 0	.1	.1	0	.1	.2
17	4.1	6.3	5.0	.9	.1	0	" 0	.1	.1	0	.1	.2
18	4.4	6.0	4.1	.4	.1	0	" 5.0	.1	.1	0	.1	.4
19	4.1	5.6	3.8	.4	.1	0	" .3	.1	.1	0	.1	2.4
20	3.6	5.6	6.0	.3	.1	0	" .2	.1	.1	0	.1	1.4
21	2.8	5.6	5.3	.4	.1	0	" .1	.1	.1	0	.1	.9
22	3.8	5.3	5.6	.3	.1	0	" 1.0	1.4	.1	0	.1	.8
23	5.3	5.3	4.7	.3	.1	0	" .7	.3	.1	0	.1	.7
24	8.8	5.3	4.1	.3	.1	0	" 1.0	" .1	.1	0	.1	.6
25	194	5.3	4.1	.3	0	0	" 1.4	" .1	.1	0	.1	.8
26	102	5.3	3.6	.3	0	0	541	" 0	.1	0	.1	.8
27	62	5.0	3.3	.2	.1	0	215	" 0	.1	0	.1	.8
28	35	5.0	3.3	.2	.1	0	169	" 0	.1	0	.1	.7
29	22		3.3	.2	.1	0	32	" 0	.1	0	.1	.5
30	16		2.9	.2	0	0	25	" 0	.1	0	.1	.5
31	14		2.2		0	0	10	0	0	0		.5
Sum	553.6	191.1	292.4	19.0	2.8	0	1,029.2	83.2	30.3	1.1	1.7	14.1
Avg.	17.9	6.8	9.4	0.6	0.1	0	33.2	2.7	1.0	0	0.1	0.5
A. F.	1,098	379	580	37.7	5.6	0	2,041	165	60.1	2.2	3.4	28.0

" Estimated

SAN PEDRO RIVER AT PALOMINAS, ARIZONA
Mean Daily Discharge in Second Feet

1961

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.6	4.1	3.1	0.2	0.2	0.1	0.9	11	28	0.2	4.8	2.2
2	3.3	4.1	3.1	.2	.2	.1	303	86	10	.2	2.2	2.2
3	3.6	4.1	2.8	.2	.2	.1	49	62	6.0	.2	1.7	2.2
4	3.6	4.1	2.8	.2	.2	.1	1.5	44	3.8	.2	1.6	2.4
5	3.6	4.1	3.1	.2	.2	.1	.2	21	2.1	.2	1.2	2.4
6	3.6	4.1	3.1	.3	.2	.1	.1	15	1.7	.3	.9	2.6
7	3.3	3.8	3.1	.8	.1	.1	.1	13	.9	.3	1.4	3.6
8	3.1	3.8	3.1	1.2	.1	.1	.1	12	.2	.6	3.8	8.9
9	2.8	3.8	2.4	.6	.1	.1	.1	32	29	2.8	4.1	8.1
10	3.1	3.8	2.2	.5	.5	.1	.1	22	22	2.2	3.3	4.7
11	3.8	3.6	2.1	.2	.8	.1	0	744	22	2.6	2.4	4.7
12	3.6	3.3	2.1	.1	.6	.1	0	32	33	1.6	2.1	4.7
13	3.3	3.1	1.9	.1	.2	.1	48	212	11	1.2	2.1	4.4
14	3.3	3.1	1.9	.1	.2	0	3.1	167	4.7	.8	2.4	4.4
15	3.6	3.1	1.7	.1	.1	.1	51	321	2.8	.6	2.8	4.7
16	3.6	2.8	1.9	.1	.1	.1	74	277	4.7	1.2	2.8	27
17	3.6	2.8	1.9	.1	.1	.1	255	46	122	.9	2.6	43
18	4.1	2.8	2.1	.2	.1	.1	4.3	21	22	.3	2.8	23
19	4.1	3.1	1.7	.2	.1	.1	.3	13	11	.2	2.8	12
20	4.4	3.3	1.3	.2	.2	.1	50	6	5.6	.1	2.8	8.7
21	4.4	3.6	1.0	.2	.2	.1	2.4	2.5	2.5	.2	2.8	7.5
22	5.0	3.3	1.4	.2	.2	.1	250	2.6	1.5	.1	2.8	7.3
23	4.4	3.1	.8	.2	.2	.2	69	42	.8	.1	2.4	6.7
24	4.1	2.8	.7	.2	.2	.2	6.9	12	.5	.1	2.2	6.3
25	4.7	3.1	.5	.2	.2	.2	1.0	3.1	.3	.3	2.2	6.0
26	4.4	3.3	.2	.2	.2	.1	.5	1.7	.3	.5	2.2	5.6
27	4.4	2.8	.2	.2	.2	.1	45	.3	.3	1.4	2.2	5.6
28	4.4	2.8	.2	.2	.1	.1	736	175	.3	1.7	2.4	5.6
29	4.4	.2	.2	.3	.1	.5	225	487	.3	2.6	2.2	5.6
30	4.4	.2	.3	.1	.1	.1	596	337	.2	30	2.2	5.6
31	4.4	.2	.3	.1	.1	.1	42	264	.2	27	2.2	5.0
Sum	120.0	95.6	53.0	8.0	6.3	3.6	2,814.6	3,484.2	391.8	80.7	74.2	242.7
Avg.	3.9	3.4	1.7	0.3	0.2	0.1	90.8	112	13.1	2.6	2.5	7.8
A.F.	238	190	105	15.9	12.5	7.1	5,583	6,911	777	160	147	481

