







































*A*, Minnesota River near Carver, Minn.



*B*, Black River near Galesville, Wis.



*C*, Mississippi River at McGregor, Iowa

**FIGURE 1.—GAGING-STATION STRUCTURES**

At most gaging stations in the northern part of the United States and at some in the mountainous regions of other parts the stage-discharge relation is affected by ice during the winter, and it becomes impossible to compute the discharge in the usual manner. Discharge for periods of ice effect is computed on the basis of the gage-height record and occasional winter discharge measurements, consideration being given to the available information on temperature and precipitation, notes by gage observers and engineers, and comparable records of discharge for other stations in the same or nearby basins. If the stage-discharge relation is affected by ice, this information is given in a note to the table. No mention is made of occasional days of ice effect if the degree of accuracy of daily records is not changed.

The data herein presented generally comprise a description of the station, a skeleton rating table, and a table showing the daily discharge and monthly and yearly discharge and runoff of the stream. Records are published for the water year which begins on October 1 and ends on September 30. A calendar for the water year 1957 is shown on page IV for the purpose of finding the day of the week for any date.

The description of the station gives the location, drainage area, records available, type and history of gages, average discharge, extremes of discharge, general remarks, and notations of revisions of the previously published record. The location of the gaging station and the drainage area are obtained from the most accurate maps available. River mileage, given under "Location" for some stations, is that determined and used by the Corps of Engineers unless otherwise noted. Under "Records available" are given the periods for which there are published records generally equivalent to those at the present site. Under "Gage" are given the type of gage currently in use and the datum of the present gage above mean sea level, and a condensed history of the types, locations, and datums of previous gages used during the period of records available. Under "Average discharge" is given the average discharge for the number of years indicated. It is not given for stations having fewer than five complete years of record or for stations where changes in water development during the period of record cause the figure to have little significance. Under "Extremes" are given the maximum discharge and gage height; the minimum discharge if there is little or no regulation; the minimum daily discharge if there is extensive regulation (also the minimum discharge if useful); and the minimum gage height (unless it is of no importance). In the first paragraph, the data given are for the complete current water year unless otherwise specified. In the second paragraph, the data given are for the periods of record within the calendar year dates in the heading (not necessarily those for the complete years indicated by the heading dates). Reliable information concerning major floods that have occurred outside the period of record are given in the third or last paragraph under "Extremes." Unless otherwise qualified, the maximum discharge corresponds to the crest stage obtained by use of a water-stage recorder, a crest-stage indicator, or a nonrecording gage read at the time of the crest. If the maximum gage height did not occur at the same time as the maximum discharge, it is given separately. Information pertaining to the accuracy of the records and conditions which affect the natural flow at the gaging station is given under "Remarks."

Previously published records of some stations have been found to be in error on the basis of data or information later obtained. Revisions of such records are usually published along with the current records in one of the annual reports. In order to make it easier to find such revised records, a paragraph headed "Revisions (water years)" has been











