LCRB

UNITED STATES
DEPARTMENT OF THE INTERIOR
Oscar L. Chapman, Secretary

BUREAU OF RECLAMATION
Michael W. Straus, Commissioner

REGION 3
E. G. Nielsen, Regional Director

REPORT
ON
WATER SUPPLY
OF THE
LOWER COLORADO RIVER BASIN

PROJECT PLANNING REPORT

NOVEMBER 1952

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Washington 25, D. C.

January 2, 1953

Air Mail

To: Regional Director, Boulder City, Nevada

From: Commissioner

Subject: Report on water supply of the Lower Colorado River Basin

Your "Report on Water Supply of the Lower Colorado River Basin", a copy of which was recently supplied us, has been examined with interest. I recommend that it be made available to the public at the earliest possible date.

In the memorandum of July 17, 1947, by which we transmitted to the Secretary of the Interior our interim report on the status of Colorado River investigations (H. Document 419, 80th Congress), it was pointed out that the term "stream depletions" was used therein without any implication that this is or is not an appropriate method of measuring the "beneficial consumptive use" with which the Colorado River Compact deals. A similar statement would be in order, I believe, in connection with your report's use of the term "consumptive use". I do not understand that by adoption of this term, accompanied as it is by a carefully framed technical definition, you intend to impute the same meaning to the terminology of the Colorado River Compact and the Boulder Canyon Project Act. I suggest that this be made clear either by attaching a copy of this memorandum to each copy of your study or in some other appropriate fashion.

Michael W. Straus

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Table S5

LOWER COLORADO RIVER BASIN

Man-Made Stream Depletions at Selected Gaging Stations and Division Points

Average Annual Depletions in 1,000 Acre-feet — October 1, 1913-September 30, 1945

Gaging station or division point	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
Colorado River at Lee Ferry (depletion by Upper Basin)	0	0	0	0	0	0	1,849.9	1,849.9
Little Colorado River above Zuni River, near Hunt, Arizona	23.0	0	0	0	0	0	0	23.0
Zuni River at New-Mex.-Ariz. State line	0	0	0	5.1	0	0	0	5.1
Little Colorado River near Woodruff, Ariz.	32.5	0	0	5.1	0	0	0	37.6
Puerco River at New Mex.-Ariz.State line	0	0	0	1.4	0	0	0	1.4
Little Colorado River at Grand Falls, Ariz.	49.3	0	0	6.5	0	0	0	55.8
Little Colorado River at mouth	50.5	0	0	6.5	0	0	0	57.0
Colorado River near Grand Canyon, Arizona	50.5	0	0	6.5	0	0	1,849.7	1,906.7
Virgin River at Littlefield, Arizona	.6	0	0	0	34.5	0	0	35.1
Colorado River below Hoover Dam, Ariz.-Nev.	57.2	0	14.2	6.5	41.8	0	2,962.8	3,082.5
Colorado River near Topock, Arizona	70.3	13.3	15.6	6.4	41.5	0	2,943.0	3,090.1
Bill Williams River at Planet, Arizona	3.8	0	0	0	0	0	0	3.8
Gila River at New Mex.-Ariz. State line	0	0	0	4.1	0	0	0	4.1
San Francisco R. at New Mex.-Ariz. State line	0	0	0	2.4	0	0	0	2.4
Gila R. at head of Safford Valley, near Solomon, Arizona	14.5	0	0	6.5	0	0	0	21.0
San Simon Creek at New Mex.-Ariz. State line	.1	0	0	0	0	0	0	.1
Gila River at Calva, Arizona	73.0	0	0	6.5	0	0	0	79.5
San Pedro River at Palominas, Arizona	0	0	0	0	0	1.1	0	1.1
Gila River at Kelvin, Arizona	104.3	0	0	6.5	0	1.1	0	111.9
Santa Cruz River near Nogales, Arizona	.6	0	0	0	0	5.4	0	6.0
Santa Cruz River at Rillito, Arizona	10.0	0	0	0	0	4.5	0	14.5
Salt River at Granite Reef Dam, Arizona	92.0	0	0	0	0	0	0	92.0
Gila River at Gillespie Dam, Arizona	1,069.7	0	0	5.2	0	5.5	0	1,080.4
Gila River near Dome, Arizona	937.4	0	0	4.0	0	5.3	0	946.7
Colorado River within Limitrophe Section at International Boundary	1,116.5	2,524.0	14.9	9.9	40.2	5.3	2,917.3	6,628.1

Table S6
LOWER COLORADO RIVER BASIN
Undepleted Stream Flow at Selected Gaging Stations and Division Points

Average annual stream flow in 1,000 acre-feet based on 1914-1945 period. Drainage areas in square miles and runoff rate in acre-feet a square mile.

Stream flow stations or division points in downstream order from Lee Ferry	Average virgin flow	Drainage area	Undepleted runoff rate
Colorado River at Lee Ferry, Arizona 1/	15,638.5	109,458	142.9
Little Colorado River above Zuni River, near Hunt, Arizona	31.1	3,685	8.4
Zuni River at New Mex.-Ariz. State line	17.8	1,075	16.6
Little Colorado River near Woodruff, Ariz.	95.7	8,101	11.8
Puerco River at New Mex.-Ariz. State line	14.9	1,083	13.8
Little Colorado River at Grand Falls, Ariz.	307.9	21,178	14.5
Little Colorado River at mouth	470.4	26,906	17.5
Colorado River near Grand Canyon, Arizona	16,110.8	137,772	116.9
Virgin River at Littlefield, Arizona	266.8	5,092	52.4
Colorado River below Hoover Dam, Ariz.-Nev.	16,776.5	167,750	100.0
Colorado River near Topock, Arizona	16,422.4	172,257	95.3
Bill Williams River at Planet, Arizona	139.0	5,144	27.0
Gila River at New Mex.-Ariz. State line	156.4	3,363	46.5
San Francisco R. at New Mex.-Ariz.State line	76.7	1,917	40.0
Gila River at head of Safford Valley, near Solomon, Arizona	399.2	7,954	50.2
San Simon Creek at New Mex.-Ariz. State line	3.5	622	5.6
Gila River at Calva, Arizona	382.5	11,492	33.3
San Pedro River at Palominas, Arizona	31.1	741	42.0
Gila River at Kelvin, Arizona	546.8	18,031	30.3
Santa Cruz River near Nogales, Arizona	21.2	542	39.1
Santa Cruz River at Rillito, Arizona	44.2	3,523	12.5
Salt River at Granite Reef Dam, Arizona	1,423.8	12,907	110.3
Gila River at Gillespie Dam, Arizona	1,792.8	49,626	36.1
Gila River near Dome, Arizona	1,403.6	58,084	24.2
Colorado River within Limitrophe Section at International Boundary	16,972.6	242,983	69.9

1/ Flow from "Final Report, Engineering Advisory Committee to Upper Colorado River Basin Compact Commission", November 29, 1948.

are available for this station from October 1913 through December 1915 and from October 1928 through September 1945. The flows for the remainder of the period were estimated on an annual basis with the average of the precipitation at Walnut Grove, Walnut Creek Ranger Station, and Prescott. The annual estimates were distributed on a monthly basis by applying the monthly percentage relationship derived from averages of the period of record at the station.

(j) Diversions to Colorado River Aqueduct. (Appendix A, Sheet 22 of Table 6) - Diversions by the Colorado River Aqueduct for the Metropolitan Water District of Southern California began in January 1939. Water is diverted by pumping from Havasu Lake about 1.8 miles upstream from Parker Dam. Water diverted by pumping from Havasu Lake, less flow returned from the Gene and Copper Basin Reservoirs, is tabulated on Sheet 22 of Table 6.

(k) Gila River Basin - Stream flow and diversion records and estimates are tabulated in Table 6 of Appendix A, on Sheets 23 through 54 for 27 stream flow stations and 5 diversions throughout the Gila River drainage area. Published stream flow data for other stations within the basin were used in some studies.

(1) Gila River near Red Rock, New Mexico. (Appendix A, Sheet 23 of Table 6) - During the study period, records for this station have been published by the Geological Survey from October 1913 through December 1914 and from October 1930 through September 1945. Records and estimates for the remainder of the period were obtained from reports of the State Engineer of New Mexico.

(2) Gila River below Blue Creek, near Virden, New Mexico. (Appendix A, Sheet 24 of Table 6) - Records of discharge are available for this station from May through November 1914, March through September 1915, and from July 1927 through September 1945. Estimates to complete the 1914-1945 period were derived on a monthly basis by correlation with the flow of the Gila River near Red Rock, New Mexico.

(3) Gila River near Clifton, Arizona. (Appendix A, Sheets 25 and 25A of Table 6) - During the 1914 through 1945 period, discharge records were obtained at this station from March 1928 through September 1933 and from May 1935 through September 1945. Records at the station at Guthrie, 5½ miles upstream, are available for the period from October 1913 through June 1918. The 1914-1945 record was completed by estimates derived by monthly correlation of the sum of the flows of the Gila River near Clifton and the San Francisco River at Clifton with the flow of the Gila River at head of Safford Valley near Solomon. Estimates for the Gila River near Clifton were obtained by subtracting the flow of the San Francisco River at Clifton from the estimates derived by the correlation.

(4) San Francisco River near Glenwood, New Mexico. (Appendix A, Sheet 26 of Table 6) - Stream flow records for this station are available from November 1928 through September 1945 except for six months during 1932. The flows for October, November, and December of 1913 and January 1914 were estimated by application of the drainage area ratio to the recorded flows of the San Francisco River near Alma, New Mexico, for the respective months. The remaining months of missing

records were estimated by monthly correlation with the flow of the San Francisco River at Clifton for months of record available at that station and the balance of the missing record was derived from monthly correlation with the flow of the Gila River at Red Rock, New Mexico.

(5) San Francisco River at Clifton, Arizona. (Appendix A, Sheets 27 and 27A of Table 6) - Discharge records are available at this station during the 1914-1945 period from October 1913 through June 1918, except for January 1916, and from August 1927 through September 1945, except for the period from October 1933 through April 1935, which was estimated on a monthly basis by correlation with the flow of the San Francisco River near Glenwood, New Mexico. The remaining period of missing records was estimated by monthly correlation with the sum of the flows of the Gila River near Clifton and the San Francisco River at Clifton. Estimates of missing records for the sum of flows of the San Francisco and Gila Rivers at and near Clifton had been derived from monthly correlation with the flow of the Gila River at head of Safford Valley.

(6) Willow Creek Diversion from Black River, near Morenci, Arizona. (Appendix A, Sheet 28 of Table 6) - These diversions began in April 1945 by pumping from the Black River, a tributary of the Salt River, into the headwaters of Eagle Creek, a tributary of the Gila River, for mining, metallurgical treatment of ores, and domestic supply in vicinity of Morenci, Arizona. Records of all diversions were obtained at a point on Willow Creek just downstream from the end of the diversion pipe line.

(7) Gila River at head of Safford Valley, near Solomon, Arizona (Appendix A, Sheets 29 and 29A of Table 6) - Records of stream flow for this station are available from June 1914 through September 1945. The eight months of missing records were estimated by monthly correlation with the sum of the flows of the San Francisco and Gila Rivers at and near Clifton, Arizona.

(8) San Simon Creek near Solomon, Arizona. Appendix A, Sheet 30 of Table 6) - Discharge records at this station are available from June 1931 through September 1932 and from May 1935 through September 1945. Annual estimates for the missing period of records were derived by seasonal correlation with precipitation at San Simon, Arizona. The year was divided into two seasons, a wet period from June through September and dry period from October through May.

(9) Gila River at Calva, Arizona. (Appendix A, Sheets 31 and 31A of Table 6) - Records of stream flow were obtained at this station from October 1929 through September 1945. Records for the period were extended by subtracting the flow of the San Carlos River near Peridot from the flow of the Gila River near San Carlos and at Coolidge Dam. Studies indicated that the contribution from the intermediate drainage area and channel losses were comparable during the missing period of record.

(10) San Carlos River near Peridot, Arizona. (Appendix A, Sheet 32 of Table 6) - Records of discharge at this station are available for partial years 1914 and 1915 and from October 1929 through September 1945. Estimates for the period of missing records were

obtained from Table 4-B in Enclosure 6 to accompany "Report on Survey, Flood Control, Gila River and Tributaries above Salt River, Arizona and New Mexico", dated December 1, 1945, and published by War Department, United States Engineer Office, Los Angeles, California. The estimates were derived from seasonal relationship curves of runoff and precipitation.

(11) Gila River below Coolidge Dam, Arizona. (Appendix A, Sheets 33 and 33A of Table 6) - The seven missing months of record for this station from October 1913 through April 1914 were obtained from estimates published in "Distribution of Waters of the Gila River", 4th Annual Report (1939) of Gila Water Commissioner to United States District Court.

(12) San Pedro River at Palominas, Arizona. (Appendix A, Sheet 34 of Table 6) - Stream flow records were obtained at this station from June 1930 through September 1933 and from May 1935 through June 1941. Records for the remainder of the 1914-1945 period were estimated by monthly correlation with the flow of the San Pedro River at Charleston, Arizona.

(13) San Pedro River at Charleston, Arizona. (Appendix A, Sheet 35 of Table 6) - The complete record for this station for the 1914-1945 period has been published by the Geological Survey.

(14) San Pedro River near Mammoth, Arizona. (Appendix A, Sheet 36 of Table 6) - Discharge records for this station are available from May 1931 through June 1941. The 1914-1945 record was completed by estimates derived by monthly correlation of the sum of the flows of the San Pedro River near Mammoth and Aravaipa Creek near Feldman with

the flow of the Gila River at Kelvin minus the flow of the Gila River below Coolidge Dam. Estimates for the San Pedro River near Mammoth were obtained by subtracing the recorded and estimated flows of Aravaipa Creek near Feldman from the estimates derived by the correlation.

(15) Aravaipa Creek near Feldman, Arizona. (Appendix A, Sheet 37 of Table 6) - Stream flow records were obtained at this station from May 1931 through June 1941. Records for the remainder of the period were estimated by monthly correlation with the sum of the flows of the San Pedro River near Mammoth and Aravaipa Creek near Feldman. Estimates for this summation of flows for the period of incomplete records have been derived by monthly correlation with the flow of the Gila River at Kelvin less flow of the Gila River below Coolidge Dam.

(16) Gila River at Kelvin, Arizona. (Appendix A, Sheets 38 and 38A of Table 6) - Discharge records at this station are complete for the 1914-1945 period.

(17) Santa Cruz River near Nogales, Arizona. (Appendix A, Sheet 39 of Table 6) Stream flow records at this station are available from October 1913 through June 1920, excepting the months of December 1914 and July 1916, from May 1921 through June 1922, from May 1930 through December 1933, and from July 1935 through September 1945. Estimates for the period of incomplete records were derived by correlation with the flow of the Santa Cruz River at Tucson on an annual basis.

(18) Santa Cruz River at Tucson, Arizona. (Appendix A, Sheet 40 of Table 6) - Records of stream flow at this station are complete for the 1914-1945 period.

(19) Rillito Creek near Tucson, Arizona. (Appendix A, Sheet 41 of Table 6) - The Geological Survey has published a complete record of discharge at this station for the period 1914 through 1945.

(20) Santa Cruz River at Rillito, Arizona. (Appendix A, Sheet 42 of Table 6) - Stream flow records were obtained at this station from October 1939 through September 1945. Records for the remaining period were estimated by monthly correlation with the sum of the flow of the Santa Cruz River at Tucson plus the flow of Rillito Creek near Tucson.

(21) Salt River near Roosevelt, Arizona. (Appendix A, Sheets 43 and 43A of Table 6) - Records of discharge at this station are complete for the 1914-1945 period.

(22) Tonto Creek near Roosevelt, Arizona. (Appendix A, Sheet 44 of Table 6) - Stream flow records at this station are available from October 1913 through December 1940. Records of monthly flow for the remainder of the period were derived from a correlation curve based on a few concurrent records of discharge of Tonto Creek above Gun Creek, near Roosevelt, Arizona.

(23) Verde River below Bartlett Dam, Arizona. (Appendix A, Sheets 45 and 45A of Table 6) - Records of discharge were obtained at this station or at sites near McDowell and above Camp Creek during the period 1914 through 1945. The Geological Survey considers that the records at the several sites are comparable.

(24) Diversions for City of Phoenix from Verde River at McDowell, Arizona. (Appendix A, Sheet 46 of Table 6) - Water has been diverted from the Verde River at McDowell for use in the City of Phoenix

since February 1922. Monthly records of these diversions as published by the Geological Survey and furnished by the Salt River Valley Water Users' Association are tabulated on Sheet 46 of Table 6 in Appendix A.

(25) Salt River at Granite Reef Dam, Arizona. (Appendix A, Sheets 47 and 47A of Table 6) - Records of flow of the Salt River immediately upstream from diversions at Granite Reef Dam have been obtained by the Salt River Valley Water Users' Association for the period 1914 through 1945. These records were computed as the sum of the total diversions by the two canals at Granite Reef Dam plus spills over Granite Reef Dam.

(26) Diversions from Salt River at Granite Reef Dam, Arizona. (Appendix A, Sheets 48 and 48A of Table 6) - Records of diversions from the Salt River at Granite Reef Dam for irrigation of lands in the Salt River Valley in the vicinity of Phoenix, Arizona, are complete for the period 1914 through 1945. Records show net diversions which were computed as the sum of the discharges of the two canals at Granite Reef Dam less flow returned to the river from the canals by wasteways between the dam and irrigated lands. Monthly diversions as published by the Geological Survey and furnished by the Salt River Valley Water Users' Association are tabulated on Sheets 48 and 48A of Table 6.

(27) Salt River below Granite Reef Dam, Arizona. (Appendix A, Sheets 49 and 49A of Table 6) - Complete records of monthly flows of the Salt River below Granite Reef Dam for the 1914-1945 period were computed from data furnished by the Salt River Valley Water Users' Association. These records include spills over Granite Reef Dam and water returned to

the river by wasteways and sluicing, and represent the total flow at Granite Reef Dam less net diversions for irrigation.

(28) Agua Fria River at Lake Pleasant Dam, Arizona. (Appendix A, Sheet 50 of Table 6) - Records of discharge at this station are published by the Geological Survey from October 1914 through September 1919 and from October 1933 through September 1945. Records for the remainder of the period from October 1913 through September 1914 and from October 1919 through September 1933 were furnished by the Maricopa County Municipal Water Conservation District No. 1.

(29) Diversions by Gillespie Canal at Gillespie Dam, Arizona. (Appendix A, Sheet 51 of Table 6) - Diversions by the Gillespie Canal began during the latter part of 1921 from the left abutment of Gillespie Dam. Records of diversions are published by the Geological Survey from June 1935 through September 1945. Annual estimates of diversions prior to June 1935 were obtained from "Arizona Stream Flow Summary", a report of the Colorado River Commission of Arizona published in March 1940.

(30) Diversions by Enterprise Canal at Gillespie Dam, Arizona. (Appendix A, Sheet 52 of Table 6) - The Enterprise Canal diverted water from the Gila River throughout the period 1914 through 1945. Following construction of Gillespie Dam in 1921, diversions to the canal have been made from the right abutment of the dam. Records of diversions at this station are published by the Geological Survey from October 1939 through September 1945. Records from June 1935 through September 1938 were computed as the difference obtained by subtracting the sum of recorded diversions by Gillespie Canal plus

recorded flows of the Gila River below Gillespie Dam from the combined discharge of the Gila River below Gillespie Dam and of the Gillespie and Enterprise Canals at Gillespie Dam as reported in Geological Survey Water-Supply Paper 1049. The record from October 1938 through September 1939 was obtained by computing the monthly flows from discharge measurements reported in Geological Survey Water-Supply Paper 879. The history of irrigation of the area obtaining its water supply from the Enterprise Canal indicates that average diversions from October 1913 through May 1935 would be comparable to average diversions during the period of recorded measurements. The average for the 1914-1945 period was thus estimated to be the same as the mean for the period of record.

(31) Gila River below Gillespie Dam, Arizona. (Appendix A, Sheets 53 and 53A of Table 6) - Records of stream flow at this station are available for the period extending from September 1921 through September 1945. Annual flows for water years, 1914 through 1921, were derived from correlation on an annual basis of the flow of the Gila River below Gillespie Dam, plus diversions by the Enterprise and Gillespie Canals, with the sum of the recorded flows of the Salt River below Granite Reef Dam, the Gila River at Kelvin, the Santa Cruz River at Rillito, and the Agua Fria River at Lake Pleasant Dam. The estimates derived from the correlations were adjusted for diversions at Gillespie Dam to obtain estimates for the flow of the Gila River below Gillespie Dam.

The period from October 1921 through September 1928 was selected for deriving the correlation curves. In general, the stream

flow records at the selected stations during the 1914-1928 period have not been affected by changes in ground-water and surface-water storage to the extent evident in years subsequent to 1928. The ground-water profile for the Phoenix area shows the average ground-water level rising steadily from 1914 to 1920, leveling for 1921, and then declining at about the same rate as the previous rise to approximately the same level in 1928 as it was in 1914. Diversions at Granite Reef Dam remained about the same throughout the period and the increased irrigated acreage obtained a water supply from better irrigation efficiency, reclamation of seeped land, and pumping from the ground-water reservoir. Storage had not been started at San Carlos Reservoir on the Gila River, Lake Pleasant on the Agua Fria River, or Bartlett Reservoir on the Verde River, and the rivers were live streams throughout most of the year.

(32) Gila River near Dome, Arizona. (Appendix A, Sheets 54 and 54A of Table 6) - Records of stream flow at this station are complete for the period 1914 through 1945.

(1) Colorado River at Yuma, Arizona. (Appendix A, Sheets 55 and 55A of Table 6) - Records of discharge at this Station are complete for the period 1914 through 1945.

(m) Diversions and Return Flows at and below Imperial Dam - Records and estimates of diversions and return flows used in determining consumptive use of irrigation water in Arizona and California downstream from Imperial Dam, and in estimating the flow of the Colorado River within the Limitrophe Section at the International Boundary between the United States and Mexico are tabulated on sheets 56 through 71 of

and West Main Canals at the Arizona-Sonora boundary less the diversions for use in California by the Alamo Canal at Andrade, California.

The record tabulated for this synthetic or constructed station represents the measured contributions of the United States to the flow of the Colorado River between the California-Baja California and Arizona-Sonora boundaries. To obtain the historic flow for this station, these tabulated flows would need to be adjusted for unmeasured contributions and losses between Yuma and the California-Baja California boundary and along the Arizona boundary of the Limitrophe Section.

(o) Recent Records - Records for 1946, 1947, and 1948 as published by the Geological Survey where available for the several selected stations have been appended to the respective tables as subsequent records.

3. Drainage Areas Above Key Gaging Stations

Stream flow contributions from intermediate drainage areas are important factors in the hydrologic equations of stream sections. As the study included the determination of the stream flow contributions from the several states and Mexico in the Lower Colorado River Basin and records of stream flow are not generally available at state lines, it was necessary to estimate the stream flow contributions from ungaged drainage areas in solving the hydrologic equations at state lines as well as at key gaging stations. The estimates of runoff were made considering the size of the drainage area involved as well as other runoff factors. Drainage areas upstream from selected gaging stations, state lines, and other division points were

determined by careful measurement on the best available maps. The measurements were compared with published and unpublished data of the Geological Survey and checked the measurements of that agency at all points for which data were available.

Accompanying Table 2 was prepared to summarize the drainage areas upstream from gaging stations and other division points in the Lower Colorado River drainage system downstream from Lee Ferry to the Limitrophe Section of the International Boundary between the United States and Mexico. The measurements of the Geological Survey are listed for all points for which the data of that agency were available. Apparent discrepancies between the listed drainage areas and published data are the result of the practice of rounding figures that are published.

A summary of the estimated and recorded average 1914-1945 stream flow at selected gaging stations together with the drainage area tributary to each is given in accompanying Table 3. Estimates of stream flow contributions from ungaged drainage areas are discussed in the section of this report on analyses.

4. Depletions of Ground-Water Basins

Ground water is water stored in and transmitted through the porous materials below the land surface. The porosity of the material, which is the proportion of the total volume consisting of voids and interstices that can be occupied by water, determines the quantity of water that the formation can store. The permeability of the material determines how freely water can move through the formation, thus its availability. The upper surface of the zone of saturation is called the

Table 2

LOWER COLORADO RIVER BASIN

Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Little Colorado River at St. Johns, Arizona	1	897	-	-	44	-	-	941
Carrizo Wash at New Mexico-Arizona State line	2	-	-	-	1,815	-	-	1,815
Intermediate drainage area	3	322	-	-	66	-	-	388
Carrizo Wash at mouth (2/3)	4	322	-	-	1,881	-	-	2,203
Miscellaneous to balance	5	541	-	-	-	-	-	541
Little Colorado River above Zuni River near Hunt, Arizona (1/4/5)	6	1,760	-	-	1,925	-	-	3,685
Zuni River at Black Rock, New Mexico	7	-	-	-	692	-	-	692
Intermediate drainage area	8	-	-	-	383	-	-	383
Zuni River at N.Mex.-Ariz. State line (7/8)	9	-	-	-	1,075	-	-	1,075
Intermediate drainage area	10	685	-	-	817	-	-	1,502
Zuni River at mouth (9/10)	11	685	-	-	1,892	-	-	2,577
Miscellaneous to balance	12	19	-	-	-	-	-	19
Little Colorado River near Hunt,Ariz. (6/11/12)	13	2,464			3,817			6,281
Silver Creek near Woodruff, Arizona	14	942	-	-	-	-	-	942
Miscellaneous to balance	15	878	-	-	-	-	-	878
Little Colorado River near Woodruff, Arizona (13/14/15)	16	4,284	-	-	3,817	-	-	8,101
Puerco River at Gallup, New Mexico	17	-	-	-	558	-	-	558
Intermediate drainage area	18	-	-	-	525	-	-	525
Puerco River at New Mex.-Ariz. State Line (17/18)	19	-	-	-	1,083			1,083

Table 2 (Continued)
LOWER COLORADO RIVER BASIN
Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Puerco River at New Mex.-Ariz. State line	19	-	-	-	1,083	-	-	1,083
Miscellaneous to balance	20	134	-	-	146	-	-	280
Puerco River above confluence with Black Creek, near Houck, Arizona (19/20)	21	134	-	-	1,229	-	-	1,363
Black Creek at mouth	22	458	-	-	229	-	-	687
Miscellaneous to balance	23	707	-	-	-	-	-	707
Puerco River near Adamana, Ariz. (21/22/23)	24	1,299			1,458			2,757
Intermediate drainage area	25	350	-	-	-	-	-	350
Puerco River at mouth (24/25)	26	1,649	-	-	1,458	-	-	3,107
Chevelon Fork near Winslow, Arizona	27	1,008	-	-	-	-	-	1,008
Clear Creek near Winslow, Arizona	28	607	-	-	-	-	-	607
Miscellaneous to balance	29	8,355	-	-	-	-	-	8,355
Little Colorado River at Grand Falls, Arizona (16/26/27/28/29)	30	15,903	-	-	5,275	-	-	21,178
Moenkopi Wash near Tuba, Arizona	31	2,486	-	-	-	-	-	2,486
Miscellaneous to balance	32	2,804	-	-	-	-	-	2,804
Little Colorado River at Coconino dam site (30/31/32)	33	21,193	-	-	5,275	-	-	26,468
Intermediate drainage area	34	27	-	-	-	-	-	27
Little Colorado River near Cameron,Ariz.(33/34)	35	21,220	-	-	5,275	-	-	26,495
Intermediate drainage area	36	411	-	-	-	-	-	411
Little Colorado River at mouth (35/36)	37	21,631	-	-	5,275	-	-	26,906

Table 2 (Continued)
LOWER COLORADO RIVER BASIN
Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Colorado River at Lee Ferry, Arizona 1/	38	-	-	-	-	-	-	109,458
Intermediate drainage area	39	776	-	-	-	-	-	776
Colorado River at Marble Canyon Dam Site Mile 32.8 (38/39)	40	776	-	-	-	-	-	110,234
Intermediate drainage area	41	60	-	-	-	-	-	60
Colorado River at Marble Canyon Dam Site Mile 39.5 (40/41)	42	836	-	-	-	-	-	110,294
Little Colorado River at mouth	37	21,631	-	-	5,275	-	-	26,906
Miscellaneous to balance	43	572	-	-	-	-	-	572
Colorado River near Grand Canyon, Arizona (42/37/43)	44	23,039	-	-	5,275	-	-	137,772
Bright Angel Creek near Grand Canyon, Arizona	45	100	-	-	-	-	-	100
Kanab Creek at mouth	46	1,642	-	-	-	677	-	2,319
Miscellaneous to balance	47	5,595	-	-	-	-	-	5,595
Colorado River at Bridge Canyon Dam Site (44/45/46/47)	48	30,376	-	-	5,275	677	-	145,786
Virgin River at Virgin, Utah	49	-	-	-	-	934	-	934
Intermediate drainage area	50	1,898	-	253	-	2,007	-	4,158
Virgin River at Littlefield, Ariz. (49/50)	51	1,898	-	253	-	2,941	-	5,092
Muddy River near St. Thomas, Nevada	52	-	-	8,384	-	-	-	8,384
Miscellaneous to balance	53	185	-	1,055	-	41	-	1,281
Virgin River at mouth (51/52/53)	54	2,083	-	9,692	-	2,982	-	14,757

Table 2 (Continued) Sheet 4 of 7

LOWER COLORADO RIVER BASIN

Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Colorado River at Bridge Canyon dam site	48	30,376	-	-	5,275	677	-	145,786
Virgin River at mouth	54	2,083	-	9,692	-	2,982	-	14,757
Miscellaneous to balance	55	4,409	-	2,798	-	-	-	7,207
Colorado River below Hoover Dam, Ariz.-Nev. (48/54/55)	56	36,868	-	12,490	5,275	3,659	-	167,750
Intermediate drainage area	57	2,356	719	1,432	-	-	-	4,507
Colorado River near Topock, Arizona (56/57)	58	39,224	719	13,922	5,275	3,659	-	172,257
Bill Williams River at Planet, Arizona	59	5,144	-	-	-	-	-	5,144
Gila River near Red Rock, New Mexico	60	-	-	-	2,857	-	-	2,857
Intermediate drainage area	61	-	-	-	361	-	-	361
Gila River below Blue Creek, near Virden, New Mexico (60/61)	62	-	-	-	3,218	-	-	3,218
Intermediate drainage area	63	-	-	-	145	-	-	145
Gila River at New Mexico-Arizona State line (62/63)	64	-	-	-	3,363	-	-	3,363
Intermediate drainage area	65	526	-	-	148	-	-	674
Gila River near Clifton, Arizona (64/65)	66	526	-	-	3,511	-	-	4,037
San Francisco River near Glenwood, New Mexico	67	92	-	-	1,572	-	-	1,664
Intermediate drainage area	68	-	-	-	253	-	-	253
San Francisco River at New Mexico-Arizona State line (67/68)	69	92	-	-	1,825	-	-	1,917
Intermediate drainage area	70	818	-	-	54	-	-	872

Table 2 (Continued) Sheet 5 of 7

LOWER COLORADO RIVER BASIN

Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
San Francisco River at Clifton, Arizona	71	910	-	-	1,879	-	-	2,789
Intermediate drainage area	72	40	-	-	-	-	-	40
San Francisco River at mouth (71/72)	73	950	-	-	1,879	-	-	2,829
Gila River near Clifton, Arizona	66	526	-	-	3,511	-	-	4,037
Miscellaneous to balance	74	1,088	-	-	-	-	-	1,088
Gila River at head of Safford Valley, near Solomon, Arizona (73/66/74)	75	2,564	-	-	5,390	-	-	7,954
San Simon Creek at New Mex.-Ariz. State line	76	395	-	-	227	-	-	622
Intermediate drainage area	77	1,654	-	-	-	-	-	1,654
San Simon Creek near Solomon, Ariz. (76/77)	78	2,049	-	-	227	-	-	2,276
Miscellaneous to balance	79	1,262	-	-	-	-	-	1,262
Gila River at Calva, Arizona (75/78/79)	80	5,875	-	-	5,617	-	-	11,492
San Carlos River near Peridot, Arizona	81	1,038	-	-	-	-	-	1,038
Miscellaneous to balance	82	359	-	-	-	-	-	359
Gila River below Coolidge Dam, Ariz. (80/81/82)	83	7,272	-	-	5,617	-	-	12,889
San Pedro River at Palominas, Arizona	84	92	-	-	-	-	649	741
Intermediate drainage area	85	428	-	-	-	-	47	475
San Pedro River at Charleston, Ariz. (84/85)	86	520	-	-	-	-	696	1,216
Intermediate drainage area	87	2,391	-	-	-	-	-	2,391
San Pedro River near Mammoth, Arizona (86/87)	88	2,911	-	-	-	-	696	3,607
Aravaipa Creek near Feldman, Arizona	89	538	-	-	-	-	-	538
Miscellaneous to balance	90	340	-	-	-	-	-	340

Table 2 (Continued)
LOWER COLORADO RIVER BASIN
Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Gila River below Coolidge Dam, Arizona	83	7,272	-	-	5,617	-	-	12,889
San Pedro River at mouth	91	3,789	-	-	-	-	696	4,485
Miscellaneous to balance	92	657	-	-	-	-	-	657
Gila River at Kelvin, Arizona (83/91/92)	93	11,718	-	-	5,617	-	696	18,031
Santa Cruz River near Nogales, Arizona	94	185	-	-	-	-	357	542
Intermediate drainage area	95	1,604	-	-	-	-	46	1,650
Santa Cruz River at Tucson, Arizona (94/95)	96	1,789	-	-	-	-	403	2,192
Rillito Creek near Tucson, Arizona	97	916	-	-	-	-	-	916
Miscellaneous to balance	98	415	-	-	-	-	-	415
Santa Cruz River at Rillito, Ariz. (96/97/98)	99	3,120	-	-	-	-	403	3,523
Salt River near Roosevelt, Arizona	100	4,306	-	-	-	-	-	4,306
Tonto Creek near Roosevelt, Arizona	101	841	-	-	-	-	-	841
Verde River below Bartlett Dam, Arizona	102	6,159	-	-	-	-	-	6,159
Miscellaneous to balance	103	1,601	-	-	-	-	-	1,601
Salt River at Granite Reef Dam, Arizona (100/101/102/103)	104	12,907	-	-	-	-	-	12,907
Agua Fria River at Lake Pleasant Dam, Arizona	105	1,459	-	-	-	-	-	1,459
Miscellaneous to balance	106	13,706	-	-	-	-	-	13,706
Gila River below Gillespie Dam, Arizona (93/99/104/105/106)	107	42,910	-	-	5,617	-	1,099	49,626
Intermediate drainage area	108	8,410	-	-	-	-	48	8,458
Gila River near Dome, Arizona (107/108)	109	51,320						

Table 2 (Continued) Sheet 7 of 7

LOWER COLORADO RIVER BASIN

Summary of Drainage Areas by States and in Mexico in Square Miles

Gaging Station or Division Point	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Colorado River near Topock, Arizona	58	39,224	719	13,922	5,275	3,659	-	172,257
Bill Williams River at Planet, Arizona	59	5,144	-	-	-	-	-	5,144
Gila River near Dome, Arizona	109	51,320	-	-	5,617	-	1,147	58,084
Miscellaneous to balance	110	4,617	2,716	-	-	-	-	7,333
Colorado River at Yuma, Arizona (58/59/109/110)	111	100,305	3,435	13,922	10,892	3,659	1,147	242,818
Intermediate drainage area	112	1	164	-	-	-	-	165
Colorado River at California-Baja California International Boundary (111/112)	113	100,306	3,599	13,922	10,892	3,659	1,147	242,983

1/ The drainage area for Item 38, Colorado River at Lee Ferry, Arizona, (109,458) was computed as Colorado River at Lees Ferry (107,886) plus Paria River at Lees Ferry (1,568) plus 4 square miles as the drainage area downstream from the gaging stations at Lees Ferry to the Compact point. Total drainage areas for all points on main stream of the Colorado River include this drainage area of 109,458 square miles.

