

Figure 1.--Map of conterminous United States showing areas covered by 18 of the 20 volumes on surface water supply. The area covered by this report is shaded.

A list of Geological Survey publications may also be obtained by applying to the Director, Geological Survey, Washington, D. C.

2. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

3. Sets are available for consultation in the offices of the Water Resources Division of the Geological Survey. Addresses of the offices in the area covered by this report are given on page 2.

Early records of the flow of streams in the United States are published in the reports listed below. In many of these reports records for years earlier than those indicated have been included for some streams.

Streamflow data for the years 1884-1901, in reports of the Geological Survey

(A = Annual Report; B = Bulletin)

Report	Character of data	Year
10th A, pt. 2	Descriptive information only.	
11th A, pt. 2	Monthly discharge and descriptive information.....	1884 to September 1890.
12th A, pt. 2do.....	1884 to June 30, 1891.
13th A, pt. 3do.....	1884-92.
14th A, pt. 2	Monthly discharge.....	1886-93.
B 151.....	Descriptions, measurements, gage heights, and ratings.....	1883-94.
16th A, pt. 2	Descriptive information only.	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge.	1895.
WSP 11.....	Gage heights.....	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge.	1895-96.
WSP 15.....	Descriptions, measurements, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries above Kansas River.	1897.
WSP 16.....	Descriptions, measurements, and gage heights of streams west of the Mississippi River, except Missouri River and tributaries above Kansas River.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge.	1897.
WSP 27.....	Measurements, ratings, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries.	1898.
WSP 28.....	Measurements, ratings, and gage heights of streams west of the Mississippi River, except Missouri River and tributaries.	1898.
20th A, pt. 4	Monthly discharge.....	1898.
WSP 35 to 39.	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4	Monthly discharge.....	1899.
WSP 47 to 52.	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4.	Monthly discharge.....	1900.
WSP 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
WSP 75.....	Monthly discharge.....	1901.

Reports on surface-water supply containing records from 1899 to date for drainage basins in this report are listed below. The data for any particular gaging station will, in general, be found in the reports covering the years during which the station was maintained.

Numbers of water-supply papers containing results of stream measurements in Colorado River basin, 1899-1960

Year	WSP	Year	WSP	Year	WSP	Year	WSP	Year	WSP
1899	a37,38	1912	329	1925	609	1937	829	1949	1149
1900	50	1913	359	1926	629	1938	859	1950	1179
1901	66,75	1914	389	1927	649	1939	879	1951	1213
1902	85	1915	409	1928	669	1940	899	1952	1233
1903	100	1916	439	1929	689	1941	929	1953	1283
1904	133	1917	459	1930	704	1942	959	1954	1343
1905	175,b177	1918	479	1931	719	1943	979	1955	1393
1906	211,b213	1919-20	509	1932	734	1944	1009	1956	1443
1907-8	249	1921	529	1933	749	1945	1039	1957	1513
1909	269	1922	549	1934	764	1946	1059	1958	1563
1910	289	1923	569	1935	789	1947	1089	1959	1633
1911	309	1924	589	1936	809	1948	1119	1960	1713

a Green and Gunnison Rivers and Colorado River above Gunnison River.
b Below mouth of Gila River.

A compilation of records for the area covered by this report through September 1950 has been published as WSP 1313. That report contains a summary of monthly and annual discharges for all previously published records as well as some records not contained in the annual series of water-supply papers. All records were reexamined and revised where warranted. Estimates of discharge were made to fill short gaps whenever practical.

The reports listed in the foregoing table contain the customary records of discharge collected during the systematic operation of gaging stations. Detailed information on the stage and discharge of many streams during major floods has been included in special reports on these floods published by the Geological Survey. The more recent of these special reports also contain other pertinent hydrologic information and analyses and compilations of data relating to earlier notable floods. The following list gives the numbers and titles of these reports.

Report

WSP 147.....	Destructive floods in the United States in 1904.
WSP 162.....	Destructive floods in the United States in 1905.
WSP 771.....	Floods in the United States, magnitude and frequency.
WSP 847.....	Maximum discharges at stream-measurement stations through September 1938.
WSP 967-A.....	Floods of September 1939 in Colorado River basin below Boulder (Hoover) Dam.
WSP 994.....	Cloudburst floods in Utah, 1850 to 1938.
WSP 997.....	Floods in Colorado.
WSP 1260-E.....	Floods of April-June 1952 in Utah and Nevada.
WSP 1260-F.....	Summary of floods in the United States during 1952.
WSP 1320-E.....	Summary of floods in the United States during 1953.
WSP 1370-C.....	Summary of floods in the United States during 1954.

RECORDS OF DISCHARGE COLLECTED BY AGENCIES OTHER THAN THE GEOLOGICAL SURVEY

The Agricultural Research Service of the United States Department of Agriculture has been collecting records of runoff near Safford, Ariz., beginning in 1940, from 4 areas of less than 800 acres, and near Tombstone, Ariz., beginning in 1954, from 8 areas ranging from 18 to 36,900 acres. Also, the Agricultural Engineering Department, University of Arizona, began collecting records in 1956 on an unnamed tributary to Pantano Wash, sec.28, T.14 S., R.15 E., half a mile upstream from mouth and 9½ miles east of Tucson, Ariz.