1960

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	16	25	15	6.0	0.5	0.1	0	1.7	7.9	0.2	0.2	0.2
2	38	25	15	5.6	.3	.1	0	7.8	2.6	.2	.2	.2
3	32	27	14	5.6	.5	.1	.1	2.4	1.0	.1	.2	.2
4	24	27	13	5.3	.5	.1	.1	16	.8	.1	.2	.2
5	18	28	12	5.0	.7	.1	.1	34	.9	.1	.2	.4
6	16	28	10	5.0	.6	0	.1	29	1.2	.1	.3	.4
7	15	28	10	4.7	.8	0	.1	5	69	.1	.3	1.6
8	14	27	9.5	4.1	.9	0	.1	125	10	.1	.3	1.4
9	12	27	8.7	3.6	.5	0	.1	25	54	.1	.2	1.4
10	16	26	8.3	3.3	.5	0	.1	79	15	.1	.2	1.4
11	793	28	7.9	1.4	.2	0	.1	23	5	.1	.2	1.4
12	1,330	31	7.1	1.2	.2	0	.1	10	1	.1	.2	1.4
13	350	30	6.7	1.0	.3	0	.1	54	.5	.1	.2	1.4
14	227	30	6.3	.9	.1	0	.1	379	.3	.2	.2	1.4
15	155	28	6.7	.7	0	0	.1	40	.2	.2	.2	1.4
16	120	26	7.1	1.2	0	0	.1	635	.2	.2	.2	1.4
17	100	25	7.9	.8	0	0	0	50	.2	.2	.2	1.4
18	80	25	7.9	.5	0	.1	0	8	.2	.2	.2	1.6
19	71	22	7.5	.5	0	.1	0	3	.2	.2	.2	1.6
20	60	21	7.5	.5	0	0	.1	5.3	.2	.3	.2	1.6
21	56	20	7.5	.9	0	0	29	20	.2	.3	.1	1.6
22	53	19	7.5	1.0	0	0	8.0	9	.2	.2	.1	1.7
23	50	18	6.7	.7	0	.1	.5	2	.2	.3	.1	1.7
24	48	18	6.3	.7	0	5.5	.5	1.5	.2	.3	.1	1.7
25	45	17	6.7	1.2	0	.1	186	1.2	.2	.2	.1	1.9
26	42	16	6.3	.7	0	.1	8	6.4	.2	.3	.1	2.1
27	39	16	6.3	.4	0	.1	2	87	.2	.2	.1	2.1
28	34	16	6.3	.3	0	.1	1	20	.2	.2	.1	2.1
29	31	15	6.7	.3	.1	0	14	14	.2	.2	.1	2.6
30	28	15	6.7	.3	.1	0	6	8.3	.2	.2	.1	4.1
31	26	15	6.3	.3	.1	.1	7	6.8	.2	.2	.1	3.8
Sum	3,939	689	261.4	63.4	6.9	6.7	263.5	1,708.4	172.4	5.6	* 5.2	* 47.4
Avg.	127	23.8	8.4	2.1	0.2	0.2	8.5	55.1	5.8	0.2	* 0.2	* 1.5
A.F.	7,813	1,367	518	126	13.7	13.3	523	3,389	342	11.1	* 10.3	* 94.0

Estimated

* Partly estimated

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 northeast of Lochiel, Arizona, and 1.5 miles upstream from the international 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.