Table 3

LOWER COLORADO RIVER BASIN

Stream Flow and Drainage Areas at Selected Gaging Stations

October 1, 1913-September 30, 1945

Average annual flow in 1,000 acre-feet
Drainage areas in square miles

Stream flow stations in downstream order from Lee Ferry	Average historic flow	Drainage area
Colorado River at Lee Ferry, Arizona 1/	13,788.6	109,458
Little Colorado River at St. Johns, Arizona	6.6	941
Little Colorado River above Zuni River, near Hunt, Arizona	8.1	3,685
Zuni River at Black Rock, New Mexico	18.4	692
Little Colorado River near Hunt, Arizona	23.1	6,281
Silver Creek near Woodruff, Arizona	23.1	942
Little Colorado River near Woodruff, Arizona	58.1	8,101
Puerco River at Gallup, New Mexico	7.2	558
Puerco River near Adamana, Arizona	55.1	2,757
Chevelon Fork near Winslow, Arizona	45.3	1,008
Clear Creek near Winslow, Arizona	77.0	607
Little Colorado River at Grand Falls, Arizona	252.1	21,178
Moenkopi Wash near Tuba, Arizona	15.7	2,486
Colorado River near Grand Canyon, Arizona	14,204.1	137,772
Bright Angel Creek near Grand Canyon, Arizona	29.3	100
Virgin River at Virgin, Utah	160.2	934
Virgin River at Littlefield, Arizona	231.7	5,092
Colorado River below Hoover Dam, Arizona-Nevada	13,694.0	167,750
Colorado River near Topock, Arizona	13,332.3	172,257
Bill Williams River at Planet, Arizona	135.2	5,144
Gila River near Red Rock, New Mexico	153.5	2,857
Gila River below Blue Creek, near Virden, New Mex.	155.0	3,218
Gila River near Clifton, Arizona	160.6	4,037
San Francisco River near Glenwood, New Mexico	64.7	1,664
San Francisco River at Clifton, Arizona	161.4	2,789
Gila River at head of Safford Valley, near Solomon, Arizona	378.2	7,954

LOWER COLORADO RIVER BASIN
Stream Flow and Drainage Areas at Selected Gaging Stations
October 1, 1913-September 30, 1945

Average annual flow in 1,000 acre-feet
Drainage areas in square miles

Stream flow stations in downstream order from Lee Ferry	Average historic flow	Drainage area
San Simon Creek near Solomon, Arizona	12.4	2,27
Gila River at Calva, Arizona	303.0	11,49
San Carlos River near Peridot, Arizona	50.5	1,03
Gila River below Coolidge Dam, Arizona	331.4	12,88
San Pedro River at Palominas, Arizona	30.0	74
San Pedro River at Charleston, Arizona	54.6	1,21
San Pedro River near Mammoth, Arizona	61.0	3,60
Aravaipa Creek near Feldman, Arizona	23.0	53
Gila River at Kelvin, Arizona	434.9	18,03
Santa Cruz River near Nogales, Arizona	15.2	54
Santa Cruz River at Tucson, Arizona	16.1	2,19
Rillito Creek near Tucson, Arizona	16.8	91
Santa Cruz River at Rillito, Arizona	29.7	3,52
Salt River near Roosevelt, Arizona	706.5	4,30
Tonto Creek near Roosevelt, Arizona	107.9	84
Verde River below Bartlett Dam, Arizona 2/	522.4	6,15
Salt River at Granite Reef Dam, Arizona	1,331.8	12,90
Salt River below Granite Reef Dam, Arizona 3/	352.1	12,90
Agua Fria River at Lake Pleasant Dam, Arizona	128.3	1,45
Gila River at Gillespie Dam, Arizona 4/	712.4	49,62
Gila River below Gillespie Dam, Arizona	641.5	49,62
Gila River near Dome, Arizona	456.9	58,08
Colorado River at Yuma, Arizona	11,684.4	242,81
Colorado River within Limitrophe Section at International Boundary 5/	10,386.3	242,98

1/ Sum of Colorado River at Lees Ferry and Paria River at Lees Ferry.
2/ Combination of the published records for the gaging sites near McDowell, above Camp Creek, and below Bartlett Dam.
3/ Computed as flow of the Salt River at Granite Reef Dam, Arizona, less net diversions for irrigation at Granite Reef Dam.
4/ Computed as flow of the Gila River below Gillespie Dam, Arizona, plus diversions by Gillespie and Enterprise Canals at Gillespie Da
5/ Measured contributions from the United States as derived in Appendix Sheet 72A of Table 6.

ground-water table or ground-water level and is almost never a flat surface. The ground-water table is not static but rises and falls as water is added or taken from the zone of saturation.

In the hydrologic cycle, there is a close interrelationship between surface water and ground water. In some areas, ground water contributes to the flow of the streams, whereas, in other areas, the streams feed the ground water. For example: When water percolating through the soils and rock reaches an impermeable layer or the zone of saturation, it moves laterally under the force of gravity until it is stored in a confined area or emerges as springs or seeps where the water table intersects the land surface and contributes to the streams. On the other hand, in arid regions and in areas of heavy ground-water withdrawal by pumping, the streams contribute to the ground water. It is, therefore, evident that man-made developments may disturb the interrelationship of ground water and surface water in the hydrologic cycle as it existed under natural or virgin conditions. In this study of water supply of the Lower Colorado River Basin it was, therefore, necessary to determine the extent of the effect of changes in ground-water storage caused by man-made developments on the flow of streams at key gaging stations throughout the drainage area.

(a) General - Changes in ground-water storage usually effect changes in the surface flow of the streams in their drainage areas and, consequently, are important factors in the hydrologic equations of the various stream sections throughout the Lower Colorado River Basin. Increases in ground-water storage caused by man-made

developments represent depletions of stream flow, whereas, the consumptive use requirements of an area, which are supplied by depletions of ground-water storage, are not depletions of stream flow for the period of study. For example, irrigation water is usually applied to land in excess of the consumptive use requirements of the crops and incidental areas and a portion of the water percolates to the ground-water basin of the area. If the additional ground-water does not return to the stream but causes a rise in the natural ground-water level, the accretion to ground-water storage represents a depletion of the flow of the stream for the period of study. If the ground water is maintained at the natural level by pumping or drainage, the effect of ground-water storage on the flow of the stream remains the same as under natural or virgin conditions for the period of study. However, if the natural ground-water level is lowered by pumping or drainage the quantity withdrawn for the period of study represents an addition to the surface water supply of the area and may either increase the flow of the stream in that river section or supply a portion of the consumptive use requirements of the area. Ground-water reservoir depletions are withdrawals of ground water which had been stored under natural conditions prior to the period of study.

Some areas in the Lower Colorado River Basin obtain a portion or all of their water supply for irrigation and domestic and municipal uses by pumping from ground-water basins located within the natural drainage area of the Lower Colorado River. A study was made of ground-water data in all areas for the period, 1914 through 1945, and it was determined that depletions of ground-water storage were evident only in

four areas. These four areas are located in the Gila River drainage area. The effect of a semiperched ground-water table beneath the irrigated area of the Yuma Mesa in Arizona is discussed in a footnote to Table 12 in the section of this report on analyses. This area was the only area in which a general rise in the ground-water table was evident.

The average annual depletions of ground-water storage for the 32-year period, 1914 through 1945, were derived from the total change in storage estimated for each area for the period. Total change in ground-water storage was obtained by applying a coefficient for specific yield to the total 32-year change in volume of the water-bearing formation estimated for each area.

The ground-water tables for the years 1914 and 1945 in the various areas were determined from available well measurements obtained in the respective years. Ground-water contour maps prepared from data obtained in 1914 or indicative of 1914 conditions were available for about half of the total area involved in the study. In areas where irrigation and well development occurred subsequent to 1914, the natural ground-water level was determined from measurements taken when wells were drilled and the 1914 ground-water table was considered the same as the natural ground-water level.

Differences in the 1914 and 1945 elevations of the ground-water table at the points of measurement were plotted on maps of suitable scale and ground-water fluctuation contours were drawn. The areas enclosed by each contour were measured by planimeter and the computed average area between contours was multiplied by the contour interval to obtain the volume of change in the ground-water reservoir between

contours. The algebraic sum of the volumes between contours resulted in the total change in volume of the ground-water basin for the area.

The specific yield or coefficient of drainage of a water-bearing formation is the ratio of the volume of water the formation will yield by gravity to its own volume. After due consideration of available data, a specific yield coefficient of 15 percent was selected as a reasonable average coefficient for the water-bearing formations of the areas under study. However, a specific yield of 16 percent was applied in the Safford Valley study in accordance with the results of many tests made in Safford Valley and reported in Geological Survey Water-Supply Paper 1103.

The derivations of the estimates of average annual depletions of the ground-water basins are described in the following paragraphs.

(b) Safford Valley - This area of 120 square miles lies along the Gila River from the head of Safford Valley near Solomon, Arizona, to Calva, Arizona. Most of the development of ground water for irrigation in the area began after 1938.

A maximum decline of 9 feet in the water table was recorded for a small area and a maximum rise of 10 feet was shown in another small area. With some sections showing a decline and others a rise in the ground-water table, the average decline for the 1914 to 1945 period was only 0.02 feet. Ground-water was withdrawn from 1,280 acre-feet of aquifer during the period. Based on specific yield of 16 percent, the total depletion of ground water storage for the 32-year period was 200 acre-feet, which was an average of only 6 acre-feet a

year. Average flow in this stream section of the Gila River was not affected by changes in ground-water storage during the 1914-1945 period.

(c) Upper Santa Cruz River - This area of 626 square miles along the Santa Cruz River extends upstream from the Pima-Pinal County boundary through Pima and Santa Cruz Counties in Arizona to about nine miles north of the International Boundary between the United States and Mexico.

Irrigation by wells began in several areas along the Santa Cruz River prior to 1914. Well development has been more or less continuous since 1914 with spasmodic increases during periods economically favorable to agriculture. A marked decline in the general ground-water level of the area has been noted since increasingly heavier pumping began in 1941. In general, the fall in the ground-water level from 1914 to 1945 increases proceeding downstream with a maximum decline of 69 feet in the vicinity of Rillito, Arizona. Average decline for the entire area from 1914 to 1945 was 11.09 feet. Based on specific yield of 15 percent, the total depletion of ground-water storage for the area was 666,300 acre-feet for the 32-year period, 1914 through 1945, or an average annual depletion of 20,800 acre-feet.

(d) Pinal County and Maricopa County Upstream from Gillespie Dam - This area of 2,665 square miles is located in the Gila River Basin in central Arizona upstream from Gillespie Dam on the Gila River and downstream from Kelvin on the Gila River, Pima-Pinal County boundary on the Santa Cruz River, Granite Reef Dam on the Salt River, and Lake Pleasant Dam on the Agua Fria River. Ground-water data for

1914 was available for most of this area although most of the well development for irrigation has occurred since 1920. Wide fluctuations in the general ground-water level have occurred during the 1914-1945 period because of accretions to the ground-water reservoir from diversions of surface water to the irrigated lands and subsequent heavy pumping for drainage and irrigation. A maximum decline in the ground-water level of 98 feet for the period was recorded for a small area about four miles west of Marinette, Arizona. A decline in the water table of 40 feet occurred in an area about two miles west of Phoenix, 73 feet for an area in the vicinity of Higley, and 75 feet for an area about two miles south of Eloy. A maximum rise in the water table of 70 feet was recorded for a small area near the Arizona Canal west of Cambelback Mountain. There were rises in the water table of 18 feet near Buckeye, 20 feet a few miles west of Casa Grande, and 5 feet for an area a few miles south of Maricopa.

The area was divided into 11 districts to facilitate the study and an average decline in the ground-water table of 16.71 feet was determined for the entire area from 1914 to 1945. Based on specific yield of 15 percent, the total depletion of ground-water storage for the entire area was 4,274,700 acre-feet for the 32-year period, 1914 through 1945, or an average annual depletion of 133,600 acre-feet.

(e) Gillespie Dam to Dome - This area of 1,082 square miles lies along the Gila River in Maricopa and Yuma Counties between Gillespie Dam and Dome, Arizona. Most of the well development for irrigation in the area has occurred since 1920. There has been a

gradual downward trend of the ground-water table since heavier pumping began about 1925 with a maximum decline of 30 feet in an area in Mohawk Valley near Tyson, Arizona.

An average decline in the ground-water table of 6.73 feet was determined for the entire area for the 1914-1945 period. Based on specific yield of 15 percent, the total depletion of ground-water storage for the area was 699,300 acre-feet for the 32-year period or an average annual depletion of 21,900 acre-feet.

(f) Summary - Accompanying Table 4 has been prepared to summarize the depletions of ground-water basins in the Lower Colorado River Basin during the period, 1914 through 1945.

5. Water Using Areas Influenced by Man

It was necessary to determine the water using areas which man has influenced in order to provide data as a basis for estimating the effect of man-made developments in depleting the flow of the Colorado River downstream from Lee Ferry. The water using areas influenced by men were considered to be those areas on which the use of water has been changed by developments of man since pioneer settlement of the areas as distinguished from natural uses. The types of water using areas investigated in the study were as follows: irrigated areas, water consuming non-cropped areas, storage reservoirs, and river channel areas exposed to evaporation and transpiration losses. Areas which consumed water under natural conditions were not investigated unless they were influenced to some extent by the activities of man. Activities of man which have influenced channel losses include the use of water by man at upstream sites, transbasin diversions, changes in the regimen of the streams

caused by regulation and channelization, the replacement of native vegetation by crops and other beneficial uses, and changes in native vegetation caused by the introduction by man of plants or trees with different consumptive use rates.

Only those water using areas were investigated that are situated within the natural drainage area of the Colorado River downstream from Lee Ferry to the Limitrophe Section of the International Boundary between the United States and Mexico. Depletions of Colorado River stream flow by uses of Colorado River water in areas located outside of the drainage area of the Colorado River were considered to be the exports or total diversions of Colorado River water transported by the respective canals and aqueducts situated outside of the drainage area of the Colorado River.

(a) Irrigated Areas - Irrigated areas are those on which water other than natural precipitation, regardless of source, is applied by man to produce crops or prepare land for the production of crops. Most of the irrigated land in the Lower Colorado River Basin is located in the southern portion of the basin and the greater portion of this irrigated area is favored with a yearlong growing season. Because of the favorable climate, double cropping of the same land is a common practice in much of the irrigated area.

The areas of irrigated land within the drainage area of the Lower Colorado River were determined by careful analysis of the data on crops compiled from various sources for the several agricultural areas and fully described in the following section on cropped areas

as distinguished from irrigated areas. Irrigated land was considered as only that land on which irrigation water was actually applied for the production of crops or preparation of the land for the production of crops during each year investigated. The use of water by unirrigated idle land within agricultural areas was considered to be supplied by natural precipitation. The average area irrigated for the 1914-1945 period and the area irrigated in 1945 in each state within the natural drainage area of the Colorado River downstream from Lee Ferry to the Arizona-Sonora boundary and in Mexico within the drainage area of the Gila River were determined to be as follows:

Arizona	California	Nevada	New Mexico	Utah	Mexico	Total
Acres	Acres	Acres	Acres	Acres	Acres	Acres
			1914-1945 average			
522,565	39,392	8,605	14,999	18,677	3,988	608,226
			Year 1945			
690,749	49,814	9,404	16,313	24,017	3,974	794,271

This tabulation does not include farmsteads and other areas incidental to irrigation. Those areas are listed and described in a later section of this chapter of the report.

Any apparent discrepancies between the acreages listed in the foregoing tabulation and irrigated areas published in other reports of the Bureau of Reclamation and other agencies are problems of definition of the term "irrigated land" rather than matters of inconsistency.

Table 4
LOWER COLORADO RIVER BASIN
Depletions of Ground-Water Basins

Average annual depletion in acre-feet — October 1, 1913-September 30, 1945

Ground-water basin	Area in square miles	Volume dewatered in acre-feet	Average decline of water table in feet	Specific yield in percent	Total depletion in acre-feet	Average annual depletion in acre-feet
Safford Valley	120	1,280	0.02	16	200	6
Upper Santa Cruz River	626	4,442,000	11.09	15	666,300	20,800
Pinal County and Maricopa County upstream from Gillespie Dam						
Florence-Coolidge area	239	3,628,000	23.72	15	544,200	17,000
Sacaton area	170	660,000	6.07	15	99,000	3,100
Eloy area	356	5,466,000	23.99	15	819,900	25,600
Casa Grande area	229	1,056,000	7.21	15	158,400	4,950
Maricopa area	160	754,000	7.36	15	113,100	3,550
St. John Mission area	168	1,434,000	13.34	15	215,100	6,700
Magma area	48	279,000	9.08	15	41,800	1,300
Queen Creek area	190	3,442,000	28.31	15	516,300	16,150
Salt River area	660	6,621,000	15.67	15	993,100	31,050
Agua Fria River area	227	4,949,000	34.07	15	742,400	23,200
Buckeye area	218	209,000	1.50	15	31,400	1,000
Total	2,665	28,498,000	16.71	15	4,274,700	133,600
Gillespie Dam to Dome	1,082	4,662,000	6.73	15	699,300	21,900

(b) Cropped Areas - Cropped areas are the areas of the various crops cultivated in the irrigated areas. Areas on which irrigation water was applied to prepare the land for the production of crops by leaching or other soil building practices were considered cropped areas. The fact that water may have been applied to land from which no crops were harvested, because of factors other than shortages of water, was not used as a basis for reducing either the cropped acreage or the amount of water that acreage would use consumptively. In localities where double cropping was practiced, the cropped areas exceeded the irrigated areas by quantities equal to the acreages double cropped. In all other localities the cropped areas were the same as the irrigated areas.

Data on crops in the agricultural areas of the Lower Colorado River Basin were obtained from various sources. The crop reporting services of the county agriculture agents, Agricultural Adjustment Administration, Production and Marketing Administration, Soil Conservation Service, irrigation and agriculture departments of colleges and universities, state land and water commissioners, water users' associations, irrigation districts, and the Bureau of Reclamation were consulted to obtain acreages in crops. Data from those sources were supplemented by such additional data as could be found in published reports of Federal and state agencies, private reports when available, and by contacting individuals whose occupation and length of residence in the community placed them in a position to have reasonably authoritative information.

Except for areas supplied with water from Bureau of Reclamation projects or constructed with funds obtained through some other Federal agency, continuous long-term crop reports were not usually available. In many cases regular annual reports for a period of time could be supplemented with intermittent reports and the missing years estimated on the basis of the changes indicated in the available reports, of agricultural practices in the area and adjoining or similar areas, and of general agricultural economic conditions. In a few cases crop and acreage data were meager and spotty. These areas are almost entirely in the mountainous regions where natural meadows have been converted to irrigated land. Such data as could be obtained from local sources were supplemented with data obtained from census reports and other reliable sources. It is recognized that the crop data, thus obtained, is subject to error. However, because the areas are small, some comprising as little as 10 acres, and these areas are generally at elevations where precipitation is high and growing season short, the effect of the error on the water use is negligible on the tribuatary stream and was considered to be nil on the flow of the main stream of the Colorado River.

Data on crops in the portion of Mexico situated within the drainage area of the Gila River were furnished by the International Boundary and Water Commission.

Accompanying Table 5 has been prepared to summarize the average acreage of the various crops cultivated during the 1914-1945 period in each state within the natural drainage area of the Colorado River downstream from Lee Ferry to the Arizona-Sonora boundary and in Mexico within the drainage area of the Gila River. Crop acreages for 1945 are listed in accompanying Table 6.

Table 5
LOWER COLORADO RIVER BASIN
Acreages of Crops Within the Natural Drainage Area of the Lower Colorado River Basin

Average area in acres — October 1, 1913-September 30, 1945

Crops	Arizona	California 1/	Nevada	New Mexico	Utah	Mexico 2/	Total
Alfalfa	131,380	13,065	2,781	4,531	8,231	1,509	161,497
Alfalfa and grain	34,718						34,718
Beans	3,140	14	2	312		398	3,866
Carrots	1,077	72					1,149
Citrus	12,112	48					12,160
Corn	12,584	503	576	2,497	1,609	512	18,281
Cotton	155,882	18,377		544			174,803
Dates	287	38					325
Deciduous fruits	2,737	25	77	140	1,963	153	5,095
Flax	3,075	892					3,967
Grapes	506	83					589
Lettuce - fall	8,063	85					8,148
Lettuce - spring	10,752	85		16			10,853
Melons	9,768	409	8	23			10,208
Misc. hay & pasture	70,126	1,634	2,280	1,006	1,578		76,624
Miscellaneous truck	4,806	800	781	306	772	235	7,700
Nurseries & flowers	53	1					54
Nuts	1,276	53					1,329
Olives	108						108
Potatoes - sweet	547	3					550
Potatoes - white	1,039		64	182	301	655	2,241
Rice	87						87
Small grains	79,722	2,616	2,042	4,400	4,024	526	93,330
Soil building crops	2,199	146					2,345
Sorghums	34,521	1,437	172	1,093	392		37,615
Sugar beet seed	1,572	1	1	41	275		1,890
Tomatoes	115	3					118
Total	582,252	40,390	8,784	15,091	19,145	3,988	669,650

1/ Does not include Imperial and Coachella Valleys in Salton Sea drainage area.

Table 6

LOWER COLORADO RIVER BASIN

Acreage of Crops Within the Natural Drainage Area of the Lower Colorado River Basin in 1945

Crops	Arizona	California 1/	Nevada	New Mexico 2/	Utah	Mexico	Total
Alfalfa	193,539	28,253	3,758	4,310	12,200	1,496	243,556
Alfalfa and grain	55,375						55,375
Beans	2,983	2		241		398	3,624
Carrots	8,255	265					8,520
Citrus	20,642	126					20,768
Corn	9,133	676	1,956	2,760	1,410	524	16,459
Cotton	166,131	1,012		635			167,778
Dates	662	83					745
Deciduous fruits	1,473		45	148	2,135	153	3,954
Flax	13,919	7,038					20,957
Grapes	301		1				302
Lettuce - fall	24,486	1,142					25,628
Lettuce - spring	19,858						19,858
Melons	18,907	3,605		45			22,557
Misc. Hay & Pasture	107,435	3,781	1,563	1,401	1,200		115,380
Miscellaneous Truck	13,898	337	785	510	825	237	16,592
Nurseries & Flowers	108						108
Nuts	1,166	18					1,184
Olives	90						90
Potatoes - sweet	864						864
Potatoes - white	3,893		163	215	260	654	5,185
Rice	162						162
Small grains	114,673	3,776	1,009	4,416	5,120	512	129,506
Soil building crops	4,690	113					4,803
Sorghums	51,432	1,760	300	1,735			55,227
Sugar Beet Seed	3,925				1,500		5,425
Tomatoes	444	18					462
Total	838,444	52,005	9,580	16,416	24,650	3,974	945,069

1/ Does not include Imperial and Coachella Valleys in the Salton Sea drainage area.

2/ Portion of Mexico in the Gila River drainage area.

(c) Water Consuming Noncropped Areas - Water consuming noncropped areas for cities, towns, and areas incidental to irrigation and irrigated farming.

(1) Cities and Towns - Phoenix is the largest city situated within the natural drainage area of the Colorado River. Acreage and population data available for the City of Phoenix for the period, 1880 to 1950, were used to provide the basis for estimating the average area of other cities in the Lower Colorado River Basin for the 1914-1945 period. The data for Phoenix were supplemented by area-population relationships determined for a few small towns with population between 150 and 2,500 to define the correlation curve for estimating the acreages of the small towns and villages.

Acreages within the incorporated area of the City of Phoenix were obtained from city maps and recorded plats for 11 separate periods between 1880 and 1950. Population data for Phoenix obtained for the 8 decennial censuses (1880 to 1950) were then used to determine the area-population relationship during the 1880-1950 period. An area-population relationship curve was derived by combining the correlation for Phoenix with the supplemental correlation, and the average acreage of other cities and towns for 1914 to 1945 were computed from acreages determined from the curve by application of population data recorded in the censuses for the several cities and towns. Where census data were not available for villages but were recorded as precincts, estimates of town population were made and an average acreage estimated as a summation of all the small villages within the drainage area of each stream section.

(2) Incidental Areas - Incidental areas were considered to be water consuming noncropped areas adjacent to or forming a part of the farms and those areas which consume water as a result of the practice of irrigation. These areas include farmsteads, canals, laterals, drains, waste ditches, roads, and railroads, which are within the irrigation development areas and outside the areas of cities and towns.

A study of aerial photographs for over 60,000 acres of irrigated farm land in the vicinity of Phoenix determined the total incidental area to be 6.79 percent of the irrigated area. The study area comprised 98 sections scattered throughout the Salt River Valley area and selected as representative of average conditions of the irrigation development area. To provide for differences in the consumptive use rates by the various types of incidental areas, four classes of incidental areas were established as follows: (1) farmsteads, 1.75 percent; (2) water surfaces of canals, laterals, drains, and waste ditches, 0.49 percent; (3) areas of vegetation within rights-of-way for canals, laterals, drains, waste ditches, roads, and railroads, 2.77 percent; and (4) surfaces of roads and roadbeds of railroads, 1.78 percent. These percentages were applied to estimate the incidental areas in the various agricultural areas. In those areas where there were no railroads, percentages of 2.54 and 1.77 were applied in estimating the respective areas of vegetation within rights-of-way and the surfaces of roadbeds.

(3) Summary - Accompanying Table 7 has been prepared to summarize the average acreage of the water consuming noncropped areas within the natural drainage area of the Lower Colorado River Basin.

Table 7
LOWER COLORADO RIVER BASIN
Acreage of Water Consuming Noncropped Areas

Average area in acres — October 1, 1913-September 30, 1945

Location	Water consuming noncropped areas					
		Incidental areas				
	Cities and towns	Farmsteads	Water surfaces of canals, laterals, drains, and waste ditches	Areas of vegetation within rights-of-way for canals, laterals, drains, waste ditches, roads & railroads	Surfaces of roads and roadbeds of railroads	Total
Arizona	34,583	9,062	2,547	14,293	9,214	69,699
California 1/	1,535	689	192	1,092	701	4,209
Nevada	1,608	150	42	226	152	2,178
New Mexico	2,891	264	74	381	266	3,876
Utah	2,795	327	91	474	331	4,018
Mexico 2/	750	70	20	110	71	1,021
Total	44,162	10,562	2,966	16,576	10,735	85,001

1/ Includes only that portion of California within the natural drainage area of the Colorado River.
2/ Includes only that portion of Mexico within the drainage area of the Gila River.

(d) Channel Areas - The major causes of losses in stream channels are evaporation from the exposed water surfaces and wetted channel areas, and the consumptive use of water by vegetation in the flood plains of the streams. As the activities of man have caused changes in these areas of evaporation and vegetative use, it was necessary to determine the acreages of channel areas influenced by man in the drainage area of the Lower Colorado River Basin. With the exception of the headwaters upstream from any man-made developments, all channel areas of the Colorado River and its tributaries downstream from Lee Ferry to the Limitrophe Section of the International Boundary were measured and estimated from the available aerial photographs, plan and profile maps of the Lower Colorado River drainage system, and other maps where necessary. Channel areas and the determination of channel losses for the 1914-1945 period and for virgin conditions are fully discussed in the section of this report on analyses.

(e) Reservoir Depletions - Reservoirs formed by man-made developments effect changes in the use of water in the areas inundated and the increased losses constitute depletions of stream flow by man. Prior to the formation of reservoirs, there were river channel losses and other natural consumptive uses in the areas inundated. These water uses by evaporation and transpiration were supplied by portions of precipitation, ground water, and surface runoff within the reservoir area. When reservoirs were formed, the water uses under natural conditions were replaced by reservoir evaporation and constitute salvage deductible from the gross reservoir evaporation losses in determining depletions of stream flow by reservoirs.

All man-made reservoirs and stock tanks or ponds in the Lower Colorado River Basin were investigated for the 1914-1945 period and average annual depletions are summarized on accompanying Table 8.

Changes in reservoir storage effect changes in stream flow. Accretions of storage constitute depletions of stream flow and withdrawals from storage increase the flow of the stream. The evaluation of the effect of surface storage in reservoirs of the Lower Colorado River Basin during the 1914-1945 period is discussed in detail in the section of this report on analyses.

The operation of reservoirs effects changes in ground-water storage in the vicinity of the reservoirs and the resultant accretions to ground-water storage for the period of investigation constitute depletions of stream flow. The determination of reservoir bank storage for the 1914-1945 period in the Lower Colorado River Basin is discussed in detail in the section of this report on analyses.

(f) Transbasin Diversions - Diversions of water from the drainage area of a stream or basin to the drainage area of another stream or basin are transbasin diversions. If the streams involved are not of the same drainage system, there is no return flow to the system and diversions at the points of export are considered depletions of stream flow at the respective points. When the streams involved are tributaries of the same drainage system, the export diversions are depletions of the flow of the stream of runoff origin at the export point and the water transferred is an import to the other tributary for rerouting within the over-all stream system of the basin.