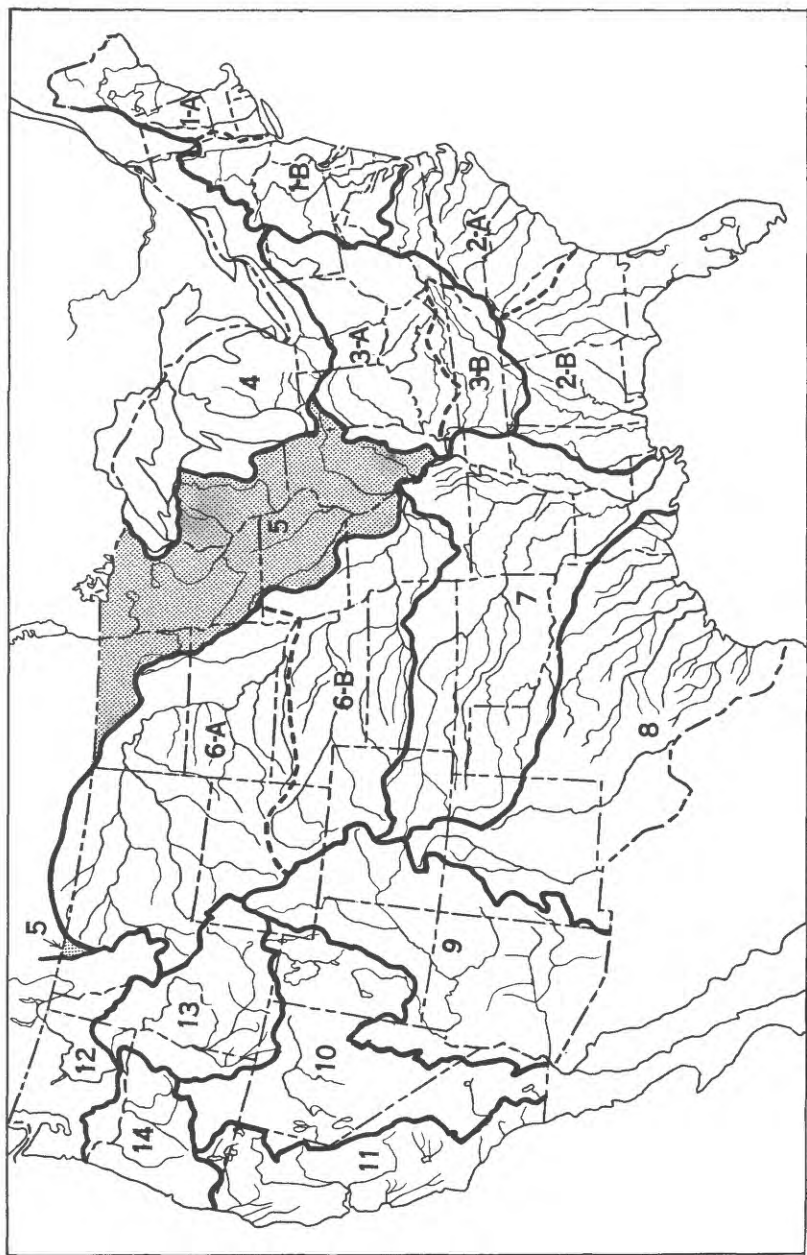


Figure 2.--Map of the United States showing areas covered by the 18 annual volumes on surface-water supply. The area covered by this report is shaded.

annual series of water-supply papers. The following table lists reports of this type for Hudson Bay and upper Mississippi River basins.

Reports containing compilations of records of discharge by States and drainage basins

WSP	Period	Report
156.....	1895-1905	Water powers of northern Wisconsin.
491.....	1898-1917	Water supply of St. Mary and Milk Rivers.
917.....	1881-1938	Surface waters of Missouri and St. Mary Rivers in Montana.

Records of discharge have been published also in State reports. Some of these are not contained in the publications of the Geological Survey or are revisions of records previously published in its water-supply papers. The following table contains a list of these reports for the area covered by this report.

State reports containing compilations of records of discharge

State	Period	Reports	Issued by
Illinois....	1908-11	Water resources of Illinois.....	Rivers and Lakes Commission.
Do.....	1900-1934	Streamflow data of Illinois.....	Division of Waterways.
Indiana.....	1923-27	Pub. 72, Surface water supply of Indiana...	Department of Conservation.
Do.....	1927-30	Pub. 112, Surface water supply of Indiana...	Do.
Iowa.....	1873-1932	Streamflow records of Iowa.....	State Planning Board.
Do.....	1873-1940	Water-Supply Bull. 1, Summaries of yearly and flood flow relating to Iowa Streams.	Iowa Geological Survey.
Do.....	1941-42	Water-Supply Bull. 2, Surface water resources of Iowa.	Do.
Do.....	1943-50	Water-Supply Bull. 3, Surface water resources of Iowa.	Do.
Do.....	1951-55	Water-Supply Bull. 5, Surface water resources of Iowa.	Do.
Minnesota....	1909-12	Water-resources investigations of Minnesota	State Drainage Commission.
Do.....	1883-1949	Bull. 5, Surface water supplies of the Mesabi Iron Range.	Department of Conservation,
Missouri.....	1857-1926	Vol. 20, 2d series, Water Resources of Missouri.	Division of Waters.
Do.....	1927-39	Vol. 26, 2d series, Surface waters of Missouri.	Missouri Bureau of Geology and Mines.
Do.....	1940-49	Vol. 34, 2d series, Surface waters of Missouri.	Missouri Geological Survey and Water Resources.
Montana.....	1889-1911	5th Biennial report.....	Do.
Do.....	1881-1938	Special Rept. 10, vols. 1-4, Water resources of Montana.	Office of the State Engineer.
North Dakota.	1919-21	Report to Governor of North Dakota on flood control.	Montana Agricultural Experiment Station.
Do.....	1882-1925	Surface water supply of North Dakota (with 12th biennial report).	State engineer.
Do.....	1882-1938	Surface water in North Dakota.....	Do.
Do.....	1882-1944	Supplement B, 4th biennial report.....	State Planning Board.
Wisconsin....	1888-1914	1st report of Railroad Commission of Wisconsin to Legislature on water powers.	State Water Conservation Commission.
Do.....	1914-23	2d report of Railroad Commission of Wisconsin to Legislature on water powers.	Railroad Commission of Wisconsin.
			Do.