RECORDS: Based on 22 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. Records good except above 3 second-foot and for periods of fragmentary or no gage height record, which are poor. Records available: January 1949 through December 1964.

REMARKS: There are small diversions by ground water pumping for irrigating about 200 acres above this station.

EXTREMES: Maximum discharge, 4,520 second-feet, July 30, 1950 (gage height 6.75 feet); minimum discharge, no flow for several days of each year.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.4	0.5	0.2	0.3	0.04	0	0	137	15	11	4.6	2.3
2	.5	.4	.3	.3	.03	0	0	43	14	11	4.2	2.2
3	.5	.3	.5	.2	.02	0	0	18	15	10	4.1	2.2
4	.5	.3	.3	.2	.03	0	0	3.7	14	9.9	3.7	2.1
5	.5	.3	.3	.2	.03	0	0	192	14	9.5	3.5	2.0
6	.4	.2	.2	.2	.03	0	0	9.5	13	9.1	3.5	2.0
7	.4	.2	.3	.1	.02	0	0	5.9	13	8.7	3.2	1.8
8	.4	.2	.3	.08	.02	0	0	5.9	14	8.3	3.2	1.8
9	.4	.2	.3	.05	.01	0	0	6.4	337	8.0	3.7	1.7
10	.5	.2	.3	.05	.01	0	0	7.2	349	7.6	3.5	1.5
11	.4	.2	.2	.05	0	0	.1	6.7	18	6.9	3.2	1.4
12	.4	.2	.3	.05	0	0	0	7.6	64	6.7	3.2	1.4
13	.4	.2	.3	.05	0	0	0	117	185	6.7	3.0	1.3
14	.4	.2	.3	.05	0	0	.2	397	39	6.4	3.0	1.2
15	.4	.2	.3	.05	0	0	0	24	17	6.4	3.2	1.1
16	.3	.2	.3	.05	0	0	0	37	14	9.1	3.7	1.0
17	.4	.2	.3	.04	0	0	0	23	14	9.1	2.8	1.0
18	.3	.2	.5	.04	.01	0	0	12	14	6.9	2.8	1.1
19	.4	.2	.4	.04	.01	0	0	12	14	6.2	2.8	1.1
20	.4	.2	.3	.04	.01	0	0	12	14	5.9	2.8	1.0
21	.4	.1	.3	.04	.01	0	32	12	14	6.2	2.7	1.0
22	.3	.1	.3	.04	0	0	16	12	14	6.2	2.6	1.1
23	.4	.2	.3	.04	0	0	109	12	14	6.2	2.4	1.1
24	.4	.1	.3	.04	0	0	3.0	12	14	6.2	2.4	1.2
25	.4	.1	.2	.04	.01	0	.6	144	14	5.6	2.3	1.2
26	.4	.2	.2	.04	.02	0	.2	53	14	5.6	2.3	1.1
27	.4	.2	.2	.04	.02	0	.1	15	14	5.6	2.3	1.1
28	.4	.1	.2	.04	.01	0	.1	14	14	5.6	2.3	1.1
29	.4	.1	.2	.04	.01	0	.1	14	13	5.1	2.3	1.1
30	.5		.2	.04	.01	0	.1	15	12	5.1	2.3	1.1
31	.5		.2		0		7.7	16		4.9		1.1
Sum	12.8	6.0	8.8	2.54	0.36	0	169.2	1,395.9	1,328	225.7	91.6	43.4
Current Year 1964										Period 1949-1964		
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.			† 2	0.5	† 16	0.3	0.41	25.4	26.7	70	1.3	
Feb.			† 1	.5	† 21	.1	.21	11.9	20.7	62	1.8	
Mar.			† 3	.5	† 1	.2	.28	17.5	17.2	57	.7	
Apr.			† 1	.3	† 17	.04	.085	5.0	9.0	29	0	
May			1	.04	† 11	0	.012	.7	2.7	10	0	
June				0		0	0	0	.3	4.4	0	
July			23	109	† 1	0	5.46	336	652	4,270	1.6	
Aug.			14	397	4	3.7	45.0	2,769	1,304	10,120	.08	
Sept.			10	349	30	12	44.3	2,634	362	2,634	0	
Oct.			† 1	11	31	4.9	7.28	448	88.2	448	0	
Nov.			1	4.6	† 25	2.3	3.05	182	38.5	182	0	
Dec.			1	2.3	† 16	1.0	1.40	86.1	30.8	86.1	0	
Yearly				397		0	8.97	6,516	2,552	12,633	126	