HYDROLOGIC CONDITIONS

Streamflow was generally near median the first 6 months of the water year and generally deficient the last 6 months. Deficient streamflow existed in practically every month of the water year in some part of the area covered by this report. Little Colorado River near Cameron, Ariz., and Rillito Creek near Tucson, Ariz., were dry all of July. This is only the 4th time that this has occurred in July on the Little Colorado River since 1921 and the 5th time that it has occurred on Rillito Creek in 52 years of record. Little Colorado River near Cameron remained dry all of August which is the first time that this has happened in 40 years. Record low daily flow for September occurred in Gila River above Safford Valley, Ariz. In Arizona, record high daily flow occurred on Salt River near Roosevelt and Verde River below Tangle Creek, above Horseshoe Dam during October and on Little Colorado River near Cameron during November and December. Cloudburst flood near Tablona, Utah on Sept. 2 developed rates of streamflow exceeding 500 cubic feet per second per square mile from 8.1 square miles.

Figure 2 on page 12, for which records of three long-term gaging stations were used, shows a comparison of the monthly and yearly mean discharges for the 1960 water year with the median discharge for the period 1931-60.

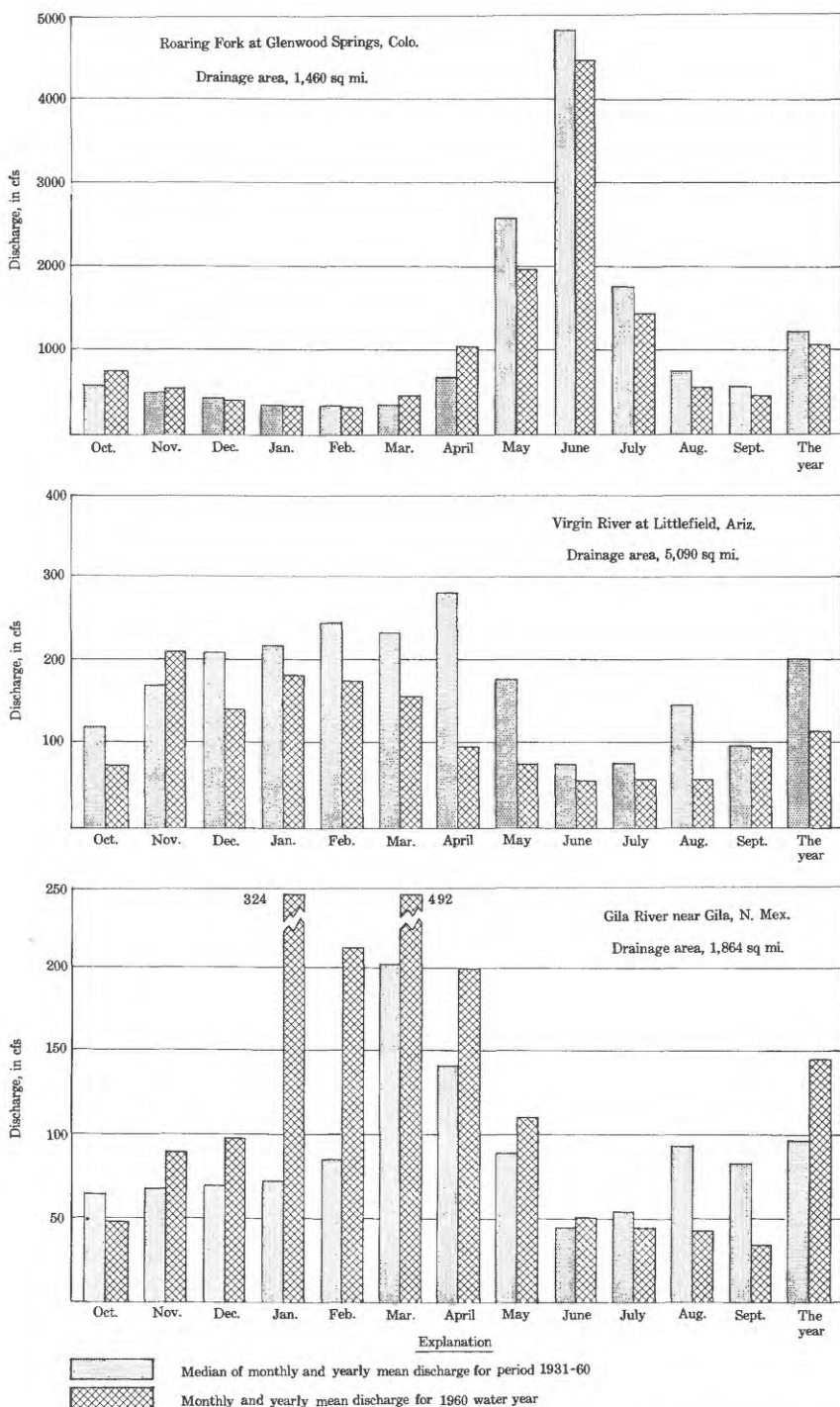


Figure 2. Comparison of discharge at three long-term representative gaging stations during 1960. water year with median discharge for period 1931-60.