Table 8

LOWER COLORADO RIVER BASIN

Stream Depletions Resulting From Changes in Evaporation and Transpiration Within Reservoir Areas Following Development

Average annual depletion in 1,000 ac-ft — Oct. 1, 1913-Sept. 30, 1945

Stream section or reservoir	Location	Average annual depletion
LITTLE COLORADO RIVER		
Little Colorado River upstream from St.Johns,Ariz.	Arizona	3.3
St. Johns to gage above Zuni River near Hunt,Ariz.	Arizona	1.6
Zuni River upstream from Black Rock, New Mexico	New Mexico	4.1
Zuni River from Black Rock to New Mex.-Ariz.State line	New Mexico	.1
Silver Creek	Arizona	.8
Woodruff gage to Grand Falls, Arizona	Arizona	3.4
VIRGIN RIVER		
Virgin River upstream from Littlefield, Arizona	Utah	1.6
MAIN STREAM OF COLORADO RIVER		
Grand Canyon to Hoover Dam:		
Small reservoirs in Hualpai Indian Reservation	Arizona	.2
Lake Mead - Hoover Dam	Ariz.-Nevada	242.2
Topock to Yuma:		
Havasu Lake - Parker Dam	Ariz.-Calif.	12.9
Headgate Rock Diversion Reservoir	Ariz.-Calif.	.1
Imperial Diversion Reservoir	Ariz.-Calif.	2.8
Laguna Diversion Reservoir	Ariz.-Calif.	20.4
GILA RIVER		
San Francisco River upstream from Glenwood, New Mex.	New Mexico	.1
Small reservoirs from head of Safford Valley to Calva	Arizona	.2
San Carlos Reservoir - Coolidge Dam	Arizona	12.2
Picacho Reservoir in Pinal County	Arizona	8.3
Salt River:		
Upper Salt River small reservoirs	Arizona	.6
Roosevelt Lake - Roosevelt Dam	Arizona	21.4
Apache Lake - Horse Mesa Dam	Arizona	3.5
Canyon Lake - Mormon Flat Dam	Arizona	1.3
Sahuaro Lake - Stewart Mountain Dam	Arizona	.8
Verde River:		
Upper Verde River small reservoirs	Arizona	1.3
Bartlett Reservoir - Bartlett Dam	Arizona	.6
Lake Pleasant on Agua Fria River	Arizona	2.9
TOTAL		346.7

Table 16

LOWER COLORADO RIVER BASIN

Stream Flow Contributions From Drainage Areas Between Selected Division Points

Average stream flow in 1,000 acre-feet — October 1, 1913-September 30, 1945

River section	State	Measured inflow	Measured outflow plus losses	Unmeasured contribution	Area in square miles	Acre-feet a square mile
Little Colorado River upstream from St. Johns, Arizona as measured at the gage	Ariz.	-	24.8	-	897	27.6
	New Mex.	-	1.8	-	44	40.3
	Total	-	26.6	-	941	28.3
Little Colorado River between St. Johns and gage above Zuni River near Hunt	Ariz.			4.1	541	7.6
	Ariz.			1.8	322	5.5
	New Mex.			3.8	685	5.5
	New Mex.			.4	300	1.4
	New Mex.			0	830	0
	New Mex.			.4	66	5.5
	Total	6.6	17.1	10.5	2,744	3.8
Zuni River between Black Rock, New Mex. and New Mex.-Ariz. State line	New Mex.			2.1	383	5.5
	Total	(estimated) 18.4	20.5	2.1	383	5.5
Zuni River between New Mexico-Arizona State line and mouth of Zuni River	Ariz.			3.8	685	5.5
	New Mex.			3.3	610	5.5
	New Mex.			.3	207	1.4
	Total	(estimated) 12.7	20.1	7.4	1,502	4.9
Little Colorado River between gage above Zuni River and gage (below Zuni River) near Hunt, excluding Zuni R.	Ariz.			.1	19	5.5
	Total	23.4	23.5	.1	19	5.5
Little Colorado River between gage near Hunt & gage near Woodruff	Ariz.			16.3	878	18.6
	Total	46.2	62.5	16.3	878	18.6
Puerco River between Gallup, New Mex. and New Mex.-Ariz. State line	New Mex.			6.5	525	12.3
	Total	(estimated) 7.2	13.7	6.5	525	12.3
Puerco River between New Mexico-Arizona State line and gage near Adamana, Arizona	Ariz.			1.6	134	12.3
	Ariz.			22.3	458	48.8
	Ariz.			6.6	707	9.3
	New Mex.			1.8	146	12.3
	New Mex.			11.2	229	48.8
	Total	13.5	57.0	43.5	1,674	26.0

Table 16 (Continued)
LOWER COLORADO RIVER BASIN
Stream Flow Contributions From Drainage Areas Between Selected Division Points

Average stream flow in 1,000 acre-feet — October 1, 1913-September 30, 1945

River section	State	Measured inflow	Measured outflow plus losses	Unmeasured contribution	Area in square miles	Acre-feet a square mile
Puerco River between gage near Adamana and mouth of Puerco River	Ariz.			3.3	350	9.3
	Total	55.1	58.4	3.3	350	9.3
Little Colorado River between gage near Woodruff and gage at Grand Falls, Arizona, excluding Puerco River	Ariz.			78.7	8,355	9.4
	Total	236.9	315.6	78.7	8,355	9.4
Little Colorado River between gage at Grand Falls and mouth	Ariz.			22.1	3,242	6.8
	Ariz.			131.3	springs	-
	Total (estimated)	267.8	421.2	153.4	3,242	47.3
Colorado River between Lee Ferry and gage near Grand Canyon excluding Little Colorado River	Ariz.			23.0	1,408	16.3
	Total	14,202.0	14,225.0	23.0	1,408	16.3
Virgin River upstream from Littlefield, Arizona as measured at the gage	Ariz.	-	45.9	-	1,898	24.2
	Nev.	-	6.1	-	253	24.2
	Utah	-	48.6	-	2,007	24.2
	Utah	-	166.2	-	934	177.9
	Total	-	266.8	-	5,092	52.4
Colorado River between gage near Grand Canyon and gage below Hoover Dam	Ariz.			355.8	11,831	30.1
	Nev.			135.4	8,076	16.8
	Nev.			0	4,161	0
	Utah			16.4	677	24.2
	Utah			.7	41	16.8
	Total	14,465.1	14,973.4	508.3	24,786	20.5
Colorado River between gage below Hoover Dam and gage near Topock	Ariz.			13.4	2,356	5.7
	Calif.			4.1	719	5.7
	Nev.			8.1	1,432	5.7
	Total	13,694.0	13,719.6	25.6	4,507	5.7

Table 16 (Continued)

LOWER COLORADO RIVER BASIN

Stream Flow Contributions From Drainage Areas Between Selected Division Points

Average stream flow in 1,000 acre-feet — October 1, 1913-September 30, 1945

River section	State	Measured inflow	Measured outflow plus losses	Unmeasured contribution	Area in square miles	Acre-feet a square mile
Gila River between gage near Virden, N.Mex. and New Mex.-Ariz. State Line	New Mex.			4.9	145	33.6
	Total (estimated)	155.0	159.9	4.9	145	33.6
Gila River between New Mexico-Arizona State line and gage near Clifton, Arizona	Ariz.			17.7	526	33.6
	New Mex.			4.9	148	33.6
	Total	152.3	174.9	22.6	674	33.6
San Francisco River upstream from Glenwood, New Mexico as measured at the gage	Ariz.	-	3.7	-	92	40.3
	New Mex.	-	63.4	-	1,572	40.3
	Total	-	67.1	-	1,664	40.3
San Francisco River between gage near Glenwood and New Mex.-Ariz. State line	New Mex.			10.2	253	40.3
	Total (estimated)	64.7	74.9	10.2	253	40.3
San Francisco River between New Mex.-Arizona State line and gage at Clifton, Arizona	Ariz.			87.8	818	107.3
	New Mex.			5.8	54	107.3
	Total	74.3	167.9	93.6	872	107.3
Gila River between gage near Clifton and gage at head of Safford Valley	Ariz.			62.9	1,128	55.8
	Total	322.2	385.1	62.9	1,128	55.8
San Simon Creek upstream from New Mexico-Arizona State line as estimated at the State line	Ariz.	-	2.2	-	395	5.6
	New Mex.	-	1.3	-	227	5.6
	Total (estimated)	-	3.5	-	622	5.6
San Simon Creek between New Mexico-Arizona State line and gage near Solomon	Ariz.			11.5	1,654	7.0
	Total	3.4	14.9	11.5	1,654	7.0
Gila River between gage at head of Safford Valley and gage at Calva, Ariz.	Ariz.			20.3	1,262	16.1
	Total	390.6	410.9	20.3	1,262	16.1
Gila River between gage at Calva and gage below Coolidge Dam, Ariz.	Ariz.			13.7	359	38.2
	Total	353.5	367.2	13.7	359	38.2
San Pedro River upstream from Palominas, Arizona, as measured at the gage	Ariz.	-	3.9	-	92	42.0
	Mex.	-	27.2	-	649	42.0
	Total	-	31.1	-	741	42.0

Table 16 (Continued)
LOWER COLORADO RIVER BASIN
Stream Flow Contributions From Drainage Areas Between Selected Division Points

Average stream flow in 1,000 acre-feet — October 1, 1913-September 30, 1945

River section	State	Measured inflow	Measured outflow plus losses	Unmeasured contribution	Area in square miles	Acre-feet a square mile
San Pedro River between Palominas and gage at Charleston, Arizona	Ariz.			32.6	428	76.2
	Mex.			3.6	47	76.2
	Total	30.0	66.2	36.2	475	76.2
San Pedro River between Charleston and gage near Mammoth, Ariz.	Ariz.			62.3	2,391	26.1
	Total	54.6	116.9	62.3	2,391	26.1
Gila River between Coolidge Dam and gage at Kelvin, Ariz. including flow of Aravaipa Creek	Ariz.			75.2	1,535	49.0
	Total	392.4	476.6	75.2	1,535	49.0
Santa Cruz River upstream from gage near Nogales, Ariz., as measured at the gage	Ariz.	-	7.2	-	185	39.1
	Mex.	-	14.0	-	357	39.1
	Total	-	21.2	-	542	39.1
Santa Cruz River between gage near Nogales and gage at Rillito, Ariz., including flow of Rillito Creek	Ariz.			83.2	2,935	28.3
	Mex.			1.8	46	39.1
	Total	15.2	100.2	85.0	2,981	28.5
Salt River between gage near Roosevelt and gage at Granite Reef Dam	Ariz.			100.2	1,601 1/	70.0
	Total	1,336.8	1,437.0	100.2	1,601 1/	70.0
Gila River between gage at Kelvin and gage below Gillespie Dam, Ariz.	Ariz.			94.7	13,706	6.9
	Total	1,934.9	2,029.6	94.7	13,706	6.9
Gila River between gage below Gillespie Dam and gage near Dome, Arizona	Ariz.			29.7	8,410	3.5
	Mex.			.2	48	3.5
	Total	712.4	742.3	29.9	8,458	3.5
Colorado River between gage near Topock and Limitrophe Section at International Boundary	Ariz.			19.4	4,618	4.2
	Calif.			12.1	2,880	4.2
	Total	13,924.4	13,955.9	31.5	7,498	4.2

1/ The average annual unmeasured contribution of 100,200 acre-feet a year from this section was based on an average annual rate of 70.0 acre-feet a square mile from 1,140 square miles tributary to the Salt River and Tonto Creek for the full 32-year period plus 440 square miles of Verde River drainage area for 17 years (1925 through 1941) and 461 square miles of Verde River drainage area for 4 years (1942

The detailed analysis of historic contributions by states together with explanatory notes for each item in the routing is given in Table 22 at the end of this section of the report. Accompanying Table 17 summarizes the average annual historic flows at state lines for the 1914-1945 period.

The channel losses on water conveyed out of the states to the Limitrophe Section at the International Boundary were prorated among the contributors on the basis of the proportionate part of the total water transported through the downstream channel sections.

3. Virgin Contributions

The 1914-1945 average annual virgin stream flow contributions at selected gages, state lines, and downstream points to the International Boundary were computed by adding the upstream man-made stream depletions to the historic contributions at the gages in the headwaters of the tributaries of the Lower Colorado River and routing the resultant undepleted stream flows downstream together with the incremental unmeasured inflows between points.

Historic and virgin channel losses from water surface evaporation and river bottom growth in the several river sections are itemized in Table 14 together with the salvages and increased losses under historic conditions as compared with virgin conditions.

Salvaged channel losses from water surface evaporation in stream sections were prorated among the contributors on the basis of the respective undepleted volumes conveyed in the sections.

Table 17
LOWER COLORADO RIVER BASIN
Average Annual Historic Contributions at State Lines
for 1914-1945 Period

	1,000 Acre-feet
ARIZONA	
Little Colorado River at mouth	381.0
Bright Angel Creek near Grand Canyon	29.3
Virgin River at Littlefield	45.3
Bill Williams River at Planet	135.2
Gila River near Dome	372.8
Ungaged area tributary to Colorado River	207.3
Subtotal	1,170.9
Less Arizona share of main stem channel losses within State	111.4
Net contribution at State line	1,059.5
CALIFORNIA	
Stream depletions by California in area tributary to the Colorado River exceed contributions by 2,557,000 acre-feet a year	
Net contribution at State line	0
NEVADA	
Virgin River at Littlefield	6.1
Ungaged area tributary to Colorado River	114.4
Subtotal	120.5
Less Nevada share of main stem channel losses within State	4.3
Net contribution at State line	116.2
NEW MEXICO	
Zuni River at Black Rock	18.4
Puerco River at Gallup	7.2
Gila River below Blue Creek, near Virden	155.0
San Francisco River near Glenwood	61.0
Ungaged area tributary to Little Colorado River	27.3
Ungaged area tributary to Gila River	22.4
Subtotal	291.3
Less channel losses within State downstream from gaging stations	7.2
Net contribution at State line	284.1
UTAH	
Virgin River at Littlefield	180.3
Ungaged area tributary to Colorado River	9.8
Net contribution at State line	190.1
MEXICO	
San Pedro River at Palominas, Arizona	26.1
Area tributary to San Pedro River downstream from Palominas	3.6
Santa Cruz River near Nogales, Arizona	8.6
Area tributary to Santa Cruz River downstream from Nogales	1.8
Area tributary to Gila River between Gillespie Dam and Dome	.2
Net inflow to the United States from Mexico	40.3
UNDISTRIBUTED	
Historic contribution of Colorado River at Lee Ferry	13,788.6
Sum of contributions at State lines	15,478.8

Salvages of channel losses caused by the replacement of native vegetation by crops and other beneficial uses were credited to the state in which the replacement occurred.

The decreased or increased channel losses caused by native growth changes in the river bottoms and the flood plains were credited or charged to the state in which the change occurred. If these changes in channel losses were in sections on the Colorado River between two states, the increased or decreased losses were apportioned equally between the two states.

Thus, the virgin channel losses apportioned to a state were the apportioned historic channel losses plus salvaged channel losses from water surface evaporation, plus salvaged channel losses from replacement of native vegetation, plus or minus the changes in losses because of native growth changes in the channels.

The detailed analysis of virgin contributions by states together with explanatory notes for each item in the routing is given in Table 23 at the end of this section of the report.

Accompanying Table 18 summarizes the average annual virgin flows at state lines in the Lower Colorado River Basin for the 1914-1945 period.

4. Summary

The 1914-1945 average annual water contributions by the states and Mexico in the Lower Colorado River Basin for historic and virgin flow conditions are summarized in accompanying Table 19.

The 1914-1945 average annual man-made stream depletions by states and Mexico at selected gaging stations and division points in the Lower Colorado River Basin are listed in accompanying Table 20.

Table 18
LOWER COLORADO RIVER BASIN
Average Annual Virgin Contributions at State Lines
Based on 1914-1945 Period

	1,000 acre-feet
ARIZONA	
Little Colorado River at mouth	431.5
Bright Angel Creek near Grand Canyon	29.3
Virgin River at Littlefield	45.9
Bill Williams River at Planet	139.0
Gila River near Dome	1,310.2
Ungaged area tributary to Colorado River	411.6
Subtotal	2,367.5
Less Arizona share of main stem channel losses within State	191.5
Net virgin contribution at State line	2,176.0
CALIFORNIA	
Ungaged area tributary to Colorado River	16.2
Less California share of channel losses within State	.1
Net virgin contribution at State line	16.1
NEVADA	
Virgin River at Littlefield, Arizona	6.1
Ungaged area tributary to Colorado River	143.5
Subtotal	149.6
Less Nevada share of main stem channel losses within State	17.8
Net virgin contribution at State line	131.8
NEW MEXICO	
Zuni River at Black Rock	23.5
Puerco River at Gallup	8.6
Gila River below Blue Creek, near Virden	157.3
San Francisco River near Glenwood	63.4
Ungaged area tributary to Little Colorado River	31.6
Ungaged area tributary to Gila River	27.1
Subtotal	311.5
Less channel losses within State downstream from gaging stations	14.4
Net virgin contribution at State line	297.1
UTAH	
Virgin River at Littlefield, Arizona	214.8
Ungaged area tributary to Colorado River	17.1
Net virgin contribution at State line	231.9
MEXICO	
San Pedro River at Palominas, Arizona	27.2
Area tributary to San Pedro River downstream from Palominas	3.6
Santa Cruz River near Nogales, Arizona	14.0
Area tributary to Santa Cruz River downstream from Nogales	1.8
Area tributary to Gila River between Gillespie Dam and Dome	.2
Net virgin inflow to the United States from Mexico	46.8
UNDISTRIBUTED	
Virgin contribution of Colorado River at Lee Ferry	15,638.5
Sum of virgin contributions at State lines	18,538.2

Table 19
LOWER COLORADO RIVER BASIN
Average Annual Water Contributions by States and Mexico

Based on 1914-1945 period — Unit: 1,000 Acre-feet

	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
HISTORIC CONTRIBUTIONS								
Historic contributions at state lines	1,059.5	0	116.2	284.1	190.1	40.3	1/ 13,788.6	15,478.8
Out of state channel losses	0	0	8.2	184.1	19.9	33.2	2/ 4,888.9	5,134.3
Historic contributions at International Boundary	1,059.5	0	108.0	100.0	170.2	7.1	8,899.7	10,344.5
Percent	10.24	0	1.04	0.97	1.65	0.07	86.03	100.00
VIRGIN CONTRIBUTIONS								
Virgin contributions at state lines	2,176.0	16.1	131.8	297.1	231.9	46.8	3/ 15,638.5	18,538.2
Out of state channel losses	0	0	8.9	187.2	21.5	34.4	1,313.6	1,565.6
Virgin contributions at International Boundary	2,176.0	16.1	122.9	109.9	210.4	12.4	14,324.9	16,972.6
Percent	12.82	0.10	0.72	0.65	1.24	0.07	84.40	100.00

1/ Historic contribution by Upper Basin at Lee Ferry.
2/ Includes channel losses of 1,156,800 acre-feet; main stream reservoir depletions of 1,175,100 acre-feet; and stream depletions by California of 2,557,000 acre-feet in excess of California contributions.
3/ Virgin contribution by Upper Basin at Lee Ferry.

Table 20

LOWER COLORADO RIVER BASIN

Man-Made Stream Depletions at Selected Gaging Stations and Division Points

Average annual depletions in 1,000 acre-feet — October 1, 1913-September 30, 1945

Gaging station or division point	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
Colorado River at Lee Ferry (depletion by Upper Basin)	0	0	0	0	0	0	0	1,849.9
Little Colorado River above Zuni River, near Hunt, Arizona	23.0	0	0	0	0	0	0	23.0
Zuni River at New Mex.-Ariz. State line	0	0	0	5.1	0	0	0	5.1
Little Colorado River near Hunt, Ariz.	23.0	0	0	5.1	0	0	0	28.1
Little Colorado River near Woodruff, Ariz.	32.5	0	0	5.1	0	0	0	37.6
Puerco River at New Mex.-Ariz. State line	0	0	0	1.4	0	0	0	1.4
Little Colorado River at Grand Falls, Ariz.	49.3	0	0	6.5	0	0	0	55.8
Little Colorado River at mouth	50.5	0	0	6.5	0	0	0	57.0
Colorado River near Grand Canyon, Ariz.	50.5	0	0	6.5	0	0	1,849.7	1,906.7
Virgin River at Littlefield, Arizona	.6	0	0	0	34.5	0	0	35.1
Colorado River below Hoover Dam,Ariz.-Nev.	57.2	0	14.2	6.5	41.8	0	2,962.8	3,082.5
Colorado River near Topock, Arizona	70.3	13.3	15.6	6.4	41.5	0	2,943.0	3,090.1
Bill Williams River at Planet, Arizona	3.8	0	0	0	0	0	0	3.8
Gila River at New Mex.-Ariz. State line	0	0	0	4.1	0	0	0	4.1
San Francisco River at New Mex.-Ariz. State line	0	0	0	2.4	0	0	0	2.4
Gila River at head of Safford Valley, near Solomon, Arizona	14.5	0	0	6.5	0	0	0	21.0
Gila River at Calva, Arizona	73.0	0	0	6.5	0	0	0	79.5
San Pedro River at Palominas, Arizona	0	0	0	0	0	1.1	0	1.1
Gila River at Kelvin, Arizona	104.3	0	0	6.5	0	1.1	0	111.9
Santa Cruz River near Nogales, Arizona	.6	0	0	0	0	5.4	0	6.0
Santa Cruz River at Rillito, Arizona	10.0	0	0	0	0	4.5	0	14.5
Salt River at Granite Reef Dam, Ariz.	92.0	0	0	0	0	0	0	92.0
Gila River at Gillespie Dam, Ariz.	1,069.7	0	0	5.2	0	5.5	0	1,080.4
Gila River near Dome, Arizona	937.4	0	0	4.0	0	5.3	0	946.7
Colorado River within Limitrophe Section at International Boundary	1,116.5	2,524.0	14.9	9.9	40.2	5.3	2,917.3	6,628.1

The 1914-1945 average annual virgin stream flows at selected gaging stations and division points in the Lower Colorado River Basin together with the undepleted runoff rates a square mile are listed in accompanying Table 21.

The detailed analysis of water contributions by states based on mean historic runoff for the 1914-1945 period is given in accompanying Table 22. The table is followed by notes discussing each item in the routing study.

The water contributions by states based on mean virgin runoff for the 1914-1945 period are analyzed in detail in accompanying Table 23. Each item in the virgin flow routing study is discussed in notes following the table.

Table 21

LOWER COLORADO RIVER BASIN

Undepleted Stream Flow at Selected Gaging Stations and Division Points

Average annual stream flow in 1,000 acre-feet based on 1914-1945 period.
Drainage areas in square miles and runoff rate in acre-feet a square mile.

Stream flow stations or division points in downstream order from Lee Ferry	Average virgin flow	Drainage area	Undepleted runoff rate
Colorado River at Lee Ferry, Arizona 1/	15,638.5	109,458	142.9
Little Colorado River at St. Johns, Ariz.	26.6	941	28.3
Little Colorado River above Zuni River, near Hunt, Arizona	31.1	3,685	8.4
Zuni River at Black Rock, New Mexico	23.5	692	34.0
Zuni River at New Mex.-Ariz. State line	17.8	1,075	16.6
Zuni River at mouth	20.4	2,577	7.9
Little Colorado River near Hunt, Arizona	51.2	6,281	8.2
Silver Creek near Woodruff, Arizona	31.6	942	33.5
Little Colorado River near Woodruff, Ariz.	95.7	8,101	11.8
Puerco River at Gallup, New Mexico	8.6	558	15.4
Puerco River at New Mex.-Ariz. State line	14.9	1,083	13.8
Puerco River near Adamana, Arizona	57.1	2,757	20.7
Puerco River at mouth	58.5	3,107	18.8
Little Colorado River at Grand Falls, Ariz.	307.9	21,178	14.5
Moenkopi Wash near Tuba, Arizona	17.0	2,486	6.8
Little Colorado River at mouth	470.4	26,906	17.5
Colorado River near Grand Canyon, Arizona	16,110.8	137,772	116.9
Bright Angel Creek near Grand Canyon, Ariz.	29.3	100	293.0
Virgin River at Littlefield, Arizona	266.8	5,092	52.4
Colorado River below Hoover Dam; Ariz.-Nev.	16,776.5	167,750	100.0
Colorado River near Topock, Arizona	16,422.4	172,257	95.3
Bill Williams River at Planet, Arizona	139.0	5,144	27.0
Gila River below Blue Creek, near Virden, New Mexico	157.3	3,218	48.9
Gila River at New Mex.-Ariz. State line	156.4	3,363	46.5
Gila River near Clifton, Arizona	169.0	4,037	41.9
San Francisco River near Glenwood, New Mex.	67.1	1,664	40.3
San Francisco River at New Mex.-Ariz.State line	76.7	1,917	40.0
San Francisco River at Clifton, Arizona	168.8	2,789	60.5

Table 21 (Continued)
LOWER COLORADO RIVER BASIN
Undepleted Stream Flow at Selected Gaging Stations and Division Points

Average annual stream flow in 1,000 acre-feet based on 1914-1945 period.
Drainage areas in square miles and runoff rate in acre-feet a square mile.

Stream flow stations or division points in downstream order from Lee Ferry	Average virgin flow	Drainage area	Undepleted runoff rate
Gila River at head of Safford Valley near Solomon, Arizona	399.2	7,954	50.2
San Simon Creek at New Mex.-Ariz.State line	3.5	622	5.6
San Simon Creek near Solomon, Arizona	14.4	2,276	6.3
Gila River at Calva, Arizona	382.5	11,492	33.3
San Carlos River near Peridot, Arizona	51.4	1,038	49.5
Gila River below Coolidge Dam, Arizona	425.8	12,889	33.0
San Pedro River at Palominas, Arizona	31.1	741	42.0
San Pedro River at Charleston, Arizona	55.6	1,216	45.7
San Pedro River near Mammoth, Arizona	73.6	3,607	20.4
Gila River at Kelvin, Arizona	546.8	18,031	30.3
Santa Cruz River near Nogales, Arizona	21.2	542	39.1
Santa Cruz River at Rillito, Arizona	44.2	3,523	12.5
Salt River near Roosevelt, Arizona	710.3	4,306	165.0
Tonto Creek near Roosevelt, Arizona	108.4	841	128.9
Verde River below Bartlett Dam, Ariz. 2/	544.3	6,159	88.4
Salt River at Granite Reef Dam, Arizona	1,423.8	12,907	110.3
Agua Fria River at Lake Pleasant Dam, Ariz.	129.5	1,459	88.8
Gila River at Gillespie Dam, Ariz.	1,792.8	49,626	36.1
Gila River near Dome, Arizona	1,403.6	58,084	24.2
Colorado River within Limitrophe Section at International Boundary	16,972.6	242,983	69.9

1/ Flow from "Final Report, Engineering Advisory Committee to Upper Colorado River Basin Compact Commission", November 29, 1948.

2/ The runoff data listed for this station are based on the combination of the published records for the gaging sites near McDowell, above Camp Creek, and below Bartlett Dam under the assumption that the records at the several sites are comparable.

Table 22 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Historic Runoff
For the 1914-1945 Period

Unit: 1,000 Acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM GAGE NEAR VIRDEN, NEW MEXICO, TO NEW MEXICO-ARIZONA STATE LINE									
Gila River below Blue Creek, near Virden	77	0	0	0	155.0	0	0	0	155.0
Estimated inflow, Virden to State line	78	0	0	0	4.9	0	0	0	4.9
Consumptive use, Virden to State line	79	0	0	0	4.7	0	0	0	4.7
Volumes conveyed, Virden to State line	80	0	0	0	155.2	0	0	0	155.2
Channel losses, Virden to State line	81	0	0	0	$ 2.9	0	0	0	2.9
Gila River at New Mex.-Ariz. State line	82	0	0	0	152.3	0	0	0	152.3
GILA RIVER FROM NEW MEXICO-ARIZONA STATE LINE TO GAGE NEAR CLIFTON, ARIZONA									
Estimated inflow, State line to Clifton	83	17.7	0	0	4.9	0	0	0	22.6
Consumptive use, State line to Clifton	84	9.0	0	0	0	0	0	0	9.0
Volumes conveyed, State line to Clifton	85	8.7	0	0	157.2	0	0	0	165.9
Channel losses, State line to Clifton	86	$ .3	0	0	¢ 5.0	0	0	0	5.3
Gila River near Clifton, Arizona	87	8.4	0	0	152.2	0	0	0	160.6
SAN FRANCISCO RIVER FROM GAGE NEAR GLENWOOD, NEW MEXICO, TO NEW MEXICO-ARIZONA STATE LINE									
San Francisco River near Glenwood	88	3.7	0	0	61.0	0	0	0	64.7
Estimated inflow, Glenwood to State line	89	0	0	0	10.2	0	0	0	10.2
Volumes conveyed, Glenwood to State line	90	3.7	0	0	71.2	0	0	0	74.9
Channel losses, Glenwood to State line	91	0	0	0	$ .6	0	0	0	.6
San Francisco River at State line	92	3.7	0	0	70.6	0	0	0	74.3
SAN FRANCISCO RIVER FROM NEW MEXICO-ARIZONA STATE LINE TO GAGE AT CLIFTON, ARIZONA									
Estimated inflow, State line to Clifton	93	87.8	0	0	5.8	0	0	0	93.6
Consumptive uses, State line to Clifton	94	5.3	0	0	0	0	0	0	5.3
Volumes conveyed, State line to Clifton	95	86.2	0	0	76.4	0	0	0	162.6
Channel losses, State line to Clifton	96	$ .6	0	0	¢ .6	0	0	0	1.2

Table 22 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Historic Runoff
For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM GAGE NEAR CLIFTON, ARIZONA, TO HEAD OF SAFFORD VALLEY, ARIZONA									
Imported water from Black River	98	.2	0	0	0	0	0	0	.2
Estimated inflow, Clifton to Safford Valley	99	62.9	0	0	0	0	0	0	62.9
Consumptive use, Clifton to Safford Valley	100	5.9	0	0	0	0	0	0	5.9
Volumes conveyed, Clifton to Safford Valley	101	151.2	0	0	228.0	0	0	0	379.2
Channel losses, Clifton to Safford Valley	102	$ .4	0	0	¢ .6	0	0	0	1.0
Gila River at head of Safford Valley, Ariz.	103	150.8	0	0	227.4	0	0	0	378.2
SAN SIMON CREEK FROM NEW MEXICO-ARIZONA STATE LINE TO GAGE NEAR SOLOMON, ARIZONA									
San Simon Creek at New Mex.-Ariz. State line	104	2.1	0	0	1.3	0	0	0	3.4
Estimated inflow, State line to Solomon	105	11.5	0	0	0	0	0	0	11.5
Consumptive use, State line to Solomon	106	1.9	0	0	0	0	0	0	1.9
Volumes conveyed, State line to Solomon	107	11.7	0	0	1.3	0	0	0	13.0
Channel losses, State line to Solomon	108	$ .5	0	0	¢ .1	0	0	0	.6
San Simon Creek near Solomon, Arizona	109	11.2	0	0	1.2	0	0	0	12.4
GILA RIVER FROM HEAD OF SAFFORD VALLEY TO GAGE AT CALVA, ARIZONA									
Estimated inflow, head of valley to Calva	110	20.3	0	0	0	0	0	0	20.3
Reservoir evaporation depletion	111	.2	0	0	0	0	0	0	.2
Consumptive use, head of valley to Calva	112	61.8	0	0	0	0	0	0	61.8
Volumes conveyed, head of valley to Calva	113	120.3	0	0	228.6	0	0	0	348.9
Channel losses, head of valley to Calva	114	$15.8	0	0	¢30.1	0	0	0	45.9
Gila River at Calva, Arizona	115	104.5	0	0	198.5	0	0	0	303.0

Table 22 (Continued) Sheet 7 of 11

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Historic Runoff

For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM CALVA TO GAGE BELOW COOLIDGE DAM, ARIZONA									
San Carlos River near Peridot, Arizona	116	50.5	0	0	0	0	0	0	50.5
Estimated inflow, Calva to Coolidge Dam	117	13.7	0	0	0	0	0	0	13.7
Consumptive use, Calva to Coolidge Dam	118	.4	0	0	0	0	0	0	.4
San Carlos Reservoir evaporation depletion	119	12.2	0	0	0	0	0	0	12.2
Accretion of surface storage in San Carlos Reservoir	120	1.7	0	0	0	0	0	0	1.7
Volumes conveyed, Calva to Coolidge Dam	121	154.4	0	0	198.5	0	0	0	352.9
Channel losses, Calva to Coolidge Dam	122	$ 9.4	0	0	¢12.1	0	0	0	21.5
Gila River below Coolidge Dam, Arizona	123	145.0	0	0	186.4	0	0	0	331.4
SAN PEDRO RIVER FROM GAGE AT PALOMINAS, ARIZONA, TO GAGE AT CHARLESTON, ARIZONA									
San Pedro River at Palominas, Arizona	124	3.9	0	0	0	0	26.1	0	30.0
Estimated inflow, Palominas to Charleston	125	32.6	0	0	0	0	3.6	0	36.2
Consumptive use, Palominas to Charleston	126	.8	0	0	0	0	0	0	.8
Volumes conveyed, Palominas to Charleston	127	35.7	0	0	0	0	29.7	0	65.4
Channel losses, Palominas to Charleston	128	$5.9	0	0	0	0	¢4.9	0	10.8
San Pedro River at Charleston, Arizona	129	29.8	0	0	0	0	24.8	0	54.6
SAN PEDRO RIVER FROM CHARLESTON TO GAGE NEAR MAMMOTH, ARIZONA									
Estimated inflow, Charleston to Mammoth	130	62.3	0	0	0	0	0	0	62.3
Consumptive use, Charleston to Mammoth	131	10.3	0	0	0	0	0	0	10.3
Volumes conveyed, Charleston to Mammoth	132	81.8	0	0	0	0	24.8	0	106.6
Channel losses, Charleston to Mammoth	133	$35.0	0	0	0	0	¢10.6	0	45.6
San Pedro River near Mammoth, Arizona	134	46.8	0	0	0	0	14.2	0	61.0