† And other days Ø Mean daily

SANTA CRUZ RIVER AT EL CAJON, SONORA

DESCRIPTION: Water-stage recorder, cableway, and Cipolletti weir with crest length of 26.25 feet and depth of 0.82 foot, 4.3 miles southwest of Santa Cruz, Sonora and approximately 30 miles southeast of Nogales, Sonora. Zero of gage is 4,270.24 feet above mean sea level, U. S. C. & G. S. datum, which is the same elevation as the crest of the weir.

RECORDS: Data is based on river stages and current meter measurements made during the year. Data obtained and furnished by the Mexican Section of the Commission. Records available: January 14, 1954 through August 1959; October 1, 1959 to June 14, 1960; July 1960; and January 6, 1961 through September 5, 1963; and from October 15, 1963 through August 3, 1964.

REMARKS: Irrigation diversions above the station affect the regimen of the river. A flood in August 1955 destroyed the weir which was repaired in February 1957.

EXTREMES: Maximum instantaneous discharge, 4,590 second-feet on August 6, 1955 with stage of 6.00 feet. Minimum discharge, 0.2 second-foot several days during April 1961 with stage of 0.03 foot.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.4	2.8	6.0	9.2	9.2	5.3	6.0	69.9				
2	6.4	2.8	6.4	9.2	9.5	5.3	5.7	68.2				
3	6.0	2.8	6.4	8.8	9.9	5.3	5.3	39.6				
4	5.7	3.5	6.7	7.4	9.9	4.9	5.3					
5	5.3	3.2	7.1	7.1	9.9	4.6	5.3					
6	4.9	2.8	7.1	7.8	10.6	4.2	5.3					
7	4.6	3.2	7.4	8.5	10.6	4.2	6.7					
8	4.6	3.5	7.4	8.8	10.6	4.2	18.7					
9	4.2	3.5	7.8	8.5	10.6	3.5	24.0					
10	3.5	3.9	7.8	8.5	10.6	3.5	9.9					
11	3.2	3.9	7.8	8.8	10.6	3.5	8.8					
12	3.5	4.2	7.8	8.8	10.6	3.2	8.5					
13	2.8	3.5	8.5	9.2	10.6	3.2	30.7					
14	2.8	3.5	9.5	9.2	10.9	3.5	23.0					
15	2.8	2.5	9.5	9.2	11.3	3.5	19.1					
16	2.8	3.2	8.8	9.2	6.7	3.2	10.6					
17	3.2	3.5	8.5	9.2	5.7	3.5	7.4					
18	3.2	3.5	5.7	9.2	6.0	5.3	9.5					
19	3.5	3.9	6.7	9.2	6.4	5.3	6.4					
20	4.2	4.2	7.4	9.2	6.7	5.3	6.4					
21	3.5	4.2	8.5	9.2	6.4	5.3	7.8					
22	2.8	4.6	9.9	9.2	6.4	5.3	20.1					
23	2.1	4.6	9.9	9.2	6.4	5.3	26.8					
24	2.5	4.9	9.2	9.2	6.7	5.3	58.6					
25	2.5	4.9	8.8	9.2	7.1	5.3	24.4					
26	2.8	5.3	8.8	9.2	7.4	5.7	17.3					
27	2.8	5.7	8.8	9.2	6.4	6.0	14.8					
28	2.8	5.7	9.2	9.2	6.0	5.7	14.1					
29	3.2	6.0	9.2	8.8	6.0	5.7	40.3					
30	3.2		8.8	8.8	6.4	6.0	53.3					
31	3.5		8.8		6.0		85.1					
Sum	115.3	113.8	250.2	266.2	258.1	140.1	585.2					
Current Year 1964									Period #1954-1964			
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.	0.16	0.03	5	7.8	13	1.8	3.9	229	473	1,486	208	
Feb.	.13	.07	29	6.0	14	2.1	3.9	226	349	1,087	98.1	
Mar.	.20	.07	†14	10.2	†18	2.8	8.1	497	307	499	176	
Apr.	.20	.13	†1	9.2	4	6.4	8.8	528	220	528	74.9	
May	.26	.10	†10	12.0	16	4.9	8.5	512	174	512	101	
June	.13	.07	†26	6.4	†10	3.2	4.6	278	110	278	63.1	
July	1.57	.10	31	180	2	4.9	18.7	1,161	741	1,227	83.5	
Aug.									5,416	32,608	229	
Sept.									1,060	3,000	106	
Oct.									345	883	78.5	
Nov.									383	696	139	
Dec.									374	807	186	
Yearly									11,178	38,895	2,317	

