



A. LITTLE WOLF RIVER AT ROYALTON, WIS.



B. BLACK RIVER NEAR BOONVILLE, N. Y.

FIGURE 1.—GAGING-STATION STRUCTURES

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.

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 "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 of gages, locations, and datums of previous gages for which discharge records are generally equivalent to those at the present site. 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). 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 non-recording 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 added to the description of all stations for which revised records have been published. Listed therein are all the reports in which revisions have been published, each followed by the water years for which figures are revised in that report. In listing the report number, "W" means water-supply paper. In listing the water years only one number is given; for instance, 1933 stands for the water year October 1, 1932, to September 30, 1933. If no daily, monthly, or annual figures of discharge are concerned in the revision, that fact is brought out by notations after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the revised figure was first published is given.

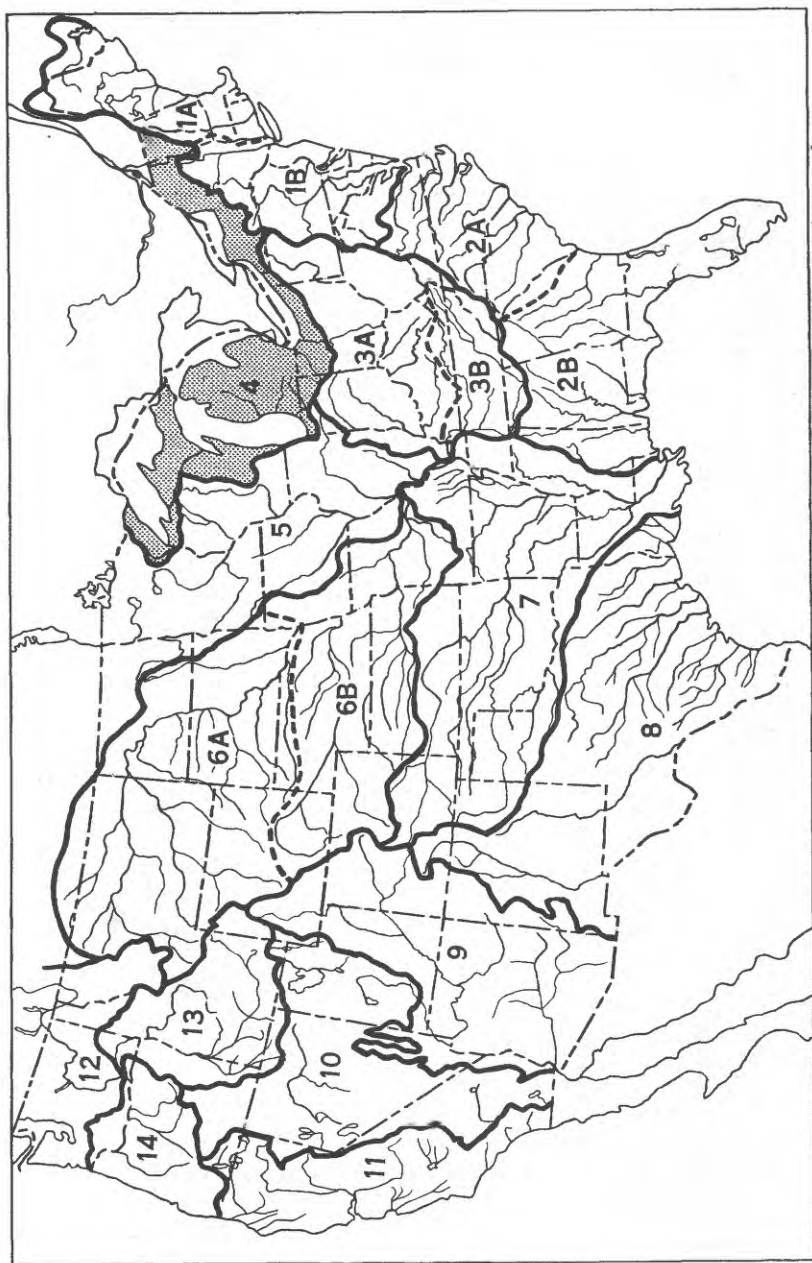


Figure 2.--Map of the United States showing areas covered by the 18 annual volumes on surface water supply. The shaded portion represents the area covered by this volume.

Part 1. North Atlantic slope basins, in two volumes:

- A, North Atlantic slope basins, Maine to Connecticut.
- B, North Atlantic slope basins, New York to York River.
2. South Atlantic slope and eastern Gulf of Mexico basins, in two volumes:
 - A, South Atlantic slope basins, James River to Savannah River.
 - B, South Atlantic slope and eastern Gulf of Mexico basins, Ogeechee River to Pearl River.
3. Ohio River basin, in two volumes:
 - A, Ohio River basin except Cumberland and Tennessee River basins.
 - B, Cumberland and Tennessee River basins.
4. St. Lawrence River basin.
5. Hudson Bay and upper Mississippi River basins.
6. Missouri River basin, in two volumes:
 - A, Missouri River basin above Sioux City, Iowa.
 - B, Missouri River basin below Sioux City, Iowa.
7. Lower Mississippi River basin.
8. Western Gulf of Mexico basins.
9. Colorado River basin.
10. The Great Basin.
11. Pacific slope basins in California.
12. Pacific slope basins in Washington and upper Columbia River basin.
13. Snake River basin.
14. Pacific slope basins in Oregon and lower Columbia River basin.