Routing of mean runoff

Table 22 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Historic Runoff
For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM COOLIDGE DAM TO GAGE AT KELVIN, ARIZONA									
Estimated inflow, Coolidge Dam to Kelvin	135	75.2	0	0	0	0	0	0	75.2
Consumptive use, Coolidge Dam to Kelvin	136	10.5	0	0	0	0	0	0	10.5
Volumes conveyed, Coolidge Dam to Kelvin	137	256.5	0	0	186.4	0	14.2	0	457.1
Channel losses, Coolidge Dam to Kelvin	138	$15.2	0	0	¢ 5.2	0	¢ 1.8	0	22.2
Gila River at Kelvin, Arizona	139	241.3	0	0	181.2	0	12.4	0	434.9
SANTA CRUZ RIVER FROM GAGE NEAR NOGALES, ARIZONA, TO GAGE AT RILLITO, ARIZONA									
Santa Cruz River near Nogales, Arizona	140	6.6	0	0	0	0	8.6	0	15.2
Water obtained from average depletion of ground-water basin in Santa Cruz and Pima Counties	141	20.8	0	0	0	0	0	0	20.8
Estimated inflow, Nogales to Rillito	142	83.2	0	0	0	0	1.8	0	85.0
Consumptive use, Nogales to Rillito	143	66.6	0	0	0	0	0	0	66.6
Volumes conveyed, Nogales to Rillito	144	44.0	0	0	0	0	10.4	0	54.4
Channel losses, Nogales to Rillito	145	$20.0	0	0	0	0	¢ 4.7	0	24.7
Santa Cruz River at Rillito, Arizona	146	24.0	0	0	0	0	5.7	0	29.7
SALT RIVER FROM ABOVE ROOSEVELT RESERVOIR TO GRANITE REEF DAM, ARIZONA									
Salt River near Roosevelt, Arizona	147	706.5	0	0	0	0	0	0	706.5
Tonto Creek near Roosevelt, Arizona	148	107.9	0	0	0	0	0	0	107.9
Verde River below Bartlett Dam, Arizona	149	522.4	0	0	0	0	0	0	522.4
Estimated inflow to Granite Reef Dam	150	100.2	0	0	0	0	0	0	100.2
Consumptive use, Roosevelt to Granite Reef	151	.3	0	0	0	0	0	0	.3
Export diversions for City of Phoenix	152	10.2	0	0	0	0	0	0	10.2
Reservoir evaporation depletions from Salt River Reservoir system	153	27.0	0	0	0	0	0	0	27.0

Routing of Mean Historic Runoff

Table 22 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Historic Runoff
For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
SALT RIVER FROM ABOVE ROOSEVELT RESERVOIR TO GRANITE REEF DAM, ARIZONA (Continued)									
Accretions of surface storage in Salt River Reservoir system	154	24.6	0	0	0	0	0	0	24.6
Bank storage in Salt River Reservoir system	155	3.6	0	0	0	0	0	0	3.6
Volumes conveyed to Granite Reef Dam	156	1,371.3	0	0	0	0	0	0	1,371.3
Channel losses to Granite Reef Dam	157	$ 39.5	0	0	0	0	0	0	39.5
Salt River at Granite Reef Dam, Arizona	158	1,331.8	0	0	0	0	0	0	1,331.8
GILA RIVER FROM GAGE AT KELVIN TO GILLESPIE DAM, ARIZONA									
Agua Fria River at Lake Pleasant Dam	159	128.3	0	0	0	0	0	0	128.3
Import diversions for City of Phoenix	152	10.2	0	0	0	0	0	0	10.2
Water obtained from average depletion of ground-water basin in this stream section	160	133.6	0	0	0	0	0	0	133.6
Estimated inflow to Gillespie Dam	161	94.7	0	0	0	0	0	0	94.7
Lake Pleasant evaporation depletion	162	2.9	0	0	0	0	0	0	2.9
Accretion of surface storage in Lake Pleasant	163	.4	0	0	0	0	0	0	.4
Picacho Reservoir evaporation depletion	164	8.3	0	0	0	0	0	0	8.3
Consumptive use in this stream section	165	1,071.2	0	0	0	0	0	0	1,071.2
Volumes conveyed to Gillespie Dam	166	881.1	0	0	181.2	0	18.1	0	1,080.4
Channel losses to Gillespie Dam	167	$300.1	0	0	¢ 61.7	0	¢ 6.2	0	368.0
Gila River at Gillespie Dam, Arizona	168	581.0	0	0	119.5	0	11.9	0	712.4
Diversions by Gillespie Canal	169	63.2	0	0	0	0	0	0	63.2
Diversions by Enterprise Canal	170	7.7	0	0	0	0	0	0	7.7
Gila River below Gillespie Dam, Arizona	171	510.1	0	0	119.5	0	11.9	0	641.5

Table 22 (Continued) Sheet 10 of 11

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Historic Runoff

For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM GILLESPIE DAM TO GAGE NEAR DOME, ARIZONA									
Water obtained from average depletion of ground-water basin in this stream section	172	21.9	0	0	0	0	0	0	21.9
Estimated inflow, Gillespie Dam to Dome	173	29.7	0	0	0	0	.2	0	29.9
Consumptive use, Gillespie Dam to Dome	174	49.4	0	0	0	0	0	0	49.4
Volumes conveyed, Gillespie Dam to Dome	175	583.2	0	0	119.5	0	12.1	0	714.8
Channel losses, Gillespie Dam to Dome	176	$210.4	0	0	¢43.1	0	¢4.4	0	257.9
Gila River near Dome, Arizona	177	372.8	0	0	76.4	0	7.7	0	456.9
COLORADO RIVER FROM GAGE NEAR TOPOCK TO LIMITROPHE SECTION AT INTERNATIONAL BOUNDARY									
Bill Williams River at Planet, Arizona	178	135.2	0	0	0	0	0	0	135.2
Estimated inflow, Topock to Limitrophe Section	179	19.4	12.1	0	0	0	0	0	31.5
Consumptive use, Topock to Limitrophe Section	180	196.0	139.2	0	0	0	0	0	335.2
Transbasin export diversions	181	0	2,432.0	0	0	0	0	0	2,432.0
Reservoir evaporation depletions	182	0	0	0	0	0	0	36.2	36.2
Accretion of surface storage in Havasu Lake	183	0	0	0	0	0	0	21.0	21.0
Bank storage in Havasu Lake	184	0	0	0	0	0	0	2.6	2.6
Volumes conveyed, Topock to Limitrophe Section	185	1,139.8	0	116.2	107.6	183.1	7.7	9,574.5	11,128.9
Channel losses, Topock to Limitrophe Section	186	$ 80.3	0	¢ 8.2	¢ 7.6	¢12.9	¢.6	¢ 674.8	784.4
Historic flow, Colorado River within Limitrophe Section at International Boundary	187	1,059.5	0	108.0	100.0	170.2	7.1	8,899.7	10,344.5

Table 22 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Historic Runoff
For the 1914-1945 Period

Unit: 1,000 acre-feet

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
Sum of measured contributions from the United States within the Limitrophe Section	188	-	-	-	-	-	-	-	10,386.3
Estimated inflow, Yuma to Limitrophe Section	189	-	-	-	-	-	-	-	.7
Volumes conveyed to Limitrophe Section	190	-	-	-	-	-	-	-	10,387.0
Channel losses, Yuma to Limitrophe Section	191	-	-	-	-	-	-	-	42.5
Historic flow, Colorado River within Limitrophe Section at International Boundary	192	-	-	-	-	-	-	-	10,344.5

$. Losses within state.
¢. Losses out of state.

Table 23 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet
Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
COLORADO RIVER FROM GAGE NEAR GRAND CANYON TO GAGE BELOW HOOVER DAM (Continued)									
Replacement of native vegetation	(77)	1.2	0	15.5	0	0	0	0	16.7
Increased losses from native growth change	(78)	.5	0	.9	0	0	0	0	1.4
Undepleted Colorado River below Hoover Dam	(79)	876.9	0	125.9	38.6	230.2	0	15,504.9	16,776.5
COLORADO RIVER FROM GAGE BELOW HOOVER DAM TO GAGE NEAR TOPOCK, ARIZONA									
Estimated inflow, Hoover Dam to Topock	72	13.4	4.1	8.1	0	0	0	0	25.6
Undepleted volumes conveyed to Topock	(80)	890.3	4.1	134.0	38.6	230.2	0	15,504.9	16,802.1
Historic channel losses	75	23.3	0	3.3	.9	5.3	0	350.8	383.6
Virgin channel losses	(81)	$11.6	0	$ 2.2	¢1.0	¢5.6	0	¢359.3	379.7
Salvage of channel evaporation	(82)	1.1	0	.2	.1	.3	0	19.8	21.5
Replacement of native vegetation	(83)	0	0	.2	0	0	0	0	.2
Increased losses from native growth change	(84)	12.8	11.3	1.5	0	0	0	0	25.6
Undepleted Colorado River near Topock	(85)	878.7	4.1	131.8	37.6	224.6	0	15,145.6	16,422.4
GILA RIVER FROM HEADWATERS IN NEW MEXICO TO NEW MEXICO-ARIZONA STATE LINE									
Consumptive use upstream from Virden	(86)	0	0	0	11.2	0	0	0	11.2
Less replacement of native vegetation	(87)	0	0	0	8.9	0	0	0	8.9
Net depletions upstream from Virden	(88)	0	0	0	2.3	0	0	0	2.3
Gila River below Blue Creek, near Virden	77	0	0	0	155.0	0	0	0	155.0
Undepleted Gila River near Virden	(89)	0	0	0	157.3	0	0	0	157.3
Estimated inflow, Virden to State line	78	0	0	0	4.9	0	0	0	4.9
Undepleted volumes conveyed to State line	(90)	0	0	0	162.2	0	0	0	162.2
Historic channel losses	81	0	0	0	2.9	0	0	0	2.9
Virgin channel losses	(91)	0	0	0	$ 5.8	0	0	0	5.8
Replacement of native vegetation	(92)	0	0	0	2.9	0	0	0	2.9
Undepleted Gila River at New Mex.-Ariz. State line	(93)	0	0	0	156.4	0	0	0	156.4

Table 23 (Continued) Sheet 7 of 14

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet

Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM NEW MEXICO-ARIZONA STATE LINE TO GAGE NEAR CLIFTON, ARIZONA									
Estimated inflow, State line to Clifton	83	17.7	0	0	4.9	0	0	0	22.6
Undepleted volumes conveyed to Clifton	(94)	17.7	0	0	161.3	0	0	0	179.0
Historic channel losses	86	.3	0	0	5.0	0	0	0	5.3
Virgin channel losses	(95)	$ 5.0	0	0	¢ 5.0	0	0	0	10.0
Replacement of native vegetation	(96)	4.3	0	0	0	0	0	0	4.3
Decreased losses from native growth change	(97)	.4	0	0	0	0	0	0	.4
Undepleted Gila River near Clifton	(98)	12.7	0	0	156.3	0	0	0	169.0
SAN FRANCISCO RIVER FROM HEADWATERS TO NEW MEXICO-ARIZONA STATE LINE									
Consumptive use above Glenwood, New Mexico	(99)	0	0	0	4.5	0	0	0	4.5
Reservoir evaporation depletion above Glenwood	(100)	0	0	0	.1	0	0	0	.1
Less replacement of native vegetation	(101)	0	0	0	2.2	0	0	0	2.2
Net depletions upstream from Glenwood	(102)	0	0	0	2.4	0	0	0	2.4
San Francisco River near Glenwood, New Mex.	88	3.7	0	0	61.0	0	0	0	64.7
Undepleted San Francisco River near Glenwood	(103)	3.7	0	0	63.4	0	0	0	67.1
Estimated inflow, Glenwood to State line	89	0	0	0	10.2	0	0	0	10.2
Undepleted volumes conveyed to State line	(104)	3.7	0	0	73.6	0	0	0	77.3
Virgin channel losses	(105)	0	0	0	$ .6	0	0	0	.6
Undepleted San Francisco River at New Mexico-Arizona State line	(106)	3.7	0	0	73.0	0	0	0	76.7

¢ Accruing on mean virgin runoff

Table 23 (Continued) Sheet 8 of 14

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet

Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
SAN FRANCISCO RIVER FROM NEW MEXICO-ARIZONA STATE LINE TO GAGE AT CLIFTON, ARIZONA									
Estimated inflow, State line to Clifton	93	87.8	0	0	5.8	0	0	0	93.6
Undepleted volumes conveyed to Clifton	(107)	91.5	0	0	78.8	0	0	0	170.3
Historic channel losses	96	.6	0	0	.6	0	0	0	1.2
Virgin channel losses	(108)	$ .9	0	0	¢ .6	0	0	0	1.5
Replacement of native vegetation	(109)	.3	0	0	0	0	0	0	.3
Undepleted San Francisco River at Clifton	(110)	90.6	0	0	78.2	0	0	0	168.8
GILA RIVER FROM GAGE NEAR CLIFTON, ARIZONA, TO HEAD OF SAFFORD VALLEY, ARIZONA									
Estimated inflow, Clifton to Safford Valley	99	62.9	0	0	0	0	0	0	62.9
Undepleted volumes conveyed, Clifton to head of Safford Valley	(111)	166.2	0	0	234.5	0	0	0	400.7
Historic channel losses	102	0.4	0	0	0.6	0	0	0	1.0
Virgin channel losses	(112)	$ .9	0	0	¢ .6	0	0	0	1.5
Replacement of native vegetation	(113)	.5	0	0	0	0	0	0	.5
Undepleted Gila River at head of Safford Valley, Arizona	(114)	165.3	0	0	233.9	0	0	0	399.2
SAN SIMON CREEK FROM HEADWATERS IN ARIZONA THROUGH NEW MEXICO TO GAGE NEAR SOLOMON, ARIZONA									
Consumptive use upstream from State line	(115)	.1	0	0	0	0	0	0	.1
San Simon Creek at N.Mex.-Ariz.State line	104	2.1	0	0	1.3	0	0	0	3.4
Undepleted San Simon Creek at State line	(116)	2.2	0	0	1.3	0	0	0	3.5
Estimated inflow, State line to Solomon	105	11.5	0	0	0	0	0	0	11.5
Undepleted volumes conveyed to Solomon	(117)	13.7	0	0	1.3	0	0	0	15.0
Virgin channel losses	(118)	$ .5	0	0	¢ .1	0	0	0	.6
Undepleted San Simon Creek near Solomon	(119)	13.2	0	0	1.0	0	0	0	14.4

Table 23 (Continued) Sheet 9 of 14

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet

Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM HEAD OF SAFFORD VALLEY TO GAGE AT CALVA, ARIZONA									
Estimated inflow, head of valley to Calva	110	20.3	0	0	0	0	0	0	20.3
Undepleted volumes conveyed to Calva	(120)	198.8	0	0	235.1	0	0	0	433.9
Historic channel losses	114	15.8	0	0	30.1	0	0	0	45.9
Virgin channel losses	(121)	$21.3	0	0	¢ 30.1	0	0	0	51.4
Replacement of native vegetation	(122)	3.3	0	0	0	0	0	0	3.3
Decreased losses from native growth change	(123)	2.2	0	0	0	0	0	0	2.2
Undepleted Gila River at Calva, Arizona	(124)	177.5	0	0	205.0	0	0	0	382.5
GILA RIVER FROM CALVA TO GAGE BELOW COOLIDGE DAM, ARIZONA									
Consumptive use on San Carlos River upstream from Peridot	(125)	0.9	0	0	0	0	0	0	0.9
San Carlos River near Peridot, Arizona	116	50.5	0	0	0	0	0	0	50.5
Undepleted San Carlos River near Peridot	(126)	51.4	0	0	0	0	0	0	51.4
Estimated inflow, Calva to Coolidge Dam	117	13.7	0	0	0	0	0	0	13.7
Undepleted volumes conveyed to dam	(127)	242.6	0	0	205.0	0	0	0	447.6
Historic channel losses	122	9.4	0	0	12.1	0	0	0	21.5
Virgin channel losses	(128)	$ 9.7	0	0	¢ 12.1	0	0	0	21.8
Replacement of native vegetation	(129)	.3	0	0	0	0	0	0	.3
Undepleted Gila River below Coolidge Dam	(130)	232.9	0	0	192.9	0	0	0	425.8

Table 23 (Continued) Sheet 10 of 14

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet

Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
SAN PEDRO RIVER FROM HEADWATERS IN MEXICO TO GAGE AT CHARLESTON, ARIZONA									
Consumptive use above Palominas, Arizona	(131)	0	0	0	0	0	1.4	0	1.4
Less replacement of native vegetation	(132)	0	0	0	0	0	.3	0	.3
Net depletions upstream from Palominas	(133)	0	0	0	0	0	1.1	0	1.1
San Pedro River at Palominas, Arizona	124	3.9	0	0	0	0	26.1	0	30.0
Undepleted San Pedro River at Palominas	(134)	3.9	0	0	0	0	27.2	0	31.1
Estimated inflow, Palominas to Charleston	125	32.6	0	0	0	0	3.6	0	36.2
Undepleted volumes conveyed to Charleston	(135)	36.5	0	0	0	0	30.8	0	67.3
Historic channel losses	128	5.9	0	0	0	0	4.9	0	10.8
Virgin channel losses	(136)	$ 6.8	0	0	0	0	¢ 4.9	0	11.7
Replacement of native vegetation	(137)	.6	0	0	0	0	0	0	.6
Decreased losses from native growth change	(138)	.3	0	0	0	0	0	0	.3
Undepleted San Pedro River at Charleston	(139)	29.7	0	0	0	0	25.9	0	55.6
SAN PEDRO RIVER FROM CHARLESTON TO GAGE NEAR MAMMOTH, ARIZONA									
Estimated inflow, Charleston to Mammoth	130	62.3	0	0	0	0	0	0	62.3
Undepleted volumes conveyed to Mammoth	(140)	92.0	0	0	0	0	25.9	0	117.9
Historic channel losses	133	35.0	0	0	0	0	10.6	0	45.6
Virgin channel losses	(141)	$33.7	0	0	0	0	¢10.6	0	44.3
Replacement of native vegetation	(142)	4.6	0	0	0	0	0	0	4.6
Increased losses from native growth change	(143)	5.9	0	0	0	0	0	0	5.9
Undepleted San Pedro River near Mammoth	(144)	58.3	0	0	0	0	15.3	0	73.6

Table 23 (Continued) Sheet 11 of 14

LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet

Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM COOLIDGE DAM TO GAGE AT KELVIN, ARIZONA									
Estimated inflow, Coolidge Dam to Kelvin	135	75.2	0	0	0	0	0	0	75.2
Undepleted volumes conveyed to Kelvin	(145)	366.4	0	0	192.9	0	15.3	0	574.6
Historic channel losses	138	15.2	0	0	5.2	0	1.8	0	22.2
Virgin channel losses	(146)	$20.8	0	0	¢ 5.2	0	¢ 1.8	0	27.8
Salvage of channel evaporation	(147)	.1	0	0	0	0	0	0	.1
Replacement of native vegetation	(148)	4.2	0	0	0	0	0	0	4.2
Decreased losses from native growth change	(149)	1.3	0	0	0	0	0	0	1.3
Undepleted Gila River at Kelvin, Arizona	(150)	345.6	0	0	187.7	0	13.5	0	546.8
SANTA CRUZ RIVER FROM HEADWATERS IN ARIZONA THROUGH MEXICO TO GAGE NEAR NOGALES, ARIZONA									
Consumptive use upstream from Nogales	(151)	.8	0	0	0	0	8.2	0	9.0
Less replacement of native vegetation	(152)	.2	0	0	0	0	2.8	0	3.0
Net depletions upstream from Nogales	(153)	.6	0	0	0	0	5.4	0	6.0
Santa Cruz River near Nogales, Arizona	140	6.6	0	0	0	0	8.6	0	15.2
Undepleted Santa Cruz River near Nogales	(154)	7.2	0	0	0	0	14.0	0	21.2
SANTA CRUZ RIVER FROM GAGE NEAR NOGALES TO GAGE AT RILLITO, ARIZONA									
Estimated inflow, Nogales to Rillito	142	83.2	0	0	0	0	1.8	0	85.0
Undepleted volumes conveyed to Rillito	(155)	90.4	0	0	0	0	15.8	0	106.2
Historic channel losses	145	20.0	0	0	0	0	4.7	0	24.7
Virgin channel losses	(156)	$56.4	0	0	0	0	¢ 5.6	0	62.0
Salvage of channel evaporation	(157)	4.5	0	0	0	0	.9	0	5.4
Replacement of native vegetation	(158)	23.6	0	0	0	0	0	0	23.6
Decreased losses from native growth change	(159)	8.3	0	0	0	0	0	0	8.3
Undepleted Santa Cruz River at Rillito	(160)	34.0	0	0	0	0	10.2	0	44.2

Table 23 (Continued)
LOWER COLORADO RIVER BASIN

Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet
Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
SALT RIVER FROM HEADWATERS TO GRANITE REEF DAM, ARIZONA									
Consumptive use, Salt River to Roosevelt gage	(161)	3.7	0	0	0	0	0	0	3.7
Small reservoir evaporation depletions	(162)	.6	0	0	0	0	0	0	.6
Water exported from Black River	98	.2	0	0	0	0	0	0	.2
Less replacement of native vegetation	(163)	.7	0	0	0	0	0	0	.7
Net depletions, Salt River to Roosevelt gage	(164)	3.8	0	0	0	0	0	0	3.8
Salt River near Roosevelt, Arizona	147	706.5	0	0	0	0	0	0	706.5
Undepleted Salt River near Roosevelt	(165)	710.3	0	0	0	0	0	0	710.3
Consumptive use, Tonto Creek to Roosevelt gage	(166)	1.4	0	0	0	0	0	0	1.4
Less replacement of native vegetation	(167)	.9	0	0	0	0	0	0	.9
Net depletions, Tonto Creek to Roosevelt gage	(168)	.5	0	0	0	0	0	0	.5
Tonto Creek near Roosevelt, Arizona	148	107.9	0	0	0	0	0	— 0	107.9
Undepleted Tonto Creek near Roosevelt	(169)	108.4	0	0	0	0	0	0	108.4
Consumptive use, Verde River to Bartlett Dam	(170)	25.3	0	0	0	0	0	0	25.3
Small reservoir evaporation depletions	(171)	1.3	0	0	0	0	0	0	1.3
Bartlett Reservoir evaporation depletion	(172)	.6	0	0	0	0	0	0	.6
Accretion of surface storage, Bartlett Res.	(173)	.1	0	0	0	0	0	0	.1
Less replacement of native vegetation	(174)	5.4	0	0	0	0	0	0	5.4
Net depletions, Verde River to Bartlett Dam	(175)	21.9	0	0	0	0	0	0	21.9
Verde River below Bartlett Dam, Arizona	149	522.4	0	0	0	0	0	0	522.4
Undepleted Verde River below Bartlett Dam	(176)	544.3	0	0	0	0	0	0	544.3
Estimated inflow to Granite Reef Dam	150	100.2	0	0	0	0	0	0	100.2
Undepleted volumes conveyed to Granite Reef	(177)	1,463.2	0	0	0	0	0	0	1,463.2

Table 23 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet
Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
SALT RIVER FROM HEADWATERS TO GRANITE REEF DAM, ARIZONA (Continued)									
Virgin channel losses	(178)	$ 39.4	0	0	0	0	0	0	39.4
Replacement of native vegetation	(179)	.3	0	0	0	0	0	0	.3
Increased channel evaporation losses	(180)	.2	0	0	0	0	0	0	.2
Increased losses from native growth change	(181)	.2	0	0	0	0	0	0	.2
Undepleted Salt River at Granite Reef Dam	(182)	1,423.8	0	0	0	0	0	0	1,423.8
AGUA FRIA RIVER FROM HEADWATERS TO LAKE PLEASANT, ARIZONA									
Consumptive use above Lake Pleasant	(183)	1.2	0	0	0	0	0	0	1.2
Agua Fria River at Lake Pleasant Dam	159	128.3	0	0	0	0	0	0	128.3
Undepleted Agua Fria River at Lake Pleasant Dam (inflow to lake)	(184)	129.5	0	0	0	0	0	0	129.5
GILA RIVER FROM GAGE AT KELVIN TO GILLESPIE DAM, ARIZONA									
Estimated inflow to Gillespie Dam	161	94.7	0	0	0	0	0	0	94.7
Undepleted volumes conveyed to Gillespie Dam	(185)	2,027.6	0	0	187.7	0	23.7	0	2,239.0
Historic channel losses	167	300.1	0	0	61.7	0	6.2	0	368.0
Virgin channel losses	(186)	$ 376.9	0	0	¢ 63.0	0	¢ 6.3	0	446.2
Salvage of channel evaporation	(187)	10.2	0	0	1.3	0	.1	0	11.6
Replacement of native vegetation	(188)	99.8	0	0	0	0	0	0	99.8
Increased losses from native growth change	(189)	33.2	0	0	0	0	0	0	33.2
Undepleted Gila River at Gillespie Dam	(190)	1,650.7	0	0	124.7	0	17.4	0	1,792.8
GILA RIVER FROM GILLESPIE DAM TO GAGE NEAR DOME, ARIZONA									
Estimated inflow, Gillespie Dam to Dome	173	29.7	0	0	0	0	.2	0	29.9
Undepleted volumes conveyed to Dome	(191)	1,680.4	0	0	124.7	0	17.6	0	1,822.7
Historic channel losses	176	210.7	0	0	43.1	0	4.4	0	257.0

Table 23 (Continued)
LOWER COLORADO RIVER BASIN
Analysis of Contributions by States Based on Mean Virgin Runoff for the 1914-1945 Period, Unit: 1,000 Acre-feet
Item numbers not in parentheses are taken from Table 22, based on historic runoff

River section	Item	Arizona	California	Nevada	New Mexico	Utah	Mexico	Undistributed	Total
GILA RIVER FROM GILLESPIE DAM TO GAGE NEAR DOME, ARIZONA (Continued)									
Virgin channel losses	(192)	370.2	0	0	¢ 44.3	0	¢ 4.6	0	419.1
Salvage of channel evaporation	(193)	16.2	0	0	1.2	0	.2	0	17.6
Replacement of native vegetation	(194)	12.9	0	0	0	0	0	0	12.9
Decreased losses from native growth change	(195)	130.7	0	0	0	0	0	0	130.7
Undepleted Gila River near Dome	(196)	1,310.2	0	0	80.4	0	13.0	0	1,403.6
COLORADO RIVER FROM GAGE NEAR TOPOCK TO LIMITROPHE SECTION AT INTERNATIONAL BOUNDARY									
Consumptive use, Bill Williams River	(197)	9.7	0	0	0	0	0	0	9.7
Less replacement of native vegetation	(198)	5.9	0	0	0	0	0	0	5.9
Net depletions, Bill Williams River	(199)	3.8	0	0	0	0	0	0	3.8
Bill Williams River at Planet, Arizona	178	135.2	0	0	0	0	0	0	135.2
Undepleted Bill Williams River at Planet	(200)	139.0	0	0	0	0	0	0	139.0
Estimated inflow, Topock to Limitrophe Section	179	19.4	12.1	0	0	0	0	0	31.5
Undepleted volumes conveyed to Limitrophe Section	(201)	2,347.3	16.2	131.8	118.0	224.6	13.0	15,145.6	17,996.5
Historic channel losses	186	80.3	0	8.2	7.6	12.9	.6	674.8	784.4
Virgin channel losses	(202)	$ 171.3	$ .1	¢ 8.9	¢ 8.1	¢14.2	¢ .6	¢ 820.7	1,023.9
Salvage of channel evaporation	(203)	9.5	.1	.7	.5	1.3	0	85.5	97.6
Replacement of native vegetation	(204)	87.1	65.9	0	0	0	0	0	153.0
Increased losses from native growth change	(205)	5.6	5.5	0	0	0	0	0	11.1
Undepleted Colorado River within Limitrophe Section at International Boundary	(206	2,176.0	16.1	122.9	109.9	210.4	12.4	14,324.9	16,972.6

$. Losses within state.
¢. Losses out of state.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER NEAR RED ROCK, NEW MEXICO

Location: Lat. 32°43'30", long. 108°40'30", in W½ sec. 23, T. 18 S., R. 18 W., 4 miles northeast of Red Rock and 14 miles downstream from Mangas Creek.

Drainage Area: 2,857 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	
1914	11.9	14.5	9.6	10.7	13.3	16.4	11.9	8.0	4.9	48.7	27.2	16.8	193.9	1/
1915	29.7	24.2	78.5	52.0	34.3	77.5	81.2	33.8	13.4	28.9	22.7	12.1	488.3	
1916	9.3	6.8	8.2	55.5	35.0	32.0	17.1	14.5	5.2	19.0	34.0	50.6	287.2	
1917	50.0	9.9	9.2	18.2	19.6	32.9	24.0	13.5	6.6	4.9	4.7	3.6	197.1	
1918	3.5	3.4	4.0	5.1	5.2	14.0	4.3	4.2	3.3	2.5	5.2	2.8	57.5	
1919	6.3	6.3	9.7	8.0	15.6	43.9	59.1	22.7	8.5	31.3	17.1	10.3	238.8	
1920	6.5	7.9	12.4	15.8	56.4	24.2	17.5	20.3	9.9	4.2	11.0	6.5	192.6	
1921	4.3	10.1	4.7	5.4	2.8	6.4	4.0	4.9	5.6	15.8	35.4	9.2	108.6	
1922	2.1	4.0	3.5	5.7	6.2	5.2	4.0	3.0	2.5	7.7	3.0	3.7	50.6	2/
1923	3.2	3.3	6.3	4.6	5.5	18.5	11.9	7.1	2.3	9.8	37.7	32.9	143.1	
1924	6.3	7.6	18.8	22.1	12.8	14.8	45.7	23.6	6.4	3.5	2.4	2.4	166.4	
1925	3.6	4.1	4.4	4.3	3.6	3.7	2.5	2.5	3.4	6.1	10.1	16.4	64.7	
1926	8.6	6.3	5.9	5.8	4.2	18.2	40.4	25.0	4.0	9.0	8.0	7.0	142.4	
1927	12.5	10.9	17.2	10.3	15.8	21.8	12.0	8.7	6.7	9.2	10.7	7.1	142.9	
1928	5.3	5.6	6.0	5.7	7.3	17.1	14.3	7.6	3.3	2.8	6.2	4.7	85.9	
1929	4.5	6.2	7.3	6.2	4.1	4.4	4.0	2.1	1.7	5.0	35.3	8.8	89.6	
1930	7.4	6.7	6.1	5.9	5.2	20.9	20.1	6.7	3.2	16.4	25.4	9.1	133.1	
1931	4.8	5.7	5.5	4.9	17.2	18.5	25.4	22.8	4.1	8.1	20.4	19.7	157.1	
1932	8.8	7.1	7.3	8.2	34.8	45.0	21.8	12.7	5.0	9.6	16.9	4.6	181.8	
1933	5.3	5.4	6.1	5.7	11.4	29.3	9.9	7.0	7.3	6.3	6.9	7.1	107.7	
1934	9.3	6.4	7.6	5.6	4.7	4.0	3.3	1.7	0.9	1.8	12.6	5.4	63.3	1/
1935	3.7	4.6	5.2	8.7	14.2	14.2	10.0	5.8	3.2	1.4	17.4	12.9	91.1	
1936	5.5	5.4	6.3	6.0	15.5	15.5	14.2	6.7	2.2	4.7	3.2	9.5	94.7	
1937	5.3	5.4	6.1	6.8	63.1	66.7	30.8	13.1	5.1	5.0	4.1	9.9	221.4	
1938	5.9	5.0	5.6	5.5	4.8	23.7	8.2	5.2	1.8	8.8	3.4	17.3	95.2	
1939	4.2	5.1	5.9	6.0	5.5	19.0	12.4	4.0	1.3	3.1	7.9	8.4	82.8	
1940	24.6	5.8	6.1	7.5	39.5	23.3	10.9	6.4	3.6	3.3	10.4	5.6	147.0	
1941	4.8	6.3	31.2	52.3	55.5	73.5	47.9	45.5	10.1	7.4	13.3	104.4	452.2	
1942	38.7	12.9	19.0	14.7	9.8	15.5	17.1	8.7	2.9	3.3	9.0	14.6	166.2	3/
1943	5.6	5.3	7.1	6.1	6.3	19.4	6.1	3.2	2.0	6.5	5.8	3.6	77.0	
1944	5.3	5.1	5.4	4.7	4.8	5.6	5.2	3.9	1.7	6.7	19.7	6.5	74.6	
1945	6.1	7.0	7.6	9.3	13.2	19.5	20.5	11.8	2.8	4.3	13.0	1.4	116.5	
14-45 Mean	9.8	7.2	10.7	12.3	17.1	23.9	19.3	11.5	4.5	9.5	14.1	13.6	153.5	

Subsequent Records

1946	5.6	4.2	4.8	5.8	5.0	4.8	2.7	1.9	0.7	2.3	6.9	8.8	53.3	3/
1947	4.8	7.5	6.4	6.2	4.6	3.9	3.1	2.5	1.7	1.1	11.5	5.2	58.5	3/
1948	2.4	3.9	4.5	4.3	5.7	19.4	18.0	4.8	2.9	2.6	3.7	2.3	74.5	3/

1/ Geological Survey Water-Supply Paper 1049 through December 1914.
2/ Records and estimates in reports of State Engineer of New Mexico.
3/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER BELOW BLUE CREEK, NEAR VIRDEN, NEW MEXICO

Location: Lat. 32°39', long. 108°51', in SE¼SW¼ sec. 18, T. 19 S., R. 19 W., at head of canyon, 1¼ miles downstream from Blue Creek, 10 miles east of Virden, and 16 miles upstream from State line.