Note.--In addition to records contained in reports listed above, the following States have issued annual or biennial reports in which are contained records of discharge: Indiana, Missouri, Montana, North Dakota, and South Dakota.

The reports listed in the foregoing tables 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 or other agencies. 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 is a list of these reports:

Report	Issued by
WSP 162: Destructive flood in the United States in 1905.	U. S. Geological Survey.
WSP 771: Floods in the United States, magnitude and frequency.	Do.
WSP 838: Floods of Ohio and Mississippi Rivers, January-February, 1937.	Do.
WSP 847: Maximum discharges at stream-measurement stations through September 1938.	Do.
WSP 1137-B: Floods of 1950 in the Red River of the North and Winnipeg River basins.	Do.
WSP 1137-G: Floods of 1950 in the upper Mississippi River and Lake Superior basins in Minnesota.	Do.
WSP 1227-D: Summary of floods in the United States during 1951.	Do.
WSP 1260-C: Floods of 1952 in the upper Mississippi and Red River of the North basins.	Do.
WSP 1320-A: Floods of June 1953 in northwestern Iowa.	Do.

Report

WSP 1370-A: Floods of June 1954 in Iowa.  
 WSP 1370-B: Floods of October 1954 in the Chicago area, Illinois and Indiana.  
 Cir. 370: Floods in Missouri, magnitude and frequency.  
 Bull. 1: Iowa floods, magnitude and frequency.  
 Bull. 1: Magnitude and frequency of floods in Minnesota.  
 Bull. 7: The 1912 flood on the lower Mississippi.  
 The floods of May 1943 in Illinois.  
 The storm of July 8, 1951, in north-central Illinois.  
 The storm of July 18-19, 1952, Rockford, Ill., and vicinity.  
 Floods in Illinois, magnitude and frequency.  
 Unit Hydrographs in Illinois.

Issued by

U. S. Geological Survey.  
 Do.  
 Do.  
 Iowa Highway Research Board.  
 Minnesota Division of Waters.  
 Illinois Rivers and Lakes Commission.  
 Illinois Division of Waterways.  
 Illinois State Water Survey Division.  
 Do.  
 Illinois Division of Waterways.  
 Do.

## RECORDS OF DISCHARGE COLLECTED BY AGENCIES OTHER THAN THE GEOLOGICAL SURVEY

The table below contains a list of gaging stations for the area covered by this report, at which records of discharge were collected during the water year October 1956 to September 1957 by agencies other than the Geological Survey. The records of these stations are not contained in publications of the Geological Survey, nor have they been published elsewhere.

Records of discharge collected by agencies other than the Geological Survey			
Stream	Location	Period	Collected by
Blue Earth River.....	Near Rapidan, Minn., at Rapidan hydroelectric plant.	1911-57	Northern States Power Co.
Cannon River.....	Near Cannon Falls, Minn., at Cannon Falls hydroelectric plant.	1921-57	Do.
Minnesota River.....	Near Granite Falls, Minn., at Minnesota Falls hydroelectric plant.	1928-57	Do.
Mississippi River....	Near Anoka, Minn., at Coon Rapids hydroelectric plant.	1918-57	Do.
Do.....	Minneapolis, Minn., at lower-dam hydroelectric plant.	1900-1957	Do.
Do.....	St. Cloud, Minn., at St. Cloud hydroelectric plant.	1924-57	Do.
Do.....	St. Paul, Minn., at Twin City Lock and Dam.	1925-57	Ford Motor Co.

Note.--The Agricultural Research Service of the United States Department of Agriculture has collected records of runoff from selected areas in the upper Mississippi River basin as follows: near Monticello, Ill., beginning in 1949, 2 areas of 40 to 100 acres each; near Colby, Wis., beginning in 1949, 1 area of 350 acres; near Fennimore, Wis., beginning in 1938, 4 areas of 20 to 330 acres; near La Crosse, Wis., beginning in 1933, 3 areas of less than 4 acres each. These records are in the files of the Agricultural Research Service.