Period includes only complete months and years † And other days ‡ Estimated

SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

DESCRIPTION: Water-stage recorder, cable with sit-down cable car located 5.5 miles east of Nogales, Arizona, 0.75 mile downstream from the international boundary and 6 miles upstream from the Santa Cruz River bridge on State Highway No. 82. Zero of gage is 3,702.54 feet above mean sea level, U. S. C. & G. S. datum (levels by International Boundary and Water Commission).

RECORDS: Based on 23 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. Records fair except for periods of fragmentary or no gage height record, which are poor. 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, July 1935 through December 1964.

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 1964.

EXTREMES: Prior to 1936: Maximum discharge, 12,000 second-feet August 31, 1935 (gage height 12.3 feet); minimum discharge, no flow for several days each year. Since 1936: Maximum discharge, 10,600 second-feet July 10, 1954 (gage height 13.27 feet); minimum discharge, no flow for several days of many years.

Mean Daily Discharge in Second Feet 1964 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.4	3.1	3.1	2.3	0.9	0.1	0	152	34	25	16	11
2	3.4	3.4	3.1	3.1	.9	.1	0	391	31	23	15	11
3	3.1	3.4	4.3	3.9	.9	.1	0	193	29	24	14	12
4	3.1	3.1	3.9	3.9	.9	.1	0	51	26	23	14	11
5	3.1	2.7	3.9	3.9	.9	.1	0	445	23	23	14	11
6	2.7	2.7	3.9	3.4	1.2	.1	0	85	40	23	14	11
7	3.1	2.7	3.9	3.4	1.2	.1	0	33	25	22	14	11
8	2.7	3.4	3.9	3.4	1.4	0	0	35	27	22	14	10
9	2.3	3.4	3.9	3.1	1.2	0	.4	51	261	19	14	10
10	3.1	3.4	3.9	2.7	.9	0	0	360	1,081	19	14	9.8
11	3.1	3.4	3.4	2.3	.9	0	24	382	629	17	14	9.8
12	2.7	3.4	3.4	2.0	.7	0	1.5	174	344	17	14	9.8
13	3.1	3.4	3.1	2.3	.5	0	0	177	251	18	14	12
14	2.7	3.4	3.1	2.0	.7	0	16	3,410	256	19	13	11
15	2.7	3.4	3.1	2.0	.5	0	19	521	127	18	14	12
16	2.7	3.4	3.1	2.0	.5	0	0	235	80	21	18	12
17	3.1	3.4	2.7	2.0	.4	0	29	199	57	37	17	11
18	3.1	3.4	3.9	1.5	.4	0	6.4	123	42	33	17	11
19	3.1	3.1	4.3	1.5	.4	0	.2	89	58	27	17	11
20	3.1	2.7	4.3	1.5	.3	0	.2	69	74	22	15	10
21	3.1	2.7	3.9	1.5	.3	0	.1	57	40	21	14	10
22	3.1	2.7	3.9	1.5	.3	0	373	47	33	20	14	11
23	3.4	3.1	3.9	1.2	.3	0	31	41	31	19	14	11
24	3.4	3.1	3.9	1.2	.3	0	21	116	27	18	14	12
25	3.4	3.1	3.9	1.2	.2	0	27	42	27	18	14	13
26	3.9	2.7	3.9	1.4	.2	0	7.4	169	27	18	13	14
27	3.4	2.7	3.9	1.7	.2	0	2.0	259	27	18	12	13
28	3.1	2.7	3.9	1.7	.2	0	1.0	110	27	17	11	13
29	3.1	3.1	3.9	1.2	.1	0	1.0	49	26	17	11	11
30	3.1	3.1	3.1	.9	.1	0	60	42	26	17	11	9.8
31	3.1	2.7	2.7		.1		482	39		16		9.2
Sum	95.5	90.2	113.1	65.7	18.0	0.7	1,102.2	8,146	3,785	651	424	344.4
Current Year 1964												
Month	Extreme Gage Feet		Extreme Second Feet				Average Second Feet	Total Acre Feet	Period 1936-1964			
	High	Low	Day	High	Low	Day			Average	Maximum	Minimum	
Jan.			26	3.9	9	2.3	3.08	189	1,152	16,710	62	
Feb.			† 2	3.4	† 5	2.7	3.11	179	561	2,710	59	
Mar.			† 3	4.3	† 17	2.7	3.65	224	428	1,580	95	
Apr.			† 3	3.9	30	.9	2.19	130	171	475	19	
May			8	1.4	† 29	.1	.58	35.6	61.4	180	2	
June			† 1		† 8	0	.02	1.4	77.3	1,020	0	
July			31	482	† 1	0	35.6	2,186	2,666	15,610	45	
Aug.			14	3,410	7	33	263	16,157	6,346	45,790	91	
Sept.			10	1,080	5	23	126	7,507	1,339	7,507	17	
Oct.			17	37	31	16	21.0	1,291	312	1,550	8.5	
Nov.			16	18	† 28	11	14.1	841	254	1,140	14	
Dec.			26	14	31	9.2	11.1	683	525	5,920	27	
Yearly				3,410		0	40.5	29,424	13,893	57,671	3,499	