Drainage Area: 3,218 square miles, excluding Animas River Basin.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	*13.2	*14.1	*9.9	*11.0	*12.9	*15.4	*10.9	6.7	7.5	61.8	32.9	16.6	212.9	1/
1915	44.3	22.9	*83.6	*51.4	*31.3	112.5	96.6	39.0	13.6	33.5	23.8	8.7	561.2	1/
1916	10.1	6.9	8.5	54.8	31.9	29.9	15.8	14.4	4.8	22.3	38.5	48.4	286.3	
1917	56.8	9.8	9.6	18.3	18.4	30.7	22.2	13.4	6.3	4.7	4.8	4.5	199.5	
1918	3.5	3.6	4.0	5.5	5.8	13.2	3.8	4.0	2.8	1.7	5.4	3.8	57.1	
1919	6.7	6.4	10.1	8.3	14.9	41.0	55.2	22.7	8.3	37.7	19.1	10.8	241.2	
1920	7.0	7.8	12.9	16.0	50.7	22.6	16.1	20.3	9.8	3.9	12.1	7.3	186.5	
1921	4.4	9.9	4.8	5.7	3.7	6.1	3.4	4.7	5.3	18.3	40.1	9.8	116.2	2/
1922	2.0	4.2	3.4	6.0	6.7	5.0	3.5	2.7	2.0	8.2	2.9	4.7	51.3	
1923	3.2	3.6	6.4	5.0	6.0	17.3	10.9	6.9	1.8	10.8	42.8	31.9	146.6	
1924	6.8	7.6	19.7	22.1	12.5	13.9	42.6	23.7	6.1	3.0	2.1	3.4	163.5	
1925	3.7	4.3	4.4	4.7	4.4	3.5	2.1	2.2	2.9	6.3	11.0	16.5	66.0	
1926	9.4	6.4	6.0	6.1	4.9	17.1	37.7	25.1	3.6	9.8	8.6	7.7	142.4	
1927	*13.9	*10.7	*18.1	*10.5	*15.1	*20.4	*11.0	*8.5	*6.4	10.7	10.9	17.4	153.6	
1928	5.6	5.3	6.3	5.7	6.4	15.2	7.6	10.7	1.9	5.6	11.4	4.9	86.6	
1929	5.0	6.4	5.1	5.3	5.1	5.2	4.1	2.8	0.7	10.4	36.7	11.3	98.1	
1930	10.7	7.2	6.0	5.5	5.0	18.9	16.1	5.7	2.0	13.9	32.9	6.8	130.7	
1931	4.3	5.2	5.3	5.1	18.0	14.8	22.6	24.3	3.2	7.2	24.3	20.1	154.4	
1932	9.7	7.2	7.9	9.0	35.6	45.0	23.3	12.7	3.5	12.4	17.2	4.4	187.9	1/
1933	7.4	5.4	6.4	6.5	14.5	27.8	10.8	7.2	7.5	5.9	7.2	11.4	118.0	
1934	10.1	6.7	8.5	6.3	5.3	4.1	3.9	1.2	0.5	0.9	22.3	7.7	77.5	
1935	4.2	4.7	6.0	9.1	13.9	14.9	9.3	5.1	2.5	0.4	6.9	18.0	95.0	
1936	5.4	6.3	7.4	6.8	15.2	13.7	11.5	5.6	2.0	4.8	2.7	9.8	91.2	
1937	5.1	6.4	6.4	7.4	52.8	61.6	30.9	12.6	5.2	5.5	4.6	9.3	207.8	
1938	5.3	5.1	5.7	6.0	4.9	20.4	8.0	5.0	1.1	7.4	4.2	14.6	87.7	
1939	3.7	5.0	6.4	6.6	5.8	17.0	9.9	3.8	0.7	2.0	7.0	6.6	74.5	
1940	22.2	6.1	6.3	7.8	33.3	23.9	10.4	5.7	2.7	2.4	8.4	6.9	136.1	
1941	4.6	6.3	34.0	51.6	52.9	67.9	44.2	41.7	9.3	7.0	13.1	77.3	409.9	
1942	39.0	12.9	18.2	15.2	10.4	15.2	16.1	8.3	2.5	2.7	8.4	15.0	163.9	3/
1943	5.0	5.4	7.3	6.7	6.0	17.9	5.6	2.4	1.7	6.2	5.1	3.9	73.2	
1944	5.1	4.6	5.6	5.1	5.0	5.2	4.9	3.0	1.0	5.4	22.4	6.5	73.8	
1945	5.8	7.3	8.1	9.9	12.7	18.8	20.8	12.1	2.5	3.1	12.0	0.8	113.9	
14-45 Mean	10.7	7.2	11.2	12.5	16.3	23.6	18.5	11.4	4.1	10.5	15.7	13.3	155.0	

Subsequent Records

1946	7.6	4.3	4.9	5.9	5.1	4.6	2.2	1.0	0.3	1.1	7.1	8.2	52.3	3/
1947	4.1	7.3	6.2	6.3	4.2	3.6	2.5	1.5	1.1	0.5	10.4	5.1	52.8	3/
1948	1.9	3.4	4.2	4.6	5.3	17.7	16.5	4.0	2.1	2.1	3.4	1.4	66.6	3/

1/ Geological Survey Water-Supply Paper 1049 except (*), estimated.
2/ Estimated.
3/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER NEAR CLIFTON, ARIZONA

Location: Lat. 32°57'55", long. 109°18'25", in NE¼SE¼ sec. 25, T. 5 S., R. 29 E., at highway bridge on U. S. Highway 666, 6 miles upstream from San Francisco River, and 7 miles south of Clifton.
Drainage Area: 4,037 square miles; 45 square miles less at Guthrie.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	18.9	16.1	14.7	12.2	13.9	14.8	9.1	1.6	4.8	57.4	44.8	18.1	226.4	
1915	42.3	23.0	146.9	52.4	92.5	108.6	100.5	30.9	8.3	34.7	24.2	9.2	673.5	
1916	5.2	6.8	6.8	83.3	61.0	67.9	27.5	18.2	3.3	6.7	26.4	24.0	337.1	1/
1917	82.3	11.3	8.8	66.0	21.4	25.9	20.6	10.3	3.3	2.3	5.7	2.1	260.0	
1918	2.6	3.9	5.0	5.8	5.0	10.9	2.6	1.6	1.7	* 5.1	* 5.1	* 1.3	* 50.6	
1919	4.5	5.7	8.2	12.6	13.5	34.4	45.8	15.4	3.8	41.4	36.2	10.0	231.5	
1920	9.5	9.1	16.8	22.5	52.3	26.4	23.1	12.2	5.9	3.6	12.4	4.9	198.7	
1921	3.7	8.0	6.7	7.0	5.4	5.2	2.4	2.1	2.2	25.0	76.6	12.2	156.5	
1922	5.8	4.9	6.8	8.1	5.5	5.7	4.2	2.3	1.5	2.3	11.3	3.3	61.7	
1923	2.8	4.0	7.0	6.0	5.3	10.2	4.0	2.5	1.2	15.1	83.4	26.1	167.6	*
1924	6.5	17.6	24.9	23.7	9.1	11.1	40.1	12.2	3.0	6.7	5.0	1.4	161.3	
1925	1.9	3.0	5.9	6.0	4.7	4.5	1.5	1.8	3.6	10.9	11.2	48.6	103.6	
1926	13.6	5.8	6.9	8.3	5.6	16.5	46.2	23.2	3.6	7.0	5.4	5.0	147.1	
1927	7.2	7.2	8.9	8.5	16.7	18.6	10.6	5.7	1.9	8.4	15.2	14.8	123.7	
1928	* 3.1	* 3.3	* 6.9	* 6.9	* 6.0	11.9	5.3	7.0	1.4	4.4	10.2	3.8	* 70.2	
1929	4.9	6.5	6.1	4.8	4.5	3.6	1.7	1.6	1.0	19.7	47.3	10.8	112.5	
1930	9.7	6.9	5.8	4.9	3.9	16.4	11.7	3.6	1.3	20.1	39.0	7.1	130.4	2/
1931	2.9	5.1	6.5	6.0	17.3	12.3	19.6	19.0	1.8	6.0	31.5	22.2	150.2	
1932	9.7	6.6	9.0	9.5	32.8	38.8	18.3	7.5	2.1	14.7	16.3	3.8	169.1	
1933	6.3	5.1	6.9	7.4	14.0	24.7	7.3	3.0	5.2	5.8	6.0	13.9	105.6	
1934	13.5	1.4	8.7	5.9	1.4	4.9	3.4	1.6	1.3	18.9	36.0	16.5	113.5	*
1935	* 2.8	* 1.9	* 5.8	*15.2	*18.3	* 16.4	* 4.3	2.2	1.1	1.0	8.3	14.2	* 91.5	2/
1936	3.3	5.4	7.5	6.9	14.6	10.2	6.5	2.1	1.3	3.7	6.2	8.9	76.6	2/
1937	3.3	5.6	6.3	7.4	46.5	55.8	24.4	8.2	3.3	3.2	4.5	11.4	179.9	2/

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER NEAR CLIFTON, ARIZONA (Continued)

Location: Lat. 32°57'55", long. 109°18'25", in NE¼SE¼ sec. 25, T. 5 S., R. 29 E., at highway bridge on U. S. Highway 666, 6 miles upstream from San Francisco River, and 7 miles south of Clifton.

Drainage Area: 4,037 square miles; 45 square miles less at Guthrie.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	5.0	4.5	6.2	6.7	4.0	16.6	4.0	2.5	1.9	6.1	6.3	16.0	79.8	2/
1939	2.6	4.8	6.0	6.0	4.8	12.5	7.7	2.4	1.0	2.0	10.5	8.0	68.3	
1940	22.7	4.3	5.5	7.2	30.5	20.2	7.2	2.9	2.4	3.3	9.0	7.5	122.7	
1941	4.3	7.2	28.9	51.1	53.1	60.7	39.3	38.8	7.0	6.1	12.7	57.9	367.1	
1942	48.8	13.5	18.3	15.3	9.8	12.6	12.1	6.0	2.0	2.0	7.7	14.9	163.0	3/
1943	4.0	5.2	7.4	7.4	5.3	15.0	3.6	1.8	4.2	5.7	7.4	6.0	73.0	
1944	3.7	3.7	5.1	5.7	5.1	3.5	4.6	2.8	1.4	5.3	18.1	6.9	65.9	
1945	4.5	7.7	7.8	10.4	11.6	15.0	16.4	8.1	1.9	2.7	15.1	1.7	102.9	
14-45 Mean	11.3	7.0	13.4	15.8	18.6	22.2	16.7	8.2	2.8	11.2	20.5	12.9	160.6	

Subsequent Records

1946	10.5	3.3	4.1	6.7	5.5	4.1	1.7	1.1	0.9	1.6	7.3	6.1	52.9	3/
1947	2.6	6.4	4.6	6.4	3.5	2.9	1.9	0.9	0.8					3/
1948								2.7	1.2	2.5	2.8	1.0		3/

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*). Record obtained at Guthrie, 5½ miles upstream.

2/ Geological Survey Water-Supply Paper 1049 except (*).

3/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN FRANCISCO RIVER NEAR GLENWOOD, NEW MEXICO

Location: Lat. 33°15'05", long. 108°52'40", in NE¼NW¼ sec. 23, T. 12 S., R. 20 W., a quarter of a mile upstream from hot springs and 6 miles south of Glenwood.

Drainage Area: 1,664 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	
1914													37.6	
1915													305.2	
1916													177.3	
1917													104.5	
1918													24.5	
1919													98.9	
1920													72.1	*
1921													33.4	
1922													22.0	
1923													42.0	
1924													74.0	
1925													23.4	
1926													58.4	
1927													60.4	
1928	*2.2	2.2	1.9	1.9	2.5	5.0	3.4	2.9	1.0	2.8	4.1	2.3	32.2	1/
1929	2.1	1.9	2.0	1.9	1.8	1.9	2.1	1.4	1.1	2.7	5.5	3.3	27.7	1/
1930	3.0	1.7	1.8	2.2	2.0	7.1	8.1	2.3	1.3	6.7	5.1	3.6	44.9	1/
1931	1.5	1.7	1.4	1.4	5.0	2.3	7.7	7.0	1.5	2.6	8.2	7.3	47.6	
1932	3.4	2.9	3.4	3.0	27.2	*36.9	*16.0	*6.2	1.8	*4.0	*6.4	*2.4	113.6	
1933	2.1	2.0	2.0	1.8	3.9	11.4	4.3	3.3	2.4	3.9	3.8	3.2	44.1	
1934	3.0	3.4	3.0	1.9	1.7	1.2	1.1	1.1	0.7	1.7	9.1	2.8	30.7	2/
1935	1.5	1.5	1.8	4.1	3.8	6.0	3.9	2.6	1.7	1.1	4.4	3.3	35.7	
1936	2.2	1.9	2.2	1.7	3.3	5.2	6.8	2.8	1.2	2.1	2.8	3.8	36.0	
1937	3.8	2.3	2.1	1.9	20.9	22.9	11.6	4.5	1.4	1.7	1.6	2.6	77.3	
1938	2.2	1.7	1.7	1.6	1.4	6.1	2.3	1.7	1.8	2.5	2.1	4.3	29.4	
1939	1.2	1.2	1.5	1.6	1.6	9.2	6.9	1.6	0.8	1.1	3.0	2.2	31.9	
1940	2.5	1.7	1.7	1.7	3.7	5.2	2.4	1.9	1.2	3.4	12.7	6.2	44.3	
1941	2.6	2.5	17.0	18.1	22.7	45.9	31.6	27.9	4.8	3.5	4.8	8.2	189.6	
1942	6.1	4.7	9.6	6.6	4.7	8.8	9.5	3.5	1.6	1.7	4.1	1.8	62.7	3/
1943	2.0	1.9	2.3	2.3	1.9	2.1	1.4	1.6	1.2	2.4	3.1	1.7	23.9	
1944	2.7	2.0	1.9	1.8	1.6	2.1	1.3	1.2	1.1	2.0	3.2	3.9	24.8	
1945	1.8	1.8	2.0	1.9	2.8	7.2	8.4	3.7	1.3	1.5	5.6	1.6	39.6	
14-45 Mean	3.8	2.4	4.6	4.6	7.4	12.2	10.4	4.8	1.8	3.8	5.1	3.8	64.7	*

Subsequent Records

1946	2.1	1.6	1.9	1.6	1.4	1.4	1.0	1.0	0.6	1.8	6.5	5.0	25.9	3/
1947	3.0	2.0	1.9	1.7	1.3	1.1	0.8	1.0	0.8	0.9	4.6	1.4	20.5	3/
1948	1.0	1.3	1.3	1.4	1.8	8.2	9.9	1.4	0.9	1.7	1.3	0.7	30.9	3/

* Estimated.

1/ Records in reports of State Engineer of New Mexico except (*).

2/ Geological Survey Water-Supply Paper 1049 except (**).

3/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN FRANCISCO RIVER AT CLIFTON, ARIZONA

Location: Lat. 33°03'00", long. 109°17'45", in SW¼SE¼ sec. 30, T. 4 S., R. 30 E., at Railroad Boulevard Bridge at Clifton, 8½ miles upstream from mouth.

Drainage Area: 2,789 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Total	Note
1914	3.8	10.5	6.0	4.6	3.7	9.3	4.5	2.7	2.1	30.4	18.0	11.7	107.3	
1915	35.1	17.3	120.0	68.8	69.8	131.4	134.0	31.6	8.1	40.4	14.0	8.2	678.7	
1916	5.6	4.8	5.3	*261.0	116.8	100.0	39.9	22.8	3.6	8.4	21.7	19.6	*609.5	1/
1917	128.8	10.5	7.8	29.2	21.4	24.5	21.0	12.5	4.0	8.5	7.0	4.8	280.0	
1918	3.2	3.7	4.3	4.7	5.1	8.2	4.6	3.4	3.9	* 5.3	* 6.4	* 1.2	* 54.0	
1919	3.6	4.6	7.7	9.6	13.3	41.2	61.6	19.1	4.4	29.9	21.9	8.8	225.7	
1920	6.1	7.1	22.5	18.7	65.4	30.7	31.0	15.2	6.5	4.4	10.1	4.3	222.0	
1921	3.2	6.3	5.0	4.5	2.5	2.4	2.9	3.3	2.8	18.8	42.1	10.8	104.6	
1922	4.2	4.0	5.3	5.4	2.7	3.0	5.4	3.4	2.2	3.5	9.5	3.0	51.6	*
1923	2.6	3.4	5.6	3.6	2.3	9.1	5.1	3.6	1.8	12.2	45.5	23.1	117.9	
1924	4.6	13.4	36.4	19.8	7.5	10.2	53.7	15.3	3.6	6.4	6.3	1.2	178.4	
1925	2.2	2.6	3.7	3.7	1.5	1.7	1.8	2.9	4.2	9.2	9.5	43.0	86.0	
1926	8.3	4.7	5.3	5.7	2.8	17.5	62.0	28.2	4.2	6.7	6.5	4.4	156.3	
1927	* 5.0	* 5.7	* 8.8	* 5.9	* 17.8	* 20.4	* 14.1	* 7.5	* 2.6	* 7.7	10.3	27.1	*132.9	
1928	4.2	4.0	4.8	4.3	7.5	13.3	7.1	6.3	2.2	10.2	13.5	3.3	80.7	
1929	4.6	4.9	4.5	4.4	4.3	4.9	6.2	3.3	1.5	7.2	31.5	13.9	91.2	
1930	5.8	4.7	4.4	4.7	4.4	12.2	12.8	4.4	2.4	13.0	16.3	5.4	90.5	
1931	2.9	3.7	3.9	3.9	17.6	9.3	12.1	13.3	3.0	7.8	20.4	26.0	123.9	
1932	13.1	8.5	12.6	8.7	72.9	67.8	31.2	12.6	3.4	9.1	18.6	5.0	263.5	1/
1933	4.4	4.0	5.2	5.3	14.3	27.5	11.1	7.8	5.7	6.6	5.4	9.3	106.6	
1934	* 6.4	* 7.5	* 7.7	* 4.9	* 5.7	* 5.3	* 4.3	* 3.0	* 1.4	* 3.7	*18.3	* 7.0	* 75.2	
1935	* 2.9	* 3.5	* 4.4	*10.1	* 11.0	* 13.5	* 9.2	7.3	3.5	2.2	8.9	9.3	* 85.8	
1936	3.7	4.5	5.8	4.9	19.9	13.8	17.2	6.3	2.6	4.2	5.4	10.0	98.3	
1937	4.1	5.5	4.9	6.3	59.6	44.8	27.5	10.5	3.6	4.4	3.9	8.1	183.2	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN FRANCISCO RIVER AT CLIFTON, ARIZONA (Continued)

Location: Lat. 33°03'00", long. 109°17'45", in SW¼SE¼ sec. 30, T. 4 S., R. 30 E., at Railroad Boulevard Bridge at Clifton, 8½ miles upstream from mouth.

Drainage Area: 2,789 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	4.7	3.4	4.2	3.9	3.4	20.7	7.1	4.4	4.2	4.5	6.0	8.4	74.9	1/
1939	2.2	2.7	3.5	3.7	3.8	15.3	16.2	3.6	1.3	2.4	6.1	4.6	65.4	
1940	5.8	3.3	4.0	4.2	14.8	9.8	5.6	4.0	3.1	3.9	17.9	13.0	89.4	
1941	5.2	7.8	44.7	44.7	48.1	80.4	56.4	52.7	9.4	6.9	12.8	20.5	389.6	
1942	14.8	9.1	26.2	15.9	11.4	17.6	20.4	7.1	2.4	2.5	7.4	4.7	139.5	2/
1943	3.5	3.3	4.4	4.8	4.3	11.7	4.8	2.8	2.0	5.1	4.9	5.2	56.8	
1944	4.1	3.5	3.8	3.9	3.6	4.4	3.7	2.8	1.5	3.5	6.2	10.0	51.0	
1945	3.7	5.2	5.8	6.0	7.6	15.5	21.5	9.9	2.5	2.6	11.0	2.7	94.0	
14-45 Mean	9.8	5.9	12.5	18.4	20.2	24.9	22.4	10.4	3.4	9.1	13.9	10.5	161.4	

Subsequent Records

1946	3.9	2.9	3.8	4.4	3.4	3.3	2.5	2.0	1.1	3.9	9.8	8.4	49.4	2/
1947	4.8	4.0	4.4	4.0	3.3	3.4	2.6	2.1	1.4	1.8	10.1	4.2	46.1	2/
1948	2.3	2.8	2.9	3.1	3.6	12.4	17.9	3.9	3.2	3.0	3.5	2.1	60.7	2/

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey annual Water-Supply Papers.

SAN FRANCISCO RIVER AT CLIFTON, ARIZONA

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

WILLOW CREEK DIVERSION FROM BLACK RIVER, NEAR MORENCI, ARIZONA

Location: Lat. 33°24'45", long. 109°42'45", in SW¼ sec. 23, T. 1 N., R. 25 E., unsurveyed, on San Carlos Indian Reservation, just downstream from end of diversion pipe line, 5.5 miles southeast of pumping plant (on Black River, 2,100 feet downstream from Freezeout Creek), 3 miles northeast of Point of Pines, and 29 miles northwest of Morenci.

The entire flow consists of Black River (head of Salt River) water which is pumped into headwaters of Willow Creek (tributary of Eagle Creek, which is tributary of Gila River) for mining, metallurgical treatment of ores, and domestic supply in vicinity of Morenci.

Diversions began April 21, 1945.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1945							0.05	0.87	1.07	1.06	0.95	1.01	5.01	1/
44-45 Mean													0.2	

Subsequent Records

1946	1.1	1.0	0.2	0	0	0	0	0.2	0.3	1.2	1.2	1.1	6.3	1/
1947	1.1	0.9	0.6	0	0	0.6	1.1	1.1	1.1	1.2	1.1	1.1	9.9	1/
1948	1.1	1.0	0.6	0	0	0.5	0.9	1.1	1.1	1.2	1.1	0.9	9.5	1/

1/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT HEAD OF SAFFORD VALLEY, NEAR SOLOMON, ARIZONA

Location: Combined discharge of Gila River and Brown Canal near Solomon. The Gila River station is at lat. 32°52', long. 109°31', in SE¼NE¼ sec. 31, T. 6 S., R. 28 E., 0.6 mile downstream from intake of Brown Canal, 8 miles northeast of Solomon, and about 13 miles downstream from San Francisco River.

Drainage Area: 7,954 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	*25.1	*30.1	*26.6	*19.0	*22.1	*28.8	*16.0	*4.7	8.9	90.5	78.8	33.4	*384.0	
1915	90.1	46.8	360.6	134.9	213.6	263.5	238.4	66.4	18.4	72.5	43.3	21.0	1,569.5	
1916	11.7	13.1	14.4	623.0	198.0	183.0	74.2	40.3	9.1	17.8	55.9	48.2	1,288.7	
1917	223.0	28.3	19.4	92.1	46.2	62.0	49.6	25.8	8.4	16.7	25.4	8.4	605.3	
1918	7.0	8.5	10.8	12.4	11.1	22.9	10.4	7.1	6.1	11.8	14.1	5.3	127.5	
1919	9.5	12.5	18.8	24.9	33.0	86.1	112.0	38.0	9.2	72.7	69.5	22.1	508.3	
1920	17.4	18.9	50.5	46.6	146.0	65.4	57.5	30.2	13.8	9.4	27.2	12.2	495.1	
1921	8.2	16.8	13.1	12.8	9.6	10.1	7.5	5.9	5.5	45.2	141.5	26.3	302.5	
1922	11.5	11.0	13.5	15.0	9.9	11.3	12.0	6.2	4.1	7.2	25.1	9.2	136.0	
1923	6.5	9.4	14.3	10.6	9.2	23.1	11.5	6.6	3.3	28.7	153.7	53.3	330.2	
1924	12.6	34.9	80.3	49.2	20.4	25.4	98.0	30.3	7.3	14.5	13.9	5.4	392.2	1/
1925	5.1	7.4	10.3	10.8	7.3	8.5	5.5	5.1	8.6	21.5	25.1	97.0	212.2	
1926	24.2	12.7	13.7	15.6	10.1	39.6	112.8	56.6	8.7	15.1	14.5	12.4	336.0	
1927	13.9	15.3	21.2	16.0	42.6	45.2	27.4	14.4	5.0	17.5	30.8	45.8	295.1	
1928	8.7	9.2	13.1	12.4	16.4	27.2	13.4	13.9	4.0	15.4	31.7	7.8	173.2	
1929	10.3	13.4	11.7	11.0	10.0	9.5	9.0	5.5	3.1	30.2	91.9	31.3	236.9	
1930	18.5	12.8	10.7	11.0	9.8	31.6	27.2	9.7	4.6	34.1	65.6	14.9	250.5	
1931	6.4	10.2	12.1	11.2	57.5	25.6	34.8	35.6	5.0	17.3	63.1	54.5	333.3	
1932	25.7	19.1	28.3	22.8	133.1	119.1	54.3	22.2	6.2	27.4	41.8	10.4	510.4	
1933	11.4	10.2	14.3	14.5	31.3	62.5	21.0	12.2	11.6	13.9	14.5	31.5	248.9	
1934	22.0	11.0	19.5	12.0	8.4	13.0	10.0	5.0	3.0	24.0	65.0	27.0	219.9	
1935	6.8	7.2	11.0	28.5	36.0	35.0	16.0	10.7	4.9	3.7	22.1	28.4	210.3	
1936	8.3	10.1	14.1	12.7	58.0	29.9	26.6	9.7	4.2	8.8	14.5	21.3	218.2	
1937	8.5	12.9	13.6	16.1	137.5	112.6	55.1	19.9	7.3	8.0	9.4	21.4	422.3	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT HEAD OF SAFFORD VALLEY, NEAR SOLOMON, ARIZONA (Continued)

Location: Combined discharge of Gila River and Brown Canal near Solomon. The Gila River station is at lat. 32°52', long. 109°31', in SE¼NE¼ sec. 31, T. 6 S., R. 28 E., 0.6 mile downstream from intake of Brown Canal, 8 miles northeast of Solomon, and about 13 miles downstream from San Francisco River.

Drainage Area: 7,954 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	10.3	8.8	12.0	11.9	9.0	41.3	12.1	7.6	5.6	12.0	15.4	25.2	171.2	1/
1939	5.7	8.3	10.3	10.7	9.7	31.2	25.5	6.7	2.5	4.3	19.1	14.3	148.3	↑
1940	29.3	8.4	10.5	12.5	47.9	32.7	14.3	7.4	7.0	8.2	30.7	22.1	231.0	↑
1941	10.5	16.7	92.6	123.4	125.8	175.8	103.4	103.7	17.6	13.9	27.6	77.0	888.0	↑
1942	71.9	24.1	52.3	34.9	23.2	35.2	34.3	14.9	4.7	4.7	16.4	24.1	340.7	2/
1943	7.9	9.0	12.3	13.3	10.9	38.8	9.2	5.0	5.7	11.9	15.2	14.4	153.6	↓
1944	8.6	8.0	9.8	10.2	9.3	8.4	8.3	5.7	3.1	9.5	27.7	29.8	138.4	↓
1945	9.8	14.4	15.2	17.9	22.8	36.9	43.3	20.0	4.8	5.4	30.5	5.5	226.5	↓
14-45 Mean	23.3	15.0	32.2	45.9	48.0	54.4	42.2	20.4	6.9	21.7	41.3	26.9	378.2	

Subsequent Records

1946	15.7	7.8	9.2	12.2	9.7	8.5	5.5	3.7	2.2	6.9	19.0	16.8	117.2	2/
1947	8.4	12.5	10.7	11.9	7.8	7.2	5.7	3.7	2.7	2.7	27.4	12.9	113.6	2/
1948	4.3	6.4	7.4	7.8	9.0	27.9	33.2	7.8	4.4	6.3	9.0	3.6	127.1	2/

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN SIMON CREEK NEAR SOLOMON, ARIZONA

Location: Lat. 32°48'06", long. 109°38'19", in NW¼NE¼ sec. 25, T. 7 S., R. 26 E., 1 mile southwest of Solomon and 2½ miles upstream from mouth.
Drainage Area: 2,276 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													23.5	
1915													7.9	
1916													17.1	
1917													8.3	
1918													5.3	
1919													16.3	
1920													10.0	
1921													15.1	
1922													6.3	*
1923													14.9	
1924													4.8	
1925													9.1	
1926													13.3	
1927													17.8	
1928													16.0	
1929													17.4	
1930													15.8	
1931									0	0.7	19.0	4.6	*26.4	
1932	4.4	0.5	0.1	0.1	0.8	0.3	0.6	0.7	0	5.9	1.4	0	14.8	
1933													* 8.7	
1934													*10.1	1/
1935								0	0	0.4	14.7	0.6	*16.6	
1936	0	0	0	0	0	0	0	0	0.1	4.1	5.7	3.7	13.6	
1937	0	0	0	0	0	0	0	0	0.2	0.8	0.7	0.9	2.6	
1938	0.5	0	0	0	0	0	0	0	1.1	1.0	2.0	1.0	5.6	
1939	0	0	0	0	0	0	0	0	0	0.1	2.7	0.4	3.2	
1940	2.0	0.3	0	0	0.5	0	0	0	1.2	0.8	3.5	3.7	12.0	
1941	0.1	0.5	0.2	0	0.1	0	0.9	0	0	0.5	7.0	4.1	13.4	
1942	0.6	0	0.4	0	0	0	0	0	0	0.2	4.3	3.0	8.5	2/
1943	0.9	0	0	0	0	0	0	0	0.2	0.9	13.5	0.8	16.3	
1944	0	0	0	0	0	0	0	0	0	1.7	9.7	5.3	16.7	
1945	0.2	0.3	0	0	0	0	0	0	0	1.2	6.4	0.2	8.3	
14-45 Mean	1.2	0.1	0.1	0	0.1	0	0.1	0.1	0.3	1.8	6.3	2.3	12.4	*

Subsequent Records

1946	3.5	0	0	0	0	0	0	0	0	0.2	2.6	0.1	6.4	2/
1947	0	0	0	0	0	0	0	0	0.4	0.2	2.7	0.7	4.0	2/
1948	0	0	0	0	0	0	0	0	0	1.1	3.5	0.1	4.7	2/

* Estimated.
1/ Geological Survey Water-Supply Paper 1049 except (*).
2/ Geological Survey annual Water-Supply Papers.

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT CALVA, ARIZONA

Location: Lat. 33°11'10", long. 110°13'10", in sec. 5, T. 3 S., R. 21 E., unsurveyed, on San Carlos Indian Reservation, at railroad bridge at head of San Carlos Reservoir, 1½ miles northwest of Calva.

Drainage Area: 11,49[illegible] square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													282.3	
1915													1,526.7	
1916													1,141.0	
1917													503.2	
1918													75.3	
1919													428.9	
1920													434.6	
1921													252.9	*
1922													46.8	
1923													220.6	
1924													320.0	
1925													118.0	
1926													211.1	
1927													207.1	
1928													92.9	
1929													174.4	
1930	17.6	11.8	10.2	5.0	3.2	18.9	14.7	4.7	0.7	43.5	71.5	8.4	210.2	
1931	1.0	6.5	11.5	7.2	58.9	11.5	20.2	29.8	0.8	3.3	84.6	54.3	289.6	
1932	34.5	16.6	30.2	21.5	134.4	115.2	35.3	8.9	2.0	16.5	23.2	4.0	442.3	
1933	3.8	6.5	12.8	12.4	24.7	50.9	7.0	3.9	1.6	2.0	1.1	22.4	149.1	1/
1934	13.7	7.5	18.6	10.3	4.0	2.4	1.2	0.3	0	14.1	66.9	21.1	160.1	
1935	1.7	2.4	7.4	28.0	36.9	21.0	4.4	2.4	0.5	1.3	18.8	24.7	149.5	
1936	2.3	5.7	12.4	13.1	56.4	19.4	8.9	1.8	0.1	2.1	6.3	21.8	150.3	
1937	2.3	9.1	7.7	17.7	124.6	104.1	29.3	8.4	1.1	1.0	1.5	11.1	317.9	

GILA RIVER AT CALVA, ARIZONA

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT CALVA, ARIZONA (Continued)

Location: Lat. 33°11'10", long. 110°13'10", in sec. 5, T. 3 S., R. 21 E., unsurveyed, on San Carlos Indian Reservation, at railroad bridge at head of San Carlos Reservoir, 1½ miles northwest of Calva.
Drainage Area: 11,492 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	6.8	6.1	9.2	11.7	7.8	37.9	2.4	0.7	1.1	2.2	6.9	13.4	106.2	1/
1939	0.1	3.7	6.1	10.6	10.4	17.3	15.6	3.4	0	0	13.7	10.6	91.5	↑
1940	24.4	4.2	4.4	12.8	45.2	18.9	3.1	2.4	2.8	2.6	22.7	14.8	158.3	↑
1941	5.4	13.7	75.9	149.0	133.5	176.5	84.1	96.6	8.6	4.9	19.7	36.2	804.1	↑
1942	112.7	24.8	53.9	35.2	22.9	21.2	13.3	6.5	1.2	1.0	6.5	15.2	314.4	2/
1943	3.2	5.7	9.2	12.2	7.2	34.7	2.4	0.6	0	1.2	16.3	9.8	102.5	↓
1944	2.2	2.3	4.2	5.8	4.0	2.6	1.6	0.8	0.1	1.2	18.5	37.3	80.6	↓
1945	7.1	8.6	8.7	15.9	16.1	17.4	24.7	7.5	0.6	1.9	22.9	0.4	131.8	↓
14-45 Mean	18.5	11.1	34.3	47.1	42.3	40.2	28.4	11.3	1.6	14.7	33.3	20.2	303.0	*
Subsequent Records														
1946	8.7	0.9	1.5	12.4	9.5	5.1	1.1	0.3	0	1.4	6.9	7.8	55.6	2/
1947	1.4	6.5	2.0	9.5	6.2	3.4	1.0	0.4	0.1	0	10.6	4.6	45.7	2/
1948	0.9	1.1	1.4	4.3	6.3	20.1	16.8	2.1	1.5	2.5	6.1	0.4	63.5	2/

* Estimated.
1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey annual Water-Supply Papers.