Water-supply papers and other publications of the Geological Survey containing data on the water resources of the United States may be purchased or consulted as follows:

1. Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., who will, on application, furnish lists giving prices. 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; W = Water-Supply Paper)

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.....	1888-93.
B 131.....	Descriptions, measurements, gage heights, and ratings.....	1893-94.
16th A, pt. 2	Descriptive information only.	
B 140.....	Descriptions, measurements, gage heights, ratings, and monthly discharge.	1895.
W 11.....	Gage heights.....	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge..	1895-96.
W 15.....	Descriptions, measurements, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries above Kansas River.	1897.
W 16.....	Descriptions, measurements, and gage heights of stream 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.
W 27.....	Measurements, ratings, and gage heights of streams east of the Mississippi River, and Missouri River and tributaries.	1898.
W 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.
W 35 to 39...	Descriptions, measurements, gage heights, and ratings.....	1899.
21st A, pt. 4	Monthly discharge.....	1899.
W 47 to 52...	Descriptions, measurements, gage heights, and ratings.....	1900.
22d A, pt. 4	Monthly discharge.....	1900.
W 65, 66.....	Descriptions, measurements, gage heights, and ratings.....	1901.
W 75.....	Monthly discharge.....	1901.

HYDROLOGIC CONDITIONS

The water year 1951 was characterized by above-normal runoff over most of the St. Lawrence River basin within the United States. No noteworthy floods occurred in this area during the water year. For two key stations in the area covered by this report, a comparison of the monthly and yearly mean discharge during the 1951 water year with the median discharge for the 25-year period 1921-45 is shown in figure 3 below.

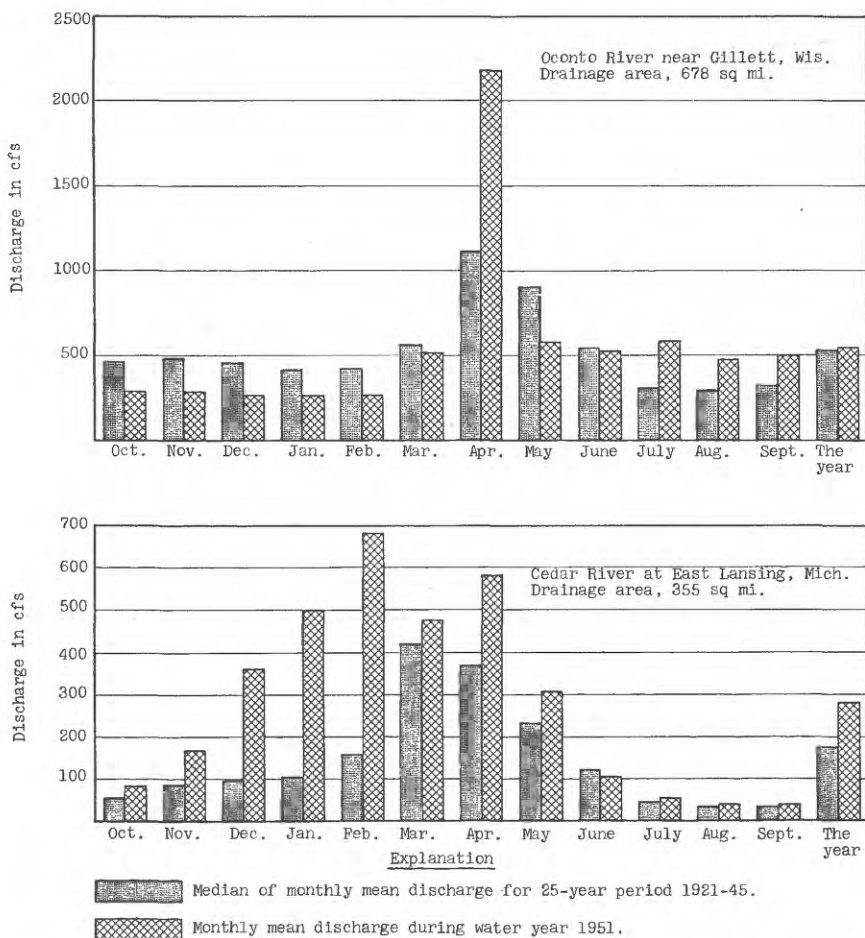


Figure 3.--Comparison of discharge at two key gaging stations during 1951 water year with median discharge for 25-year period.

STREAMS TRIBUTARY TO LAKE SUPERIOR

Pigeon River at Middle Falls, below International Bridge, Minn.

(International gaging station)

Location.--Lat 48°00'44", long. 89°36'58", in NE $\frac{1}{4}$ sec. 24, T. 64 N., R. 6 E., on right bank 400 ft upstream from Middle Falls, $3\frac{1}{2}$ miles upstream from mouth, and $5\frac{1}{2}$ miles downstream from International Bridge.