† And other days

∅ Mean daily

SEWAGE EFFLUENT, NOGALES INTERNATIONAL TREATMENT PLANT

DESCRIPTION: Two 12-inch Parshall flumes, each with a recording flow meter and continuous totalizer, one located at the international boundary for measuring effluent coming from Nogales, Sonora and the second located at the treatment plant in the influent line of secondary settling tank; and two calibrated sludge pumps of which pumping times are recorded. One pumps from primary settling tank into digester and the other recirculates sludge from secondary tank to primary tank. Bypass of raw sewage may be made to Nogales Wash, the quantity being estimated on basis of head in a control box in influent line ahead of primary tank. Nogales international sewage treatment plant is located near the north edge of Nogales, Arizona on right bank of Nogales Wash, approximately 2 miles downstream from the international boundary.

RECORDS: Total effluent is computed by adding to the flow measured in the flume from primary to secondary tank, the sludge pumped from primary tank into digester, which does not pass through this flume; subtracting the sludge recirculated from secondary to primary tank, which passes through this flume twice; and adding those flows of bypassed raw sewage into Nogales Wash. Flows from the United States are deduced from total measured flows less measured flows from Mexico. Records available: Continuous monthly record since the plant was placed in operation in August 1951, daily record January 1952 through December 1964.

REMARKS: Nogales international treatment plant treats combined sewage from Nogales, Arizona and Nogales, Sonora by means of primary and secondary sedimentation, sludge digestion, and trickling filters. 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 1964			Period 1952-1964		
	U.S.	Mexico	Total	Maximum	Minimum	Mean	Maximum	Minimum	Mean
Jan.	40.400	29.500	69.900	2.500	2.000	2.255	4.162	0.650	1.745
Feb.	35.300	30.400	65.700	2.500	2.000	2.266	3.762	.650	1.839
Mar.	37.000	32.700	69.700	2.500	2.000	2.248	3.662	.750	1.801
Apr.	36.100	29.200	65.300	2.400	1.900	2.177	3.962	.700	1.756
May	34.800	30.600	65.400	2.300	1.700	2.110	3.634	.550	1.674
June	31.100	30.400	61.500	2.200	1.700	2.050	3.317	.700	1.556
July	31.100	35.200	66.300	2.300	1.900	2.139	3.502	.700	1.606
Aug.	29.100	38.600	67.700	2.700	1.700	2.184	3.587	.750	1.957
Sept.	41.400	38.100	79.500	3.000	1.900	2.650	4.112	.800	2.237
Oct.	46.400	46.900	93.300	3.400	2.500	3.010	3.761	.700	2.123
Nov.	42.750	34.300	77.050	2.800	2.300	2.568	3.510	.800	1.877
Dec.	40.350	29.700	70.050	2.500	1.700	2.260	3.360	.350	1.845
Yearly	445.800	405.600	851.400	3.400	1.700	2.326	4.162	0.350	1.835