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN CARLOS RIVER NEAR PERIDOT, ARIZONA

Location: Lat. 33°19'20", long. 110°26'50", in NW¼ sec. 30, T. 1 S., R. 19 E., unsurveyed, on San Carlos Indian Reservation, at highway bridge, 2 miles downstream from San Carlos and 2 miles upstream from Peridot.

Drainage Area: 1,038 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914							0	0	0.1	0.8	2.9	1.9	*39.5	1/
1915	3.6	3.6				6.0	2.7	2.2	0.2		0.9	0.3	*240.0	1/
1916													212.0	
1917													26.5	
1918													8.0	
1919													92.0	
1920													92.0	
1921													31.5	
1922													19.0	*
1923													16.5	
1924													21.5	
1925													29.5	
1926													56.5	
1927													24.5	
1928													7.5	
1929													28.0	
1930	0.5	0.6	0.9	2.5	0.9	13.6	0.7	0.3	0.1	5.2	11.6	0.2	37.1	
1931	0.3	1.0	0.8	0.7	19.1	0.9	0.5	0.3	0.3	3.8	6.9	2.1	36.7	
1932	0.7	4.3	7.5	2.9	29.3	2.9	0.6	0.4	0.1	1.3	1.8	0.1	51.9	
1933	0.6	0.6	0.9	1.2	4.0	1.9	0.4	0.3	0.1	1.0	0.5	5.3	16.8	
1934	1.3	0.6	0.7	0.8	0.8	0.4	0.3	0.1	0.1	0.2	7.2	1.4	13.9	1/
1935	0.3	0.5	0.9	14.9	36.2	11.7	6.4	0.3	0.1	1.9	12.3	2.1	87.6	
1936	0.3	0.7	0.9	1.3	34.2	3.1	0.9	0.2	0.1	0.4	1.8	0.6	44.5	
1937	0.3	0.5	1.1	4.0	33.2	2.6	0.6	0.3	0.1	0.6	3.0	0.5	46.8	
1938	0.2	0.4	0.8	0.8	0.6	9.2	0.4	0.2	0.1	0.7	1.4	0.9	15.7	
1939	0.1	0.4	0.7	0.8	2.9	1.7	4.1	0.2	0	0.9	6.4	0.2	18.4	
1940	0.4	0.6	0.7	1.3	5.4	0.7	0.3	0.1	0.4	1.2	3.5	1.4	16.0	
1941	0.4	3.2	33.8	31.7	31.8	77.6	10.1	1.0	0.4	1.1	3.4	6.7	201.2	
1942	1.4	1.5	5.4	8.3	1.8	3.2	0.9	0.6	0.3	0.3	0.7	0.9	25.3	2/
1943	0.7	0.8	2.9	8.9	1.7	9.7	0.5	0.3	0.3	0.1	2.2	2.2	30.3	
1944	1.2	0.7	0.9	1.0	1.7	3.2	0.7	0.5	0.2	0.2	0.7	2.2	13.2	
1945	0.6	1.1	1.1	1.4	1.3	7.4	1.3	0.5	0.1	0.4	1.7	0.2	17.1	
14-45 Mean	0.7	1.2	4.4	9.6	14.2	8.1	2.7	0.7	0.2	1.6	4.6	2.5	50.5	*

Subsequent Records

1946	0.4	0.6	0.9	2.4	0.8	0.7	0.5	0.2	0	1.1	3.2	4.3	15.1	2/
1947	0.6	0.8	1.2	0.8	0.6	0.7	0.5	0.4	0.1	0	3.2	2.3	11.2	2/
1948	1.9	0.5	0.6	0.5	0.6	3.0	0.6	0.1	0	1.1	1.3	0.2	10.4	2/

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER BELOW COOLIDGE DAM, ARIZONA

Location: Lat. 33°10'15", long. 110°31'45", in SW¼ sec. 17, T. 3 S., R. 18 E., unsurveyed, 2,200 feet downstream from Coolidge Dam.

Drainage Area: 12,889 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	*25.0	*29.3	*22.8	*18.4	*19.9	*26.6	*13.2	0.5	4.3	59.5	66.3	36.0	321.8	
1915	72.1	50.0	517.8	207.9	285.2	219.7	230.5	69.5	11.5	55.7	30.7	15.9	1,766.5	
1916	4.1	4.3	13.6	776.7	189.1	176.2	64.1	24.8	3.4	5.4	48.5	42.8	1,353.0	
1917	199.2	26.3	21.4	113.7	53.5	47.6	28.7	9.3	2.1	11.5	13.6	2.9	529.8	
1918	1.7	2.8	6.0	12.1	12.4	16.8	2.3	0.9	1.9	4.6	20.3	1.5	83.3	
1919	2.2	5.2	21.5	18.2	36.2	67.6	106.6	25.6	1.7	111.4	100.9	23.9	521.0	
1920	21.1	28.6	98.2	68.7	191.5	55.2	28.5	8.9	2.9	3.0	15.9	4.2	526.7	
1921	3.2	10.6	11.1	12.0	4.8	3.5	2.5	0.8	0.1	62.5	155.7	17.6	284.4	
1922	3.3	3.5	6.8	17.2	5.2	3.7	3.2	0.9	0.3	4.8	15.9	1.1	65.9	
1923	1.3	1.5	8.9	4.2	3.5	11.0	2.1	0.3	0	35.4	122.2	46.7	237.1	
1924	3.8	40.7	105.7	61.6	15.4	16.5	82.0	12.7	0.3	0.6	2.1	0.1	341.5	1/
1925	0.2	0.6	3.4	4.7	2.8	3.1	1.1	0.5	0.8	2.6	18.8	108.9	147.5	
1926	17.4	9.2	15.2	16.1	5.1	29.5	120.5	40.5	1.2	3.5	3.5	5.9	267.6	
1927	7.3	12.5	20.5	13.2	69.5	35.7	6.8	2.8	0.6	5.8	14.1	42.8	231.6	
1928	3.9	3.8	11.9	9.9	13.0	10.9	2.9	1.4	0	6.3	32.7	3.7	100.4	
1929	2.2	4.7	00	0	0	1.4	1.4	0.1	0	0	1.5	5.5	16.8	
1930	9.9	5.4	2.4	0	6.1	9.2	28.9	26.1	36.3	29.3	27.9	38.1	219.6	
1931	11.4	4.6	2.2	2.2	3.3	14.8	33.0	32.8	36.3	47.5	20.7	15.2	224.0	
1932	5.3	2.8	0	0	0.1	18.1	35.6	35.7	36.5	43.2	36.2	42.9	256.4	
1933	13.8	12.4	4.5	3.6	4.0	28.1	40.3	40.2	47.5	52.0	54.5	34.1	335.0	
1934	16.0	13.8	5.6	6.0	9.1	18.4	27.9	27.5	19.7	18.7	4.0	17.9	184.6	
1935	11.4	4.8	3.5	0.4	2.9	4.7	21.5	25.8	34.9	38.8	16.3	19.8	184.6	
1936	14.8	6.8	3.9	1.7	1.5	14.9	28.9	34.3	36.8	33.8	28.1	22.6	228.1	
1937	18.6	9.6	5.0	0.1	3.2	14.6	30.1	40.1	41.0	46.0	44.4	27.0	279.7	

GILA RIVER BELOW COOLIDGE DAM, ARIZONA

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER BELOW COOLIDGE DAM, ARIZONA (Continued)

Location: Lat. 33°10'15", long. 110°31'45", in SW¼ sec. 17, T. 3 S., R. 18 E., unsurveyed, 2,200 feet downstream from Coolidge Dam.

Drainage Area: 12,889 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	24.3	17.2	10.2	11.5	7.9	11.2	23.7	22.1	23.0	11.2	13.6	13.8	189.7	1/
1939	6.5	2.3	4.9	5.8	4.0	13.8	22.5	15.4	6.7	0.3	10.5	9.7	102.4	|
1940	11.4	10.7	12.0	8.9	9.6	16.9	18.6	17.8	10.9	8.5	19.0	16.4	160.7	|
1941	7.1	4.3	5.3	1.3	0.8	0.6	6.9	31.0	40.4	49.9	35.3	32.8	215.7	|
1942	19.0	15.9	5.6	4.5	15.1	21.2	35.9	37.4	46.3	55.6	53.0	42.5	352.0	2/
1943	26.8	19.5	15.5	13.7	18.2	23.8	37.4	43.6	50.7	50.6	29.6	35.7	365.1	|
1944	22.3	19.1	11.8	9.7	7.3	12.8	31.0	31.8	35.7	44.0	37.3	34.6	297.4	|
1945	22.2	11.9	15.3	5.6	10.1	12.4	20.0	22.7	24.3	29.3	17.2	25.3	216.3	|
14-45 Mean	19.0	12.3	31.0	44.7	31.6	30.0	35.6	21.4	17.4	29.1	34.7	24.6	331.4	

Subsequent Records

1946	11.5	7.6	6.9	1.4	6.9	11.3	10.2	10.2	1.2	0.1	1.5	5.8	74.6	2/
1947	4.4	3.7	5.3	6.4	6.1	8.9	11.2	0.3	0	0	3.5	10.1	59.9	2/
1948	4.1	1.6	2.2	4.7	5.5	9.7	14.9	6.9	8.1	3.1	6.3	1.1	68.2	2/

* From "Distribution of Waters of the Gila River", 4th Annual Report (1939) of Gila Water Commissioner to U. S. District Court.

1/ Geological Survey Water-Supply Paper 1049 except (*) in 1914.

2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN PEDRO RIVER AT PALOMINAS, ARIZONA

Location: Lat. 31°22'45", long. 110°06'45", in SE¼ sec. 33, T. 23 S., R. 22 E., at highway bridge, 0.7 mile east of Palominas, 4½ miles downstream from international boundary, and 13 miles southwest of Bisbee.

Drainage Area: 741 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													90.9	
1915													87.5	
1916													17.9	
1917													49.4	
1918													10.8	
1919													49.3	
1920													24.6	
1921													53.7	*
1922													18.3	
1923													22.2	
1924													12.7	
1925													23.3	
1926													64.8	
1927													23.5	
1928													7.8	
1929													27.3	
1930									0.8	10.5	12.0	2.1	*29.9	
1931	0.6	0.5	0.6	0.5	3.0	0.7	0.4	0.2	0.1	1.6	16.4	7.2	31.8	
1932	3.6	0.8	1.7	3.1	1.5	1.2	0.6	0.4	0.2	6.1	6.5	0.4	26.1	
1933	0.4	0.5	0.7	1.2	0.8	0.4	0.3	0.2	0.2	3.4	2.1	3.7	13.9	
1934													*17.7	1/
1935								0.1	0.1	1.8	10.0	3.7	*19.9	
1936	0.4	1.2	2.0	0.6	0.5	0.3	0.2	0.1	0.8	4.3	4.3	8.9	23.6	
1937	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.2	1.1	3.6	25.4	4.3	37.5	
1938	1.5	0.3	0.8	0.4	0.4	0.4	0.2	0.1	0.7	5.2	5.0	3.4	18.4	
1939	0.3	0.3	1.5	0.5	0.3	0.2	0.2	0.1	0	5.6	17.3	2.8	29.1	2/
1940	0.3	0.3	0.4	0.4	0.6	0.3	0.2	0.1	0.6	2.9	23.5	1.6	31.2	3/
1941	0.5	0.5	0.7	4.4	1.4	0.9	0.7	0.3	0.1				*22.7	4/
1942													11.4	*
1943													28.6	*
1944													11.8	*
1945													21.1	*
14-45 Mean	1.0	0.7	2.1	1.3	0.8	0.6	0.3	0.2	0.9	6.0	11.6	4.5	30.0	*

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey Water-Supply Paper 879.

3/ Geological Survey Water-Supply Paper 899.

4/ Geological Survey Water-Supply Paper 929 except (*).

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN PEDRO RIVER AT CHARLESTON, ARIZONA

Location: Lat. 31°37'40", long. 110°10'30", in NE¼NE¼ sec. 11, T. 21.S., R. 21 E., in Spanish land grant of San Juan de las Boquillas y Nogales, at highway bridge ¼ mile south of Charleston, and 8½ miles upstream from Babocomari River. Prior to Dec. 1, 1942, at site 1½ miles downstream.

Drainage Area: 1,216 sq. mi.; 1,250 sq. mi. prior to Dec. 1, 1942.

Water Year	Oct	Nov	Ded	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	0.2	3.5	0.5	0.9	0.6	0.5	0.4	0.3	0.3	8.7	126.2	6.4	148.5	
1915	2.9	2.0	75.6	17.1	12.1	9.8	3.0	1.5	1.2	12.3	5.4	6.4	149.3	
1916	0.8	1.2	1.1	5.3	1.2	0.7	0.4	0.4	0.2	8.5	11.1	3.4	34.3	
1917	4.0	0.3	0.7	1.6	0.9	2.2	1.8	2.3	2.2	34.4	33.9	5.9	90.2	
1918	0.5	0.7	0.7	0.9	0.5	0.6	0.3	0.1	3.2	7.1	5.3	0.4	20.3	
1919	1.0	0.6	1.4	1.0	0.7	0.5	0.2	0.2	0.1	43.2	30.9	13.8	93.6	
1920	3.6	7.6	4.4	8.0	2.9	2.4	1.1	0.5	2.0	0.9	5.7	2.6	41.7	
1921	0.3	0.7	0.7	1.0	0.7	0.9	0.3	0.2	0.4	53.9	40.2	2.4	101.7	
1922	0.7	0.7	0.9	0.9	0.6	0.6	0.3	0.2	0.6	12.6	10.7	7.8	36.6	
1923	0.3	0.5	1.3	1.0	0.4	0.7	0.4	0.2	0.2	14.9	18.3	4.1	42.3	
1924	0.6	1.7	6.3	3.7	0.7	1.4	0.4	0.2	0.2	5.0	4.3	0.6	25.1	
1925	0.3	0.4	0.4	0.6	0.5	0.6	0.6	0.4	9.9	11.2	10.0	2.0	36.9	1/
1926	0.6	1.3	1.0	1.2	0.9	0.9	0.9	0.4	0.1	1.6	1.6	112.3	122.8	
1927	10.2	2.3	1.9	1.6	1.2	1.2	1.2	0.8	0.6	7.9	12.4	2.8	44.1	
1928	1.1	1.2	1.3	1.3	1.3	1.1	0.9	0.8	0.4	2.2	4.3	1.1	17.0	
1929	7.6	1.4	1.2	1.2	1.1	1.0	0.9	0.6	0.4	24.1	10.0	4.5	54.0	
1930	1.9	1.0	1.2	1.6	1.3	1.5	0.9	0.7	1.3	21.1	17.0	4.0	53.5	
1931	1.1	1.2	1.8	1.4	4.6	1.1	0.5	0.5	0.5	4.7	32.6	14.9	64.9	
1932	6.5	1.5	3.6	6.3	1.6	2.2	1.2	0.8	0.6	10.0	10.9	0.7	45.9	
1933	0.9	1.4	1.2	1.7	1.6	1.2	0.7	0.9	0.6	7.9	3.2	6.8	28.1	
1934	2.5	0.9	1.2	1.2	0.9	0.9	0.7	0.4	0.2	6.0	17.0	1.4	33.3	
1935	0.7	0.9	1.4	2.2	1.7	1.5	0.8	0.6	0.3	2.0	25.0	6.9	44.0	
1936	0.9	2.3	3.2	1.5	1.4	1.1	0.9	0.5	1.1	6.4	10.7	14.7	44.7	
1937	1.8	1.2	1.3	1.6	1.1	1.2	0.8	0.7	1.4	5.1	33.7	6.4	55.9	
1938	2.2	0.8	1.4	1.2	1.0	1.0	0.7	0.6	1.0	8.3	10.0	6.4	34.6	
1939	0.8	0.9	2.4	1.1	0.9	0.9	0.6	0.4	0.2	7.7	27.4	6.5	49.8	
1940	1.3	1.0	1.1	1.1	1.8	1.0	0.6	0.5	1.0	8.2	37.9	3.0	58.5	
1941	1.4	1.2	1.6	5.9	2.9	1.5	1.4	0.9	0.5	5.0	13.6	4.8	40.7	
1942	1.6	0.7	1.8	1.3	1.1	1.1	0.8	0.5	0.2	3.3	5.1	6.1	23.6	2/
1943	0.6	0.7	1.0	1.1	0.9	0.8	0.5	0.9	5.3	7.6	26.4	2.0	47.8	
1944	1.3	0.8	1.0	1.1	0.9	1.4	0.7	0.6	0.3	5.4	7.6	3.2	24.3	
1945	0.9	0.9	1.1	1.2	0.9	1.1	0.9	0.5	0.2	3.4	26.0	0.6	37.7	
14-45 Mean	1.9	1.4	3.9	2.5	1.6	1.4	0.8	0.6	1.1	11.3	19.8	8.3	54.6	

Subsequent Records

1946	1.2	0.7	0.9	1.2	1.0	1.0	0.7	0.4	0.3	5.4	17.6	3.1	33.5	2/
1947	0.6	0.7	1.0	1.1	0.9	0.9	0.6	0.5	0.3	1.9	22.3	1.5	32.3	2/
1948	0.4	0.6	0.8	0.8	1.1	0.9	0.6	0.4	0.2	6.8	13.2	7.4	33.2	2/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey Annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SAN PEDRO RIVER NEAR MAMMOTH, ARIZONA

Location: Lat. 32°44', long. 110°39', in NE¼ sec. 18, T. 8 S., R. 17 E., at bridge on Mammoth-Winkelman highway 1¼ miles north of Mammoth.

Drainage Area: 3,607 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													134.4	
1915													157.9	
1916													34.1	
1917													58.7	
1918													26.5	
1919													148.6	
1920													63.3	
1921													149.6	*
1922													34.9	
1923													91.1	
1924													16.5	
1925													23.7	
1926													86.5	
1927													47.5	
1928													34.3	
1929													61.2	
1930													92.1	
1931								0	0.7	2.3	57.3	18.2	*89.7	
1932	12.2	4.2	6.6	7.2	8.8	3.3	0.5	0	0	11.9	11.2	0	65.9	
1933	0	0	0.4	1.0	0.8	0.1	0	0	0	6.1	2.1	4.5	15.0	
1934	2.6	0.1	0.2	0.1	0	0	0	0	0	2.9	18.0	0.9	24.8	1/
1935	0	0	0.3	1.7	1.9	1.2	0	0	0	0.1	29.2	10.6	45.0	
1936	0.2	1.8	3.2	0.9	2.9	0	0	0	0.3	4.1	14.9	9.7	38.0	
1937	0	0.2	0.5	1.0	4.5	0.1	0	0	0	1.2	42.3	13.2	63.0	
1938	0.5	0	0.3	0	0	1.2	0	0	0.4	7.0	14.5	7.1	31.0	
1939	0	0	0.6	0	0.1	0	1.0	0	0	7.5	39.0	7.4	55.6	2/
1940	1.6	0	0	0	0.7	0	0	0	0.6	6.1	51.9	2.5	63.4	3/
1941	0.4	0.3	11.4	8.5	6.9	6.9	0.9	0.2	0				*73.3	4/
1942													19.0	*
1943													39.2	*
1944													32.2	*
1945													35.8	*
14-45 Mean	1.8	0.6	3.2	2.8	2.3	1.0	0.2	0	0.3	10.8	29.8	8.2	61.0	*

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey Water-Supply Paper 879.

3/ Geological Survey Water-Supply Paper 899.

4/ Geological Survey Water-Supply Paper 929 except (*).

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

ARAVAIPA CREEK NEAR FELDMAN, ARIZONA

Location: Lat. 32°50', long. 110°38', in NW¼ sec. 9, T. 7 S., R. 17 E., 6 miles upstream from mouth and 6 miles east of Feldman.

Drainage Area: 538 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													18.3	
1915													109.3	
1916													19.8	
1917													13.8	
1918													19.4	
1919													35.1	
1920													23.1	
1921													30.3	
1922													16.3	*
1923													16.2	
1924													14.4	
1925													11.5	
1926													24.2	
1927													24.1	
1928													15.2	
1929													16.1	
1930													19.7	
1931								0.5	0.6	2.2	3.0	3.0	*27.7	
1932	1.8	2.9	5.1	1.6	9.0	2.0	1.1	0.8	0.6	2.2	1.6	0.6	29.3	
1933	1.0	0.8	1.7	1.7	1.4	0.9	0.8	0.6	0.5	2.9	0.6	0.8	13.7	
1934	1.3	0.7	0.7	0.6	0.6	0.7	0.5	0.4	0.3	1.7	2.6	0.5	10.6	1/
1935	0.5	0.8	1.3	4.3	10.3	7.3	1.1	0.7	0.3	0.4	8.2	2.1	37.3	
1936	0.7	1.1	1.0	2.1	5.2	1.8	0.9	0.5	0.3	2.2	1.4	2.2	19.4	
1937	0.7	0.7	1.3	4.3	4.8	1.0	0.7	0.5	0.3	0.7	1.7	2.5	19.2	
1938	0.5	0.6	0.9	0.8	1.0	4.0	0.6	0.4	0.3	1.0	1.3	0.9	12.3	
1939	0.4	0.6	0.9	0.7	1.0	0.7	0.5	0.3	0.1	0.5	2.9	0.9	9.5	2/
1940	1.9	0.5	0.9	0.6	2.6	0.6	0.4	0.3	2.4	0.5	2.4	1.5	14.6	3/
1941	0.4	4.4	15.8	5.7	9.9	11.8	2.3	1.3	0.6				*57.9	4/
1942													16.2	*
1943													15.9	*
1944													13.4	*
1945													13.2	*
14-45 Mean	0.9	1.1	4.0	2.3	3.2	2.5	0.8	0.6	0.8	2.4	2.7	1.7	23.0	*

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey Water-Supply Paper 879.

3/ Geological Survey Water-Supply Paper 899.

4/ Geological Survey Water-Supply Paper 929 except (*).

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT KELVIN, ARIZONA

Location: Lat. 33°06'15", long. 110°58'45", in NW¼NW¼ sec. 12, T. 4 S., R. 13 E., at Kelvin, 1000 feet downstream from Mineral Creek, 17 miles downstream from San Pedro River, and 19.5 miles upstream from Ashurst-Hayden Dam.

Drainage Area: 18,031 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	12.2	30.2	26.1	20.2	18.0	9.6	2.2	0.4	3.9	120.6	141.7	53.8	438.9	
1915	*75.2	48.2	*760.0	*300.0	*328.0	*233.6	*233.9	72.1	15.3	*94.1	66.7	19.2	2,246.3	
1916	8.1	8.2	21.8	817.5	175.3	165.8	65.9	27.5	6.3	14.3	50.3	53.0	1,414.0	
1917	212.4	30.9	18.0	107.6	49.1	44.5	28.5	15.0	2.7	33.4	37.0	10.7	589.8	
1918	2.6	3.4	6.8	17.4	16.5	49.5	4.4	2.5	3.4	4.5	39.3	1.8	152.1	
1919	2.4	6.2	24.9	29.7	59.6	69.6	113.8	25.3	2.6	212.7	157.5	31.9	736.2	
1920	18.0	33.1	117.8	103.2	231.9	84.9	41.3	13.5	4.4	5.7	32.2	7.5	693.5	
1921	2.4	11.0	11.8	15.0	8.3	4.4	2.7	1.0	0.3	99.1	282.2	23.4	461.6	
1922	6.0	5.4	11.6	22.1	10.8	6.8	5.3	1.5	0.3	*10.0	*36.3	6.4	122.5	
1923	0.5	2.1	12.0	6.5	5.9	14.2	2.2	0.4	0.1	*47.4	*197.1	57.3	345.7	
1924	6.1	40.1	115.5	72.4	17.3	20.1	79.4	15.2	0.7	2.2	8.4	0.4	377.8	
1925	0.2	0.7	4.6	5.6	2.7	3.4	1.3	0.4	5.9	12.3	31.5	109.3	177.9	1/
1926	17.5	11.7	24.2	21.2	7.9	31.0	121.6	37.5	2.0	5.6	8.4	117.1	405.7	
1927	24.2	15.7	23.9	17.1	86.1	50.4	9.6	3.3	1.8	12.4	25.4	54.4	324.3	
1928	5.7	4.6	16.9	15.4	19.2	11.7	3.2	1.3	0.1	9.9	57.2	6.0	151.2	
1929	4.4	5.4	1.6	2.1	2.2	2.4	2.3	0.2	0.1	16.5	29.8	30.7	97.7	
1930	14.2	7.2	5.1	5.3	6.7	27.1	26.7	26.9	35.0	54.7	90.5	43.5	342.9	
1931	12.2	10.8	5.3	5.1	34.4	18.4	32.1	31.4	36.6	54.4	86.5	36.2	363.4	
1932	20.5	12.1	16.7	9.7	25.4	25.9	38.6	33.9	34.8	55.9	48.1	43.9	365.5	
1933	14.2	14.1	12.3	10.3	10.3	29.1	40.4	39.3	46.8	58.6	56.0	41.9	373.3	
1934	19.4	14.5	7.6	7.2	10.1	17.9	25.5	24.8	18.6	25.7	28.4	20.3	220.0	
1935	11.8	7.1	5.2	11.7	24.2	19.8	24.2	25.5	34.2	38.8	90.0	41.8	334.3	
1936	16.3	11.4	8.5	6.7	18.4	20.2	29.9	35.2	34.3	39.4	42.8	38.7	301.8	
1937	20.8	11.2	9.9	10.7	22.3	18.9	30.0	37.8	37.9	46.9	80.6	38.2	365.2	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER AT KELVIN, ARIZONA (Continued)

Location: Lat. 33°06'15", long. 110°58'45", in NW¼NW¼ sec. 12, T. 4 S., R. 13 E., at Kelvin, 1,000 feet downstream from Mineral Creek, 17 miles downstream from San Pedro River, and 19.5 miles upstream from Ashurst-Hayden Dam.

Drainage Area: 18,081 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	27.2	17.9	12.6	13.4	10.0	20.1	24.0	22.8	21.6	15.2	29.6	19.6	234.0	1/
1939	7.1	2.0	7.9	6.6	7.7	13.5	21.0	14.1	5.7	4.2	50.0	16.8	156.6	|
1940	13.2	10.6	12.1	8.8	14.7	16.0	17.5	16.8	13.0	12.5	68.2	20.9	224.3	|
1941	8.5	10.0	61.4	39.7	34.7	59.7	22.2	37.8	40.8	57.0	58.1	45.9	475.8	|
1942	22.8	21.8	17.1	13.7	18.3	25.3	37.0	35.3	41.6	52.5	58.0	47.0	390.4	2/
1943	27.9	21.0	18.0	20.6	20.1	36.8	37.2	42.7	50.7	53.2	57.6	41.7	427.5	|
1944	24.3	19.8	13.8	11.6	14.0	16.5	30.5	30.5	33.2	43.5	62.6	39.4	339.7	|
1945	24.5	15.1	17.9	12.0	11.2	16.4	20.8	22.5	22.4	30.0	47.8	24.2	264.8	|
14-45 Mean	21.3	14.5	44.7	55.2	41.3	37.0	36.7	21.7	17.4	42.0	67.4	35.7	434.9	

Subsequent Records

1946	15.4	7.8	10.1	5.8	8.0	12.1	10.0	8.9	1.5	5.3	19.8	15.3	120.0	2/
1947	4.8	4.9	6.4	7.8	6.3	8.7	10.2	0.8	0.1	0.2	23.5	13.3	87.0	2/
1948	5.8	2.1	2.9	4.5	6.0	10.1	14.3	5.6	5.9	10.0	20.1	4.4	91.7	2/

* Revisions listed in Geological Survey Water-Supply Paper 1119.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey annual Water-Supply Papers.

GILA RIVER AT KELVIN, ARIZONA

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LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SANTA CRUZ RIVER NEAR NOGALES, ARIZONA

Location: Lat. 31°20'40", long. 110°51'05", in NW¼ sec. 18, T. 24 S., R. 15 E., unsurveyed, in Spanish land grant of Buena Vista, 0.75 mile downstream from international boundary and 5.5 miles east of Nogales.

Drainage Area: 542 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	0	0.2	0.2	0	0.1	0	0	0	0	3.5	6.4	2.7	13.1	
1915	0.2	0.6	*36.4	12.2	8.4	8.3	4.4	2.7	0.4	5.0	3.6	0.6	*82.8	
1916	0	1.0	1.6	2.7	2.3	1.8	0.8	0.3	0.2	*6.6	1.5	0.4	*19.2	
1917	0.2	0.1	0.7	1.0	0.7	0.3	0.2	0.1	0.1	2.6	4.7	3.2	13.9	
1918	0.4	0.7	0.5	0.8	0.9	0.5	0.1	0	0	0	0.5	0	4.4	
1919	0	0	0	0.1	0.7	0.1	0.1	0	0	4.5	4.8	2.7	13.0	
1920	0.6	1.5	2.4	5.5	1.3	0.6	0.3	0.1	0.2	*0	*0.5	*0	*13.0	
1921								0	0	3.4	15.2	1.9	*23.4	
1922	0.7	0.5	0.8	1.0	0.5	0.4	0	0	0.1	*0.2	*0.2	*0.6	*5.0	
1923													*14.0	
1924													*7.2	1/
1925													*9.0	
1926													*16.6	
1927													*6.9	
1928													*6.7	
1929													*18.9	
1930								0.1	0.5	6.3	4.1	0.1	*13.5	
1931	0.1	0.2	0.3	0.3	7.2	1.4	0.5	0.1	0	2.4	17.8	9.0	39.3	
1932	1.9	1.6	2.0	8.2	2.5	1.5	0.5	0.1	0.1	5.4	7.2	0.8	31.8	
1933	0.3	0.5	1.1	1.7	1.1	0.7	0.3	0.1	0	0.3	0.2	0.6	6.9	
1934	0.8	0.1	0.1										*9.4	
1935										0.8	12.1	4.0	*18.1	
1936	0.6	0.9	1.4	0.8	0.7	0.4	0.2	0	0.4	4.1	4.5	0.8	14.8	
1937	0	0.3	0.4	1.5	0.5	0.4	0.1	0	0	1.0	7.9	4.0	16.1	
1938	0.7	0.4	0.4	0.4	0.3	0.2	0	0	0.1	1.7	2.2	1.8	8.2	
1939	0.1	0	0.2	0.4	0.5	0.2	0.1	0	0	2.6	11.6	2.8	18.5	
1940	1.5	0.5	0.5	0.6	1.5	0.4	0.1	0	0	1.1	3.3	0	9.5	
1941	0.1	0.2	0.4	0.7	1.5	0.7	0.4	0.1	0	1.1	1.5	0.1	6.8	
1942	0	0	0.2	0.3	0.2	0.3	0.1	0	0	2.9	3.7	0.3	8.0	2/
1943	0	0.1	0.1	0.2	0.2	0.1	0.1	0	1.0	2.7	4.7	0.3	9.5	
1944	0.1	0.1	0.2	0.2	0.4	0.4	0.1	0	0	0.3	1.5	0.1	3.4	
1945	0	0.1	0.3	0.5	0.2	0.2	0.1	0	0	0.7	2.6	0	4.7	
14-45 Mean	0.3	0.4	2.0	1.7	1.3	0.8	0.4	0.1	0.1	2.2	4.5	1.4	15.2	*

Subsequent Records

1946	0	0	0.1	0.2	0.2	0.2	0.1	0	0	5.2	7.9	2.4	16.3	2/
1947	0.4	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0	0.6	2.3	0.3	5.3	2/
1948	0	0.1	0	0.1	0.2	0.1	0.1	0	0	0.6	7.0	0.5	8.7	2/

* Estimated.

1/ Geological Survey Water-Supply Paper 1049 except (*).

2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SANTA CRUZ RIVER AT TUCSON, ARIZONA

Location: Lat. 32°13'15", long. 110°58'50", in NE¼NE¼ sec. 14, T. 14 S., R. 13 E., at Congress Street Bridge in Tucson.