Drainage area.--600 sq mi at present site.

Records available.--April 1924 to September 1951. Published as "at International Bridge" April 1924 to September 1940. October 1923 to September 1932 in House Document 92, 73d Congress, 1st session. June 1921 to September 1951 in reports of Water Resources Division, Department of Resources and Development, Canada.

Gage.--Water-stage recorder. Datum of gage is 789.58 ft above mean sea level, datum of 1929. April 1924 to Sept. 1, 1936, staff gage, and Sept. 2, 1936, to Sept. 30, 1940, wire-weight gage at International Bridge $5\frac{1}{2}$ miles upstream at different datum.

Average discharge.--28 years (1923-51), 509 cfs.

Extremes.--Maximum discharge during year, 7,490 cfs May 2 (gage height, 9.32 ft); minimum discharge, 170 cfs Aug. 25 (gage height, 1.04 ft).

1923-51: Maximum discharge observed, 11,000 cfs May 5, 1934 (gage height, 7.6 ft, site and datum then in use), from rating curve extended above 7,000 cfs; minimum, 27 cfs Nov. 4, 1945 (gage height, -0.08 ft).

Remarks.--Records good except those for periods of ice effect, which are fair, and those for periods of no gage-height record, which are poor.

Cooperation.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

Rating table, water year 1950-51, except periods of ice effect
(gage height, in feet, and discharge, in cubic feet per second)

1.0	161	2.5	606	6.0	2,920
1.3	234	3.0	810	7.0	3,920
1.6	321	4.0	1,320	8.0	5,150
2.0	444	5.0	2,010	10.0	9,170

Discharge, in cubic feet per second, water year October 1950 to September 1951

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	300	376	340	300			280	6,880	1,410	662	213	285
2	1,470	373	340	280			280	*7,280	1,320	642	203	256
3	*2,350	404	340	260	220	220	280	7,080	1,260	606	201	225
4	1,630	407	340	260			300	5,950	1,280	572	198	211
5	1,180	398	360	260		*220	360	4,870	1,210	539	194	206
6	976	413	340	240		220	420	4,250	1,130	475	198	208
7	951	444	340	240		220	500	3,920	1,130	385	206	226
8	951	*420	340	240	200	200	650	3,920	1,260	357	208	216
9	833	400	320	260		200	800	3,920	1,320	339	206	211
10	722	400	320	260		200	1,000	3,620	1,260	336	198	394
11	662	380	320	240		220	*1,300	3,220	1,210	318	196	624
12	606	380	320	240		220	1,600	2,920	1,160	306	194	*821
13	572	380	*320	240		220	1,600	2,720	1,100	297	*189	1,320
14	523	380	320	260		220	1,600	2,530	1,080	294	184	1,020
15	523	400	300	280		220	1,500	2,440	1,000	318	179	765
16	523	400	300	280	220	220	1,500	2,350	976	330	177	589
17	556	400	300	260		220	1,400	2,170	927	306	175	507
18	556	380	300	260		240	1,400	2,090	903	285	172	444
19	606	380	300	240		220	1,400	1,950	1,020	276	177	385
20	589	360	300	240		220	1,500	1,890	1,210	268	182	366
21	556	340	300	220		220	1,500	1,810	*1,320	259	194	572
22	523	340	300	220		220	1,400	1,700	1,290	254	194	606
23	491	340	320	240	240	220	1,400	1,600	1,240	245	186	624
24	475	320	320	220		220	1,500	1,500	1,160	237	177	556
25	460	320	300	*220		240	1,930	1,410	1,050	234	175	491
26	444	320	280		220	240	2,620	1,350	1,000	229	177	875
27	428	320	280			260	3,320	1,160	903	224	175	2,350
28	413	320	280	220		260	4,810	2,090	788	224	172	1,740
29	304	320	280		-	280	6,130	1,930	722	221	172	1,260
30	391	320	280		-	260	6,310	1,660	681	221	182	1,080
31	379	-	280		-	260	-	1,500	-	218	237	-
Total	22,043	11,135	9,680	7,580	6,160	7,060	50,390	93,660	33,300	10,477	5,891	19,434
Mean	711	371	312	245	220	228	1,680	3,021	1,110	338	190	648
Cfsm	1.16	0.618	0.520	0.408	0.367	0.380	2.80	5.03	1.85	0.563	0.317	1.08
In.	1.37	0.69	0.60	0.47	0.38	0.44	3.12	5.81	2.06	0.65	0.37	1.20

Calendar year 1950: Max 7,280 Min 100 Mean 848 Cfsm 1.41 In. 19.21
Water year 1950-51: Max 7,280 Min 172 Mean 758 Cfsm 1.26 In. 17.16

Peak discharge (base, 3,000 cfs).--May 2 (8:30 p.m.) 7,490 cfs (9.32 ft).

* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 8 to Apr. 23 (no gage-height record Jan. 26 to Mar. 4; discharge estimated on basis of weather records and records for Baptism River near Beaver Bay).