RAINFALL ON THE SANTA CRUZ RIVER WATERSHED IN INCHES

Tabulated below are monthly records of rainfall with averages for their periods of record at stations located in Arizona. Four stations are operated and maintained by the United States Section of this Commission and four by the U. S. Weather Bureau. For location, elevation, period of record, type of gage in use, and the observer, see alphabetical listing of stations at bottom of page following the monthly record.

Month	Meigs Ranch, Arizona		Jones Ranch, Arizona		Greene Cattle Company, Arizona		Nogales Sanitation Plant 2N, Arizona	
	1964	Average 1952-1964	1964	Average 1952-1964	1964	Average 1953-1964	1964	Average 1953-1964
Jan.	0.65	# 1.06	0.25		T	0.95	0.07	1.14
Feb.	.09	# .40	T		.15	.47	.12	.44
Mar.	.87	# .96	1.10		.85	.82	.73	.89
Apr.	.50	# .28	T	0.29	T	.11	.32	.14
May	0	.05	0	.03	0	.05	0	.06
June	0	.53	.10		.45	.47	.34	.34
July	6.68	4.64	8.85	5.78	4.00	4.50	3.37	4.25
Aug.	6.11	4.64	7.06		4.00	# 3.18	6.99	4.56
Sept.	5.43	1.30	4.27		4.20	1.21	2.89	1.11
Oct.	1.24	.90	1.25		1.00	.90	1.21	1.13
Nov.	.43	.51	.60		1.00	.50	1.16	.61
Dec.	0	.60	0	.74	.10	.52	.28	.73
Yearly	22.00	15.87	23.48		15.75	13.68	17.48	15.40

Month	Nogales, Arizona		San Rafael Ranch, Arizona		Canelo, Arizona		Patagonia, Arizona	
	1964	Average 1914-1964	1964	Average 1924-1964	1964	Average 1930-1964	1964	Average 1930-1964
Jan.	0.08	1.10	0		0.32	1.22	0.44	1.30
Feb.	.11	.82	.18		.02	1.08	.08	1.00
Mar.	.71	.78	.88		.74	.78	.71	.84
Apr.	.27	.31	.18	.40	.26	.38	.42	.35
May	0	.14	0	.11	0	.12	0	.16
June	.33	.44	.76	.78	.20	.95	.43	.49
July	3.26	4.00	4.19	4.50	7.65	4.29	4.84	4.50
Aug.	6.06	4.01	4.32	4.06	4.46	4.57	4.74	4.29
Sept.	2.74	1.56	4.71	1.79	4.87	1.67	8.13	1.75
Oct.	1.24	.76	1.08		1.26	.91	1.43	.85
Nov.	1.21	.72	.91	.66	.83	.78	1.27	.80
Dec.	.25	1.14	.12	1.08	.35	1.20	.52	1.14
Yearly	16.26	15.78	17.33		20.96	17.95	23.01	17.47

Some months missing T Trace

LOCATION OF RAINFALL STATIONS

NAME OF STATION	TYPE GAGE	LATITUDE	LONGITUDE	ELEV. (FT.)	RECORD BEGAN	OBSERVER
Canelo	S	31° 33'	110° 32'	4,985	1930	R. E. Ewing
Greene Cattle Company (San Rafael)	R	31° 22'	110° 35'	4,644	June 1952	I. B. & W. C.
Jones Ranch	S	31° 22'	110° 36'	4,960	Mar. 1952	I. B. & W. C.
Meigs Ranch	S	31° 26'	110° 36'	4,836	Mar. 1952	I. B. & W. C.
Nogales	R	31° 21'	110° 55'	3,800	1914	Milford L. Noon
Nogales Sanitation Plant 2N	S	31° 21'	110° 56'	3,757	June 1952	I. B. & W. C.
Patagonia	S	31° 33'	110° 45'	4,044	1930	O. J. Rothrock
San Rafael Ranch	S	31° 21'	110° 37'	4,741	1924	San Rafael Ranch