Drainage Area: 2,192 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	0	0	0	0	0	0	0	0	0	0.8	1.0	0	1.8	
1915	0.2	0.4	55.0	10.4	11.2	3.1	0	0	0.6	0.6	0	0	80.9	
1916	0	0	0	24.5	0.6	0	0	0	0	2.7	8.2	1.3	37.3	
1917	0.1	0	0	0	0	0	0	0	0	8.5	10.4	9.3	28.3	
1918	0	0	0	0	0	0	0	0	0.1	0.2	4.6	0	4.9	
1919	0	0	0.1	0	0	0	0	0	0	15.4	9.8	2.2	27.5	
1920	0	0.5	0.5	3.8	0.2	0	0	0	0	0.4	1.8	0.7	7.9	
1921	0	0	0.1	0	0	0	0	0	0	5.2	23.6	3.2	32.1	
1922	0	0	0	0.4	0	0	0	0	0	4.1	5.5	0.9	10.9	
1923	0	0	0	0	0	0	0	0	0	4.4	11.3	0	15.7	
1924	0	2.2	0.5	0.3	0	0.3	0.1	0	0	0.3	0	0	3.7	
1925	0	0	0	0	0	0	0	0	0	1.7	2.7	2.5	6.9	
1926	0.1	0.4	0	0.1	0	0	0.1	0	0	0.2	0.7	18.6	20.2	1/
1927	0.2	0.1	0.2	0	0	0	0	0	0	0.3	1.2	1.1	3.1	
1928	0	0	0	0	0.1	0	0	0	0	0.4	2.2	0.2	2.9	
1929	0	0	0	0	0	0	0	0	0	4.8	8.5	11.0	24.3	
1930	0	0	0	0	0.1	1.3	0	0.1	1.3	2.1	3.0	0.2	8.1	
1931	0	0	0	0	4.6	0	0	0.1	0.1	5.4	24.0	3.0	37.2	
1932	0	1.3	0	3.6	0	0	0	0	0	6.7	3.1	0	14.7	
1933	0.3	0	0	0	0	0	0	0	0	0.9	1.6	4.5	7.3	
1934	0.2	0	0	0	0	0	0	0	0	0.5	6.5	0.3	7.5	
1935	0	0	0.1	0.4	0.3	0	0	0	0	1.2	8.3	10.1	20.4	
1936	0	0.6	0.2	0.1	0.1	0	0	0	0	3.7	3.3	0.8	8.8	
1937	0	0	0	0	0	0	0	0	0	1.8	5.4	1.1	8.3	
1938	0	0	0.1	0	0	0	0	0	0.4	1.0	6.0	0.1	7.6	
1939	0	0	0	0	0	0	0	0	0	2.6	20.8	1.0	24.4	
1940	0	0	0	0	0.3	0	0	0	0.5	1.9	10.1	0.7	13.5	
1941	0	0.1	0.1	0.6	0.1	0	0	0	0	0.7	2.1	1.3	5.0	
1942	0	0	0.1	0.1	0	0	0	0	0	0.8	1.6	0.4	3.0	2/
1943	0	0	0	0	0	0	0	0	0.2	1.9	6.8	2.2	11.1	
1944	0	0	0	0	0	0	0	0	0	0.1	7.6	2.0	9.7	
1945	0.7	0.7	0	0	0	0	0	0	0	5.3	13.8	0.3	20.8	
14-45 Mean	0.1	0.2	1.8	1.4	0.5	0.1	0	0	0.1	2.7	6.7	2.5	16.1	

Subsequent Records

1946	0.5	0	0	0.5	0	0	0	0	0	3.8	7.4	2.6	14.8	2/
1947	2.3	0	0	0	0	0	0	0	0	0.5	2.8	0.9	6.5	2/
1948	0	0	0	0	0	0	0	0	0	1.2	6.6	0.8	8.6	2/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

RILLITO CREEK NEAR TUCSON, ARIZONA

Location: Lat. 32°18', long. 110°59', in sec. 23, T. 13 S., R. 13 E., at Oracle Road Bridge, 4 miles upstream from mouth and 4 miles north of Tucson. Moved to site 1,800 feet downstream on July 19, 1945.

Drainage Area: 903 square miles; 916 square miles after July 19, 1945.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	0	0	0	0	0.8	0	0	0	0	2.5	2.9	2.6	8.8	
1915	0.1	1.4	106.8	21.4	25.4	10.1	1.2	0	0	0	0	0	166.4	
1916	0	0	0	37.1	2.2	3.6	0.1	0	0	0.9	7.8	0.7	52.4	
1917	0	0	0	1.7	0.3	0	0	0	0	5.1	2.9	0.6	10.6	
1918	0	0	0	0	0	7.8	0	4.2	0.5	0.1	0	0	12.6	
1919	0	0	0	0	0.8	0.3	0.7	0	0	30.8	4.1	0.5	37.2	
1920	0	2.4	2.7	4.4	11.6	2.3	0.6	0	0	0	2.0	0	26.0	
1921	0	0	0	0	0	0	0	0	0	26.0	16.1	0.4	42.5	
1922	0	0	0	0.2	0	0	0	0	0.1	0.2	1.9	0.6	3.0	
1923	0	0	0	0	0	0	0	0	0	2.5	4.1	0.1	6.7	
1924	0	0.3	5.2	0.1	0	0	0.2	0	0	0	0	0	5.8	
1925	0	0	0	0	0	0	0	0	0	0.7	1.5	2.5	4.7	
1926	0	0	0	0	0	0.2	0.6	0	0	0.1	0.1	1.0	2.0	1/
1927	0	0	0.1	0.2	1.5	1.3	0	0	0	0	0.2	1.3	4.6	
1928	0	0	0	0	0	0	0	0	0	0.4	0.8	0.1	1.3	
1929	0	0	0	0	0	0	0	0	0	1.8	7.0	18.0	26.8	
1930	0	0	0	0	0	3.3	0	0	0.2	3.2	3.2	0.7	10.6	
1931	0	0	0	0	5.5	0.1	0	0	0	0	6.3	0.1	12.0	
1932	0.1	2.4	1.3	0.4	5.2	1.7	0	0	0	3.6	0.2	0	14.9	
1933	0.4	0	0	0	0.2	0.1	0	0	0	0	0.1	0.7	1.5	
1934	0.3	0	0	0	0	0	0	0	0	0.7	0.9	0.3	2.2	
1935	0	0	0	1.4	3.6	0.8	0	0	0	0.4	7.9	4.1	18.2	
1936	0	0	0	0.3	0.9	0	0	0	0	0.3	2.1	0	3.6	
1937	0	0	0	0	3.0	0.4	0	0	0	0.2	0.8	0.1	4.5	
1938	0	0	0	0	0	1.9	0	0	0.1	0.1	0.5	0	2.6	
1939	0	0	0	0	0	0	0	0	0	1.7	5.1	0	6.8	
1940	0	0	0	0	0.3	0	0	0	0.4	0	7.1	0.5	8.3	
1941	0	0.2	12.8	2.7	4.4	7.0	0	0	0	0.2	1.8	0.6	29.7	
1942	0	0	0.7	0.5	0.3	0.2	0	0	0	0	0.3	0.1	2.1	2/
1943	0	0	0	0	0	0.6	0	0	0	0	1.7	0.3	2.6	
1944	0	0	0	0	0	0	0	0	0	0.7	2.4	0.1	3.2	
1945	0	0.1	0	0	0.1	0.3	0	0	0	0.4	3.0	0	3.9	
14-45 Mean	0	0.2	4.1	2.2	2.1	1.3	0.1	0.1	0	2.6	3.0	1.1	16.8	

Subsequent Records

1946	0.1	0	0	0	0	0	0	0	0	0.4	2.5	0.1	3.1	2/
1947	0.1	0.1	0	0	0	0	0	0	0	0	3.8	0.1	4.1	2/
1948	0	0	0	0	0	0	0	0	0	0.2	0.4	0.3	0.9	2/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SANTA CRUZ RIVER AT RILLITO, ARIZONA

Location: Lat. 32°24'05", long. 111°08'25", in NE¼SW¼ sec. 8, T. 12 S., R. 12 E., 1 mile southeast of Rillito, 7-3/4 miles downstream from Canada del Oro, and 8-3/4 miles downstream from Rillito Creek.

Drainage Area: 3,523 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													11.4	
1915													178.9	
1916													69.0	
1917													42.7	
1918													11.1	
1919													67.0	
1920													21.3	
1921													77.2	
1922													14.1	
1923													22.5	
1924													6.3	
1925													13.5	*
1926													29.2	
1927													6.5	
1928													4.3	
1929													62.6	
1930													15.7	
1931													45.0	
1932													22.8	
1933													10.7	
1934													9.9	
1935													40.9	
1936													11.7	
1937													11.3	
1938													8.4	
1939													32.0	
1940	0	0	0	0	0.7	0	0	0	0.6	1.5	16.3	1.1	20.2	
1941	0	0.7	10.4	2.3	2.2	2.7	0	0	0	0.6	3.4	2.2	24.5	
1942	0	0	0.3	0.1	0.3	0.2	0.1	0	0	0.5	1.5	0.9	3.9	1/
1943	0	0	0	0	0	0.4	0	0	0.1	1.6	10.2	5.3	17.6	
1944	0	0	0	0	0	0	0	0	0	0.9	11.0	2.4	14.3	
1945	0.4	0.4	0	0	0	0	0	0	0	6.0	17.2	0.1	24.1	
14-45 Mean	0	0.2	4.7	2.5	1.3	0.6	0.1	0.1	0.1	5.3	9.9	4.9	29.7	*

Subsequent Records

1946	0.5	0	0	0.3	0	0	0	0	0	3.8	9.8	2.4	16.8	1/
1947	2.4	0.1	0	0	0	0	0	0	0					1/

* Estimated.

1/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER NEAR ROOSEVELT, ARIZONA

Location: Lat. 33°37', long. 110°55', in NE¼ sec. 9, T. 3 N., R. 14 E., unsurveyed, 100 feet downstream from bridge on Globe-Young highway, a quarter of a mile downstream from Pinal Creek, 1 mile upstream from diversion dam for power canal, 14 miles east of village of Roosevelt, and 17 miles upstream from Roosevelt Dam.

Drainage Area: 4,306 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	13.2	15.2	20.9	23.3	73.3	62.1	63.4	26.6	15.3	36.4	65.1	44.2	459.0	
1915	39.5	29.8	158.3	140.8	187.4	229.1	358.3	227.0	73.1	89.8	37.0	23.0	1,593.1	
1916	19.5	22.3	23.2	983.3	258.1	513.3	256.5	108.9	48.8	28.2	42.6	56.0	2,360.7	
1917	86.6	27.0	19.0	92.9	87.5	73.5	142.9	74.3	28.4	29.5	27.6	17.7	706.9	
1918	14.2	14.7	14.9	16.9	24.8	124.8	40.2	23.1	17.4	22.6	24.1	11.5	349.2	
1919	11.3	14.5	18.2	15.6	54.8	100.3	217.6	75.8	22.5	201.4	99.1	47.8	878.9	
1920	28.9	127.9	282.5	160.3	518.5	172.5	126.4	99.9	38.2	18.7	29.5	17.8	1,621.1	
1921	18.0	29.5	20.1	19.5	20.5	24.3	18.9	17.9	13.3	43.0	221.8	64.1	510.9	
1922	19.7	14.5	19.5	36.4	57.8	122.6	113.7	56.5	23.2	20.3	30.2	14.7	529.1	
1923	11.6	13.6	29.2	16.7	27.8	79.6	72.9	39.3	14.7	22.2	54.2	110.2	492.0	
1924	25.0	59.9	200.5	73.6	30.3	59.4	188.1	67.3	22.9	15.0	16.2	11.7	769.9	1/
1925	10.8	11.7	13.7	12.5	12.6	59.4	38.1	16.0	11.6	15.9	35.2	53.4	290.9	
1926	24.9	17.2	15.2	14.7	14.9	80.2	252.6	120.8	27.6	20.2	20.5	19.4	628.2	
1927	15.4	15.2	23.1	21.5	252.6	141.4	128.4	80.3	31.4	20.8	26.8	36.6	793.5	
1928	13.7	12.7	15.4	13.5	36.1	50.3	39.2	31.2	15.1	18.5	22.2	13.8	281.7	
1929	15.6	15.6	15.5	16.7	15.5	40.7	102.0	26.8	12.1	19.0	67.3	60.8	407.6	
1930	25.7	15.9	13.8	18.2	31.8	107.5	98.7	36.5	16.8	33.4	57.8	15.5	471.6	
1931	9.8	16.6	14.4	11.9	141.6	50.2	77.4	60.5	15.7	19.1	58.0	71.8	547.0	
1932	67.7	38.9	67.2	43.6	341.0	214.5	187.0	73.7	26.0	29.5	50.2	30.0	1,169.3	
1933	17.1	13.0	16.2	16.1	28.0	95.8	68.3	61.2	31.1	29.1	27.9	22.7	426.5	
1934	27.2	16.7	18.0	14.8	13.6	25.3	19.0	12.2	7.2	11.0	46.2	25.2	236.4	
1935	11.1	12.2	12.9	52.8	127.3	158.4	187.4	67.5	39.5	13.9	34.2	30.8	748.0	
1936	13.1	14.4	14.7	13.6	111.3	118.9	193.9	69.7	21.2	14.4	23.6	28.3	637.1	
1937	14.6	17.6	19.6	22.7	238.6	212.4	204.7	75.5	23.0	17.6	16.9	14.6	877.8	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER NEAR ROOSEVELT, ARIZONA (Continued)

Location: Lat. 33°37', long. 110°55', in NE¼ sec. 9, T. 3 N., R. 14 E., unsurveyed, 100 feet downstream from bridge on Globe-Young highway, a quarter of a mile downstream from Pinal Creek, 1 mile upstream from diversion dam for power canal, 14 miles east of village of Roosevelt, and 17 miles upstream from Roosevelt Dam.

Drainage Area: 4,306 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	12.2	11.4	14.3	13.0	13.3	127.7	49.3	27.0	11.4	14.2	36.7	23.5	354.0	1/
1939	9.5	9.7	13.0	13.3	19.2	83.5	113.2	31.6	9.3	7.9	22.2	13.5	345.9	
1940	11.6	13.1	12.3	14.8	33.4	56.0	55.1	26.9	13.2	13.5	20.9	25.8	296.6	
1941	29.2	28.4	184.4	217.1	166.3	512.5	285.3	310.3	81.2	41.1	36.4	33.7	1,925.9	
1942	43.7	27.9	43.0	61.1	34.6	78.8	136.4	57.7	17.5	12.9	24.2	17.0	554.8	2/
1943	15.8	14.3	19.8	55.3	50.6	171.3	98.3	37.3	12.6	10.1	23.6	19.5	528.5	
1944	15.1	12.1	12.9	12.6	20.0	72.7	78.9	40.0	14.9	11.3	16.1	21.9	328.5	
1945	17.3	14.9	15.4	16.8	30.3	100.7	153.2	71.0	15.8	11.9	31.0	11.7	490.0	
14-45 Mean	22.1	22.5	43.2	70.5	96.0	128.7	130.2	67.2	24.1	28.5	42.0	31.5	706.5	

Subsequent Records

1946	16.2	10.1	15.7	16.4	13.6	30.1	34.6	14.7	6.5	10.7	37.4	95.9	301.9	2/
1947	18.0	29.3	30.8	19.9	24.2	35.2	28.7	20.7	7.6	6.3	22.9	40.8	284.4	2/
1948	43.2	15.4	18.2	16.5	21.5	66.1	186.6	49.4	12.5	12.7	16.3	7.1	465.5	2/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

TONTO CREEK NEAR ROOSEVELT, ARIZONA

Location: Lat. 33°52', long. 111°18', in sec. 14, T. 6 N., R. 10 E., 16 miles upstream from Roosevelt Dam and 16 miles northwest of village of Roosevelt.

Drainage Area: 841 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	
1914	0.9	4.3	3.4	7.1	36.1	11.0	2.4	0.9	0.2	1.7	2.3	1.0	71.3	
1915	1.9	1.7	23.2	37.2	64.5	30.6	6.1	16.8	3.5	2.1	1.2	0.7	189.5	
1916	0.4	0.4	2.1	165.5	14.5	11.7	6.4	5.3	2.4	0.8	6.4	6.1	222.0	
1917	4.4	1.2	1.5	15.9	8.1	5.5	54.8	5.0	2.6	3.9	4.6	2.1	109.6	
1918	0.8	1.2	1.7	2.8	6.6	19.6	4.4	0.5	0.3	2.5	5.1	0.6	46.1	
1919	0.1	2.3	6.9	3.3	35.2	20.6	11.3	2.3	0.4	13.9	14.1	2.0	112.4	
1920	2.7	21.5	49.8	28.3	91.4	30.7	22.3	5.9	1.4	0.9	12.5	1.2	268.6	
1921	1.6	4.5	1.7	1.6	2.0	2.1	1.2	0.5	0.2	5.5	12.8	1.7	35.4	
1922	1.9	1.0	8.8	22.3	38.9	60.6	13.3	4.8	0.8	2.9	3.5	0.7	159.5	
1923	0.4	1.0	12.8	2.3	20.8	58.3	6.2	1.8	0.3	4.6	5.6	6.3	120.4	
1924	0.2	8.4	75.0	23.9	3.0	7.1	12.0	2.6	0.4	0.7	0.3	0.5	134.1	
1925	0.4	0.2	5.2	2.6	1.3	9.2	2.8	0.7	0.6	1.5	3.8	8.4	36.7	
1926	5.8	2.6	2.6	1.1	0.8	7.4	103.1	23.2	0.8	1.2	2.6	4.1	155.3	
1927	1.5	0.2	12.2	1.2	84.7	15.6	9.7	3.8	9.7	3.2	5.5	18.0	165.3	1/
1928	0.5	1.0	1.6	2.4	17.3	2.1	0.3	0.9	0.3	1.3	5.8	2.2	35.7	
1929	1.0	2.6	1.3	2.5	7.9	11.4	29.3	1.8	0.7	0.2	4.1	1.4	64.2	
1930	0.1	0.1	0.2	1.6	0.9	15.2	5.6	1.2	0.2	7.3	4.5	0.7	37.6	
1931	0.4	7.7	3.5	0.4	45.3	4.3	10.7	6.8	0.2	0.9	9.7	2.1	92.0	
1932	0.9	15.8	31.8	18.4	114.9	23.8	9.2	2.3	0.5	2.3	4.3	0.8	225.0	
1933	2.8	1.0	3.5	6.9	8.5	10.8	3.2	5.0	0.4	1.5	1.3	2.3	47.2	
1934	2.6	1.0	1.6	1.1	3.2	1.1	0.4	0.3	0.3	0.3	3.9	3.7	19.5	
1935	0.3	2.0	0.9	18.3	20.5	28.3	11.3	2.4	0.4	0.5	5.6	3.4	93.9	
1936	0.6	0.7	1.0	0.7	18.5	13.9	9.6	1.1	0.2	1.0	4.3	2.6	54.2	
1937	0.4	1.4	3.3	13.0	76.8	62.2	11.7	2.3	0.7	2.0	0.8	0.4	175.0	
1938	0.4	0.2	0.3	0.5	1.5	33.1	1.8	0.5	0.5	0.2	2.8	2.9	44.7	
1939	0	0	3.1	2.6	8.1	9.3	5.2	0.6	0.3	0.1	2.1	4.6	35.8	2/
1940	0.2	0.2	0.5	1.2	4.5	1.1	1.3	0.2	0.4	0.5	1.8	1.0	12.9	2/
1941	3.6	1.9	56.8	40.0	53.0	119.0	74.0	36.0	2.5	2.0	3.4	1.2	393.4	3/
1942	1.6	2.6	9.1	18.7	3.1	9.4	6.2	2.3	0.3	0.3	1.1	1.0	55.7	4/
1943	0.5	0.7	2.9	19.0	9.4	34.0	2.7	0.6	0.1	0	1.5	0.5	71.9	4/
1944	0.4	0.4	0.7	1.0	22.0	44.0	15.5	4.2	0.4	0.3	0.1	0.4	89.4	4/
1945	0.3	0.7	1.0	3.2	6.3	46.0	14.5	3.0	0.3	0.5	3.5	0.1	79.4	4/
14-45 Mean	1.2	2.8	10.3	14.6	25.9	23.7	14.6	4.6	1.0	2.1	4.4	2.7	107.9	

Subsequent Records

1946	0.2	0.3	1.9	1.2	0.6	0.9	0.6	0.2	0	0.1	4.4	27.0	37.4	4/
1947	1.0	8.3	18.2	6.3	2.8	2.3	0.7	0.3	0	0	7.9	0.2	48.0	4/
1948	0.4	0.6	5.2	1.1	1.6	7.5	5.5	0.5	0	0.2	1.6	0	24.2	4/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey Water-Supply Papers 879 and 899.
3/ Oct, Nov, and Dec are from W.S.P. 929; other months are estimated.
4/ Estimated.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

VERDE RIVER BELOW BARTLETT DAM, ARIZONA

Location: Lat. 33°48'30", long. 111°40'00", in NE¼ sec. 6, T. 5 N., R. 7 E., 2¼ miles downstream from Bartlett Dam and 3½ miles upstream from Camp Creek. Prior to 1942 at sites 3 to 20 miles downstream.
Drainage Area: 6,159 square miles since Jan. 1, 1942. 6,620 square miles prior to 1925 and 6,180 square miles from 1925 to 1942.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	12.6	20.1	18.8	58.8	169.1	44.1	15.0	9.5	6.8	12.5	14.4	13.7	395.4	
1915	20.1	16.1	40.1	76.3	136.0	149.3	90.7	108.7	12.3	20.1	21.4	13.8	704.9	
1916	10.9	14.8	24.1	434.7	64.0	197.5	41.4	14.2	9.5	12.4	31.2	77.1	931.8	
1917	44.6	19.4	20.9	75.2	83.1	108.2	357.3	77.1	14.0	25.6	44.7	23.1	893.2	
1918	15.2	14.5	16.3	24.2	50.2	283.6	21.1	9.8	8.2	11.8	33.5	11.3	499.7	
1919	11.9	20.6	28.2	21.2	52.9	95.9	79.3	10.6	7.0	130.7	55.7	28.0	542.0	
1920	45.6	169.6	137.1	137.4	515.1	115.8	61.9	18.8	12.4	11.1	28.0	13.5	1,266.3	
1921	14.8	27.6	21.0	19.4	18.6	32.1	14.0	10.3	7.5	18.2	104.2	21.9	309.6	
1922	27.2	17.1	88.3	159.5	152.7	201.6	63.7	15.8	9.7	12.8	20.5	14.3	783.2	
1923	11.4	16.8	75.6	21.3	67.9	135.7	47.2	11.9	6.9	12.2	15.6	114.8	537.3	
1924	16.6	57.6	215.2	61.1	20.6	32.1	97.9	10.6	5.9	11.5	6.4	12.0	547.5	1/
1925	14.0	12.6	26.6	18.4	18.3	25.4	26.9	12.5	7.4	12.5	21.8	67.1	263.5	
1926	47.9	20.3	22.6	18.3	16.3	44.3	263.2	25.1	7.0	11.9	15.3	20.6	512.8	
1927	15.2	12.8	26.6	19.6	393.2	124.8	48.1	12.0	12.0	16.0	29.1	108.8	818.2	
1928	17.1	17.7	26.1	29.5	81.8	61.3	14.3	10.4	6.7	8.1	29.7	11.2	313.9	
1929	16.2	16.3	18.6	19.7	22.9	84.1	127.5	9.2	6.9	10.1	35.7	23.2	390.4	
1930	10.8	12.9	14.4	17.9	24.6	82.5	32.4	10.8	5.9	19.2	38.4	16.8	286.6	
1931	13.8	30.6	21.9	14.1	167.7	39.3	15.0	15.1	5.8	9.9	47.9	22.4	403.5	
1932	13.1	35.7	58.3	29.4	371.2	223.8	46.2	12.2	8.2	13.8	15.2	8.0	835.1	
1933	18.0	12.4	18.1	23.5	20.2	44.6	17.8	21.2	8.8	11.2	10.1	13.8	219.7	
1934	14.3	12.3	15.6	16.0	15.0	13.9	15.3	7.4	6.3	7.6	27.8	12.8	164.3	
1935	10.2	15.9	19.5	64.3	124.2	121.2	59.5	11.3	6.8	7.4	36.4	28.9	505.6	
1936	14.7	14.7	17.1	16.3	49.8	59.6	41.2	9.2	5.5	13.7	26.7	18.9	287.4	
1937	13.0	18.6	17.9	28.4	351.7	250.7	84.5	11.5	8.4	13.3	10.1	11.1	819.2	

VERDE RIVER BELOW BARTLETT DAM, ARIZONA

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

VERDE RIVER BELOW BARTLETT DAM, ARIZONA (Continued)

Location: Lat. 33°46'30", long. 111°40'00", in NE¼ sec. 6, T. 5 N., R. 7 E., 2¼ miles downstream from Bartlett Dam and 3½ miles upstream from Camp Creek. Prior to 1942 at sites 3 to 20 miles downstream.
Drainage Area: 6,159 square miles since Jan. 1, 1942. 6,620 square miles prior to 1925 and 6,180 square miles from 1925 to 1942.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	12.6	12.8	16.1	16.7	22.6	289.9	13.3	7.9	5.9	8.5	17.8	12.1	436.2	1/
1939	10.0	12.0	23.9	18.3	18.8	49.5	23.6	7.9	5.1	5.1	18.3	57.6	250.1	↑
1940	25.9	16.3	23.9	18.3	31.4	41.1	20.4	9.5	5.4	9.0	17.3	20.4	238.9	|
1941	32.7	26.6	18.6	28.7	187.4	301.4	287.2	39.7	58.7	50.0	48.8	70.3	1,150.1	|
1942	14.1	14.4	6.4	3.6	9.6	49.1	48.4	44.3	51.3	33.8	11.0	7.9	293.9	2/
1943	8.8	12.8	10.6	19.8	24.9	58.4	57.9	44.7	6.8	6.0	3.9	28.2	282.8	|
1944	18.3	13.0	2.1	18.7	13.4	59.6	102.1	43.9	53.6	34.5	47.9	31.4	438.5	|
1945	11.4	1.7	27.2	17.2	25.9	54.4	69.9	47.2	46.1	23.4	26.6	44.9	395.9	↓
14-45 Mean	18.2	23.0	34.9	48.3	103.8	108.6	72.0	22.2	13.4	18.9	28.5	30.6	522.4	

Subsequent Records

1946	13.3	10.1	14.1	15.6	17.5	16.0	36.1	19.6	8.3	4.2	7.5	28.0	190.3	2/
1947	6.0	7.4	28.5	12.9	25.8	35.5	22.7	13.8	8.3	8.0	3.7	19.1	191.7	2/
1948	22.5	12.9	26.2	11.4	6.4	41.4	55.2	15.9	14.4	6.0	8.1	17.4	237.8	2/

1/ Geological Survey Water-Supply Paper 1049. Published as Verde River near McDowell and above Camp Creek, near McDowell, Arizona.

2/ Geological Survey annual Water-Supply Papers. Published as Verde River above Camp Creek, near McDowell, until 1942. Records at the several sites are comparable.

VERDE RIVER BELOW BARTLETT DAM, ARIZONA

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

DIVERSION FOR CITY OF PHOENIX FROM VERDE RIVER AT McDOWELL, ARIZONA

Location: Lat. 33°34', long. 111°40', in NE¼ sec. 30, T. 3 N., R. 7 E., on canal, 2 miles northwest of mouth of Verde River, 3.9 miles downstream from intake, and 4.5 miles downstream from McDowell.

Water is pumped from infiltration galleries and shallow wells on right bank of Verde River in SE¼ sec. 6, T. 3 N., R. 7 E., three quarters of a mile downstream from McDowell and 6¼ miles upstream from mouth of Verde River. Water is used for municipal supply of Phoenix and is carried 29 miles to that city by pipe line.

Diversions began in February 1922.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1922					0.5	0.5	0.6	0.7	0.7	0.8	0.7	0.7	5.2	
1923	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.8	0.9	0.8	0.7	7.7	
1924	0.6	0.5	0.5	0.5	0.5	0.6	0.7	0.8	0.8	1.0	0.9	0.7	8.1	
1925	0.6	0.5	0.6	0.6	0.5	0.7	0.7	0.4	0.3	0.8	0.9	0.8	7.4	
1926	0.4	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.8	1.1	0.9	0.7	8.5	
1927	0.8	0.6	0.6	0.7	0.6	0.7	0.8	0.9	1.0	1.2	1.0	0.9	9.8	
1928	0.9	0.7	0.7	0.7	0.7	0.9	0.9	1.0	1.1	1.3	1.2	1.0	11.1	
1929	1.0	0.9	0.9	0.9	0.7	1.1	1.1	1.2	1.2	1.3	1.4	1.4	13.1	1/
1930	1.2	1.0	1.1	0.9	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.2	13.6	
1931	1.1	1.0	1.0	1.1	1.0	0.9	1.1	1.1	1.3	1.5	1.3	1.2	13.6	
1932	1.3	0.9	0.9	1.1	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.3	14.4	
1933	0.8	0.8	0.7	0.7	0.6	0.9	1.0	1.2	1.6	1.7	1.6	1.2	12.8	
1934	1.0	0.8	0.7	0.8	0.8	1.2	1.4	1.6	1.6	1.9	1.5	1.5	14.8	
1935	1.3	0.9	0.8	0.7	0.7	0.9	1.3	1.4	1.7	1.7	1.3	1.3	14.0	
1936	1.1	0.8	0.8	0.8	0.6	0.9	1.0	1.2	1.4	1.4	1.3	1.2	12.5	
1937	1.0	0.8	0.7	0.7	0.7	0.9	1.2	1.4	1.6	1.8	1.8	1.3	13.9	
1938	1.2	0.9	0.8	0.8	0.8	1.0	1.4	1.5	1.8	1.9	1.8	1.7	15.6	
1939	1.3	1.0	0.8	0.8	0.8	1.2	1.4	1.8	2.0	2.2	1.9	1.3	16.5	2/
1940	1.3	0.9	1.1	1.1	1.1	1.5	1.7	2.0	2.2	2.4	2.3	1.7	19.3	
1941	1.3	1.1	0.9	1.0	1.1	1.2	1.3	1.7	2.1	2.3	2.1	1.7	17.8	
1942	1.2	1.1	0.9	1.0	1.1	1.4	1.5	2.0	2.4	2.5	1.9	1.5	18.5	3/
1943	1.5	1.1	1.1	1.0	1.1	1.5	1.7	2.2	1.8	1.5	1.7	1.6	17.8	
1944	1.2	1.0	1.1	1.2	1.1	1.4	1.6	2.1	2.3	2.4	2.4	2.1	19.9	
1945	1.6	1.2	0.9	1.0	1.3	1.5	1.8	2.3	2.2	2.3	2.0	2.0	20.1	4/
14-45 Mean	0.8	0.6	0.6	0.6	0.6	0.8	0.9	1.0	1.1	1.2	1.1	0.9	10.2	

Subsequent Records

1946	1.5	1.2	1.2	1.2	1.1	1.8	1.8	1.9	2.1	2.2	1.8	1.9	19.7	4/
1947	1.4	1.2	1.4	1.4	1.6	2.0	2.2	1.7	1.9	2.4	1.9	1.8	20.9	4/
1948	2.0	1.5	1.5	1.6	1.5	1.8	2.3	2.6	2.4	2.6	2.5	2.5	24.8	4/

1/ Geological Survey Water-Supply Paper 1049.
2/ Geological Survey Water-Supply Paper 879.
3/ Geological Survey Water Supply Paper 1009.
4/ Records furnished by Salt River Valley Water Users' Association.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER AT GRANITE REEF DAM, ARIZONA 1/

Location: Lat. 33°31', long. 111°42', about the center of sec. 13, T. 2 N., R. 6 E., 2.5 miles downstream from former Arizona Dam, and 3.75 miles downstream from Verde River.

Drainage Area: 12,907 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	62.4	40.9	31.2	70.9	176.0	91.9	92.5	101.0	73.1	75.9	97.9	94.8	1,008.5	
1915	50.3	41.7	76.9	98.0	152.0	175.0	222.0	411.0	135.0	138.0	130.0	118.0	1,747.9	
1916	97.8	70.8	54.4	1250.0	616.0	833.0	327.0	164.0	140.5	148.0	124.0	166.0	3,991.5	
1917	107.0	70.6	48.0	105.0	106.0	164.0	406.0	166.0	151.0	162.0	127.0	139.0	1,751.6	
1918	114.0	76.6	58.3	56.4	70.5	309.0	145.0	151.1	149.0	136.0	143.0	152.0	1,560.9	
1919	87.9	53.5	41.2	40.4	74.1	125.0	139.0	129.0	136.0	188.0	150.0	118.0	1,282.1	
1920	83.5	191.0	152.0	186.0	877.0	291.0	228.0	134.0	134.0	152.0	155.0	131.0	2,714.5	
1921	64.2	61.6	46.9	49.3	67.7	114.0	97.7	106.0	111.0	133.0	169.0	119.0	1,139.4	
1922	78.5	55.2	114.0	182.0	172.0	250.0	127.0	128.0	124.0	137.0	137.0	131.0	1,635.7	
1923	68.7	46.0	81.7	53.7	75.3	156.0	121.0	125.0	118.3	116.0	124.0	196.0	1,281.7	
1924	58.2	72.9	244.0	72.0	60.3	78.7	142.0	134.0	155.0	174.0	188.3	157.0	1,536.4	
1925	63.3	39.6	39.9	31.3	47.8	86.2	97.7	87.5	87.1	105.1	81.8	132.0	899.3	2/
1926	52.0	34.8	30.4	23.1	32.7	72.5	275.0	81.6	105.0	112.0	94.9	128.0	1,042.0	
1927	54.4	49.6	49.5	48.3	467.0	151.0	84.6	93.8	96.5	117.0	102.0	177.0	1,490.7	
1928	73.7	52.2	38.1	38.2	106.0	105.4	94.2	105.0	131.0	147.0	116.0	142.0	1,148.8	
1929	50.4	37.0	23.3	25.6	37.1	107.0	163.0	89.1	93.9	90.0	81.5	131.0	928.9	
1930	54.3	37.7	18.9	21.5	31.9	92.6	57.6	59.2	89.0	83.2	86.0	129.0	760.9	
1931	49.3	51.2	24.9	18.4	176.0	64.3	62.6	77.7	87.5	99.5	76.3	105.0	892.7	
1932	73.1	56.4	60.2	33.9	393.0	225.0	91.3	110.0	112.0	110.0	105.0	146.0	1,515.9	
1933	61.2	62.1	31.4	31.2	33.8	81.3	72.1	84.3	99.6	114.2	95.7	121.0	887.9	
1934	88.8	58.3	29.4	49.0	42.4	76.2	84.2	74.9	78.3	95.2	68.7	117.0	862.4	
1935	68.6	40.6	22.5	62.8	127.4	118.8	100.1	86.1	109.0	120.9	88.4	115.6	1,060.8	
1936	80.1	52.7	39.6	40.1	46.9	94.9	109.6	107.5	123.4	123.3	105.9	131.9	1,055.9	
1937	73.7	57.8	35.1	28.8	360.9	253.1	129.8	130.4	123.8	160.4	170.8	150.0	1,674.6	

SALT RIVER AT GRANITE REEF DAM, ARIZONA

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER AT GRANITE REEF DAM, ARIZONA (Continued) 1/

Location: Lat. 33°31', long. 111°42', about the center of sec. 13, T. 2 N., R. 6 E., 2.5 miles downstream from former Arizona Dam, and 3.75 miles downstream from Verde River.