## HYDROLOGIC CONDITIONS

During the first six months of the 1957 water year, streamflow was deficient in the southern part of the area covered by this report. Monthly mean discharge of Pecatonica River at Freeport, Ill., was the lowest for October in 43 years of record. The drought conditions were partly relieved by rains in April. Streamflow became excessive over much of the area in May and June. In June damaging floods occurred in southern Illinois and in Minnesota. Peak discharge of Kaskaskia River near Vandalia, Ill., on June 29 was the greatest in 47 years. Several streams in Minnesota exceeded the previous maximum in 20 to 25 years. Floods in mid-July in the Illinois River basin were record-breaking; peak discharge of Illinois River at Marseilles was the greatest in nearly 40 years of record. Monthly mean discharge of Mississippi River at Anoka, Minn., was record-high for the month in July and September. Localized flooding and severe damage occurred in St. Croix Falls, Wis., September 1, 2, as a result of heavy rains reported to have exceeded  $3\frac{1}{2}$  inches in two hours. For three key gaging stations in the area covered by this report a comparison of monthly and yearly mean discharges for the 1957 water year with the median discharges for the 25-year period 1921-45 is shown in figure 3 on following page.

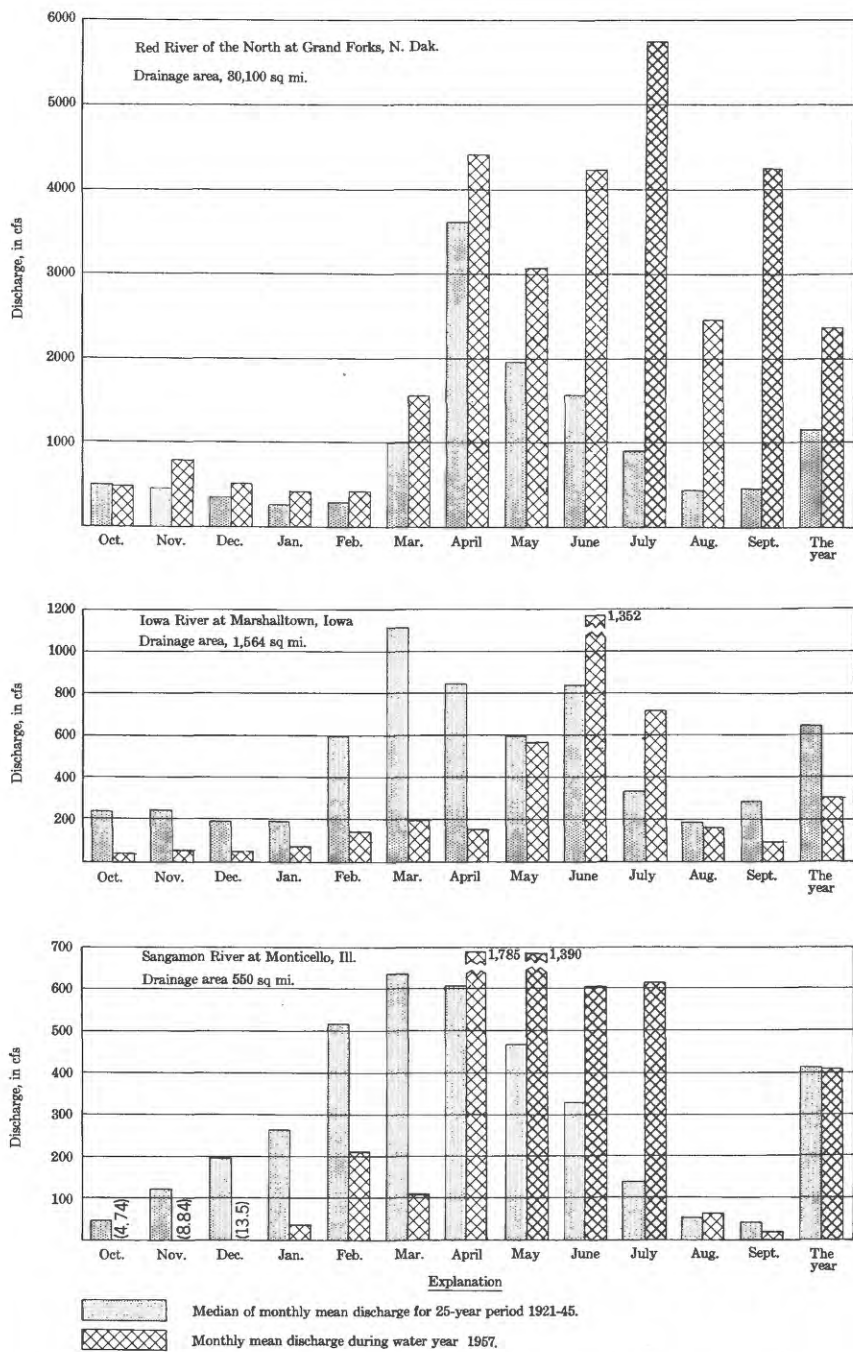


Figure 3.— Comparison of discharge at three key gaging stations during 1957 water year with median discharge for 25-year period.



























































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































