S Standard 8" rain gage R Recording rain gage

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

Tabulated below are the monthly records of temperature, humidity, evaporation, and wind at the station two miles north of the Nogales Sanitation Plant in Arizona. The station is operated and maintained by the United States Section of this Commission. The equipment consists of: standard 8-inch rain gage, 48-inch diameter evaporation pan with stillwell and hook gage, maximum and minimum thermometer, anemometer, hygrothermograph, and psychrometer, hand turbine type.

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

Temperature - Degrees Fahrenheit

Month	Nogales Sanitation Plant - 2N		
	1964		
	Mean	Max.	Min.
Jan.	ø 40.3	73	9
Feb.	40.2	78	9
Mar.	47.2	83	17
Apr.	55.7	88	27
May	ø 63.5	96	27
June	71.6	100	45
July	ø 79.1	104	59
Aug.	73.9	95	53
Sept.	69.3	93	44
Oct.	64.4	91	36
Nov.	48.6	79	23
Dec.	ø 45.7	75	14
Yearly	ø 58.3	104	9

ø One or more days missing

Mean Relative Humidity - Percent

Month	Nogales Sanitation Plant - 2N	
	1964	
	Max.	Min.
Jan.	92	52
Feb.	79	52
Mar.	96	52
Apr.	93	46
May	76	37
June	87	44
July	100	67
Aug.	100	60
Sept.	100	51
Oct.	97	56
Nov.	97	61
Dec.	92	68
Yearly	100	37

Evaporation - Inches

Month	Nogales Sanitation Plant - 2N	
	1964	Average #1953-1964
	Jan.	3.77
Feb.	4.84	4.57
Mar.	6.97	7.25
Apr.	10.06	9.75
May	12.58	12.43
June	13.80	13.54
July	9.03	9.73
Aug.	‡ 6.75	7.15
Sept.	‡ 5.61	7.38
Oct.	6.05	6.56
Nov.	3.70	4.26
Dec.	3.39	3.14
Total	86.55	89.18

‡ Adjusted to full month
Some months missing

Mean Wind Speed - Miles per Hour

Month	Nogales Sanitation Plant - 2N	
	1964	Average 1953-1964
	Jan.	2.2
Feb.	2.5	2.4
Mar.	2.9	2.7
Apr.	2.7	2.5
May	2.1	2.5
June	2.4	2.2
July	1.6	1.6
Aug.	.7	.8
Sept.	.5	1.0
Oct.	1.3	1.4
Nov.	1.7	1.4
Dec.	1.7	1.6
Yearly	1.8	1.8

**DRAINAGE AREAS ABOVE GAGING STATIONS AND IRRIGATED AREAS
ALONG SANTA CRUZ RIVER AND WHITEWATER DRAW
1964**

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 Smoke Control Section, Phelps-Dodge Smelter at Douglas, Arizona.

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	200	0	200
Lochiel Station to Nogales Station	103	348	451	0	2,300	2,300
Above Nogales, Arizona Gaging Station	185	348	533	200	2,300	2,500
Whitewater Draw:						
Above Douglas, Arizona Gaging Station	1,023	0	1,023	16,373	0	16,373

CORRECTIONS TO PREVIOUS WATER BULLETINSCOLORADO RIVER AT SOUTHERLY INTERNATIONAL BOUNDARY - DISCHARGES

In the 1960, 1961, 1962, and 1963 Water Bulletins, in the RECORDS paragraph, Twenty-One Mile Wasteway should be 2.2 miles upstream instead of 1.6 miles as shown.

LOCATION OF RAINFALL STATIONS ON THE COLORADO RIVER WATERSHED

In the 1963 Water Bulletin, the elevations at Brawley and El Centro, California should be below mean sea level instead of above mean sea level as shown.