Drainage Area: 12,907 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	78.3	48.1	29.3	27.0	36.3	313.4	105.5	106.1	121.6	129.0	121.4	134.6	1,250.6	A
1939	72.6	49.3	30.7	19.2	30.3	75.8	84.6	81.0	84.8	92.2	81.0	65.8	767.3	|
1940	63.3	43.3	43.1	22.7	30.3	82.3	73.5	64.4	67.9	70.9	47.9	49.1	658.7	
1941	35.8	31.7	33.0	28.6	187.3	302.7	431.4	389.7	154.2	143.8	149.0	160.8	2,048.0	2/
1942	78.4	59.1	36.4	26.9	65.7	93.9	101.2	119.6	136.8	133.2	114.7	115.5	1,081.4	
1943	77.7	53.5	52.3	23.6	46.1	81.1	105.1	117.1	119.9	115.6	67.4	113.7	973.1	|
1944	87.9	64.8	34.7	29.0	32.6	66.3	114.3	97.5	122.1	111.5	103.3	131.6	995.6	
1945	92.0	37.1	54.8	18.5	42.9	70.1	98.3	108.8	116.3	101.5	88.9	144.1	973.3	V
14-45 Mean	71.9	56.2	53.3	87.9	150.7	162.5	143.2	125.6	115.2	123.0	112.2	130.1	1,331.8	

Subsequent Records

1946	86.9	71.3	51.8	15.0	55.3	99.5	91.4	95.5	102.3	73.9	74.9	89.4	909.2	2/
1947	73.2	38.3	66.7	35.1	47.6	72.9	72.3	55.8	65.3	58.0	55.4	75.2	715.8	2/
1948	53.2	30.0	43.6	20.0	27.6	64.1	92.9	66.6	71.9	67.0	69.5	86.2	692.6	2/
1949	50.9	35.6	30.4	7.6	27.2	96.4	91.6	76.9	87.3	102.4	95.6	105.0	806.9	2/
1950	54.7	35.4	26.8	20.1	31.5	74.3	93.2	64.0	89.1	82.2	93.7	85.4	750.4	2/
1951	42.9	26.3	30.5	16.1	12.8	63.8	45.0	41.0	71.1	83.6	64.6			2/

1/ These records are computed as the sum of the total diversions by the two canals at Granite Reef Dam and the spills over Granite Reef Dam, and represent the total flow of Salt River immediately upstream from diversions at Granite Reef Dam.

2/ Records furnished by Salt River Valley Water Users' Association.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

DIVERSIONS FROM SALT RIVER AT GRANITE REEF DAM, ARIZONA 1/

Location: Granite Reef Dam, lat. 33°31', long. 111°42', about the center of sec. 13, T. 2 N., R. 6 E., 2.5 miles downstream from former Arizona Dam, and 3.75 miles downstream from Verde River.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	60.9	35.4	29.1	41.7	51.4	74.0	87.0	98.1	71.5	74.2	95.1	93.2	811.6	
1915	47.0	38.7	27.6	15.2	31.3	90.9	101.2	122.3	120.2	129.1	117.3	113.8	954.6	
1916	94.9	67.9	42.4	39.6	59.1	98.9	118.2	140.7	140.5	145.4	119.4	89.2	1,156.2	
1917	86.4	70.6	43.5	15.9	39.8	107.9	96.9	124.4	150.4	144.3	116.9	136.3	1,133.3	
1918	114.0	76.5	57.5	40.3	48.5	82.9	143.7	151.1	148.6	134.1	128.4	142.3	1,267.9	
1919	87.7	48.1	23.9	23.4	34.6	94.6	119.4	129.0	135.7	106.4	125.4	101.7	1,029.9	
1920	49.0	31.2	14.4	24.6	33.0	75.2	118.8	112.1	133.1	151.8	147.9	130.9	1,022.0	
1921	43.3	28.8	28.6	42.8	67.3	113.5	97.5	105.2	111.0	126.4	88.8	114.4	967.6	
1922	59.8	40.3	31.8	28.0	51.5	82.4	114.1	125.6	122.6	136.1	132.6	129.2	1,054.0	
1923	68.6	44.9	27.3	51.4	53.7	102.4	118.7	124.2	118.3	115.4	122.5	124.4	1,071.8	2/
1924	58.2	14.3	24.5	39.5	59.7	77.6	132.1	132.0	154.6	173.6	188.3	156.8	1,211.2	
1925	62.6	39.6	36.6	31.3	47.8	86.1	96.8	87.5	87.1	105.1	81.7	107.3	869.5	
1926	44.6	34.8	30.4	22.9	32.4	72.3	54.9	81.6	104.6	111.9	94.9	123.4	808.7	
1927	54.4	49.6	22.6	37.4	66.3	121.1	84.2	93.6	95.9	116.3	100.5	116.4	958.3	
1928	73.7	52.2	37.9	37.0	66.2	105.4	94.2	104.9	130.6	146.7	115.6	138.4	1,102.8	
1929	50.4	37.0	23.3	25.5	37.1	100.8	91.8	89.1	93.9	90.0	80.5	129.6	849.0	
1930	54.3	37.7	18.9	20.6	31.9	85.3	57.6	59.2	89.0	82.5	77.8	128.0	742.8	
1931	49.3	49.6	24.9	18.4	47.5	64.3	62.6	77.7	87.5	99.5	74.2	104.6	760.1	
1932	73.1	53.0	43.8	33.1	61.4	136.1	91.3	109.5	111.7	109.6	104.7	145.7	1,073.0	
1933	61.2	62.1	31.4	30.8	33.7	81.3	72.1	84.3	99.6	114.2	95.7	120.5	886.9	
1934	87.3	58.3	29.4	49.0	42.4	76.2	84.2	74.9	78.3	95.2	68.5	116.8	860.5	
1935	68.6	40.6	22.3	51.5	69.8	84.6	91.6	86.1	109.0	120.9	88.3	115.6	948.9	
1936	80.0	52.7	39.6	40.1	39.6	94.9	109.6	107.5	123.4	119.7	102.8	131.9	1,041.8	
1937	73.7	57.8	34.8	27.3	79.4	102.7	127.2	130.3	122.9	159.9	170.3	149.8	1,236.1	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

DIVERSIONS FROM SALT RIVER AT GRANITE REEF DAM, ARIZONA (Continued) 1/

Location: Granite Reef Dam, lat. 33°31', long. 111°42', about the center of sec. 13, T. 2 N., R. 6 E., 2.5 miles downstream from former Arizona Dam, and 3.75 miles downstream from Verde River.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	78.1	48.0	29.3	27.0	36.3	96.5	105.5	106.1	121.5	128.9	121.2	134.6	1,033.0	2/
1939	72.6	49.3	30.4	19.2	30.3	75.8	84.6	81.0	84.8	91.8	80.0	57.1	756.9	3/
1940	63.3	43.3	43.1	22.7	30.3	82.3	73.5	64.4	67.9	70.9	47.9	48.9	658.5	4/
1941	35.8	31.7	17.7	26.1	59.6	42.7	103.2	150.5	154.2	142.6	148.2	159.8	1,072.1	
1942	78.4	58.7	36.3	25.6	65.7	93.9	100.9	119.6	136.8	133.0	114.7	115.1	1,078.7	
1943	77.7	53.5	52.3	23.6	46.1	80.6	105.0	117.0	119.9	115.6	64.3	113.5	969.1	
1944	87.9	64.8	34.7	28.9	32.1	66.3	114.0	97.3	122.0	111.3	103.3	131.5	994.1	
1945	92.0	37.1	54.1	18.4	42.9	69.7	98.3	108.8	116.3	100.1	88.8	144.1	970.6	5/
14-45 Mean	68.4	47.1	32.6	30.6	47.8	88.1	98.5	106.1	114.5	118.8	106.4	120.8	979.7	
Subsequent Records														
1946	86.7	71.3	51.8	15.0	55.2	99.5	91.3	95.4	102.3	75.8	74.9	87.1	906.3	5/
1947	73.2	38.3	66.4	35.0	47.5	72.9	72.3	55.8	65.3	58.0	55.0	74.9	714.6	5/
1948	53.2	30.0	43.0	20.0	27.5	64.0	92.9	66.6	71.9	66.9	69.3	86.2	691.5	5/

1/ Records show net diversion which was computed as the sum of the diversions near head of the two canals less flow returned to river from the canals by wasteways between the dam and irrigated lands.

2/ Geological Survey Water-Supply Paper 1049.

3/ Geological Survey Water-Supply Paper 879.

4/ Geological Survey Water-Supply Paper 1009.

5/ Computed from records furnished by Salt River Valley Water Users' Association.

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER BELOW GRANITE REEF DAM, ARIZONA 1/

The record for this station is computed from records obtained at other stations.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	1.5	5.5	2.1	29.2	124.6	17.9	5.5	2.9	1.6	1.7	2.8	1.6	196.9	
1915	3.3	3.0	49.3	82.8	120.7	84.1	120.8	288.7	14.8	8.9	12.7	4.2	793.3	
1916	2.9	2.9	12.0	1,210.4	556.9	734.1	208.8	23.3	0	2.6	4.6	76.8	2,835.3	
1917	20.6	0	4.5	89.1	66.2	56.1	309.1	41.6	0.6	17.7	10.1	2.7	618.3	
1918	0	0.1	0.8	16.1	22.0	226.1	1.3	0	0.4	1.9	14.6	9.7	293.0	
1919	0.2	5.4	17.3	17.0	39.5	30.4	19.6	0	0.3	81.6	24.6	16.3	252.2	
1920	34.5	159.8	137.6	161.4	844.0	215.8	109.2	21.9	0.9	0.2	7.1	0.1	1,692.5	
1921	20.9	32.8	18.3	6.5	0.4	0.5	0.2	0.8	0	6.6	80.2	4.6	171.8	
1922	18.7	14.9	82.2	154.0	120.5	167.6	12.9	2.4	1.4	0.9	4.4	1.8	581.7	
1923	0.1	1.1	54.4	2.3	21.6	53.6	2.3	0.8	0	0.6	1.5	71.6	209.9	
1924	0	58.6	219.5	32.5	0.6	1.1	9.9	2.0	0.4	0.4	0	0.2	325.2	2/
1925	0.7	0	3.3	0	0	0.1	0.9	0	0	0	0.1	24.7	29.8	
1926	7.4	0	0	0.2	0.3	0.2	220.1	0	0.4	0.1	0	4.6	233.3	
1927	0	0	26.9	10.9	400.7	29.9	0.4	0.2	0.6	0.7	1.5	60.6	532.4	
1928	0	0	0.2	1.2	39.8	0	0	0.1	0.4	0.3	0.4	3.6	46.0	
1929	0	0	0	0.1	0	6.2	71.2	0	0	0	1.0	1.4	79.9	
1930	0	0	0	0.9	0	7.3	0	0	0	0.7	8.2	1.0	18.1	
1931	0	1.6	0	0	128.5	0	0	0	0	0	2.1	0.4	132.6	
1932	0	3.4	16.4	0.8	331.6	88.9	0	0.5	0.3	0.4	0.3	0.3	442.9	
1933	0	0	0	0.4	0.1	0	0	0	0	0	0	0.5	1.0	
1934	1.5	0	0	0	0	0	0	0	0	0	0.2	0.2	1.9	
1935	0	0	0.2	11.3	57.6	34.2	8.5	0	0	0	0.1	0	111.9	
1936	0.1	0	0	0	7.3	0	0	0	0	3.6	3.1	0	14.1	
1937	0	0	0.3	1.5	281.5	150.4	2.6	0.1	0.9	0.5	0.5	0.2	438.5	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

SALT RIVER BELOW GRANITE REEF DAM, ARIZONA (Continued) 1/

The record for this station is computed from records obtained at other stations.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	0.2	0.1	0	0	0	216.9	0	0	0.1	0.1	0.2	0	217.6	2/
1939	0	0	0.3	0	0	0	0	0	0	0.4	1.0	8.7	10.4	2/
1940	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	2/
1941	0	0	15.3	2.5	127.7	260.0	328.2	239.2	0	1.2	0.8	1.0	975.9	2/
1942	0	0.4	0.1	1.3	0	0	0.3	0	0	0.2	0	0.4	2.7	2/
1943	0	0	0	0	0	0.5	0.1	0.1	0	0	3.1	0.2	4.0	2/
1944	0	0	0	0.1	0.5	0	0.3	0.2	0.1	0.2	0	0.1	1.5	2/
1945	0	0	0.7	0.1	0	0.4	0	0	0	1.4	0.1	0	2.7	2/
14-45 Mean	3.5	9.1	20.7	57.3	102.9	74.4	44.7	19.5	0.7	4.2	5.8	9.3	352.1	

Subsequent Records

1946	0.2	0	0	0	0.1	0	0.1	0.1	0	0.1	0	2.3	2.9	2/
1947	0	0	0.3	0.1	0.1	0	0	0	0	0	0.4	0.3	1.2	2/
1948	0	0	0.6	0	0.1	0.1	0	0	0	0.1	0.2	0	1.1	2/

1/ This record is computed as the sum of spills over Granite Reef Dam and water returned to the river from the canals by wasteways and sluicing between the dam and irrigated lands. These records represent the total flow of Salt River at Granite Reef Dam less net diversions for irrigation.

2/ Computed from records published by the Geological Survey and records furnished by the Salt River Valley Water Users' Association.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

AGUA FRIA RIVER AT LAKE PLEASANT DAM, ARIZONA

Location: Lat. 33°51', long. 112°16', in NW¼ sec. 21, T. 6 N., R. 1 E., at left upstream end of Lake Pleasant Dam, 2¼ miles upstream from New River.
Drainage Area: 1,459 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	
1914	1.0	3.0	0.4	7.8	55.2	1.6	1.3	0.1	0.1	3.2	0.1	3.8	77.6	1/
1915	2.7	0.4	10.1	152.1	48.3	9.2	2.5	9.9	0.6	5.4	6.4	2.4	250.0	
1916	0.2	2.3	15.0	701.8	33.2	31.0	8.9	1.7	0.4	1.5	3.8	7.1	806.9	
1917	12.4	1.0	1.2	22.7	18.9	6.8	92.3	5.8	0.9	63.9	9.0	5.6	240.5	2/
1918	0.5	0.5	0.7	3.7	1.3	13.5	1.2	0.2	0.8	0.9	22.1	0.6	46.0	
1919	0.4	1.8	1.9	0.5	11.2	3.4	1.7	0.6	0.2	22.4	13.7	16.7	74.5	
1920	1.9	180.0	16.4	80.4	128.9	22.4	7.5	4.3	0.7	2.1	11.3	10.1	466.0	
1921	1.0	4.4	2.4	1.8	3.1	1.3	1.5	0.1	0.1	21.0	20.7	8.6	66.0	
1922	34.7	1.0	14.2	94.0	65.1	66.0	6.5	1.8	1.6	2.8	5.1	13.1	305.9	
1923	1.3	1.4	5.3	0.7	4.2	57.1	6.3	3.2	2.3	4.0	4.9	52.3	143.0	
1924	0.1	6.5	74.6	16.8	2.7	6.3	17.3	1.1	0.9	1.0	7.4	7.8	142.5	
1925	2.1	1.5	4.5	1.1	1.1	1.1	1.1	0.8	1.1	6.5	10.4	11.5	42.8	
1926	1.1	1.0	2.2	2.7	4.1	9.1	72.0	17.7	1.2	6.1	24.3	22.7	164.2	1/
1927	6.0	4.0	40.0	1.0	170.0	24.0	23.0	2.0	1.0	0.8	24.1	31.1	327.0	
1928	1.8	0.5	3.7	2.2	9.4	2.0	2.8	2.4	1.5	1.6	9.9	2.0	39.8	
1929	1.6	0.3	0.6	0.6	0.4	0.3	5.3	0.1	0.1	0.6	4.5	8.8	23.2	
1930	0.4	0.2	0.2	1.2	0.6	8.6	2.2	0.4	0.2	4.9	9.4	6.0	34.3	
1931	0.4	6.4	0.6	0.6	56.1	0.9	0.4	0.3	0.2	5.4	29.4	2.2	102.9	
1932	1.7	1.0	6.2	1.7	58.1	9.1	0.6	0.4	0.3	1.0	3.4	0.7	84.2	
1933	2.0	0.3	1.1	9.2	2.6	4.4	1.0	0.8	0.8	1.8	3.1	5.4	32.5	
1934	1.3	0.5	0.3	0.3	0.2	0.4	0.2	0.2	0.2	0.4	8.7	0.9	13.6	
1935	0.2	0.8	2.1	8.3	28.1	14.9	2.1	0.2	0.8	3.5	9.3	8.4	78.7	
1936	0.2	0.4	0.4	0.4	1.6	1.3	0.5	0.3	0.3	5.0	9.7	3.9	24.0	2/
1937	0.6	0.3	1.1	4.3	58.2	41.8	2.1	0.1	1.4	1.3	2.2	1.2	114.6	
1938	0.6	0.5	0.4	0.3	0.2	25.7	0.4	0.1	0	0	0.5	0.4	29.1	
1939	0.3	0.1	5.4	0.4	1.3	1.9	0.6	0	0	0	2.6	17.4	30.0	
1940	0.3	0.5	0.5	0.2	2.5	0.2	1.3	0.5	0.8	0.4	1.3	1.7	10.2	
1941	3.7	0.3	19.0	11.5	17.0	74.2	68.2	3.8	0.8	4.5	4.1	2.0	209.1	
1942	1.5	0.8	4.0	2.9	1.4	2.6	1.1	0.2	0	0.6	3.5	3.3	21.9	3/
1943	1.2	0.7	0.5	1.6	0.3	2.2	0.2	0.1	0.1	0.1	11.6	3.4	22.0	
1944	0.7	0.4	0.3	0.2	12.5	19.8	2.6	0.5	0	1.2	2.0	2.2	42.4	
1945	0.2	0.7	0.9	1.5	5.2	19.9	4.2	0.5	1.0	2.3	4.0	0.2	40.6	
14-45 Mean	2.6	7.0	7.4	35.5	25.1	15.1	10.6	1.9	0.6	5.5	8.8	8.2	128.3	

Subsequent Records

1946	1.4	0.4	0.7	0.3	0.2	0.1	0.1	0	0.1	1.4	4.0	2.3	11.0	3/
1947	0.5	0.7	1.3	0.5	0.2	0.1	0	0.2	0.1	0.1	3.9	0.1	7.7	
1948	0	0	0.2	0.1	0.1	0.1	0	0	0	0.2	4.5	0	5.2	

1/ Records of Maricopa County Municipal Water Conservation District No. 1.
2/ Geological Survey Water-Supply Paper 1049.
3/ Geological Survey annual Water-Supply Papers.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

DIVERSIONS BY GILLESPIE CANAL AT GILLESPIE DAM, ARIZONA

Location: Lat. 33°13'45", long. 112°45'30", in SE¼NE¼ sec. 28, T. 2 S., R. 5 W., 200 feet downstream from head gates at Gillespie Dam, 20 miles north of Gila Bend.
Canal diverts water from left bank of Gila River just upstream from left end of Gillespie Dam for irrigation in vicinity of Gila Bend.
Diversions began during latter part of 1921.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1921													20.0	
1922													80.0	
1923													80.0	
1924													80.0	
1925													80.0	
1926													101.6	
1927													144.4	*
1928													130.6	
1929													84.3	
1930													81.8	
1931													96.0	
1932													97.9	
1933													75.5	
1934													55.0	
1935									3.0	1.4	4.4	6.9	*76.6	
1936	3.1	5.0	8.3	8.7	7.6	9.0	6.4	3.7	2.2	2.0	8.7	4.5	69.2	1/
1937	2.4	3.5	7.0	10.8	9.3	11.6	11.9	8.7	4.9	4.3	4.7	4.9	84.0	
1938	3.0	4.2	8.1	9.1	9.1	11.6	9.9	7.1	3.9	2.7	4.5	2.1	75.3	
1939	2.1	3.1	6.4	8.8	8.6	8.2	5.7	3.2	1.5	1.0	6.2	9.6	64.4	
1940	4.9	5.4	7.0	8.4	8.3	7.2	5.7	3.3	1.7	1.4	3.5	3.2	60.0	
1941	3.2	4.0	5.5	9.9	9.2	9.4	10.3	10.1	10.2	7.7	9.7	6.7	95.9	
1942	7.0	7.8	8.6	8.7	8.5	9.6	8.9	6.8	4.2	3.3	2.8	1.8	78.0	2/
1943	1.9	3.0	5.4	6.6	8.1	9.8	7.4	4.4	2.3	1.8	8.9	4.9	64.5	
1944	4.3	4.7	8.8	8.6	7.9	9.7	7.9	7.0	3.8	2.4	3.8	3.6	72.5	
1945	2.8	5.2	7.2	11.2	9.1	9.2	7.9	5.6	3.3	2.8	7.1	3.4	74.8	
14-45 Mean	3.0	3.9	6.2	7.8	7.4	8.2	7.0	5.1	3.2	2.4	5.0	4.0	63.2	3/
Subsequent Records														
1946	4.7	4.6	7.8	9.6	8.0	8.4	7.1	5.3	3.2	4.6	4.1	6.0	73.4	2/
1947	8.4	8.1	8.3	9.0	7.7	8.4	6.3	4.7	2.4	1.8	3.3	4.7	73.1	2/
1948	2.7	3.2	5.3	6.0	5.5	6.1	5.0	3.3	2.5	1.9	3.1	1.2	45.8	2/

* Estimates from "Arizona Stream Flow Summary," a report of The Colorado River Commission of Arizona published in March 1940.

1/ Geological Survey Water-Supply Paper 1049 except (*).
2/ Geological Survey annual Water-Supply Papers.
3/ Estimated.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

DIVERSIONS BY ENTERPRISE CANAL AT GILLESPIE DAM, ARIZONA

Location: Lat. 33°13', long. 112°46', in SW¼NE¼ sec. 28, T. 2 S., R. 5 W., 600 feet downstream from intake at Gillespie Dam.
Canal diverts water from right bank of Gila River at Gillespie Dam for irrigation between dam and Gila Bend.
The Enterprise Canal has diverted water from the Gila River throughout the period, October 1913 through September 1945, and diversions have been made from present heading since construction of Gillespie Dam in 1921.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1935									0.7	0.7	0.8	0.9		1/
1936	0.8	0.8	1.0	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.6	9.9	
1937	0.7	0.7	0.7	0.9	0.7	0.8	0.7	0.6	0.6	0.6	0.6	0.7	8.3	1/
1938	0.6	0.5	0.6	0.7	0.8	0.8	0.6	0.7	0.6	0.5	0.5	0.5	7.4	1/
1939	0.4	0.5	0.3	0.7	0.5	0.6	0.7	0.7	0.7	0.6	0.7	0.5	6.9	2/
1940	0.6	0.5	0.5	0.6	0.5	0.6	0.7	0.6	0.5	0.5	0.7	0.6	6.9	1/
1941	0.7	0.6	0.5	0.8	0.3	0.6	0.9	0.8	0.7	0.6	0.6	0.5	7.6	
1942	0.5	0.6	0.7	0.7	0.6	0.7	0.8	0.7	0.5	0.5	0.5	0.5	7.3	3/
1943	0.6	0.6	0.6	0.5	0.5	0.8	0.6	0.5	0.6	0.6	0.5	0.5	6.9	
1944	0.7	0.9	0.8	0.8	1.0	0.8	0.6	0.6	0.7	0.5	0.5	0.5	8.4	1/
1945	0.8	0.8	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.5	0.7	0.5	7.3	1/
14-45 Mean	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	7.7	4/

Subsequent Records

1946	0.5	0.7	0.7	0.8	0.5	0.6	0.6	0.6	0.5	0.6	0.5	0.7	7.3	3/
1947	0.7	0.8	0.8	0.8	0.6	0.5	0.9	1.0	1.2	1.0	0.9	0.7	9.9	3/
1948	0.8	0.9	0.9	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.5	8.7	3/

1/ Computed by deducting the sum of recorded diversions by Gillespie Canal plus recorded flows of Gila River below Gillespie Dam from the combined discharge of Gila River below Gillespie Dam and of Gillespie and Enterprise Canals at Gillespie Dam as reported in Geological Survey Water-Supply Paper 1049.

2/ Computed from discharge measurements reported in Geological Survey Water-Supply Paper 879.

3/ Geological Survey annual Water-Supply Papers.

4/ Average for 1914-1945 period estimated to be the same as the mean for the period of record.

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER BELOW GILLESPIE DAM, ARIZONA

Location: Lat. 33°13'45", long. 112°45'30", in SE¼NE¼ sec. 28, T. 2 S., R. 5 W., at east end of Gillespie Dam, 8 miles downstream from Hassayampa River and about 165 miles upstream from mouth.
Drainage Area: 49,626 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914													650.7	
1915													2,962.4	
1916													4,358.2	
1917													1,296.5	1/
1918													463.1	
1919													992.0	
1920													2,460.9	
1921												*44.4	674.3	
1922	45.0	27.8	95.9	190.7	153.0	218.2	34.6	10.9	15.2	15.6	16.1	42.4	865.4	
1923	16.6	14.2	69.5	44.0	23.5	45.1	1.8	0	0	25.4	171.8	124.3	506.2	
1924	0.8	125.1	359.9	204.7	21.5	7.1	60.6	2.0	0	0	0	0	781.7	
1925	2.3	12.1	23.3	19.1	7.9	3.6	2.4	2.1	0.4	0	4.1	157.8	235.1	
1926	31.9	7.2	14.0	13.5	4.1	7.4	331.3	20.4	0	8.9	1.0	115.0	554.7	
1927	43.7	7.4	87.2	34.1	502.7	92.4	3.0	0	0	0.4	0.4	107.8	879.1	
1928	0.1	0	4.8	5.0	50.8	1.7	0.1	0	0	0	16.3	0.3	79.1	
1929	0	0	2.0	6.4	1.2	2.7	59.1	0	0	0	13.4	26.6	111.4	2/
1930	0.6	0	0	6.3	0.2	19.3	0	0.1	0	1.2	50.1	2.8	80.6	
1931	0	1.1	0	0	140.7	4.2	0	0	0	0	63.0	12.8	221.8	
1932	3.8	11.3	23.7	5.9	312.0	93.4	1.0	0	0	0	1.1	0	452.2	
1933	1.9	0	4.8	7.6	4.7	0.1	0	0	0	0	0	0.5	19.6	
1934	0	0	0.2	0	0	0	0	0	0	0	6.8	1.0	8.0	
1935	0	0	2.2	13.8	54.4	37.2	3.7	0	0	0	7.6	9.7	128.6	
1936	0	0.2	1.0	1.9	10.9	0.9	0	0	0	10.1	2.3	0.5	27.8	
1937	0	0.1	2.2	12.3	238.8	134.2	6.4	0	0	0	3.7	0	397.7	

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER BELOW GILLESPIE DAM, ARIZONA (Continued)

Location: Lat. 33°13'45", long. 112°45'30", in SE¼NE¼ sec. 28, T. 2 S., R. 5 W., at east end of Gillespie Dam, 8 miles downstream from Hassayampa River and about 165 miles upstream from mouth.
Drainage Area: 49,626 square miles.

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	0	0	0	0.4	0	187.5	0.1	0	0	0	0.3	0	188.3	2/
1939	0	0	2.3	0.1	0	0	0	0	0	0	12.5	22.9	37.8	〃
1940	0	0	0	0	0	0.1	0	0	0	0	6.3	0	6.4	〃
1941	0	2.3	3.6	43.1	92.4	344.4	303.9	236.9	2.4	0.6	5.7	0.9	1,036.2	〃
1942	0.4	0.3	8.1	5.3	2.0	1.7	0	0	0	0	0	0	17.8	3/
1943	0.2	0.5	0	1.4	0.5	1.8	0	0	0	0	7.2	2.5	14.1	〃
1944	0	0	1.8	1.4	5.6	3.4	0.2	0	0	0	1.0	0	13.4	〃
1945	0	0	0.8	0	0	0.3	0	0	0	0	6.3	0	7.4	〃
14-45 Mean	18.9	29.0	65.8	129.7	128.4	98.0	63.6	17.1	2.8	16.1	39.4	32.7	641.5	1/

Subsequent Records

1946	1.2	0	0.7	1.4	0	0	0	0	0	0.5	0.1	25.6	29.5	3/
1947	0.7	0.6	2.2	1.1	0.1	0	0	0	0	0	6.9	1.1	12.7	3/
1948	0	0	0	0	0.2	0	0	0	0	0	0.7	0	0.9	3/

1/ Estimated except (*), which is from Geological Survey Water-Supply Paper 1049.
2/ Geological Survey Water-Supply Paper 1049.
3/ Geological Survey annual Water-Supply Papers.

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER NEAR DOME, ARIZONA

Location: Lat. 32°45'40", long. 114°25'10", in SW¼ sec. 4, T. 8 S., R. 21 W., at highway bridge, 3 miles west of Dome and 12 miles upstream from mouth.

Drainage Area: 58,084 square miles. 1/

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1914	0	0	0	1.2	118.8	17.6	0	0	0	2.0	29.2	11.0	179.8	
1915	10.4	10.5	357.5	139.6	694.2	314.6	389.6	367.0	16.9	2.4	21.8	0	2,324.5	
1916	0	0	0	2093.0	861.6	716.8	559.3	27.0	2.5	0	0	70.9	4,361.1	
1917	222.3	53.7	27.5	163.8	83.3	132.9	448.3	243.7	0.5	0	82.3	0	1,458.3	
1918	0	0	0	1.6	12.4	243.4	17.2	0.1	0	0	52.2	0	326.9	
1919	0	0	2.8	11.9	24.4	18.9	60.1	3.2	0	42.6	54.3	8.8	227.0	
1920	21.2	188.0	306.6	40.1	424.5	190.5	108.2	14.7	0	0	0	0	1,293.8	
1921	0	9.4	13.6	23.0	8.4	1.0	0	0	0	0	341.2	41.1	437.7	
1922	15.2	5.7	42.9	331.3	82.4	164.3	34.2	2.8	0	0	0	7.0	685.8	
1923	0.1	0	52.1	16.5	5.5	92.2	2.0	0	0	1.0	102.3	57.4	329.1	
1924	2.7	83.2	223.9	317.2	22.3	4.7	30.5	2.0	0	0	0	0	686.5	2/
1925	0	0	0	0	0	0	0	0	0.2	0	0	64.7	64.9	
1926	10.7	0.4	1.8	0.9	0.2	0	228.3	21.2	0	0	0	6.6	270.1	
1927	84.8	0	45.1	36.6	415.5	116.6	8.5	0	0	0	2.0	54.8	763.9	
1928	1.4	0	0	0	22.6	0.3	0	0	0	0	0	0	24.3	
1929	0	0	0	0	0	0	0	0	0	0	0	3.0	3.0	
1930	1.9	0	0	0	0	1.9	0	0	0	0	11.8	0	15.6	
1931	0	0	0	0	78.0	2.1	0	0	0	0	14.5	8.1	102.7	
1932	0	1.4	6.6	1.4	168.5	82.2	6.0	0.2	0	0	0	0	266.3	
1933	1.1	0	0	0	0	0	0	0	0	0	0	0	1.1	
1934	0	0	0	0	0	0	0	0	0	0	0.2	0	0.2	
1935	0	0	0	0	3.3	1.8	0	0	0	0	0	0.8	5.9	
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	
1937	0	0	0	0	71.2	75.8	6.7	0	0	0	0	0	153.7	

Table 6

LOWER COLORADO RIVER BASIN

Stream Flow in 1000 Acre-feet

GILA RIVER NEAR DOME, ARIZONA (Continued)

Location: Lat. 32°45'40", long. 114°25'10", in SW¼ sec. 4, T. 8 S., R. 21 W., at highway bridge, 3 miles west of Dome and 12 miles upstream from mouth.

Drainage Area: 58,084 square miles. 1/

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total	Note
1938	0	0	0	0	0	45.9	0	0	0	0	0	0	45.9	2/
1939	0	0	0	0	0	0	0	0	0	0	0	3.5	3.5	↑
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	!
1941	0	0	0	0.7	0	192.1	181.1	211.2	4.4	0.1	0.1	0	589.7	
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	3/
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	
1944	0	0	0	0	0	0	0	0	0	0	0	0	0	!
1945	0	0	0	0	0	0	0	0	0	0	0	0	0	↓
14-45 Mean	11.6	11.0	33.8	99.3	96.8	76.4	65.0	27.9	0.8	1.5	22.2	10.6	456.9	

Subsequent Records

1946	0	0	0	0	0	0	0	0	0	0	0	0	0	3/
1947	0	0	0	0	0	0	0	0	0	0	0.4	0	0.4	3/
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	3/

1/ Includes 344 square miles in Aubrey Valley Playa, a closed basin, and excludes all other closed basins.

2/ Geological Survey Water-Supply Paper 1049.

3/ Geological Survey annual Water-Supply Papers.